

Norwegian University of Life Sciences
Faculty of Landscape and Society
Department of Urban and Regional Planning

Philosophiae Doctor (PhD)
Thesis 2021:70

Future sustainability for housing development: An eco-modernist and a degrowth scenario

Framtidig bærekraft som premiss
for boligutvikling: et øko-modernistisk
scenario og et motvekst-scenario

Silvia Mete

Future sustainability for housing development: An eco-modernist and a degrowth scenario

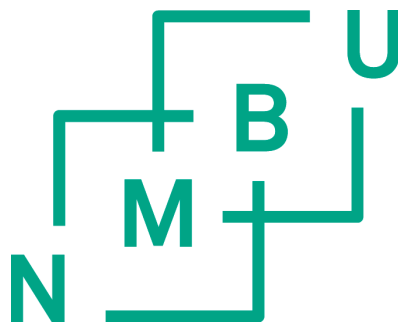
Framtidig bærekraft som premiss for boligutvikling:
et øko-modernistisk scenario og et motvekst-scenario

Philosophiae Doctor (PhD) Thesis

Silvia Mete

Norwegian University of Life Sciences
Faculty of Landscape and Society
Department of Urban and Regional Planning

Ås (2021)



Thesis number 2021:70

ISSN 1894-6402

ISBN 978-82-575-1846-2

Acknowledgements

This thesis would not have been possible without the trust, support, help and mentorship of my main supervisor Jin Xue. Her knowledge, passion for research, encouraging words, and her empathy inspired me and motivated me throughout this journey. I owe a sincere debt of gratitude to my co-supervisor Petter Naess, who was always willing to discuss with great interest, who was supportive and encouraging, and devoted meaningful guidance to my research. I wish to thank you both for trusting me and for being such inspiring supervisors along this journey.

This thesis was also written during a tough period for many of us, especially in Italy, and especially for the people I love. Finding the strength to write during those times was not easy. Again, I am grateful for my supervisors, who were supportive and close to me during those times. I hope I have been able to meet your expectations.

I would also like to thank all my colleagues who supported me, offering guidance and valuable comments. Particular thanks go to my fellow PhD colleagues: I was very lucky I had the chance to meet and share both formal and informal time together, and I am grateful for your friendship, support and laughs. Kind thanks also to the administrative personnel, for the important help and guidance during the programme, from start to completion.

Thanks to my Norwegian family, and especially to the family of Marte and Francesco, who were incredible hosts and dear friends, I will never forget your kindness. Thank you to my wonderful friends Valentina, Melissa, Carla, Elisabetta and Silvia, for your love and patience.

Special thanks to my beloved husband Audun, who has supported me, who has believed in me, and who is the person I love the most. And finally, I would like to thank my family. They are always close to me, thank you mamma Patrizia, papa' Silvio and my brother Gianluca.

Abstract

This thesis is mainly concerned with the environmental and social sustainability of housing development in affluent countries using Oslo and Milan as case studies. It aims to investigate alternative housing futures that can provide secure access to adequate housing, equal distribution and environmental sustainability. It contributes to the housing debate by suggesting the reorientation of the housing sustainability field towards integrating the social and environmental domains. This is because it finds an important gap in housing research concerning the lack of integration of the two domains and the need for more interdisciplinarity in housing research and practice.

Based on these interdisciplinarity and normative goals, this study employs two theoretical paradigms to address and design two alternative future scenarios for the housing sector in affluent Western countries and applies them in the cases of Oslo and Milan in 2030.

Furthermore, this study applies ecological modernisation and degrowth as societal paradigms to investigate the future housing development meeting the normative conditions. These two theories are normatively laden and offer an interesting base for designing future scenarios for housing development following both environmental and social sustainability. Ecological modernisation considers economic growth a lever for increasing sustainability and addresses it by proposing decoupling measures to soothe the environmental impacts emerging from growth. Degrowth represents what scholars have defined as a 'voluntary, smooth and equitable transition into a regime of lower production and consumption' (Schneider et al., 2010). Both future scenarios acknowledge environmental limits and consider social justice to avoid the environmental degradation and aggravated inequality that the current 'pro-growth housing system' entails.

This study builds on different steps with different methods and techniques. Thus, the project applies a mixed-method approach to ascertain the different research questions. The study follows the philosophical position of critical realism, which acknowledges this plurality of methods when the object of study is not well understood with a single method.

The first step is the literature review, where both meta-theoretical and theoretical approaches are used to argue for the integrated approach in housing sustainability. In the second step, two scenarios are designed following degrowth and ecological modernisation in the cases of Oslo and Milan and applying the methods borrowed from the future study field. In the third step, the study further discusses the elements from the current socio-economic structures hindering or facilitating the achievement of the paradigm shifts designed in the scenarios. It does so empirically using a gaming session based on the backcasting technique with a retroductive approach. To analyse the results of the gaming session and identify at a more structural level the hindrances or elements facilitating these shifts, the study applies a retroductive approach and relies on political economy and critical urban theories.

The study's findings indicate that future housing development, which respects ecological limits and social justice, is possible, depending on the societal framework conditions. Setting a goal, even utopian, is a step towards the creation of the right conditions to achieve sustainability in the housing sector. However, paradigm shifts can only be achieved by confronting the current conditions instead of ignoring the limitations of the current structure of society.

In particular, the dissertation points to the underlying growth mechanisms, focusing on the dynamics of the capitalist economy, and to neoliberalism's opposition to public regulations to counteract economic inequality, as an important obstacle to achieving the scenarios. In order to promote a radical scenario for degrowth in the housing sector, it is necessary to abolish the capitalist features of the current growth-based housing development.

Norsk sammendrag

Hovedtemaet for denne avhandlingen er miljømessig og sosial bærekraft i boligutviklingen i velstående land, med Oslo og Milano som casestudier. Avhandlingen undersøker alternative framtidige boligszenarioer som sikter mot å sikre en miljømessig bærekraftig boligsektor, gode nok boliger for alle, og utjevning av ulikheter i boligstandard. Avhandlingen bidrar til den akademiske og politiske boligdebatten ved å foreslå en reorientert forståelse av bærekraftig boligutvikling, med integrering av de sosiale og miljømessige dimensjonene. Dette foreslås ettersom boligforskningen i dag mangler integrering av de to dimensjonene, og fordi det er behov for mer tverrfaglighet innen både boligforskning og praksis.

For å fremme slik tverrfaglighet og de normative målene, tar denne studien utgangspunkt i to ulike teoretiske paradigmer for å utforme alternative fremtidsszenarioer for boligsektoren i velstående vestlige land, og anvender disse på Oslo og Milano i 2030.

Studien anvender øko-modernisme og motvekst som samfunnsparadigmer for å undersøke fremtidig boligutvikling som kan oppfylle de normative betingelsene. Ettersom de to teoriene er basert på ulike normative føringer, gir de et interessant grunnlag for å utforme fremtidige scenarier for boligutvikling som oppfyller kriterier for både miljømessig og sosial bærekraft. Øko-modernisme anser økonomisk vekst som en pådriver for å øke bærekraften og foreslår tiltak som kan frikoble økonomisk vekst fra negative miljøvirkninger og dermed redusere miljøbelastningen. Motvekst representerer det forskere har definert som en 'ønsket, gradvis og rettferdig overgang til et regime med lavere produksjon og forbruk' (Schneider et al., 2010). Begge fremtidsszenarioene anerkjenner at det finnes miljøgrenser og tar hensyn til sosial rettferdighet for å unngå de miljøødeleggelsene og den forverrede ulikheten dagens vekstbaserte boligsystem medfører.

Denne studien er bygd opp trinnvis ved hjelp av forskjellige metoder og teknikker. Prosjektet anvender en kombinasjon av metoder for å undersøke og besvare forskningsspørsmålene. Studien bygger på den filosofiske posisjonen kritisk realisme, som anerkjenner verdien av et slikt mangfold av metoder når undersøkelsesobjektet ikke lar seg godt belyse med en enkelt metode.

Det første trinnet er litteraturgjennomgangen, der både metateoretiske og teoretiske tilnærminger brukes til å argumentere for den integrerte tilnærmingen til bærekraft. I det andre trinnet er to scenarier utformet i henhold til motvekst og øko-modernisme for casene Oslo og Milano, ved hjelp av metoder fra forskningsfeltet framtidsstudier, 'future studies'. I det tredje trinnet drøfter studien hvilke deler av dagens sosioøkonomiske strukturer som kan hindre eller muliggjøre oppnåelse av de paradigmeskiftene scenariene forutsetter. Dette gjøres empirisk ved en rollespill-økt basert på backcasting-teknikken med en retroduktiv tilnærming. For å analysere resultatene av rollespill-økten og på et mer strukturelt nivå identifisere hindringene eller de muliggjørende elementene for disse skiftene, bruker studien en retroduktiv tilnærming og baserer seg på politisk økonomi og kritisk byteori.

Studiens funn indikerer at en fremtidig boligutvikling som oppfyller både økologiske grenser og sosial rettferdighet, kan være mulig, avhengig av de samfunnsmessige rammebetingelsene. Å sette et mål, til og med et utopisk mål, er et skritt på veien mot å skape de rette forholdene for å oppnå bærekraftig utvikling i boligsektoren. Slike paradigmeskift kan bare oppnås ved å konfrontere de nåværende forholdene i stedet for å se bort fra hvilke begrensninger dagens samfunnsstruktur utgjør. Spesielt peker avhandlingen på de underliggende vekstmekanismene, med fokus på dynamikker i den kapitalistiske økonomien, og på nyliberalismens motstand mot offentlige reguleringer for å motvirke økonomisk ulikhet, som en viktig hindring for å oppnå scenariene. For å fremme et radikalt scenario for motvekst i boligsektoren, er det nødvendig å avskaffe enkelte nyliberale trekk ved den nåværende vekstbaserte boligutviklingen.

Table of Contents

1	Introduction, background and status of knowledge.....	1
1.1	Introduction	1
1.1.1	The thesis's main theme and the importance of the topic	1
1.1.2	Problem statement	3
1.1.3	The objective of this thesis	7
1.1.4	Main research questions.....	8
1.2	Status of knowledge	9
1.2.1	The interface between the social and environmental sustainability of housing development.....	9
1.2.2	Achieving housing sustainability – a question of scale.....	13
1.2.3	Methodological gaps	15
1.3	Titles of articles and publication status	16
1.4	Structure of the thesis	17
2	Theoretical framework	18
2.1	Metatheory	18
2.2	Theories	24
2.2.1	Sustainable development	24
2.2.2	Ecological modernisation	27
2.2.3	Degrowth.....	29
2.2.4	Paradigm shifts.....	30
2.2.5	Political economy of environmental sustainability	32
2.2.6	Cities and critical urban theory	34
3	Research strategy and methodology.....	36
3.1	Philosophy of science implications for a research design	36
3.2	Research design.....	39
3.3	Data collection methods.....	41
3.3.1	Choice of case studies.....	41
3.3.2	Future studies, backcasting and CLA-gaming	42
3.4	Data analysis methods.....	45
	Quantitative analysis.....	45
	Qualitative analysis.....	46
3.5	Ethical considerations	47

4	Summary of articles	48
4.1	Article 1: Arguing for a degrowth housing development that integrates social and environmental sustainability.....	48
4.2	Article 2: Integrating environmental sustainability and social justice in housing development: Two contrasting scenarios	49
4.3	Article 3: Towards Degrowth Housing Development? Lessons from a Scenario-Based Gaming Session in the Oslo Region	50
5	Results and discussion	52
5.1	Comparing the two cases: Oslo and Milan	53
5.1.1	Environment, physical structure and technology in the two cases: Status quo, future envision and backcasting analysis	54
	Environment and the physical structure.....	54
	Technology in the housing sector	56
5.1.2	Housing distribution and social justice in the two cases: Status quo, future envision, and backcasting analysis	58
5.2	Comparing the two futures: Ecological modernisation and degrowth.....	60
5.2.1	Economy and political acceptance	60
5.2.2	Environmental technology.....	63
5.2.3	Social and environmental justice	64
5.3	Contribution to knowledge	66
5.4	Limitations and future research	68
5.4.1	Gaming session.....	68
5.4.2	Theoretical limitations	69
6	Conclusions	71
	References	74

Figures

Figure 1 Research Design.....	39
-------------------------------	----

List of articles

The thesis includes the following articles:

Article 1.

Silvia Mete

Arguing for a degrowth housing development that integrates social and environmental sustainability.

Under review in the Nordic Journal of Urban Studies.

Article 2.

Silvia Mete and Jin Xue

Integrating environmental sustainability and social justice in housing development: Two contrasting scenarios.

Published online in Progress in Planning, July 2020.

<https://doi.org/10.1016/j.progress.2020.100504>

Article 3.

Silvia Mete

Towards degrowth housing development? Lessons from a scenario-based gaming session in the Oslo region.

Accepted for publication in Local Environment Journal.

1 Introduction, background and status of knowledge

1.1 Introduction

1.1.1 The thesis's main theme and the importance of the topic

This thesis's main theme concerns the environmental and social sustainability of future housing development in affluent countries, with two specific cases of Oslo in Norway and Milan in Italy.

This thesis acknowledges the need for an environmentally sustainable future for housing development. Regarding the urban sustainability agenda, underlining how vast and important the impacts of the ideological shift towards sustainable development have been is crucial (WCED, 1987). The World commission on environment of development report (WCED, 1987) insists on the need to change the quality of growth (ibid.), stating that sustainable development requires and involves more than growth. The report also considers the needs of future generations and suggests that sharing resources must happen between and within generations. Housing, both during construction and consumption, creates several environmental impacts (Nelson, 2018). Since housing as an artefact remains over time, environmental impacts can have effects over longer periods and generations. The ecological impacts derived from housing should be acknowledged and addressed to achieve environmental sustainability within and between generations.

Regarding the social aspects of housing development, the thesis starts with the premise that access to housing is a right (UNHabitat, 2009). According to the United Nations Human Settlements Program (UNHabitat), the concept of adequate housing includes freedom and entitlements; the latter includes security of tenure, housing land and property restitution, equal and non-discriminatory access to housing, participation in housing-related decision making (UNHabitat, 2009) and a set of criteria that ensure the habitability of the dwelling. Considering housing as a right suggests that everyone should be guaranteed access to adequate housing.

The thesis takes the point of departure that future housing development should consider both environmental and social sustainability. The thesis applies ecological modernisation and degrowth as societal paradigms to design future scenarios where both environmental and social sustainability of the housing sector are possible. These two theories are normatively laden and offer an interesting base for designing future scenarios following both the environmental and social sustainability of the housing future.

Ecological modernisation considers economic growth a lever for increasing sustainability and addresses it by proposing decoupling measures to soothe the environmental impacts emerging from growth. This approach is a theory that asserts the possibility of economic growth, with decoupling measures that can reduce environmental threats (Gunnarsson - Östling & Höjer, 2011). This paradigm has been widely supported by policies at the supranational and national levels, and the local level, where plans are often developed. Regarding the social dimension, ecological modernisation mostly focuses on procedural justice, promoting participation in decision making at the local level (Gibbs, 2000). Later, ecological modernisation incorporated democratisation, redistribution and social justice in its tenets (Hajer, 1995).

Degrowth represents what scholars have defined as a 'voluntary, smooth and equitable transition to a regime of lower production and consumption' (Schneider, Kallis, & Martinez-Alier, 2010). This concept is opposed to the so-called depression due to specific financial and economic contingencies, where unplanned negative growth happens within a pre-existing growth regime (Schneider et al., 2010). Degrowth aims at reaching environmental sustainability by respecting the planetary boundaries. It also aims at reaching social sustainability by promoting equal distribution, along with a good quality of life.

The scenarios' designs are inspired by the two societal paradigms and the contextual aspects of the two metropolitan areas of Oslo and Milan. The construction of the scenarios employs approaches within the field of future studies (Section 3). The limitations and possibilities given by the present conditions to realising the most radical scenario – degrowth – were also researched empirically.

Thus, I performed a gaming session with different types of actions in the Oslo region.

We are facing big challenges in our current society, especially the different environmental and social crises arising from relative poverty and inequality issues. These aspects are also reflected in the current housing development in many affluent countries. Therefore, we need to reflect on how to handle these challenges so that future housing development can avoid violating both environmental limits and social welfare aspects. The importance of the thesis lies in employing an innovative approach to explore alternative housing development futures that aim at solving the multiple crises. In particular, the thesis explores the possibilities of pursuing an integrated understanding of housing sustainability as embracing both social and environmental dimensions.

1.1.2 Problem statement

Although contextual differences linked to the diversity of housing sectors exist, the mainstream economic paradigm for the housing sector in affluent countries can be defined as pro-growth housing or housing for growth (Nelson, 2018). Such a pro-growth paradigm entails a capitalist approach to both the production of housing units and their distribution and consumption, mainly via buying and renting. Particularly, under the neoliberal model, housing has become a major sector for the economy, and also a marketable good, prone to speculation and under market rules (Jackson & Senker, 2011). Furthermore, the housing and finance sectors are strongly intertwined (Jackson & Senker, 2011). The neoliberal doctrine states that the mechanisms provided by the market are the best vehicles for providing goods and services following people's demands (Sen, 1993). Both a consumerist approach based on personal preferences and affordability and a debt-based financial structure are at the core of the economy of the growth model in the housing sector presently in most developed countries. Keeping on the path of growth in the housing sector can present several risks and drawbacks for the environment and society.

The ecological footprint of both housing production and consumption in the pro-growth model is severe. Integral to pro-growth housing is a tendency to

increase per capita housing consumption, or how many square meters per persons are consumed. This consumption has increased in most countries. The housing sector's footprint includes both construction and operational impacts (Naess & Xue, 2016): construction impacts are derived mostly from the building phase (consumption of materials and activities during the process), whereas the operational impacts are derived from day-to-day use. Also, refurbishing or demolishing a house or parts of it causes environmental impacts. (Naess & Xue, 2016)

Furthermore, all new housing constructions have an environmental impact strongly linked to transportation needs. The transportation needs depend mostly on the location, density of the housing structure itself and the residential habits. Densification strategies have been welcomed as enablers to provide sustainable urban development, both due to their strong link with public transport policies and also for protecting natural areas and farmland against conversion into urban land (Naess, Strand, Wolday, & Stefansdottir, 2019). However, densification strategies might not be enough to respond to long-term challenges – eventually, when the potential of the building sites in the inner core will be exhausted, it will nevertheless require an expansion towards the outskirts of the city, thereby impacting rural areas and biodiversity.

Although eco-efficiency measures and decoupling strategies help in reducing housing impacts, the continuous growth promoted in the housing sector creates a very heavy load, which is difficult to compensate for in the long run (Naess & Xue, 2016). Therefore, the increase in environmental impacts raises concerns with questions of global equity – it would be fair to ask what the consequences would be if the per capita housing consumption in the world's poor countries were to reach the levels of Norway or Italy, which are the two contexts of the scenarios in the thesis. Also, what about global equity if growth in poor countries to catch up with the (growing) consumption level in rich countries is not ecologically sustainable?

Furthermore, some social consequences of the pro-growth housing paradigm exist because it considers housing a tool for profit accumulation. One phenomenon that has happened in many cities, probably fuelled by certain urban governance

strategies, concerns the financialisation of the housing market. Financialisation is shown in different ways. It is visible in the debt-based model that has reached some extremes, such as overextended loans; it is also recognisable in land-use planning, and a regime of accumulation, or rise of values that clearly shows in the housing market (Aalbers, 2016). A second phenomenon that is increasingly occurring is the internationalisation of the housing market that is occurring in many cities. Housing as a financial object attracts international investment. At different levels, financialisation and internationalisation occur within the housing markets of different cities (ibid.). The internationalisation process increases costs, overloads some areas of the city with second homes and investment objects and reduces market accessibility by the inhabitants.

The financialisation of the housing sector produces social inequalities difficult to tackle by public policies, such as the production of social housing: the investments of the public sector cannot sustain and level the inequalities produced by the marketisation of the housing stock (Camagni, 2007). The current growth model in the housing sector has allowed more people to enter it, with due geo-historical differences, by purchasing a house through a high debt (Jackson, 2009). However, this does not mean that it has increased affordability; instead, the deregulation of the mortgage market, as a tool applied to the housing sector, has encouraged credit-constrained people to bid up housing prices (Gan & Hill, 2009). This example explains how the mechanisms of housing affordability and accessibility have become complicated in the current housing sector, which is mostly marketed and finance-driven. The public sector, the only body that can regulate the housing sector, could have avoided credit-constrained buyers entering the housing market at all (Jackson & Senker, 2011) by, for example, providing housing support or social housing.

However, it has been a trend that in many European countries, the already low presence of the public sector in social investments before the 2008–2009 crisis was further reduced in its wake, inducing a risk of inequality, sharpening a situation already critical in the housing sector. This induced an increase in homelessness and difficult housing accessibility (Chamberlain & Johnson, 2013). The public sector

'retrenched' from providing social housing and investment for housing. The reasons for the scarce investment of the public sector in housing, both maintenance and production, relate to a phenomenon that is both ideological and economical. It can be easily highlighted in what Esping-Andersen (2013) called the 'retrenchment' of the public sector, which has become a quite common term to describe the welfare sector's evolution in most developed countries. 'Retrenchment' indicates that the public sector, guided by governmental policies, has reduced its expenditure on welfare allowances and housing provision. What is more, scholars have expressed doubts that housing is fully included in what we consider welfare at all (Malpass, 2008); some address it as the 'wobbly pillar of welfare'. It hints at the fact that it is the most unstable and probably less developed of all pillars, creating implications for policy making.

It is fair to say that the shortcomings deriving from the current housing market are linked to strong 'structural inequalities' that have the effect of locking people into poverty instead of easing their way out. A demonstration of this is given by the fact that difficult mobility in a 'housing career' (Kleinhans, 2003) is a clear sign of a 'poverty trap' – a person stuck in an unstable tenancy is less likely to defeat poverty (Clark, 2012). The pro-growth arguments highlight that growth might be able to elevate the status of all social groups through a trickle-down effect – this is likely to eliminate the absolute poverty. Housing studies also demonstrate that the very residential mobility that should help elevate a person's housing career is put at stake by economic contingencies and financial crises (Lawrence, 2012). Another trait of the 'poverty trap' phenomenon highlights that a person living in a poor neighbourhood is less likely to access better-paid jobs and, therefore, less likely to improve the housing condition (Galster, Quercia, & Cortes, 2000; Lawrence, 2012).

These are some of the most visible outcomes regarding the social justice of the pro-growth housing model. In conclusion, the current growth model has not yet resolved inequality, affordability and accessibility questions but has proven to create more issues. As Jackson and Senker (2011) underline, the economic growth model does not automatically provide prosperity, full employment or full housing

provision. A lack of housing accessibility eventually causes evident disparity, a rise of debts, and a vicious poverty cycle.

A future of the housing sector encompassing both social and environmental sustainability is pivotal, and I argue that acknowledging this will be an important milestone both in research and practice. Therefore, a need to explore housing futures beyond the pro-growth paradigm exists and can fulfil both social and environmental sustainability. The project argues for this interdisciplinarity across the social and environmental domains within the housing field as a platform for scenarios and change.

Based on this interdisciplinarity and the normative goal of achieving environmentally and socially sustainable housing development, this thesis employs two theoretical paradigms to address and design futures for the housing sector. Both future scenarios acknowledge the environmental limits and are concerned about social justice, aiming to avoid the environmental degradation and aggravated inequality that a 'business as usual' scenario (i.e. the pro-growth housing paradigm) would entail. The two paradigms are ecological modernisation and degrowth, and they provide the theoretical foundations for building the two empirical scenarios. These are not specifically tailored to the housing sector, but they do represent two different sustainability discourses. These were discussed and translated into the housing sector's principles.

1.1.3 The objective of this thesis

As an overarching objective, this study aims to investigate alternative housing futures that aim to secure both access to adequate housing and environmental sustainability. The study considers both ecological modernisation and degrowth as societal paradigms applied to the housing sector to construct normative, explorative future scenarios.

The thesis further includes sub-objectives:

1. This thesis aims to construct two housing development futures. Specifically, the scenarios for future housing development until 2030 are built under normative

and theoretical assumptions: normativity is derived from pre-defined future goals and the societal paradigms – ecological modernisation and degrowth.

2. The thesis aims to investigate how current socio-economic-political conditions hinder or enable transformations.
3. The study further aims to compare the two scenarios and their outcomes.

These objectives will be achieved by studying Norwegian and Italian contexts.

1.1.4 Main research questions

Based on the abovementioned problem and stated objectives, the thesis addresses this main research question:

How can future housing development in affluent Western countries encompass both environmental and social sustainability?

This main question will be answered by exploring the following sub-questions:

Why should the environmental and social dimensions be combined in housing research and policy? (Paper 1)

How can future housing scenarios encompassing both environmental sustainability and access to adequate housing be depicted from ecological modernisation and degrowth perspectives, respectively? (Paper 2)

The thesis further narrows down to the more radical degrowth scenario and aims to investigate the following:

In what ways do the current socio-economic conditions hinder or contribute to achieving a future depicted from a degrowth perspective? (Paper 3)

1.2 Status of knowledge

1.2.1 The interface between the social and environmental sustainability of housing development

This thesis focuses on sustainable housing development as a concept encompassing both environmental and social sustainability. This section will present and discuss the state-of-the-art theories, knowledge and debates within both the environmental and social spheres of housing development.

As mentioned earlier, the integration of environmental and social sustainability is pivotal in future housing development, so how has housing research so far addressed this interface? It is fair to say that, for a long time, housing research has focused separately on environmental and social issues concerning housing without much dialogue between the two domains.

Since the release of the Brundtland Commission's report (WCED, 1987), the housing research field has considered the necessity of addressing the environmental sustainability agenda. During the 1990s, scholars created the concept of sustainable housing, which handles the environmental sustainability dimension related to the economic and social domains (Brown & Bhatti, 2003; Gibson, 1994; Huby, 1998; Tosics, 2004). Regarding environmental sustainability, housing studies have often focused on building technology and design as major ways to reduce the environmental impacts of buildings (Priemus & ten Heuvelhof, 2005). Other researchers have expanded the impacts of housing on a larger spatial scale, as the emissions due to longer travel distances and high car dependency are related to low-density suburban or exurban settlements (Naess, 2012). The question of scale is pivotal in the aspects concerning the environmental sustainability of housing and is a major interest point for the thesis, which recognises the need for reflection at an urban/regional scale.

More recently, the field of sustainable housing has acknowledged the need to go beyond sole building technology solutions to minimise the environmental impacts of housing (Schweber & Leiringer, 2012). Recently, scholars have given more weight to lifestyle choices and the interaction between inhabitants and the

environment in which they live (Gatersleben, Murtagh, & Abrahamse, 2014; Moezzi & Janda, 2014; Vale & Vale, 2010). The pivotal role of the inhabitants is investigated, especially the lifestyle choices affecting domestic energy use, the importance of their values in the individual choices inducing a pro-environmental behaviour and to boost the social potential of the schemes aiming at taking actions in reducing building energy use.

After the global economic crisis in 2009, some scholars began exploring degrowth housing as a path to sustainable housing development. Acknowledging the importance of smarter designs (both technologically and architecturally) in reducing the environmental damage of housing development, scholars within the degrowth field also suggest reducing housing size and per capita consumption by introducing and extending the concepts of sufficiency, introducing a cap in consumption, or by supporting sharing initiatives (Nelson & Schneider, 2018). This is based on the argument that the 'decoupling' between environmental effects and growth in the housing sector will never be absolute (Naess & Xue, 2016).

The same body of literature states that degrowth must follow an equitable redistribution of wealth to ensure quality of life for all through the presence of strong policies and social institutions (ibid.). Changing towards this sustainable consumption endeavour in housing, according to Cohen (2021), will encounter strong inertia and require significant disruption in the fields of finance, engineering, planning and construction. The scholar (ibid.) also highlights that some of the changes towards decreasing consumption are already happening: residential preferences towards urban lifestyles, changes in work habits and co-living experiences are some examples. Such changes create a positive loop, encouraging planners and designers to adjust new housing to more sustainable alternatives. Still, affluent countries that lack significant 'shock' (ibid.) do not seem to be abandoning the path of high consumption and larger homes, although outsized homes increasingly fail to meet the needs of households (one person/single parents, etc.).

For social sustainability, the main conceptualisation includes equity and social cohesion (Dempsey, Bramley, Power, & Brown, 2011; Murphy, 2012). Particularly, Dempsey et al. (2011) underlined how social sustainability is influenced by factors

such as the built environment. Social equity responds to distributive notions of social justice (ibid.), while sustainability of communities is a wider umbrella term encompassing the healthy functioning of society itself.

It is also worth reflecting on the impacts that the housing consumption of the rich might have on the opportunities for the healthy functioning of other, less privileged communities, both nationally and internationally. On a global scale, it is fair to say that the consumption levels of the most affluent countries occupy some of the 'ecological space' of the poorest countries. Thus, in an optic of social justice across nations, the wealthier nations should limit their consumption, leaving to the poorest space for growth, which is still desirable (Xue, Arler, & Næss, 2012). Nationally, the issue of a just distribution of benefits and burdens between communities is also important, as the lack of it creates social distrust, mental and physical health issues, political upheaval and social unrest, both in the current pro-growth conditions and potentially also in a degrowth future.

Housing scholars have advocated, over the last decades, for a more integrated approach between the social and environmental domains in the conception of housing (Priemus, 2001) to promote the sustainability of the housing sector. The interdisciplinarity between the social and environmental domains of housing is now more discussed (Winston, 2014). However, especially in practice, it seems difficult to achieve a holistic and interdisciplinary sustainable housing discourse (Jones, 2012). The observed negative social impacts partially caused by environmentally sustainable housing development show the need for major integration (Hagbert & Femenías, 2016). Other examples show both the unmet social objectives of sustainable urban development (Jensen, Jørgensen, Elle, & Lauridsen, 2012) and the lack of care for the residents' needs when pursuing urban compaction as a sustainable urban strategy (Gallent, 2001).

Scholarship within the 'just sustainability' umbrella has also focused on the rising contradictions and frictions between social and environmental sustainability policies in the urban domain (Agyeman, Schlosberg, Craven, & Matthews, 2016). In some cases, social exclusion, segregation and ecological gentrification can be consequences of environmental sustainability strategies in cities, which include

densification or ecological renovation (Anguelovski et al., 2020). Considering housing projects, scholars have underlined that pro-growth-based development and planning within the neoliberal context fail to deliver social goods inclusively and equitably (Vale & Freemark, 2019).

Chiu (2002) proposed an interesting framework for integrating the social and environmental dimensions in housing sustainability. The framework highlights some important social preconditions, including the presence of equitable distribution and consumption of housing, harmony within the local communities, acceptable housing and living environment qualities and the presence of conditions to produce and consume sustainable housing. The framework provides sensible and valuable directions for an integrated housing field. It reveals the presence of existing conflicts and the need for further studies and application in practice.

Despite these attempts to integrate the social and environmental sustainability of housing development, some gaps can still be identified within the existing studies. Specifically, the majority of studies that take environmental perspectives tend to underestimate social justice in housing development. This increases the risk of inequality and reduces social cohesion. Also, fewer studies have reflected on the environmental consequences of strategies that aim at reducing housing inequalities by lifting housing standards and producing more housing. Increasing production will inflate the overall housing consumption level, which will increase the environmental burdens.

Furthermore, most of the literature addresses questions of sustainability in the housing sector only at the neighbourhood/community level (Dempsey et al., 2011) or at the building scale, especially when referring to technological measures. Often, larger-scale distribution problems at both national and urban-regional scales are unaddressed. Such a focus on the local scale is rather limited in pursuing sustainability in housing development. First, acknowledging that different scales generate different issues is pivotal. Looking at a larger spatial scale, as in the abovementioned case of the suburban and exurban settlements, shows that these settlements tend to increase car dependency, which impacts emissions, life quality of inhabitants, job opportunities, etc.

Second, issues at different scales are generated by different mechanisms and should therefore be addressed by appropriate measures that can tackle the issues. If it is true that bettering the technological standard of one building is important, other appropriate measures (improving public transport and infrastructures, proximity services, etc.) at the neighbourhood or city level can only be improved by institutions and only those that can tackle issues generated at the larger scale.

Third, issues on one scale can influence development and generate problems on other scales. As mentioned above, the consumption level of most affluent urban areas is already occupying the ecological space of others. This generative effect and the influence that our consumption level can have on others are very suggestive of the need to incorporate aspects of scale in the thesis and generally in housing research. The next section will delve into this question of scale, considering the two sustainability paradigms – degrowth and ecological modernisation.

1.2.2 Achieving housing sustainability – a question of scale

For degrowth, which aims at reducing environmental impacts by supporting reduced housing consumption, some proponents have suggested an approach based on residential decentralisation, as it implies more respectfulness of local habitats and communities (Latouche, 2009; Trainer, 2012). This eco-village vision is considered by some degrowth advocates to be an ideal degrowth settlement. Aside from the eco-village vision, other local initiatives are mentioned – co-housing and bottom-up initiatives (Nelson, 2018), along with squatting (Cattaneo & Gavalda, 2010) or urban gardening.

These punctual initiatives, along with the eco-village vision, are interesting and manage to enrich the debate. However, they all lack an urban/regional scale orientation. Some of these initiatives might be functional to the neighbourhood scale, but considering scaling them up to the urban and regional levels would result in the promotion of a low-density vision and paradoxically the use of more rural areas and the promotion of new buildings (to promote the realisation of the eco-village, for instance) in outer urban areas (Xue, 2014). The low-density approach

and the eco-village vision would create more environmental impacts, thus hindering the realisation of a sustainable future in housing development. This is the reason why the thesis considers the urban and regional contexts, especially Oslo and Milan metropolitan areas, and focuses on this in opposition to a decentralised and spatially scattered future image.

The same logic applies to the eco-modernist endeavour. Similarly, considering a green-growth experiment, maintaining the growth level in the housing sector requires constructing new buildings. This construction, necessary for large-scale decentralisation to occur, requires large amounts of land conversion into building sites. This process would impact natural areas, ecosystems and biodiversity and threaten rural areas. This aspect would risk realising a scenario that matches the environmental and social goals of sustainability in the future.

More generally, the thesis proposes future images and scenarios tailored to urban areas, scaling up issues that are often discussed more locally within the degrowth research debate. Particularly, in the degrowth debate, it recurs an anti-urban rhetoric, which is shown in the suggestion of ad-hoc degrowth strategies outside urban societies (Trainer, 2019) or in suburbia (Alexander & Gleeson, 2018). Suggesting similar measures, aside from the abovementioned scale issues, also means renouncing to tackle the difficulties of the population already living in urban areas as a form of 'escapism' (Naess, 1994). Proposing the configuration of eco-villages means re-settling part of the population. Even if this measure were viable, it would still leave all the questions emerging on the lack of sustainability in urban and regional contexts unanswered.

In this regard, this thesis attempts to reduce the gap created by the typical dichotomy of the degrowth debate between localisation and globalisation. As Buch-Hansen (2018) underlined, many initiatives that follow the degrowth endeavour have emerged locally, but an important limitation of the movement comprises a lack of impact on the 'functioning of the wider economic system'. This thesis, although limited in its reach, aims to overcome the localisation bias. Also, another gap comprises the lack of focus on deep social structures, preventing important underlying economic and social mechanisms to emerge. The thesis recognises this

gap and discusses the underlying mechanisms limiting or promoting such a shift at a wider level.

1.2.3 Methodological gaps

On this note, the discussions about futures within degrowth and housing scholarship (Schneider et al., 2013) propose pathways through employing measures and immediate actions, such as sharing options, refurbishment and education of the inhabitants to limit consumption. Although these are valuable suggestions, this thesis revolves around a different process that allows us to investigate deeper structural hindrances or enablers to such a radical shift. Using the scenario design, the gaming session based on the back-casting approach and its analysis following the existing theories, this thesis establishes an interesting methodology that has not been extensively used in housing research. What is more, the methodology, which will be expounded in Chapter 3, enables a better understanding of the 'functioning of the wider socio-economic system' (Buch-Hansen, 2018) and how it limits or encourages paradigm shifts for sustainable housing development.

This thesis also innovates housing research methodologies by introducing both serious gaming and future study methods. Housing research, with its important body of research, often reflects on path dependency and thus on the consequentiality of past policies on the present conditions. The literature is rich in arguments discussing the current housing systems, the housing markets, the mechanisms and the trends in the housing sectors of different parts of the world. The tendency, though, is to approach the concept of the future very cautiously and always with the character of recommendation. This thesis tries to dismantle this tendency by boldly approaching unexpected futures and establishing a normative goal for which to aim.

Using the gaming approach, as this thesis shows, offers great potential in housing research. It puts the participants in the condition of figuring out unexpected scenarios, and it guides them towards a significant leap into the future. This innovative method enables the participants to overcome the typical complexity of housing research with its multifaceted nature. The complexity of housing research

with its many sub-fields (housing markets, welfare, social justice and environmental sustainability) seems, for many, a limitation to the discussions about future. This thesis shows that by following a precise methodology encouraged by an open meta-theoretical basis, it is possible to envision futures and establish discussions about significant paradigm shifts without losing the complexity of housing.

Especially regarding the complexity aspect, housing scholars have also clearly highlighted the potential for a different and greater methodological contribution regarding interdisciplinarity. David Clapham states that examples of forefront housing research on interdisciplinary thinking exist, but that there is a 'wide scope for this approach in the future' (Clapham, Clark, & Gibb, 2012, p. 487). This thesis considers this suggestion and uses interdisciplinarity as a basis for the design of the future and the analysis of the results.

Methodologically, this thesis offers a different and more systematic approach to discussing future scenarios. What is more, only after doing that, it is relevant to discuss possible actions and policies. This thesis examines the potential challenges and conflicts generated by deep socio-economic structures. Studies on sustainable housing development often focus on sustainable building initiatives, compact land-use planning strategies and general measures and actions. Despite the importance of these approaches, focusing on specific housing strategies could make deep socioeconomic structures remain undetected.

1.3 Titles of articles and publication status

Article 1.

Silvia Mete

Arguing for a degrowth housing development that integrates social and environmental sustainability.

Under review in the Nordic Journal of Urban Studies.

Article 2.

Silvia Mete and Jin Xue

Integrating environmental sustainability and social justice in housing development: Two contrasting scenarios.

Published online in Progress in Planning, July 2020.

<https://doi.org/10.1016/j.progress.2020.100504>

Article 3.

Silvia Mete

Towards degrowth housing development? Lessons from a scenario-based gaming session in the Oslo region.

Accepted for publication in Local Environment Journal.

1.4 Structure of the thesis

This chapter (Introduction) discusses the main elements of the thesis – the objective, relevance of the topic, the research questions and the knowledge status. The second chapter (Theoretical Framework) includes both a meta-theoretical section and the main theories presented in the thesis (theories on sustainable development, ecological modernisation, degrowth, political economy and critical urban theory). The third chapter (Research strategy and methodology) presents the research design and the methods. The fourth chapter presents summaries of the articles in the thesis. In chapter five (Discussion), the main results of the thesis are presented and discussed, first from a cross-case perspective (Milan and Oslo) and later from a cross-future perspective (eco-modernist and degrowth scenarios). The discussion chapter also includes an overall reflection on the contribution of this thesis to the knowledge status within its topic and the limitations of the work. The sixth chapter (Conclusion) summarises the findings and the main contributions of this thesis. The three articles in this thesis are presented fully after the cover essay.

2 Theoretical framework

2.1 Metatheory

This thesis is based on a critical realist ontology for several reasons, which will be highlighted throughout this chapter. Critical realism acknowledges nature as the biggest system within which other subsystems exist – society and economy. Housing systems depend on nature, and the relationship between nature and society is inescapable, even if not constant. The way in which this relationship happens is mutable – for instance, humans relate to nature differently from the past in a very destructive way nowadays.

This relation, for the critical realist position, implies that there are environmental limits to housing development and that all the strategies taken should respect these environmental boundaries. However, it is impossible to clearly define a level beyond which housing consumption should not be increased due to concerns about social and environmental sustainability (Naess & Xue, 2016). These limits depend on contextual aspects, as the Norwegian or Italian one – for instance, a tendency to sprawl was more pronounced in the Milan case than Oslo, but Oslo shows a much higher consumption trend in housing per capita (Mete & Xue, 2020). How close or far we are from the limits also depends on values, how much environmental degradation we accept, how we value non-human nature if we are aiming at reducing global inequalities, or if we accept that these should increase and be perpetuated. Respecting the environmental limit is pivotal for this thesis and for the design of the housing scenarios, being those based on the eco-modernist or the degrowth paradigm.

This ontological position constitutes an important starting point for this thesis and for its approach to reality. Critical realism acknowledges that reality is not transparent and recognises that reality comprises more than observed or observable events. This position disagrees with other ontologies, such as

empiricism. According to critical realism, empiricism makes the fundamental error of reducing ontology to epistemology, as it reduces reality to what we can observe with our senses (Danermark, Ekström, & Karlsson, 2019). The realist ontology indicates the necessity to look under the observable surface and to investigate both generative mechanisms of the events and their underlying causal powers. However, the causal powers and generative mechanisms exist regardless of whether they produce observable events, and these events, in turn, occur independently of whether and when they might be perceived (Skrede & Hølleland, 2018).

The generative mechanisms and the causal power of things, the events and the experiences together form the three dimensions of reality – the real, the actual and the empirical (Bhaskar, 2013). The presence of the three dimensions of reality also implies that reality differs from our constructions about it. Science must be aware of this aspect and must investigate the true dimension of reality, even if our language, values and knowledge can often be obstructive or create bias. Particularly, the realist ontology shows that two objects constitute science. There is an intransitive object, derived from generative mechanisms, and it is independent of our knowledge about it, and there is a transitive dimension made by theories, which represents the connection between reality and science (Danermark et al., 2019). However, the transitive dimension is a fallible representation of intransitive reality.

This thesis benefits from researching the generative and causal mechanisms of change. This is helpful because the whole thesis revolves around scenario thinking and futures, which underlie mechanisms of change, along with the current conditions facilitating or hindering the transformations. Hence, the basic assumption that there is a mutual relation between the human sphere and the structural conditions (Naess, 2016) was central throughout the thesis work. Critical realism is also pivotal to the thesis, as it provides the tools to abstract the causal mechanisms that emerge from the three dimensions of reality (social relations, experience and actual events), which are at the foundation of housing provision (Lawson, 2012).

According to critical realism, the way the causal powers and the properties of a phenomenon function is through a plethora of levels. Reality is stratified according

to this ontology. To uncover these layers, which underlie the phenomenon we are considering, understanding causal powers is fundamental Naess (2015). Causal powers ‘emerge’ at each level, and compared to the one below, something qualitatively new can emerge (Danermark et al., 2019).

Regarding the topics covered in this thesis, there are particularly three key aspects for which a critical realist metatheory is suitable – the interdisciplinarity, aspects related to the future and change, and aspects concerning structure and agency.

Interdisciplinarity

This thesis focuses on future housing development, which is part of the wider field of housing studies, a field known for its fragmentation (Lawson, 2012) and multifaceted nature (Clapham, 2018). Studies of housing development can benefit from a philosophical position that is ontologically open to and can facilitate interdisciplinary research. An ontological perspective that takes a systematic and stratified notion of housing lays the foundation for integrating the social and environmental domains in housing development. A critical realist approach is favourable, as it recognises that the genesis of housing systems depends on the interaction of contingent and necessary social relations (Lawson, 2013).

Regarding the interdisciplinarity of the housing sector, and particularly the need for integrating the social and environmental domains for future sustainability, critical realism offers an important ontological theory. Specifically, critical realism has had several development phases that all encompass the idea that reality is layered and that there is an emergence of new elements, especially from the lower levels (Danermark et al., 2019). This is called ‘the stratification of reality’, and it is made clear in the four-planar social being ontology developed by Bhaskar (2015).

This metatheory postulates that every social event occurs on at least four planes that are dialectically interdependent:

(a) The plane of material transactions with nature, (b) the plane of social interaction between people/agents, (c) the plane of social structure proper

and (d) the plane of the stratification of the embodied personality of agents (Bhaskar et al., 2015, p. 106).

This stratification of reality reveals the complexity of social events that are visible in the social science domain. The four-planar social being ontology has, at its core, natural, ecological (material transactions with nature), psychological and social aspects, including social interaction and social structure. This model also provides some important insights into the dialectic interdependency between the planes. Regarding housing, it is important to highlight that housing is a human artefact, the construction of which consumes material, uses territory and impacts nature wholly. The physical dimension and the materiality of housing are the contact point with nature: (a) concerning housing and its socialisation elements – there are contractual aspects of housing, legal aspects and network aspects (family/friends relations). These interactions between people (b) are contextual to culture and can influence the physical form of housing and the function that it performs: the way we live in a home and with whom (inter-generational or not, a detached unit, an apartment, etc.). The social structures (c) and their relation to housing include regulatory systems, along with welfare and policies. Specifically, housing depends on rules on property rights and the distribution of property ownership. Housing relates to legislation and the apparatus of the state to maintain social order. Finally, it relates to the mode of production of society, for example, a neoliberal capitalist model or a more Keynesian one. The embodied personality of agents (d) relates to housing as the ‘inner dialogue’ (Archer, 2000, p. 10) that housing experiences might create, based on its influence on one’s life history and personality, and its effects on psychological and physical health.

Change and futures

Critical realism offers interesting insights into the concept of change, which is a pivotal aspect of this thesis. Bhaskar discussed and approached the notion and forms of change (Danermark et al., 2019). A need for a deep ontological and philosophical understanding of change was the background for such discussion. As clearly underlined by Danermark et al. (2019) change is natural within reality itself

- reality is made of turns and shifts; especially for social science, understanding change is vital.

Bhaskar has further developed the understanding of change, acknowledging that change includes addressing the concept of 'absence'. What is not there is the pushing element for change. Also, needs, especially the ones inducing the desire to have fairer and just futures for humans, show the importance of transformative praxis and change, especially in societal development. Transformative praxis and change, albeit referring to a far future, still happen within a framework and context and create a dialogue with existing structures that can enable or hinder change. As Næss (2015) explained, future actions are formed by the social structures. The social structures themselves are created by the agents' actions, and these structures often extend beyond the agents who created them in place.

Nevertheless, social structures are not fixed; they change, and they continue to exist only if they are in use. For housing, the agents of such changes might be the planners, the people using or inhabiting a space and the people who are interested in the development. Structural change may happen in a revolutionary way, but only if certain conditions are met and if the agents are forced into a paradigm shift. More often, structures change slowly and incrementally, with a strong heritage from the previous path. As Lawson underlined (2012), social structures and agents condition the transformation towards a future of the housing sector and housing provision in at least three ways. First, the cultural beliefs, housing aspirations and individualistic ideals of property ownership influence policymaking (ibid.) and more in general changes in the housing sector. Second, the material conditions – investments, materials for the building phase and availability of land – all influence changes in housing provision (ibid.). Third, the status quo, which is made up of long-established relations and routines between different agents (planners, investors, inhabitants, finance actors, etc.), is another cause influencing change, especially conditioning transformation.

Structure and agency

This thesis benefits from understanding the underlying mechanisms and engines of transformation and acknowledges the importance of structure and agency when discussing societal change. The morphogenetic approach (Archer, 2013) helps in understanding social change and its ingredients – agents (the actors involved), structures (as relations among social positions occupied by the agents, e.g., power, competition, dependence, economic structures that define positions and relations, etc.) and cultures.

Change is driven by the dynamics between the agents, structures and cultural elements: they are related but should not be conflated with each other (Porpora, 2013). Each of them has a specific distinction from the others. Also, change is more of an emergence process. Structure often poses threats and constraints to change and to the actions of the agents. Nevertheless, agents have the power to act in transforming the structure ‘elaboration’. The morphogenetic approach delves into the aspect of time. For elaboration to happen, some temporal aspects need consideration: the social structure precedes in time the action that allows transformation; also, elaboration only happens after the actions of agents, such as reproduction or transformation. Hence, structural change should be understood regarding the complexity of the elements at stake. In a problem-solving-oriented discipline such as urban planning, the stratification, derived from the four-planar social being ontology of Bhaskar, and also the conceptualisation of structure and agency, as previously underlined, clearly calls for interdisciplinarity.

Summarising the relation of this thesis with critical realism: when imagining a future for the housing sector, it is necessary to relate to it with a systematic approach. It is fundamental to avoid a reductionist approach and to envision an interdependency of domains within which human beings interact, constitute agents in the reproduction and construction of housing, and are the final recipients for the satisfaction of the most important rights and basic human needs. Critical realism represents the meta-theoretical basis of this thesis, especially because it encourages the interdisciplinarity required by complex and stratified fields, such as the housing sector, and because it also provides an understanding of the dynamics of

transformation. All those elements are identified in the scenarios designed in this thesis and made explicit, particularly in the empirical phase of the project – the gaming session designed on the case of Oslo, discussing a degrowth future for its housing sector.

2.2 Theories

2.2.1 Sustainable development

This thesis discusses changes in the housing sector targeting sustainability, both socially and environmentally. Therefore, the definition and debate behind the concepts of sustainability and sustainable development are pivotal to the project. Regarding the urban sustainability agenda, the 1987 WCED report is pivotal for this thesis, as it offers an original definition of sustainable development. The original definition stated by the Brundtland Commission at the beginning of the chapter ‘Our Common Future’ (p. 43) reads: ‘Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs’. It contains within its two key concepts:

- the concept of ‘needs’, particularly the essential needs of the world’s poor, to which overriding priority should be given;
- the idea of limitations imposed by the state of technology and social organisation on the environment’s ability to meet present and future needs. (WCED, 1987, p. 43)

Following the urban sustainability agenda, the WCED report (1987) emphasises the needs of future generations and suggests that sharing resources must happen between and within generations. Following this principle, there is a moral obligation to preserve the well-being of other species and, generally, nature (WCED, 1987, p. 52). Even if this concern is stated, there is a general and strong tendency of the report to an anthropocentric view on nature and a clear focus on enhancing economic growth, albeit with a changed quality of the growth (WCED, 1987).

In particular, it states that sustainable development requires and involves more than growth. Therefore, the WCED report asks for green growth as a pathway to sustainable development. The main aim of green growth is to reach a more equitable distribution of income, reducing the risks of economic crisis and maintaining and preserving the environmental capital. The report mentions 'reviving growth' as among the seven 'strategic presuppositions' for sustainable development (ibid.). Thus, the report is distant from indicating any form of degrowth, either economically or physically. However, it highlights a change in the content of growth – it needs to be 'less material and energy-intensive and more equitable in its impact' (WCED, 1987). It also mentions that 'consumption standards' must be adjusted to keep growth within ecological boundaries.

Since the Brundtland Commission brought the concept of sustainable development to the international agenda in 1987, it has been interpreted in different ways, and its radicalness has also been diluted. The report presents some contradictions between what is defined as sustainable development and what is proposed as an approach to sustainable development. The major limitation that this thesis also addresses is the fact that negative environmental impacts are the results of economic growth, which is nevertheless promoted by the report. Even if the concept of growth mentioned in the report remains within ecological limits in the long term, it will be impossible not to overcome the planetary boundaries. The World Commission, in the same line with eco-modernist thinking, suggests eco-efficiency and technological optimism as ways of making economic growth compatible with environmental sustainability (Naess, 2006). In the long run, a similar approach brings resource depletion, and especially for housing, it entails compromising biodiversity, consuming rural land and undermining the quality of life and resources (ibid.).

The report also shows the need to care for inter- and intra-generational justice. The concept of needs is therefore central and has an ethical and philosophical dimension in the form of human needs theories. Particularly, although needs are different according to culture, there are specific needs that are essential across cultures and must be met. The essentiality of the needs is visible in the

consequences caused by the lack of their realisation. Specifically, drawing on human needs theories (Assiter & Noonan, 2007), there are universal life necessities also defined as intrinsic needs.

Those needs include all the necessities that should be met to avoid a possibly 'objective harm'. For example, access to clean water, food and a secure dwelling. These are particularly relevant to my research. For dwellings, the person could settle for a lower standard but would still suffer from objective harm when it is totally lacking. Also, the theory of needs suggests that if a person can reinterpret the need without suffering harm, then it is considered 'need deprivation' but not 'objective harm' (Assiter & Noonan, 2007). A renowned example is the 'bow cello example' – to play the cello, a bow is required. The lack of the bow could prevent reaching a significant musical experience, but if a person can revise her interpretation of the scope or need, then no harm is caused. In this thesis, it is important to anticipate that housing and adequate housing standards belong to intrinsic human needs. The lack of it, due to several factors, even after re-interpretation of the scope or need, can cause severe distress and harm to the person.

The challenge for most cities in absorbing and replicating the concepts expressed by the WCED report (1987) is trying to combine the need for growth with environmental sustainability (Xue, 2016). These attempts have created various terms and approaches, widely used in urban planning – 'eco-metropolis green growth' is one of the examples. The sustainability results are often controversial because they are often guided by the mere need of a marketing strategy. 'Green' appeals to the new economy professionals and to some specific groups that can generate income and new jobs in the clean-tech sector, and the so-called creative class (Florida, 2014), which is what nowadays competitive cities aim for (Kahn, 2007). Scholars have also referred to the concept of an 'urban sustainability fix'. It is a strategy applied to specific urban areas that combines ecological solutions to economic growth, but it could sound more a branding operation than a true ecological shift (Martin et al., 2019). Green strategies in all their forms are part of what is called 'entrepreneurial policies' (Hall & Hubbard, 1996; Røe & Luccarelli,

2012) , which have been rising in most cities, not only those at the top of the 'global city ranking' (Hall & Hubbard, 1996; Sassen, 2011). The theoretical approach and sustainability paradigm, that has at its core the green growth concept, is 'ecological modernisation'. In the next section, the theoretical background and tenets are presented.

2.2.2 Ecological modernisation

The research delves into two main sustainability paradigms: ecological modernisation and degrowth. They represent major alternatives to the current status quo, and both point towards a future with achieved environmental sustainability. The two paradigms are grounded and funded on different theoretical bases and arguments.

The ecological modernisation paradigm has been hegemonic in the sustainability debate since the 1980s, when the theory first originated. It has kept throughout the years a stable set of tenets, which assume that economic growth and environmental and social sustainability can be reconciled (Mol & Janicke, 2009; Spaargaren, 2000). This reconciliation is viable only if a process of reform of institutions is in place. Considering the current capitalist society, its reconciliation with environmental protection requires the independence of ecological rationality and its major role in guiding economic and social policies (Mol & Spaargaren, 1993). Concurrently, the ecological rationality should not dominate other rationalities, according to the eco-modernist tenets. According to this logic, it functions as an 'ecologisation of the economy' (ibid.). To achieve eco-modernist change, several domains must concur – environmental governance, consumption and lifestyle and technological innovation.

The technological aspect is considered a major asset of the ecological modernisation paradigm. The eco-modernist paradigm sees technology and technological innovation as the key to a reconciliation of economic growth and environmental sustainability, and it promotes a betterment that happens within the market economy. With the due differences, ecological modernisation scholars share

a technological optimism for reducing the impact of our current economic growth model on the environment. The conceptualisation of different types of technologies applied to the environment has also changed within the ecological modernisation debate. It went from end-of-pipe technologies to socio-technological systems, which are more complex (Mol & Janicke, 2009).

Thus, ecological modernisation requires a major set of innovations to be efficient. Aside from technological innovation, it is crucial to be aware that solving environmental issues while remaining within market logic requires a great governance effort. It requires private actors to participate in environmental governance initiatives and decision making. It clearly requires reshaping the whole state and non-state actors' participation, and it should imply a reduction in the role of environmental authorities for better governance and a lighter bureaucracy with more innovative policy making (Huber, 2009). This last innovation can happen within different arenas, such as resources, policy discourse and rules of the game and policy coalitions (Van Tatenhove & Leroy, 2003).

However, ecological modernisation does not challenge the economic growth paradigm, but it suggests that consumers can be put in the position of making greener choices and that infrastructures can be changed to provide green services (as for energy, water, heating, etc.). Ecological modernisation does not address or focus directly on reducing material consumption but rather proposes changes in everyday consumer practices and gives consumers the enabling power of sustainable transition while simply offering the technological infrastructures for it (eco-efficiency measures and technologies for housing are a good example) or greener products to be purchased.

The reconciliation strategy, which is assumed to be a win-win game, shows the positive aspects of the eco-modernist paradigm. One of these aspects is that it is easily acceptable and shared, as it does not propose significant cuts in productions and consumptions. It puts in the middle of the debate the private sector, offering a new and more flexible environmental governance and offering the appeal of a green agenda to private actors, consumers and companies. However, even if ecological modernisation believes in this reconciliation between capitalist values and

environmental sustainability, it does not completely solve the conflict between economic growth and environmental limits and planetary boundaries.

2.2.3 Degrowth

An alternative societal paradigm to ecological modernisation is degrowth, which has a crucial difference – it challenges the growth economic model of the capitalist society. Going beyond the growth paradigm, degrowth entails a radical change in our society and a social-political and economic shift (Sekulova, Kallis, Rodríguez-Labajos, & Schneider, 2013). Degrowth endeavours to respect planetary boundaries and environmental limits, and to promote a good life, a just distribution and the satisfaction of basic needs.

Degrowth endeavours, however, are typically intended for rich countries. Limiting consumption in wealthy countries would save ‘ecological space’, allowing growth where it remains desirable – in the poorest countries (Schneider et al., 2010; Xue et al., 2012). Degrowth challenges the economic growth hegemony altogether, pointing towards the direction of a socio-political restructuring beyond the concept of growth. First, contrary to the ecological modernisation paradigm, it entails a de-commodification of nature to avoid the dominance of market-based solution. However, degrowth does not support dismantling the markets but rather defines those against all the conditions that can ensure human well-being within the environmental limits. Hence, there must be a limit to commodification and, thus, a limit to consumption.

Degrowth scholars also dispute technological optimism, which is a crucial aspect of ecological modernisation. The technological fix cannot completely decouple the effects of our consumption from the economic growth. Degrowth therefore suggests following a different path to ensure the sustainment of our lives and well-being within the planetary boundaries. It promotes and pushes towards a sufficiency strategy, which reduces the consumption level among the consumers of affluent countries. Technology remains essential, but it is an addition to the sufficiency strategy to achieve long-term sustainability. Reduction in consumption

and production is considered the main path to sustainability and is central to the degrowth paradigm.

Along with the tenets and the sufficiency strategy, degrowth aims at a different image of well-being and a shift in understanding happiness, which should be detached from materialistic means, and rather give space to other sources, such as more time to be active socially, participate in politics or enjoy family activities.

The redistribution should happen equally (Demaria, Schneider, Sekulova, & Martinez-Alier, 2013), but it poses challenges, which are arguably greater than in an ecological modernisation paradigm. Concerning degrowth, where there is a limit to production and consumption, a discussion on redistribution and justice must be in place to avoid worsened inequality (Büchs & Koch, 2017; Jackson & Victor, 2016). It is pivotal to mediate the outcomes of limiting aggregate consumption levels without proper redistribution strategies. It might entail a stronger state intervention to keep the employment level steady through work-sharing measures or other forms of income equalisation, along with eliminating financialisation and speculation in different sectors, which is a known driver of inequality.

2.2.4 Paradigm shifts

This thesis addresses questions related to change: scenarios are the concretised design of a hypothetical change, in this case, a normative future, where the transformation is positive and sustainable. Questions of change are addressed in Paper 3 via meta-theoretical mechanisms of change and transformation – those expressed by the morphogenetic approach by Archer (2013). Particularly, the empirical part of the research revolves around what can hinder or facilitate change through the backcasting approach. Reflecting on the structural hindrances, theories suggesting difficulties in promoting radical change in public policies are inspiring. According to (Pierson, 2000), it is understandable that future images and plans can resemble what the present structures look like. This is because there is a tendency for so-called ‘increasing returns’, which include the well-known concept of ‘business as usual’.

If the focus shifts specifically to what can hinder the change, apart from the tendencies described in the 'increasing return' theory or the 'path dependency' theory, we could consider the actors of change. Archer (2013) considered all individuals to be agents in some way. Some may act collectively as corporate agents. But some agents take a particular, more leading role in societal transformation. Archer referred to these agents as actors. The agents, as highlighted by Archer (ibid.), have specific causal powers and properties that might hinder or facilitate the change itself. Let us consider the example of the figure of former US president Ronald Reagan, in the transition to a post-Fordist regime, where his role was so prominent to the point that the change in regime is known as the 'Reagan revolution' (Porpora, 2013). Another example is that of 'veto players' (Tsebelis, 1995), typical of many sectors. The result of the actions of 'veto players' shows quite significantly their capacity and power to hinder change. They can also nudge to maintain the status quo, as it does not imply putting at risk their role or the interests they represent.

For paradigmatic shifts regarding this thesis, it is possible to take a step forward in the reflection. As Buch-Hansen (2018) showed, paradigm shifts are essentially rare due to the above mentioned 'path dependencies'. More generally, transformations at the institutional level never include a clean cut with the past (Buch-Hansen & Carstensen, 2021). The institutions within which political struggle happens are selective, as they might privilege certain actors or ideas – thus, they play a conservative function in preventing paradigm shifts or the establishment of new social structures. For a socio-economic paradigm to change, be it degrowth or eco-modernist, several preconditions should be in place (Buch-Hansen, 2018). First, a deep crisis, unsolvable by the existing institutions; second, the presence of an alternative project; third, an organised group united on promoting an alternative project through the existing political struggles; and fourth, wide consent around the project itself.

2.2.5 Political economy of environmental sustainability

Both the morphogenetic approach (Section 2.1) and the body of research on political change point at the mechanisms of transformation in society and in existing institutions but do not give specific directions on the underlying dynamics of the dominant social structures in our societies. To approach socio-economic change and to discuss it coherently from the degrowth and eco-modernist perspectives, this thesis has studied and included theories from the political economy of environmental and social sustainability in detail in Paper 3.

This body of research guides us to understand how the capitalist system functions as a barrier to realising the degrowth scenario in most affluent countries. Specifically, it explains the mechanisms of the market economy underlying the main traits of the pro-growth housing system in affluent countries. The current political-economic neoliberalist system is based on growth premises. Growth, along with capital accumulation, is the engine of our capitalist economies, and it is also the main trait of housing systems (Marcuse, 2012). This applies not only to a neoliberal variant of capitalism but also to Keynesian variants.

Growth itself represents a crucial root cause of ecological degradation, as it pushes the limits of the biosphere. As underlined by Fotopoulos (2007), the continuous expansion in production and consumption has been at the expense of the quality of life of both humans and other species, as it affects the climate and the state of air, water, environment and habitats. What is more, the ecological crisis affects social classes differently, putting the livelihood of the most vulnerable in our societies at more risk (Fotopoulos, 2007). It is the case for the ecological crisis and its manifestations (e.g. Hurricane Katrina) but also more generally for questions of equality or lack of it. According to Fotopoulos (*ibid.*), inequality relates to the system of the market economy, an encompassing concept of which growth is only one of the components.

Along with the ecological crisis, contemporary capitalism also has traits of social crisis, which are linked to growing inequality (Buch-Hansen, 2018), a tendency that has been more evident after the 2008 financial crisis. It is therefore natural to wonder whether both the ecological and social crises can be resolved

under the current capitalist and pro-growth premises and if any paradigm shift could be successful under these conditions.

Then, what if the paradigm shift to a long-term sustainable future would happen under the current pro-growth and capitalist premises? This is the case for forms of eco-compatible capitalism, under which eco-modernist positioning applies. As underlined by Latouche (2003), responding with 'green capitalism' or eco-compatible capitalism also appears a demanding exercise of change, as it requires much regulation to suggest measures to effectively reduce the environmental impacts. Taming capitalism towards an eco-compatible form could use Keynesian measures to push towards a more virtuous direction. However, Keynesianism is based on growth premises, which are incompatible with environmental sustainability; thus, a so-called 'green Keynesianism', detached from continuous economic growth, was imagined by Martinez-Alier (Foster, 2011). Considering a more extreme and worrisome scenario, it is possible to imagine that a so-called 'eco-fascism' could emerge, which has been criticised by scholars (Naess, 2004). This scenario would entail that one or several capitalist countries would recognise that they are running into ecological limits. As a response, they might force capitalists of the remaining world into bankruptcy, also through warfare. This would allow the remaining capitalists to still pursue accumulation and growth without being hindered by ecological limits.

When we reflect on degrowth, some scholars highlight that we cannot have reformed capitalism (Schneider et al., 2010). Even the partial acceptance of capitalism in a degrowth paradigm shift poses the biggest barrier to realising our scenario. Several scholars have argued that, for degrowth to function on a societal scale, it would necessarily need a break from the capitalist model (Buch-Hansen, 2018).

2.2.6 Cities and critical urban theory

Under capitalism, the urban space is the 'point of collision', where the benefits of the few (linked to capital accumulation and growth) collide with the needs of the most discontented groups (Harvey, 2010). Urbanisation is a process present globally and is no longer limited to 'great towns' or a single configuration of production centres (Brenner, 2009). Urbanisation is instead a process that includes more than human artefacts; it stretches out of the previous borders, and it comprises different 'investment patterns', infrastructural networks and spaces that operate similarly across the globe (Lefebvre, 2003). As Lefebvre underlined, the urbanisation process is intensifying and extending at all spatial scales. This thesis deals with urban housing, which is greatly significant in capital accumulation; therefore, critical urban theory can offer an in-depth explanation and a critical perspective.

Although the contextual aspects and geographies differ, capitalist development operates similarly, be it in the context of a small city or metropolitan area (Brenner, 2009). Hence, the theory recognises the impact of the patterns of capitalist urbanisation with their impacts on the environment, society and political-economic structures. Furthermore, always from a critical urban theory perspective, reaching equity and social justice in our cities under the current capitalist urbanisation conditions appears difficult. More important here is the difficulty in combining social justice, welfare and environmental sustainability in the housing sector.

As cities are the main arena of capital accumulation, with housing development being central, it is interesting to address critical urban theory, which focuses on urban problems and provides interesting insights that agree with the abovementioned perspective of political economy. Despite the crisis tendencies and instabilities, capitalist urban development remains mainstream. According to critical urban theory, environmental degradation and human suffering are consequences of the urban crisis caused by the drawbacks of capitalism (Harvey, 2014). Particularly, the theory mentions a three-fold crisis in the urban arena and in housing, which is directly linked to the capitalist logic. The crisis includes the increased commodification of housing (a), fuelled by the consumerist ideal of

homeownership (b) and accompanied by the retrenchment of governments from investment in public housing (c) (Marcuse, 2012). Another pillar that I added to the three-fold crisis is the high environmental impact of housing.

3 Research strategy and methodology

3.1 Philosophy of science implications for a research design

This thesis is built on different steps with different methods and techniques. Thus, the project applies a mixed-method approach to work through the different steps and research questions. The housing sector, which this thesis confronts with its environmental and social sustainability, is a multifaceted one. Both in research and practice, housing includes several components and domains, such as the economic, social and environmental components. The choice to utilise several methods, some of which are borrowed from other research fields (e.g. future studies), is functional to address different questions and to build future scenarios and discuss them.

The utility of this plurality of methods is acknowledged by the philosophical position of critical realism (Naess, 2015). Critical realism supports the use of different methods, both qualitative and quantitative, as a useful way to explain causal relations. This thesis does not aim at describing or comparing observable events but rather considers the underlying causality and mechanisms.

The implications for a research design also include three important aspects that critical realism discusses – interdisciplinarity, change and reproduction.

a) Interdisciplinarity

The interdisciplinary integration of environmental and social sustainability in housing development forms the backbone of this thesis (Paper 1). It offers both the normative background and the starting point for designing future scenarios (Paper 2). Also, with housing and planning as two multifaceted research disciplines, the call for interdisciplinarity in this thesis is fundamental. Critical realism offers a basis and support for this approach. The same applies to the presence of different levels. To

explain the emergence of mechanisms and events from one level to another, a multiplicity of disciplines should be involved (Bhaskar, Danermark, & Price, 2017). The research embraces this interdisciplinarity, both at the early stages when considering the sustainability of housing development and when analysing the results of the gaming session, where different theories were proposed to unveil the underlying mechanisms enabling or facilitating a future degrowth scenario (Paper 3). However, it is fair to mention that being an urban planner, when borrowing from theories from other disciplines (political economy and philosophy), these theories are at the limits of my competence.

b) Change

As discussed in Section 2.1, change is an important element of this thesis and is discussed widely within critical realist scholarship. For the research strategy of this thesis, this implies at least two applications – change depicted in the designing of scenarios and the analysis of the results of the gaming session with the discussion of the underlying mechanisms and the engines of transformation. The role of agents, structures and culture in this thesis is acknowledged as pivotal to change. It is encountered in the analysis of the gaming session, where the structure was broken down into the political, socio-economic, technological, built environment and cultural themes (PESTEC) table – a table where the participants filled the blocking and enabling current conditions for achieving a radical degrowth scenario (Paper 3). For the agency, I considered the participants' voices and their vested roles. Some important insights were gained when analysing the video of the gaming session, showing the agency of certain actors in the room and their power or lack in promoting change. The analysis of the results of the gaming session by structure and agency provided important guidance to acknowledge the main underlying socio-economic mechanisms standing in the way of facilitating a paradigm shift for the housing sector and its sustainability.

c) Retrodiction and retrodiction

Critical realism also offers the basis for conducting explanatory research in social science. The realist approach offers guidance in identifying the underlying

mechanisms that generate events (Danermark et al., 2019), and to examine the relation between those mechanisms. Retroduction and retrodiction are the main distinguished concepts for explanatory research in the social sciences and are often used together in explanatory research.

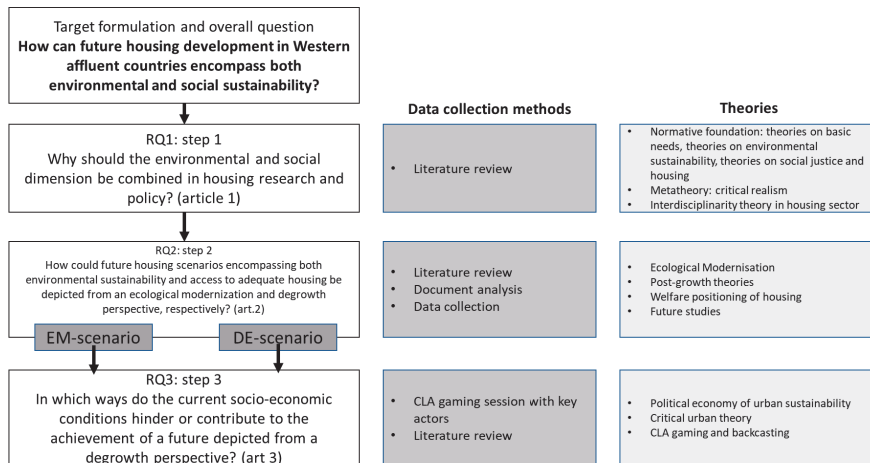
Retroduction is considered to be among the core modalities of inference in a critical realist-inspired methodology (Lawson, 2013). Retroduction is a thought process that allows one to imagine and theorise the antecedents of a 'component' (Bhaskar, 2016). This means that this process enables understanding of what is constitutive for the structures and what is related to these structures. As Danermark explained, it guides us to investigate 'what properties must exist for X to be what X is' (2019, p. 130). Also, retrodiction offers guidance in investigating the relationship between the mechanisms and structures, which are assumed to influence the phenomenon we are explaining in research. Scholars applying retrodiction can apply existing theories by comparing and developing them (Danermark et al., 2019).

This thesis applies both retroduction and retrodiction. These two stages of explanatory research underlie research question 3: *'In which ways do the current socio-economic conditions hinder or contribute to achieving a future depicted from a degrowth perspective?'* Regarding retroduction, this thesis uses a method in line with it to understand which conditions should be present to achieve the imagined future. The method is 'backcasting' (Robinson, 2003); (Svenfelt, Engström, & Svane, 2011) typically applied to retrieve the antecedents of the main component (here, the future degrowth scenario in housing development) and the necessary conditions. The backcasting method will be further discussed in the frame of the future studies research field and in Paper 3. Later, retrodiction is applied – I applied existing theories to further explain the conditions as hindrances or enablers to achieving the future scenario. This process is theoretically driven and combines both political economic and critical urban theories (Paper 3). This makes it in line with the retrodictive stage of explanatory research based on critical realism.

3.2 Research design

The project is based on a structured research design, which was a significant part of the provisional work done. The project confronts the sustainable development discourse and its paradigms (ecological modernisation and degrowth) with the housing sector. It also directly engages with the design of future housing scenarios in specific geographical contexts. It investigates which present conditions are necessary for those scenarios, and ultimately, it attempts to explain the underlying mechanisms and current structural conditions promoting or hindering radical change. A tight research design was important to answer the overall research question and to have a guiding scheme throughout the PhD project.

Figure 1 Research Design



The research design is visually explained in Figure 1, which follows the research questions, the data collection methods and the theory used in each part. The project comprises three parts, which unfold in three papers. The first paper is mainly theory-based and argumentative: under three different arguments, both meta-theoretical and theoretical, I discussed the need for interdisciplinary study of the housing sector. A second part builds a normative scenario under each of the paradigms of degrowth and ecological modernisation by applying future studies' techniques and exploring relevant theories and empirical data. To examine different contexts for implementing the scenarios, the project works with two cases, one in

Norway and one in Italy, specifically in the metropolitan areas of Oslo and Milan. Following critical realist methodology for comparative case studies (Bergene, 2007), the case study's purpose is to have a platform of data and contextual aspects to shape the scenarios and retrieve the underlying causal mechanisms concerning change, not to suggest a sole comparison of observable elements between the two cases. Both the second and third parts of the project are empirical. The third part, which corresponds to Paper 3, comprises a gaming session with key actors as contributors to the Oslo area housing sector and the results' analysis through a retrodictive theoretical analysis. Part 3 uses the backcasting method, and it deals only with the Oslo case and the degrowth scenario.

Part 3 unfolds in the preparation and realisation of a gaming session in Oslo. In November 2019, I organised an event in which I invited 10 professionals and experts from the Oslo housing sector. The gaming session was the result of a theoretical and practical preparation on the themes of gaming, on the specific causal layered analysis (CLA) techniques and on the context of Oslo. The decision to choose only one case study, Oslo, and not to replicate the session in Milan, was difficult but based on several major points. Ideally, the gaming session could have been performed in both cities, but preparing a similar event required much preparation and was time consuming (contacting the experts, preparing the game, transcribing the results and analysing them). Repeating the experiment in Milan could have been done if the project had a bigger basis and other researchers were involved too. Working empirically on the Oslo case offered the chance to unpack in detail the present conditions in the metropolitan area and left more time to analyse and research the underlying mechanisms facilitating or hindering change.

Similarly, in the Oslo gaming session, I chose to focus only on the radical scenario – degrowth. The exclusion of the eco-modernist scenario seemed necessary at the time for several reasons. The gaming session was organised after a workday, where the participants kindly agreed to join for two and half hours. The practicalities around the event excluded longer hours, and replicating the game for the same amount of time on another day for the eco-modernist scenario did not meet everyone's interest. Replicating the experiment with different or fewer

participants would not have been ideal. Similarly, compressing the experiment with both scenarios in that session would have caused losing important details on either scenario. Focusing on just degrowth was a valuable choice, as participants had enough time to familiarise themselves with an unexpected scenario, could discuss it in groups and could complete the tasks required by the game on time (Paper 3). The choice to use the radical degrowth scenario instead of ecological modernisation was guided by the theoretical results of Paper 2. The paper compares the eco-modernist and the degrowth scenarios and demonstrates as preliminary conclusions that degrowth is more effective in achieving the sustainability goals. This was among the main reasons for focusing on degrowth when considering empirical conditions. However, in this covering essay, in chapter 5, I tried covering both city cases and both scenarios, although I did not address them in each paper. This way, this thesis also covers the eco-modernist scenario in the discussion, and the Milan case too.

3.3 Data collection methods

3.3.1 Choice of case studies

In Paper 2, the two cases of Oslo in Norway and Milan in Italy were studied. The reason for this choice was to examine the two cases which could be representative of different areas in Europe. Being in Europe, there are many similarities in political and economic systems, alongside some cultural aspects, at least relative to a comparison between countries across continents. Oslo and Milan are also larger metropolitan areas which, in the later years, typically have seen population and local economic growth as the economy and the available or desired jobs are moving from secondary to tertiary sectors. Also, the common challenge of handling environmental and climate issues for European countries, which represent the rich part of the world, and the necessity of these countries to transform towards being more sustainable, makes it interesting for both cases. Concerning the housing sectors, when considering housing provision and distribution policies (Allen, 2006), both cases share a common trait of 'public retrenchment' from the housing sector. The neoliberal approach and the pro-growth housing sector have pushed towards a

more limited intervention of the public sector in providing public housing, and home ownership is the most diffused tenure form.

Furthermore, there are important factors where the two countries and the two metropolitan areas significantly diverge. On the economic aspect, Norway has experienced continuous economic growth and has had the possibility to expand public spending. Italy, however, has had fluctuating but quite still-standing economic growth and a high debt, which often forces the country to restrain public spending. The two countries also maintain different welfare regimes, a social-democratic approach in Norway, and a more 'familialistic' approach in Italy (Esping-Andersen, 2013), which has important repercussions on the housing sector, as shown in Paper 2.

The two city regions could be considered representative cases for metropolitan areas of their regions: Norway for the Nordic region and Italy for the Southern region of Europe. Comparing how the two futures, ecological modernisation and degrowth, unfold in the two city regions pictures how they can manifest differently in the two regions of Europe. Investigating the different manifestations offer clear benefits. The two cities offer important data on sustainability, which put the scenarios in real contexts. Seeing how the scenarios work, following existing data and projections, makes them more grounded and realistic, even if radical. Seeing how different cases react (through empirical or theoretical reasoning) to the stimuli offered by different scenarios is beneficial for this thesis, as it shows the major common structural elements hindering or promoting change. It also reveals the contextual aspects or those triggered by agency. Chapter 5 therefore steps further in discussing these elements by establishing a cross-case and a cross-future discussion.

3.3.2 Future studies, backcasting and CLA-gaming

The research is projected into the future and should address policies that are not yet in place. It also discusses accordingly future choices and desirable outcomes and the conditions that would allow those outcomes. There is an interesting and rich body of research working on scenario design in different fields, which span from

energy consumption to infrastructure to society and economy (Geurs & Van Wee, 2000; Gunnarsson - Östling & Höjer, 2011; Heinonen, Minkkinen, Karjalainen, & Inayatullah, 2017; Svenfelt et al., 2019). The project adopts the scenario approach as the main methodological tool and applies it to the housing sector. The research field of future studies explores methods and tools to discuss and argue for future changes and was the main learning source for the scenario design (Börjeson, Höjer, Dreborg, Ekvall, & Finnveden, 2006).

The research uses different types of scenarios, including mostly *explorative* and *normative scenarios*. The so-called *explorative scenarios* tend to respond to the question ‘*What can happen?*’ Within this category, it is possible to find strategic scenarios that help in answering the question ‘*What can happen if we act in a certain way?*’ In this case, it is useful to look especially at *normative scenarios* (Börjeson et al., 2006) . They are useful for addressing changes in a distant future and might give some space to explore different options. Among the normative scenarios, it is possible to find both *preserving scenarios* (aiming at suggesting slight changes to the current situation, maintaining the *status quo*) and *transforming scenarios* (aiming at removing the structures blocking the space for changes). Using *transforming scenarios* allows the study to investigate rather radical and unexpected futures without the typical compromises of the *preserving* ones.

In association with the normative scenarios, *backcasting* represents a way to retroductively individuate the blocking elements or enablers required to achieve specific future targets and to resolve a societal problem. As mentioned earlier in this chapter, I applied the backcasting method in a specific gaming session where several stakeholders were involved – persons belonging to institutions active in providing housing policies, private actors of the real estate sector, urban planners and architects of the Oslo area were involved. Their role in this phase was to help identify the possible steps, measures and policies to be taken, and the structural or ideological obstacles and barriers that might hinder realising the radical degrowth scenario.

The stakeholders were involved in a gaming session that followed the CLA method (Inayatullah, 2004). The method is a multi-layered gaming method, which

follows four layers already expounded in Paper 3. Layer one is the *litany* and refers to the factual aspects of the story/scenario. Layer two is the *systemic causes* and helps to individuate the causal logic between factors underlying the scenarios. These are the components of the synthesising table PESTEC, which participants in the gaming session were asked to fill in. The *worldviews* are the third layer, which focuses on the views given by the agents in the game. The last layer is *metaphors*, which include perceptions of the scenario for each agent.

The method was used in projects with a similar degree of radicality of the scenarios but focused on the transformative energy scenarios (Heinonen et al., 2017). From the outcomes of Heinonen's study, it appeared as a successful method to both illustrate a very unexpected scenario to a not-informed public and to involve the participants in the gaming session in practical tasks relating to the research questions. In my case, given both time and staff constraints, I adapted the method for easier process and response to my research questions. Hence, only the first two layers were performed in the gaming session, whereas the last two were parts of the analysis and were partially answered in Paper 3 using the video material and retrodictive work with the theories.

While the litany phase was mainly informative to the participants, the systemic cause phase was fundamental to my research. In the litany phase, I gave each participant a fictitious newspaper from the future on a random day of 2030 in Oslo. The newspaper was showing an Oslo housing sector fully based on the degrowth tenets and allowed the participants to understand the principles and the outcomes of such scenario. Later, the participants discussed in groups preparing the PESTEC table and truly performing the backcasting process. They highlighted the enabling and hindering factors for achieving the degrowth scenario under the PESTEC factors. The inputs derived from the gaming session were combined with the relevant theories within the political economy and the critical urban theory and later analysed. Involving the stakeholders in a late phase of the project after the desirable scenario had been chosen was imperative. It allowed the researcher to explore the different possibilities without being influenced by the professionals in

the early phase, not changing the content of the scenario and focusing only on the factors blocking or promoting the degrowth endeavour in the housing sector.

3.4 Data analysis methods

Quantitative analysis

In this thesis, one of the approaches utilised was to design scenarios based on the techniques offered by future studies and previously explained in this chapter. The two scenarios, the eco-modernist and degrowth, were framed in the two urban contexts – Milan and Oslo. The scenarios looked at the year 2030 and were framed to cover several aspects of the futures. Regarding the choice of year, as clarified in Paper 2, the choice was dictated by the consistency of the data for both cities and for a better reliability of the trends retrieved from the publicly available databases. Regarding the framework of the scenarios, the preliminary design work included the preparation of the distinctive traits of future housing development following the eco-modernist or the degrowth paradigms. Table 1 within Paper 2 summarises this effort and shows a division between ‘fixed elements’ – elements that are taken for the given population growth trends and ‘shifting elements’. These elements vary according to each scenario and follow the logic of the theoretical tenets of the two paradigms. They were the nature of housing (including tenure forms), consumption, technology, physical structure and distribution. All these elements vary for each scenario and in the two cases: Milan and Oslo.

To project such different futures and materialise the future according to these ‘shifting elements’ of housing development, datasets were collected from publicly available databases on residential energy consumption, housing distribution, transport and infrastructures, land use and urban density. These datasets were analysed and combined. Considering that the datasets going far back in time are influenced by many factors and that the purpose was to explore a large envelope of hypothetical scenarios, I based the extrapolation on data points close to the current date and then project a similar amount of years ahead. One main purpose of the quantitative part was to assess the impacts of the measures in ecological modernisation and degrowth scenarios. With a decided future situation, I then used

existing theories to find how each scenario could differ from a business-as-usual trajectory based on the existing knowledge about the typical magnitude of the effects of the key elements in each scenario, which were identified through earlier mixed-methods studies.

These illustrations of potential future directions were then used for qualitative discussions. For instance, the data were also used to compare the current consumption and distribution in the two different metropolitan areas and to discuss the potential factors influencing them, which include policies, culture, economic system, or economic state. The housing density trends in different areas, combined with the current policies and the confirmed urban plans, were then used to project possible housing scenarios, applying the different constraints from the hypothesised scenarios.

Qualitative analysis

The data and the assessment of the impacts of the measures paved the way for the qualitative analysis that has been conducted within Papers 2 and 3. Paper 2 offered, via theoretical reasoning, the basis for preliminary conclusions on the impacts of the measures of the two scenarios, while Paper 3 through the gaming session provided an interesting experiment on the degrowth scenario for the Oslo area. The gaming session has been crucial in providing the main results of the backcasting approach and in identifying the underlying mechanisms blocking or facilitating the achievement of the degrowth scenario designed for the Oslo area. Previously, in this chapter, I summarised the role and the steps of the game, while within this section, I briefly explained the phase of analysis of the results of the gaming session. As previously underlined, after the gaming session, I collected PESTEC tables compiled by the two groups that participated in the gaming session. The tables individuate blocks and facilitate elements at the political, economic, socio-environmental, technological and cultural levels of a degrowth scenario for the Oslo region. I further analysed the results qualitatively in light of the structure and agency theories and sorted them according to elements related to conditions specific to the housing sector and deep systemic conditions. The results are visible in Table 1 within Paper 3. This last operation paved the way for a more systematic

approach, which included an analysis through the theoretical lenses of the political economy of environmental sustainability and critical urban theory. The two theories were applied to look beyond the more superficial events or experiences derived from the gaming session and my personal bias as a researcher. The qualitative analysis applied in this process made it possible to identify some major elements blocking the achievement of the scenario.

3.5 Ethical considerations

The game session was conducted following the guidelines of the Norwegian Centre for Research Data, NSD. Participants were anonymised, and their personal data were treated confidentially. The recordings were stored confidentially, where only the research team had access (author and supervisors).

4 Summary of articles

4.1 Article 1: Arguing for a degrowth housing development that integrates social and environmental sustainability

Pro-growth housing or housing for growth, as defined by Nelson et al. (2018), is the mainstream paradigm for the housing sector of most affluent countries. Integral to the pro-growth system is the capitalist production of dwellings, alongside buying and renting within the market. Consequently, housing has become a major sector and force for the economy. One of the main challenges of the pro-growth housing systems of most affluent countries concerns the lack of integration between environmental and social sustainability in cities and metropolitan areas. This argumentative article is based primarily on theoretical reasoning and argues for a degrowth housing development that can better integrate social and environmental sustainability. The arguments are as follows: first, an ontological perspective that takes a systematic and stratified notion on housing lays the foundation for integrating the social and environmental domains in housing development; second, by analysing the current conditions of Western pro-growth housing systems, it appears that there has been little integration between the social and the environmental domain; third, environmental sustainability necessitates a decrease in the consumption level of housing per capita (degrowth), which presents social risks. To avoid social risks, it is fundamental to have housing systems where environmental and social sustainability are interconnected. The main trend in the pro-growth housing sectors of most affluent countries induces little integration between the social and the environmental domains. Policies tend to be fragmented and targeted at specific issues, with little integration between the two domains in the responses. Neglecting and underestimating the importance of integrating environmental and social aspects in housing has triggered impacts on the environment and created even more inequality. Arguments for interdisciplinarity, both in housing research and practice, make up the basis for future radical

scenarios. In particular, it strengthens the need to delineate scenarios acknowledging both social and environmental dimensions.

4.2 Article 2: Integrating environmental sustainability and social justice in housing development: Two contrasting scenarios

The article discusses futures in housing development, using the approaches from 'future studies'. The main aim is to develop scenarios able to achieve a specific normative goal: a future housing development that is both environmentally sustainable and socially just. In building up the scenarios, we draw upon two sustainable development discourses that challenge the current mainstream societal paradigm and housing development model to different degrees: Ecological Modernisation and Degrowth. The two paradigms reflect different degrees of societal change, from more conventional to radical. The scenarios are applied to the two selected cases of the Milan and Oslo metropolitan areas, exploring statistics on the contextual housing system and document analysis on planning and housing. We further qualitatively discuss, through theoretical reasoning, how the specific scenarios can take place and which challenges will be encountered and offer some preliminary conclusions.

Ecological Modernisation and Degrowth are two conceptualisations of sustainable development, which also lead to different pathways. On the environmental side, the scenarios focus on three main aspects: domestic energy consumption in the housing sector, residential land consumption at the metropolitan level and housing-related mobility. On the social side, the scenarios focus on adequate housing for all and a certain level of equalisation in housing consumption.

The article shows that all the scenarios can score successfully in terms of substantial betterment of the environmental and social aspects of housing in the future, Oslo and Milan, if certain conditions are met. Regarding the eco-modernist scenario, it ensures that technological improvement, applied to housing, leads the way to a more sustainable future. However, in the eco-modernist scenario, the

energy consumption in the building phase still has impacts, although it is reduced if eco-friendly measures are in place. The allocation of new areas for urban development burdens the environment, threatening biodiversity. Technology can reduce impacts but only to a certain level, and the reduction in domestic consumption of energy alone will not be able to cover for all the environmental impacts in a pro-growth housing sector.

A change towards a non-marketised housing sector as the one designed within the degrowth scenario would also result in a more environmentally friendly housing development. Degrowth implies a maximum cap in consumption of the residential floor area per capita. This allows for no extra growth in the existing housing stock, aside from remodelling and retrofitting operations on the buildings or replacement of old or unfavourably located dwellings. If a maximum cap to consumption is considered, there is a possibility that the current housing stock might be able to include the groups today excluded by the market mechanisms. Even though the viability of such extreme measures needs to be discussed, the degrowth scenario would rely on significant reductions in consumption to function.

4.3 Article 3: Towards Degrowth Housing Development? Lessons from a Scenario-Based Gaming Session in the Oslo Region

The article focuses on the potentials and barriers for the realisation of a degrowth scenario in housing development in the Oslo region. The point of departure is a previously designed radical degrowth scenario that depicts a future housing development that is both environmentally sustainable and socially just. The article includes both an explanation of the gaming session and the analysis on the results. Through a gaming session with housing stakeholders of the Oslo region, I investigated the current elements hindering or facilitating the degrowth scenario. The gaming session was situated within the backcasting approach. The game was developed based on the causal layered analysis technique (CLA) (Heinonen et al., 2017; Inayatullah, 2004). At the gaming session, several experts from the housing sector of Oslo were invited, including planners, practitioners from public authorities, researchers and real estate developers. The experts invited were

divided into two discussion groups after having gained information on the degrowth scenario from a fictitious newspaper from the future. They were encouraged to discuss the topics freely and to fill a table with their summarised view on the current blocking or enabling factors to achieve the degrowth future. The article puts forward the results of the gaming session, analysed through the lenses of morphogenetic theory, theory of political economy of environmental sustainability, and critical urban theory. These theories helped sort the main hindrances, especially political and socio-economic ones, to reach the suggested degrowth scenario. The results of the gaming session reveal important structural hindrances against the scenario within the current housing model, which directly depends on the socio-economic structures of capitalism. The article promotes a debate concerning housing for degrowth and a reflection on the deep socio-economic conditions for degrowth transformation. This opens up more research on the structures that currently hinder reaching a degrowth future in the housing sector and shows the need for more discussion on the deeper structures that might enable or block a radical future change in housing development.

5 Results and discussion

This thesis revolves around the possibility of reaching a future for the housing sector that encompasses both environmental and social sustainability. The focus is on Western affluent countries, particularly the Oslo metropolitan area, Norway and Milan metropolitan area, Italy. The need to reach a housing future that is sustainable on both fronts was explained in the first article of this thesis, with several arguments addressing the specific research question: ‘Why should the environmental and social dimension be combined in housing research and policy?’ The response to this question is the backbone of this thesis, especially the design of future scenarios, and it is a multifaceted answer. There is a metatheoretical dimension to it, which calls for this combination of social and environmental dimensions, and which relates to housing as a multifaceted domain, requiring a multidisciplinary and integrated approach in research and practice; there is a socio-economic-environmental claim, showing the limits of the current pro-growth housing development. Finally, always in Paper 1, I propose a claim linked to the future, showing that creating a radical change in housing development on the environmental side without considering the social dimension would provoke unexpected and rather worrisome consequences on society. Considering the degrowth paradigm shift, I also argue that a similar constraint in housing consumption without a just redistribution in place would risk worsening the condition of some. Thus, acceptable standards and the affordability of dwellings must be included to promote a just shift.

This thesis acknowledges the need for integration between the different domains of sustainability and considers it a necessary and critical condition for the design of future scenarios within the housing sector. Ecological modernisation and degrowth are the two theories shaping the scenarios, and the two future scenarios aim to reach this integration. They do it in different ways due to the tenets of each of the two theories: ecological modernisation reaches this integrated sustainability by

introducing decoupling measures boosted by technological optimism and by pursuing social justice through participatory processes to ensure that low-income groups benefit from green practices. Degrowth approaches the environmental dimension with a reduction in the per capita consumption of housing, along with technological measures to reduce the impacts of the current housing stock. It addresses social justice by redistributing housing shares from those who own the most of housing stock to those who do not, and by considering housing a right and a part of welfare. Adding to the dimension of the two theories, there are cross-case dimensions – the different contexts of the Oslo and Milan cases. The contextual and geographical aspects play a significant role in the design phase of the scenarios and later in the backcasting analysis.

This chapter comprises a cross-case discussion and a cross-futures one. The aim of this discussion is not to compare events between Oslo and Milan or the two scenarios but to investigate the underlying mechanisms promoting or acting as hindrances to a paradigm shift. Finally, this chapter aims to deepen the understanding of the topic while responding to the main research question of this thesis.

5.1 Comparing the two cases: Oslo and Milan

This thesis focuses on the Milan and Oslo metropolitan areas as contexts in which the degrowth and ecological modernisation scenarios are designed. Taking a cross-case perspective, it is possible to obtain interesting insights, always considering the geographical and contextual specificities of the two cities and countries. The way the two cities can effectively reach a future housing development encompassing both environmental and social sustainability is here summarised and expounded under elements from the status quo, the future envisioned and the backcasting analysis.

5.1.1 Environment, physical structure and technology in the two cases: Status quo, future envision and backcasting analysis

Environment and the physical structure

The Oslo and Milan city cases show similar trends in growth in average per capita housing consumption. None of the cases has adopted strong controlling measures to halt the process or slow down the increase in consumption of housing, space and energy regarding the residential sphere. Nevertheless, both cities show a growing interest in counteracting the effects of sprawling tendencies. The following paragraphs will summarise the land use policies in both cities and clarify some of the underlying mechanisms emerging from the status quo and the scenario design.

Starting with the Oslo case, regulations in protection of the main forest area and densification strategies are in place: the Planning and Building Act has since 1985 protected Marka (forest) against urban development, and the Marka border established then has remained almost completely unchanged. The regulation is supplemented by the so-called Markaloven, which protects against urban development and strengthens protection against other kinds of technical encroachments. Considering densification, it has been the main urban development strategy in Oslo since the mid-1980s, and the population density for the whole morphological city has increased by 42% from 1985 to 2020. Both regulations in protection of the main forest area and densification strategies have been able, over the past decades, to halt construction in several areas.

Regarding the counteracting measures for the effect of sprawling tendencies, mentioning Oslo's road pricing schemes is imperative (in the form of toll cordons). Originally, introduced in 1990, the toll fees have been gradually introduced and more cordons have been added. Moreover, while nearly all revenues were spent on road building in the beginning, almost the totality of the revenues within the municipality of Oslo and 70% for Oslo and Akershus combined are now, according to the latest Oslo Package (3), spent on public transport.

Still, considering all the above-mentioned measures, the municipal masterplans approved by the municipalities of the Oslo metropolitan area show a

significant increase in the residential area both in Oslo and even more in the outer municipalities. The increase in residential area is driven not only by population growth but also, considerably, by the tendency of increased consumption of floor area per capita in dwellings and non-residential buildings. This thesis demonstrates that, considering the population growth trend projected by Statistics Norway for the Oslo metropolitan area and applying high density standards (highest density standard for Oslo), as the ecological modernisation scenario suggests, it would be possible to limit the need for new residential areas by approximately one-third (from the currently planned 29 km² to circa 20 km²). In the degrowth scenario, which reduces the per capita consumption of residential floor areas, any residential area increase is avoided.

Milan also presents some tendencies to increase the spatial extension of residential areas. The residential area has steadily increased over the past 30 years, driven by the construction sector, which is one of Italy's most productive industrial sectors. This endorsement to the building sector is, according to ISPRA (2015), not accompanied by any real demographic needs for new housing. The report shows that, in the past, the link between new housing and demography was positively and stably correlated, while, today, this is no more the case. Land consumption seems to no longer have a connection with increasing population, as may still be the case in the Oslo metropolitan area. Also, in the Milan case, a significant increase in residential area has been approved by municipal plans, of which almost half will be on natural land. In the ecological modernisation scenario, by setting new density standards for those of the central areas of the city, the planned new residential areas could drop to less than half. In the degrowth scenario, which lowers the per capita consumption of housing, the need for new residential areas can be nullified or limited to specific areas in need of reclamation or better use.

Considering the two cases, it is clear that both scenarios are beneficial in reducing the environmental impacts of housing, although to different degrees and with different types of environmental impacts. However, changes suggested by degrowth require a remodulation of the housing sector: indeed, a physical remodelling of the dwellings for degrowth where housing consumption stops

growing. In a redistribution optic, bigger units would need to be divided or shared, which appears to be a hindrance for an expedite shift. Also, it is worth noting that Milan already has a lower residential floor area per capita than Oslo and so an expectancy to further reduce sqm per capita in Milan would, if one chooses to compare the two without considering other aspects, seem to have differing social impact. This social impact also pairs with the acceptance, or lack of it, of a degrowth scenario. As shown in the discussion of Paper 3, limiting per capita consumption is not easily accepted by inhabitants, as they struggle to see housing growth as one of the causes of the increase in ecological degradation, and also as they do not see a personal benefit or reward in such a shift.

Similarly, the eco-modernist scenario encounters some resistance from the inhabitants, especially when discussing more densification in low-density areas. For example, regarding Oslo, densification policies were resisted by some inhabitants when a densification plan was proposed and approved (Oslo Kommune, 2021). Reasons for this resistance might be several. Still, it shows that even an eco-modernist shift, which relies on densification strategies, often encounters hindrances that do not make for an expedite shift.

Technology in the housing sector

In both city cases, a higher building energy standard is beneficial for achieving environmental sustainability in the housing sector. This measure is common to ecological modernisation and the degrowth scenarios. But this thesis also shows that this measure has limitations, especially when not accompanied by measures to reduce per capita consumption of housing.

a) Technology Advancement: how fast can technology be to limit our consumption? At this moment, technology is improving but still struggling to decouple our impacts. Let us analyse the Oslo case. As shown in Article 2, converting the entire housing stock to the most recent building technology standards, projected to 2030, would still induce a 28% increase in total residential energy consumption. Similarly, the Milan situation shows that total residential energy consumption has increased in the decade 2008–2018. Following the normative goals set by

sustainability in the scenarios, the Milan metropolitan area would need to drastically turn around this trend, in a scenario in which neither a cap on consumption nor a reduction in residential areas is introduced – the ecological modernisation scenario. In both cases, such a large-scale implementation of new technologies to reduce energy consumption must consider social impacts, as such investments may not be affordable for all and would most probably induce an increase in housing prices, reducing housing accessibility. Coinciding with the writing of this thesis, as a measure to keep the economy growing during the COVID-19 pandemic, the Italian government introduced 110% reimbursement for housing improvements, which reduces energy consumption. It could be interesting to explore how many will use this and the reasons for understanding certain barriers when relying on technology advancement, even when supported by an immense use of public funding.

b) Both in the Milan and Oslo metropolitan areas, the sqm per person follows an increasing trend, with a higher value in the Oslo case. A rapidly growing trend in housing consumption consequently increases the energy consumption. The degrowth scenario offers an alternative to this increase in consumption, although radical, in this sense. A cap in consumption would facilitate the task of technology in limiting the impact of the existing housing stock.

In the Oslo case, stopping the increase in consumption in sqm per capita and retrofitting a small portion of the existing housing stock to the most recent building technology standards would mean cutting significantly the energy consumption. Even closer to the 0% growth of total energy consumption would decrease per capita residential consumption. Similarly, Milan would see a similar effect of a radical cap in consumption. The degrowth scenario, by limiting per capita consumption, would allow for accommodating the projected population growth within the existing housing stock. By eliminating additional housing construction, the degrowth scenario offers a chance to reduce the total energy consumption without even addressing the existing stock regarding environmental standards. Reflecting on these results across cases, it really shows that, on paper, the cap in consumption benefits both metropolitan areas in reducing energy consumption and

impacts. However, operationalising a similar endeavour in the two areas in which the housing market is very expensive and highly financialised would mean completely challenging a sector and policies encouraging housing investments. Similar reflections will follow in the across-future discussion and bring it to a more structural node – economic and political acceptance.

c) As evident from the gaming session conducted on the Oslo case about the degrowth scenario (Paper 3), the costs of technological innovation appear to be a major barrier for realising the degrowth future scenario, especially if very innovative standards need to be applied to the existing housing stock. I can plausibly assume, given the technological optimism on which eco-modernism relies, that even the ecological modernisation scenario would have high costs of technological innovation. From the backcasting analysis, this aspect appears clearly, and a similar consideration can be made on the Milan case. Regarding the costs of such renovation to upgrade environmental standards, it would sound like an excessive burden on households if no policies were in place to support it.

d) Renovations themselves, with the use of new materials and energy consumption, already constitute a big share of the impacts the housing sector has on the planet. Is it sustainable to continuously renovate to achieve higher standards? Both the cost of the renovations to apply the latest environmental standards and the impacts produced by such renovations (energy, new materials, etc.) burden the environment. Those aspects must be carefully weighed.

5.1.2 Housing distribution and social justice in the two cases: Status quo, future envision, and backcasting analysis

Both cities present tendencies typical of the pro-growth housing sector (Art.1). In both cases, the housing sector is highly financialised and presents high and rising costs to access housing. Both cities have undergone the neoliberal wave of the 1980s in which most of the public housing stock has been sold (in the Norwegian case, via the increasingly financialised role of cooperatives). Still, in both cities, housing has a status symbol value, accompanied by the typical home-ownership predominance

among the different tenure forms. In Milan, the rental market is more common than in Oslo.

In Oslo, ownership is not only a narrative (Nelson, 2018) of the pro-growth housing system but also a culture. The participants of the empirical gaming session (Art. 3, Table 1) call it the 'culture of property'. This aspect is a major hindrance, according to the backcasting analysis, to achieving either an eco-modernist or degrowth future since, according to participants, homeowners would resist changes threatening their properties. However, another aspect shows how enabling it could be to bring back some of the reminiscences of the past housing policies that Norway had in place up to the neoliberal wave of 1980s. The limit on the size of new dwellings, together with the control on price rent through financial incentives, can be a heritage to redesign new housing welfare for the future. As underlined in Article 1 (Argument nr.2), the pro-growth policy induces a skewed distribution of housing, and Oslo is not immune to this process. Scholars have pointed to the West/East division aspects, especially regarding failures to inclusion and ensuring social justice (Andersen & Skrede, 2017). Also, environmental justice fails to be met in the new developments, showing that ecological improvement is still more available for wealthy neighbourhoods than for poorer areas of the city (Røe & Luccarelli, 2012). A sustainable housing future, whether eco-modernist or degrowth, needs to overcome these unequal aspects.

In Milan, the high share of the population vulnerable or excluded altogether from the housing market severely threatens the realisation of an equitable housing future in which social justice is fulfilled. Both scenarios would need to intervene in tailoring measures to help the most vulnerable groups out of homelessness in its wide sense (Ethos classifications span from rooflessness to overcrowded dwellings and inadequate housing with low standard living). Creating incentives and regulations are the main tools in the eco-modernist toolbox. Ecological modernisation in housing needs to guarantee the role of the market without a hindrance from producing dwellings that do not meet the societal needs of the inhabitants. Some of the negative externalities can be absorbed through Keynesian policies. As a global city, Milan faces the challenges of a very unaffordable rental

sector. Hence, a rental control in specific areas could be a positive addition to an eco-modernist approach, although quite radical. As clarified in Article 2, the degrowth scenario in both cases requires a redistribution policy in place for the housing sector. A context like that of Milan, complex and burdened by several social questions related to the housing sector, needs to be carefully followed up. Reinstating a form for housing welfare, with housing becoming a right, such as health or education, is the first step in a degrowth scenario. This means enhancing the existing share of social housing, which is 9.8% in Milan, and promoting courageous move towards a redistribution of the housing stock.

5.2 Comparing the two futures: Ecological modernisation and degrowth

Both scenarios present difficulties in their realisation and viability. This is mostly due to willingness, political willingness in particular. This appears both from the backcasting analysis but has a strong back-up from political economy theory, which often underlines how intricated and bumpy the road to radical transformational change is.

5.2.1 Economy and political acceptance

Regarding political and public acceptance, the eco-modernist scenario seems to have an edge: it does not challenge the economic premises under which the current housing systems work and thrive. However, it replicates its features and promotes growth in the economy and the housing sector. This capitalist production of dwellings has consequences, as the ones mentioned consistently for the two city cases in this thesis: increase in per capita consumption of housing, increase in the total residential energy consumption, increase in the residential land areas, increase in the rent and purchase costs, etc. Concurrently, it benefits in several respects from the trickle-down effect, which considerably helps to increase the conditions of the most vulnerable groups. It also has the merits of being easier to be accepted, and at least on paper, easier to implement starting from the green-neoliberal conditions of today, both in Oslo and Milan.

Not challenging these features is a mixed blessing in the realisation of an eco-modernist scenario. There is a clear component in the successful realisation of the scenario: the public acceptance. This is an aspect that in public policies should never be underestimated. To create change swiftly, it is important to have momentum to act on political agendas and to have as few veto players as possible who could halt a process. A scenario as an eco-modernist one could easily follow the green wave initiated by both political parties (Oslo is a great example with the presence of ecologically aware progressive parties) and private actors. Similarly, in Milan, 'green growth' is appealing to both society and industry when it does not impede one's lifestyle. But is it true that an eco-modernist future is easy to implement and maintain?

A significant change in societal and economic paradigms is required, even for the eco-modernist scenario. Although it relies on the current socio-economic structures and does not challenge the pro-growth capitalist premises, the scenario requires quite some structural changes. Article 2 delves into the details of the scenario. Here, it is worth mentioning the extensive attention to technological innovation, the land-use change towards a much denser urban development, the endeavour to achieve social sustainability, and the provision of housing for all. But what does this mean for the scenario?

To put it simply, a watered-down version of the eco-modernist position will not work, as it will only reiterate growth, together with several social and environmental limitations. Thus, even ecological modernisation, which seems a step closer to the status quo, requires a vast engagement to maintain the current economic setting while acting towards eco-social sustainability. This is because the current housing sector is based on a pro-growth and capitalist system, which allows for the reproduction of wealth but increases social inequality and threatens the environment. However, even if any betterment regarding sustainability (eco-efficiency/affordability-social equality) of the current housing development sector creates positive outcomes (limit the CO₂, domestic energy consumption, reduce the land use), it still encounters the limits posed by infinite growth. Hence, an eco-modernist approach can count on positive outcomes in the near future

(optimisation/efficiency of the energy-level consumption of the housing sector via technological innovation) but would still not be sustainable in the longer run.

Also, the high degree of public coordination and control needed to realise a full-scale implementation of eco-modernist solutions would be quite extensive. Several institutional frameworks would need to exist to ensure this. However, such institutional frameworks (for example, legislation, regulations, taxation and subsidies) for changing the quality of growth are largely absent today. In addition, private enterprises, alongside many politicians, have been strong opponents of the introduction of such institutional arrangements.

Regarding political and public acceptance of the degrowth scenario, there are several limitations expounded both theoretically and empirically in Articles 2 and 3. Regarding theoretical considerations, degrowth proposes a cap in consumption for the housing sector. Although this seems a measure per se that could only be implemented for the housing sector, Article 3 shows that such a measure cannot be developed within the market logic frame of the current pro-growth housing systems. Reducing consumption is totally antithetic to the market logic. Degrowing one sector (housing) while promoting growth in all other sectors would create a skewed situation, putting at risk the work force, private capital, and development in other sectors connected to housing. Housing is entrenched in various domains (Article 1): it constitutes ca 9% of GDP growth (Nelson, 2018) in all European Union, and it absorbs labour force and capital surplus too. Dismantling or limiting its growth can harm the rest of the capitalistic economy. Therefore, from a political economy standpoint, it was fundamental for the degrowth scenario in this thesis to be not only a set of actions or reforms but also a true transformation acting at the core of the current pro-growth economy. This thesis finds that a radical degrowth shift in the housing sector cannot happen in isolation; it would require the entire socio-economic system to shift to the degrowth tenets.

As shown in the gaming session in the context of Oslo, challenging the pro-growth housing system seemed to the participants the most unsurmountable of the limits. What was called by the participants as 'capitalist-driven logic' behind the

Oslo housing sector is the elephant in the room when discussing housing for degrowth. Along with the economic implications, such a radical transformation would meet stark resistance, not only in directly involved sectors (e.g. building sector, real estate) but also from the homeowners. Since housing is a clear reward for personal success, equalising housing consumption through a maximum cap would encounter resistance from those groups who own or aspire to own luxurious dwellings.

Another difficulty in the realisation concerns the time dimension. As underlined by Buch-Hansen and Carstensen (2021), both degrowth and ecological modernisation present problems with the temporality of change. The two futures, for the sake of the validity of the data analysed, entail in this thesis a perspective to 2030. This short time perspective is also validated by the impending climate crisis, which requires actions within a shorter frame. However, I partially agree with the two scholars (Buch-Hansen & Carstensen, 2021) in suggesting that it is 'unrealistic' for both paradigm shifts to happen in a short time frame. The eco-modernist endeavour seems unrealistic in a short time because a rapid and absolute decoupling seems barely possible. The degrowth project seems unrealistic because of the high degree of socio-cultural change required (ibid.). However, this thesis shows that a pragmatic approach to both paradigms is possible, especially if applied to a specific sector, such as housing. The difficulties of a swift application of these measures are visible and expounded on in this chapter, but they should not totally overshadow the possibilities given by these scenarios.

5.2.2 Environmental technology

A full-scale implementation of eco-modernist principles is the one that the thesis discusses. This means that the implementation of this future cannot take on board or allow environmentally detrimental solutions in large parts of society, let alone housing. As shown in the cross-case discussion, ecological modernisation requires environmental and technological betterment. This means the intense and continuous use of monetary funds to address the impacts of our living standards. Limiting the reflection to the housing stock, I showed how high the impact of refurbishment needs to be to achieve a significant result within the next decade on

both the existing and the new housing stock. This has costs that private homeowners or developers will not be easily accepting. Similar measures would need to use public funds to function, with a financial operation that would be Keynesian. The latest public measures to improve the eco-standards of housing in Italy ('ecobonus') are a clear sign of this risk: the public sector funds entirely the renovation of housing, up until 110% of its costs.

Regarding degrowth, it is important to underline that cancelling the need for new buildings through the redistribution of the existing stock makes the sustainability goal of the housing sector achievable. Still, the same technological innovation as in the eco-modernist scenario is required, as the ecological performance of the dwellings needs to be improved to reduce total residential energy consumption. What is more, technological, but mostly physical change, is required by degrowth in the phase of remodelling to the extent of subdividing the bigger housing units or creating a modifiable space. Adjusting the current housing stock to be performant in the degrowth scenario to achieve the endeavour of equalising housing consumption, though limiting consumption and redistribution, is a demanding operation.

5.2.3 Social and environmental justice

A full-scale implementation of eco-modernist principles means overcoming some of today's injustices, both socially and environmentally. As Gilbert (2014) underlined, today's 'green neoliberalism' fails to improve and ecologically innovate low-income neighbourhoods, which is something that eco-modernists cannot condone or promote. A full-scale eco-modernist future promotes inclusion and participation in achieving the widest levels of sustainability and environmental justice. But this inclusion needs to be widely accepted and promoted, something that per se does not happen in a capitalist pro-growth housing system as today. In fact, it appears that reconciling eco-modernist measures at their fullest with a capitalist competitive market economy would require a high amount of political steering, along with significant monetary expenses to guide this transition, quite like degrowth in this aspect. This difficult reconciliation could per se be considered an internal contradiction of the ecological modernisation paradigm.

Like the environmental and technological aspects, in the social aspects, the ecological modernisation scenario requires a significant intervention to function. The scenario in this thesis draws on the well-known trickle-down mechanism to secure a basic satisfactory living standard for all, meaning that parts of the growth in the economy will eventually 'fall down' to the most vulnerable groups. Although, through tailored measures for reducing housing exclusion, this seems viable, in the long run, these trickle-down mechanisms increase the gap between the rich and the poor. Thus, even stronger policies need to be in place for it to work, which would again not be in line with the neoliberal political agendas applied in the two city cases. As in the technological example, even here, a Keynesian approach is required.

Regarding the degrowth scenario, housing will change its status, going from being a marketised good to being included in welfare care, as it will be a right by law. This is one of the key differences between the eco-modernist scenario and degrowth. This shift discourages and limits most forms for financialisation of the housing sector (e.g. dwellings kept as financial objects), albeit some forms might still be present. This shift facilitates the accessibility of housing, especially for vulnerable groups that today struggle to enter the housing market. However, it is questionable whether a degrowth housing future easily achieves social sustainability and promotes social justice.

In general terms, slowing the pace of growth in any sector heightens the risk for inequality (Jackson & Victor, 2016; Piketty, 2014). This is especially true when degrowth happens regarding passive degrowth, thus when the whole system is developed on the market and pro-growth logic. Degrowth under such conditions lacks some of the positive aspects that ecological modernisation offers. If the eco-modernist scenario can count on a trickle-down effect of growth to the poorer groups, the same cannot happen in degrowth, where this growth is non-existent. Hence, this thesis offers interesting insight into the conditions necessary for a degrowth scenario to be equitable. The findings from Articles 2 and 3 show that degrowth in total housing consumption threatens equality, and the very human need satisfaction, if the consumption levels of those already overconsuming housing keeps increasing. A broader wealth redistribution from the rich to the poor is the

most viable way to achieve equality in a context constrained by a limited consumption level.

5.3 Contribution to knowledge

This thesis addresses the knowledge gaps presented earlier and offers an original contribution. First, it contributes to the housing sustainability debate: it suggests reorienting it towards the integration of the social and environmental domains. This thesis covers the reasoning behind this need for integration and actively approaches metatheory to address it. It takes a strategic approach and directly focuses on designing scenarios for these dimensions of sustainability. It contributes to the social sustainability of housing by indicating the need for a major redistribution of housing towards an equalisation ensuring social justice. This is especially the case for degrowth. It also contributes to the environmental domain of housing by suggesting strategies and indicating limitations that risk the goal of environmentally sustainable housing development, along with different justice issues that can be raised in different future scenarios.

Furthermore, this thesis contributes to the degrowth field with several insights, starting from the gaps discussed in Chapter 1.3. First, this thesis attempts to discuss and propose scenarios to solve what scholars have seen as weaknesses in the degrowth debate. In particular, the lack of discussion among degrowth scholarship on what could make this paradigm shift materialise and why degrowth has been unable to become hegemonic but rather politically marginalised (Buch-Hansen, 2018). This thesis has filled these gaps, proposing a possible scenario for the housing sector, showing which conditions are necessary for the shift to happen and which are currently blocking it. This thesis does not openly discuss reasons for the marginalisation of the degrowth debate, which plausibly can be due to the growth tendencies and mechanism alongside its associated culture and politics, which make degrowth marginal.

For the degrowth debate to be sharable and acceptable, a jump towards the 'bigger scale' is fundamental. Furthermore, this thesis has shown the tendency among degrowth scholarship to resonate mostly at the local level via community-

oriented projects. Observing the macro scale through the urban scale shows the limits and possibilities of the whole degrowth project when applied to the housing sector. In particular, this thesis contributes to the discussion of housing distribution in the project of housing for degrowth. Even if the starting point for degrowth is oriented towards well-being, satisfaction of needs, and overall social justice, the application remains weak on the 'urban' and 'housing distribution' in the housing for degrowth debate. This thesis acknowledges this gap and contributes by indicating in the scenario possible redistribution dynamics for the housing sector and, consequently, the limitations of those dynamics (feasibility, political acceptance).

Regarding ecological modernisation, this thesis contributes to it by clarifying the limitations and discovers that the full realisation of the scenario and its success require a significant effort. Achieving sustainability through eco-modernist tenets requires important public investments and cohesion. Nevertheless, this thesis shows that in the housing sector, no matter how strong the eco-modernist endeavour is, if the sector keeps following the pro-growth predicament, it is impossible to have an infinite decoupling of the ecological and social impacts.

The methodology and the methods employed in this thesis represent an interesting addition and contribution to the housing scholarship. A scenario-based approach is innovative, although bold. The boldness is given by the complex dimension, the difficulty in retrieving the data and their elaboration. This thesis paints possible scenarios and proposes a method to retroductively investigate their functioning via backcasting. The serious gaming session based on the CLA technique is a valid addition, and housing research and practice can benefit from this method.

Finally, the metatheoretical and the ontological approach, under the critical realism wing, is a significant discovery for me as a researcher and housing enthusiast. It strengthened the arguments in favour of interdisciplinarity, offered the possibility of developing a broad understanding of change, helped to formulate the game via the retroduction mode, and analysed it through the retroductive use of theories. This thesis contributes methodologically by showing the possible applications of this philosophy of science position and how the housing field could

gain integrity by approaching and deepening the ontological and epistemological aspects of research.

5.4 Limitations and future research

5.4.1 Gaming session

The topic presented in this thesis is multifaceted and complex. Given the limited amount of time and resources, the project could not include three other possible gaming sessions: two gaming sessions for the Milan area and one more for the ecological modernisation scenario in Oslo. In perspective, gaining insights from these experiments could enrich the debate even more.

The gaming approach could also be further explored. As a way of efficiently and constructively generating and discussing ideas among various important stakeholders, it is a very useful tool. The use of the gaming approach in planning and policy creation could be worth a research question. Consequently, in the third paper, only barriers and enablers of degrowth were explored. This was chosen as the focus of the gaming session, and I explained the reasons for choosing only degrowth within Chapter 3. Ecological modernisation is a so-called conventional scenario by design, as it follows the present pathway and does not radically challenge the socio-economic premises. However, one could potentially explore how to further accelerate this and extend the mapping of barriers and enablers to this scenario. Interestingly, gaming participants struggled to look beyond the existing societal conditions or eco-modernist paradigm. They needed a great push in the discussion, showing both how marginalised the degrowth debate is in society and how the ecological and social crisis that would require such a shift do not seem evident for the gaming participants.

To answer the research questions, the analysis of the gaming session extensively considered what the participants' conclusions were and how they corresponded with other relevant discussions, academic, or public. It will be imperative for policy makers or planners to further explore the use of similar gaming sessions to better understand the room for manoeuvre and the potential

strategies that can induce the change that is wanted. Further research could also be done on the limits of such gaming methods and on how to design them in mitigating those limits or how to judge when or how such game sessions can be efficient.

5.4.2 Theoretical limitations

When discussing a cap for housing distribution per capita, many different national guidelines exist as to what the minimum necessary requirement is for living spaces. This differs between cultures and contexts. As examples, inviting guests home or eating out, gardening, and intergenerational living represent preferences or trends that change between cultures but can also change during a person's lifetime. Future research could expand on the matter, especially if a practical application to housing formation will be made.

Considering the data and the scenario elaboration, it is important to mention some limitations. About the building sector in general, there is a significant gap in the data on the environmental impacts of the building sector, both national and supranational. This thesis includes residential consumption per capita but has failed to include all the exceeding energy consumption for construction/renovation of housing. It is assumed that these are large contributors but are persistently left out, as is unfortunately often the case in other green energy calculations, such as electric cars or windmill plants. This would be an interesting component to investigate in future research, as it could heavily sway the discussion even further towards preserving existing constructions where possible. Also, in the construction industry, ecological modernisation is to be expected, both in the material selection and production processes. Similarly, it is also difficult to retrieve EU data on energy use for transport and mobility related to housing, which are aspects that could be further improved.

When elaborating the figures for the scenarios, the datasets found at the different national and regional statistics bureaus were often found at non-coinciding time intervals. In addition, the data were, in certain cases, given in different units or had to be converted or derived through assumptions by the author to compare the scenarios. In addition, the extrapolations do not consider the probability of

particular events, which could significantly influence the current trends. This would be far too complex regarding the scenarios.

The projections illustrate a few clean-cut scenarios and do not evaluate the sensitivity of how smaller, more realistic changes to the different variables could give different outcomes. This was purposefully done to reveal that the objective was not to paint realistic potential outcomes but to illustrate the extremes and the potentials of the different paths. By this choice, the author recognises that the results are of limited specific use but have a greater significance at the strategic level: the value of this way of thinking and designing a scenario is one of the most important contributions in this thesis, even with the limitations related to the data results.

6 Conclusions

This thesis answered the three research questions posed. *(1) Why should the environmental and social dimension be combined in housing research and policy?* In the housing sectors of affluent countries, the trend has been to give more importance to economic elements, with little integration of the social and environmental domains. Neglecting and underestimating the importance of integrating environmental and social aspects have triggered negative impacts on the environment and created more social inequality.

It is proposed that degrowth could be a plausible model in housing development to successfully integrate the environmental, social and economic domains, considering the possibility of growth-limiting measures to reduce consumption and equitable forms of redistribution. This thesis revealed the limits and potential social risks when considering such redistribution. Implementing degrowth in housing development was thus proposed following the three layers of Gowdy and O'Hara's (1997) sustainability hierarchy: nature, society, and economy. To maintain sustainable housing development, accounting for certain social conditions, such as accessibility and affordability, is imperative. These are further considered under the next research questions.

(2) How could future housing scenarios encompassing both environmental sustainability and access to adequate housing be depicted from an ecological modernisation and degrowth perspective, respectively? This thesis contributed to the research field with a relevant method for depicting future housing scenarios and evaluating their impacts by comparing the two scenarios of ecological modernisation and degrowth when applied to two different cases, Oslo and Milan metropolitan areas. Both the scenarios' potential to maintain environmental sustainability and access to adequate housing were evaluated, alongside their potential impacts. Two of the key questions posed were whether the two scenarios

by themselves are sufficient to reduce the environmental impacts in the future and whether they could address redistribution and equity. Through these questions, new insights into the limits of the two scenarios were found.

For ecological modernisation, the necessary large interventions were highlighted, where major parts of the existing building stock would have to undergo energy classification upgrades. Apart from the question of how difficult this was to implement due to the complex funding and cooperation between public and private sectors, the main issue remained that the energy classification upgrade would still induce a significant increase in consumption due to two increasing trends: population and increasing sqm per capita. This was true for both city cases, although more significant for Oslo.

Ecological modernisation could solve the basic needs of more marginalised groups and ensure process equity through participatory approaches. However, continuing with the financialised housing sector would still threaten that inequality might increase.

For degrowth, the potential challenges of compromising living standards when redistributing the housing stock were instead highlighted, and the significant cost of physical remodelling of the existing housing stock. However, degrowth would use technological advances, and it was through promoting a cap in consumption, which could nearly nullify the need for new housing (except some replacement of worn-down buildings), even considering newcomers. The effort needed was significant, although political acceptance would be difficult to achieve and require a significant socio-cultural shift.

(3) In which ways do the current socio-economic conditions hinder or contribute to the achievement of a future depicted from a degrowth perspective? This thesis identified how current socio-economic conditions may hinder or contribute to the achievement of a future when depicted from a degrowth perspective, which was achieved using an innovative approach, a gaming session, to scout the barriers and enablers in the current eco-political system. The identification was done across several dimensions, such as socio-economic, technological, cultural and political,

and also separated between whether they were of housing policy nature or of a more systemic nature. This method, involving stakeholders in the housing sector, provided valuable insights into the obstacles of a degrowth future, including regulatory, financial, social and cultural aspects (social status and culture of ownership). After the gaming session, it followed the retrodictive analysis, where the results of the gaming, read against major political economic and critical urban theories, demonstrated that one of the important barriers was the current capitalist socio-economic system, with its cultural and social repercussions.

The identification of such societal conditions as potentials or barriers to degrowth was foundational to the discussion of the steps towards degrowth in affluent countries, moving towards a more constructive approach. To promote the degrowth scenario in the housing sector, it was necessary to dismantle the capitalist socio-economic system in which pro-growth housing development found place. However, it is important, in my opinion, to move beyond the so-called 'deconstructive phase' in which the dominant discourses are critique of the main neoliberal and capitalist project (Buch-Hansen, 2018). It is pivotal to move towards a more 'constructive' one, where it is possible to gain enough support to pave the way for a paradigm shift. This thesis revealed that a scenario-based approach offers interesting possibilities to be constructive in closely observing a specific sector, such as housing in this case, to overcome the abstraction of the theoretical tenets of ecological modernisation and degrowth while considering the urban scale. Thesis hopefully aims to open a discussion in this sense in future research and to propose an innovative approach for housing sustainability in research and practice.

References

- Agyeman, J., Schlosberg, D., Craven, L., & Matthews, C. (2016). Trends and directions in environmental justice: From inequity to everyday life, community, and just sustainabilities. *Annual Review of Environment and Resources*, 41.
- Alexander, S., & Gleeson, B. (2018). *Degrowth in the suburbs: A radical urban imaginary*: Springer.
- Allen, J. (2006). Welfare regimes, welfare systems and housing in Southern Europe. *European Journal of Housing Policy*, 6(3), 251-277.
- Andersen, B., & Skrede, J. (2017). Planning for a sustainable Oslo: the challenge of turning urban theory into practice. *Local Environment*, 22(5), 581-594.
- Anguelovski, I., Brand, A. L., Connolly, J. J., Corbera, E., Kotsila, P., Steil, J., . . . Baró, F. (2020). Expanding the boundaries of justice in urban greening scholarship: toward an emancipatory, antisubordination, intersectional, and relational approach. *Annals of the American Association of Geographers*, 110(6), 1743-1769.
- Archer, M. S. (2000). *Being human: The problem of agency*: Cambridge University Press.
- Archer, M. S. (2013). *Social morphogenesis*: Springer Science & Business Media.
- Assiter, A., & Noonan, J. (2007). Human needs: a realist perspective. *Journal of Critical Realism*, 6(2), 173-198.
- Bergene, A. (2007). Towards a critical realist comparative methodology: Context-sensitive theoretical comparison. *Journal of Critical Realism*, 6(1), 5-27.
- Bhaskar, R. (2013). *A realist theory of science*: Routledge.
- Bhaskar, R. (2016). *Enlightened common sense: The philosophy of critical realism*: Routledge.
- Bhaskar, R., Danermark, B., & Price, L. (2017). *Interdisciplinarity and wellbeing: a critical realist general theory of interdisciplinarity*: Taylor & Francis.
- Bhaskar, R., Esbjörn-Hargens, S., Hedlund, N., & Hartwig, M. (2015). *Metatheory for the twenty-first century: Critical realism and integral theory in dialogue*: Routledge.
- Brenner, N. (2009). What is critical urban theory? *City*, 13(2-3), 198-207. doi:10.1080/13604810902996466
- Brown, T. I. M., & Bhatti, M. (2003). Whatever Happened to 'Housing and the Environment'? *Housing studies*, 18(4), 505-515. doi:10.1080/02673030304253
- Buch-Hansen, H. (2018). The Prerequisites for a Degrowth Paradigm Shift: Insights from Critical Political Economy. *Ecological Economics*, 146, 157-163. doi:<https://doi.org/10.1016/j.ecolecon.2017.10.021>
- Buch-Hansen, H., & Carstensen, M. B. (2021). Paradigms and the political economy of ecopolitical projects: Green growth and degrowth compared. *Competition & Change*, 1024529420987528.
- Büchs, M., & Koch, M. (2017). *Postgrowth and wellbeing: challenges to sustainable welfare*: Springer.

- Börjeson, L., Höjer, M., Dreborg, K.-H., Ekvall, T., & Finnveden, G. (2006). Scenario types and techniques: towards a user's guide. *Futures*, 38(7), 723-739.
- Camagni, R. (2007). Il finanziamento della città pubblica. Baioni M. e Caudo G., La costruzione della città pubblica, Milano.
- Cattaneo, C., & Gavaldà, M. (2010). The experience of rurban squats in Collserola, Barcelona: what kind of degrowth? *Journal of Cleaner Production*, 18(6), 581-589.
- Chamberlain, C., & Johnson, G. (2013). Pathways into adult homelessness. *Journal of Sociology*, 49(1), 60-77. doi:<https://doi.org/10.1177/1440783311422458>
- Chiu, R. L. (2002). Social equity in housing in the Hong Kong special administrative region: A social sustainability perspective. *Sustainable development*, 10(3), 155-162. doi:<https://doi.org/10.1002/sd.186>
- Clapham, Clark, A., & Gibb, K. (2012). *The Sage handbook of housing studies*: Sage.
- Clapham, D. (2018). Housing Theory, Housing Research and Housing Policy. *Housing, Theory and Society*, 35(2), 163-177. doi:10.1080/14036096.2017.1366937
- Clark, W. A. (2012). Residential mobility and the housing market. *The SAGE Handbook of Housing Studies*, 66-83.
- Cohen, M. J. (2021). New Conceptions of Sufficient Home Size in High-Income Countries: Are We Approaching a Sustainable Consumption Transition? *Housing, Theory and Society*, 38(2), 173-203. doi:10.1080/14036096.2020.1722218
- Danermark, B., Ekström, M., & Karlsson, J. C. (2019). *Explaining society: Critical realism in the social sciences*: Routledge.
- Demaria, F., Schneider, F., Sekulova, F., & Martinez-Alier, J. (2013). What is degrowth? From an activist slogan to a social movement. *Environmental Values*, 22(2), 191-215.
- Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable development*, 19(5), 289-300. doi:10.1002/sd.417
- Esping-Andersen, G. (2013). *The three worlds of welfare capitalism*: John Wiley & Sons.
- Florida, R. (2014). *The Rise of the Creative Class--Revisited: Revised and Expanded*: Basic Books (AZ).
- Foster, J. B. (2011). Capitalism and degrowth: an impossibility theorem. *Monthly Review*, 62(8), 26-33.
- Fotopoulos, T. (2007). Is degrowth compatible with a market economy? *The international journal of inclusive democracy*, 3(1), 1-16.
- Gallent, N. (2001). Housing, homes and social sustainability. *Planning for a Sustainable Future*, 115.
- Galster, G. C., Quercia, R. G., & Cortes, A. (2000). Identifying neighborhood thresholds: An empirical exploration. *Housing Policy Debate*, 11(3), 701-732. doi:<https://doi.org/10.1080/10511482.2000.9521383>
- Gan, Q., & Hill, R. J. (2009). Measuring housing affordability: Looking beyond the median. *Journal of Housing economics*, 18(2), 115-125. doi:<https://doi.org/10.1016/j.jhe.2009.04.003>
- Gatersleben, B., Murtagh, N., & Abrahamse, W. (2014). Values, identity and pro-environmental behaviour. *Contemporary Social Science*, 9(4), 374-392. doi:<https://doi.org/10.1080/21582041.2012.682086>

- Geurs, K., & Van Wee, B. (2000). Backcasting as a tool to develop a sustainable transport scenario assuming emission reductions of 80-90%. *Innovation: The European Journal of Social Science Research*, 13(1), 47-62.
- Gibbs, D. (2000). Ecological modernisation, regional economic development and regional development agencies. *Geoforum*, 31(1), 9-19.
- Gibson, M. S. (1994). *Housing and the environment: A new agenda*: Chartered Institute of Housing.
- Gilbert, L. (2014). Social Justice and the "Green" City. *urbe. Revista Brasileira de Gestão Urbana*, 6(2), 158-169.
- Gowdy, J., & O'Hara, S. (1997). Weak sustainability and viable technologies. *Ecological Economics*, 22(3), 239-247. doi:[https://doi.org/10.1016/S0921-8009\(97\)00093-1](https://doi.org/10.1016/S0921-8009(97)00093-1)
- Gunnarsson - Östling, U., & Höjer, M. (2011). Scenario planning for sustainability in Stockholm, Sweden: environmental justice considerations. *International Journal of Urban and Regional Research*, 35(5), 1048-1067.
- Hagbert, P., & Femenías, P. (2016). Sustainable homes, or simply energy-efficient buildings? *Journal of Housing and the Built Environment*, 31(1), 1-17. doi:10.1007/s10901-015-9440-y
- Hajer, M. A. (1995). *The politics of environmental discourse: ecological modernization and the policy process*: Clarendon Press Oxford.
- Hall, T., & Hubbard, P. (1996). The entrepreneurial city: new urban politics, new urban geographies? *Progress in human geography*, 20(2), 153-174.
- Harvey, D. (2010). *Social justice and the city* (Vol. 1): University of Georgia Press.
- Harvey, D. (2014). *Seventeen contradictions and the end of capitalism*: Oxford University Press, USA.
- Heinonen, S., Minkinen, M., Karjalainen, J., & Inayatullah, S. (2017). Testing transformative energy scenarios through causal layered analysis gaming. *Technological Forecasting and Social Change*, 124, 101-113.
- Huber, J. (2009). Ecological modernisation: Beyond scarcity and bureaucracy. *The Ecological Modernisation Reader*, 42-55.
- Huby, M. (1998). *Social policy and the environment*: Open Univ Pr.
- Inayatullah, S. (2004). Causal layered analysis: Theory, historical context, and case studies. In *The causal layered analysis reader: Theory and case studies of an integrative and transformative methodology* (pp. 1-52): Tamkang University Press.
- ISPRA. (2015). Consumo di suolo in Italia. In: Rapporto.
- Jackson, T. (2009). Beyond the growth economy. *Journal of industrial ecology*, 13(4), 487-490.
- Jackson, T., & Senker, P. (2011). Prosperity without growth: Economics for a finite planet. *Energy & Environment*, 22(7), 1013-1016.
- Jackson, T., & Victor, P. A. (2016). Does slow growth lead to rising inequality? Some theoretical reflections and numerical simulations. *Ecological Economics*, 121, 206-219.
- Jensen, J. O., Jørgensen, M. S., Elle, M., & Lauridsen, E. H. (2012). Has social sustainability left the building? The recent conceptualization of "sustainability" in Danish buildings. *Sustainability: Science, practice and policy*, 8(1), 94-105. doi:10.1080/15487733.2012.11908088

- Jones, P. (2012). Housing: From Low Energy. In *The SAGE Handbook of Housing Studies* (pp. 327).
- Kahn, M. E. (2007). *Green cities: urban growth and the environment*: Brookings Institution Press.
- Kleinhans, R. (2003). Displaced but still moving upwards in the housing career? Implications of forced residential relocation in the Netherlands. *Housing studies*, 18(4), 473-499. doi:<https://doi.org/10.1080/02673030304248>
- Latouche, S. (2003). Would the West actually be happier with less? The world downscaled. *Le Monde Diplomatique*.
- Latouche, S. (2009). *Farewell to growth: Polity*.
- Lawrence, R. (2012). The SAGE Handbook of Housing Studies. In. doi:10.4135/9781446247570
- Lawson, J. (2012). A review of structurally inspired approaches in housing studies—concepts, contributions and future perspectives. *The SAGE Handbook of Housing Studies*, 188-205.
- Lawson, J. (2013). *Critical realism and housing research*: Routledge.
- Lefebvre, H. (2003). *The urban revolution*: U of Minnesota Press.
- Malpass, P. (2008). Housing and the new welfare state: Wobbly pillar or cornerstone? *Housing studies*, 23(1), 1-19.
- Marcuse, P. (2012). A critical approach to solving the housing problem. In *Cities for people, not for profit: Critical urban theory the right to the city* (pp. 215-230).
- Martin, C., Evans, J., Karvonen, A., Paskaleva, K., Yang, D., & Linjordet, T. (2019). Smart-sustainability: A new urban fix? *Sustainable cities and society*, 45, 640-648.
- Mete, S., & Xue, J. (2020). Integrating environmental sustainability and social justice in housing development: two contrasting scenarios. *Progress in Planning*, 100504.
- Moezzi, M., & Janda, K. B. (2014). From “if only” to “social potential” in schemes to reduce building energy use. *Energy Research & Social Science*, 1, 30-40. doi:<https://doi.org/10.1016/j.erss.2014.03.014>
- Mol, A. P., & Janicke, M. (2009). The origins and theoretical foundations of ecological modernisation theory. In *The Ecological Modernisation Reader. Environmental Reform in Theory and Practice*. (pp. 17-27): Routledge.
- Mol, A. P., & Spaargaren, G. (1993). Environment, modernity and the risk-society: the apocalyptic horizon of environmental reform. *International sociology*, 8(4), 431-459.
- Murphy, K. (2012). The social pillar of sustainable development: a literature review and framework for policy analysis. *Sustainability: Science, practice and policy*, 8(1), 15-29.
- Naess, P. (1994). Normative planning theory and sustainable development. *Scandinavian Housing and Planning Research*, 11(3), 145-167.
- Naess, P. (2004). Live and let die: the tragedy of Hardin's social Darwinism. *Journal of Environmental Policy & Planning*, 6(1), 19-34.
- Naess, P. (2006). Unsustainable growth, unsustainable capitalism. *Journal of Critical Realism*, 5(2), 197-227.
- Naess, P. (2012). Urban form and travel behavior: Experience from a Nordic context. *Journal of Transport and Land use*, 5(2), 21-45.

- Naess, P. (2015). Critical realism, urban planning and urban research. *European planning studies*, 23(6), 1228-1244.
- Naess, P. (2016). Built environment, causality and urban planning. *Planning Theory & Practice*, 17(1), 52-71.
- Naess, P., Strand, A., Wolday, F., & Stefansdottir, H. (2019). Residential location, commuting and non-work travel in two urban areas of different size and with different center structures. *Progress in Planning*. doi:<https://doi.org/10.1016/j.progress.2017.10.002>
- Naess, P., & Xue, J. (2016). Housing standards, environmental sustainability and social welfare. *Crisis System: A Critical Realist and Environmental Critique of Economics and the Economy*; Næss, P., Høyer, KG, Bhaskar, R., Price, L., Eds, 130-149.
- Nelson, A. (2018). *Small is Necessary : Shared Living on a Shared Planet*. PB - Pluto Press.
- Nelson, A., & Schneider, F. (2018). *Housing for degrowth: Principles, models, challenges and opportunities*: Routledge.
- Oslo Kommune. (2021). Revisjon av småhusplanen. Retrieved from <https://www.oslo.kommune.no/slik-bygger-vi-oslo/revisjon-av-smahusplanen/#gref>
- Pierson, P. (2000). Increasing returns, path dependence, and the study of politics. *American political science review*, 94(2), 251-267.
- Piketty, T. (2014). *Capital in the 21st century*. Cambridge, Mass.: Harvard University Press.
- Porpora, D. V. (2013). Morphogenesis and social change. In *Social morphogenesis* (pp. 25-37): Springer.
- Priemus, H. (2001). The wider goals of housing policy in the 21st century. (1/2001), 4-5.
- Priemus, H., & ten Heuvelhof, E. (2005). The long way to sustainable housing areas. In: SAGE Publications Sage UK: London, England.
- Robinson, J. (2003). Future subjunctive: backcasting as social learning. *Futures*, 35(8), 839-856.
- Røe, P. G., & Luccarelli, M. (2012). *Green Oslo: Visions, Planning and Discourse (Urban Planning and Environment)*: Ashgate Publishing Group.
- Sassen, S. (2011). *Cities in a world economy*: Sage Publications.
- Schneider, F., Kallis, G., & Martinez-Alier, J. (2010). Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. Introduction to this special issue. *Journal of Cleaner Production*, 18(6), 511-518.
- Schneider, F., Martinez-Alier, J., Asara, V., Schaefer, B., Sekulova, F. J. B. p. e. p. o., & open research questions, n. M. k. b. e. o. S. H., Barcelona. (2013). Sustainable housing in a post-growth Europe. 6-7.
- Schweber, L., & Leiringer, R. (2012). Beyond the technical: a snapshot of energy and buildings research. *Building Research & Information*, 40(4), 481-492. doi:<https://doi.org/10.1080/09613218.2012.675713>
- Sekulova, F., Kallis, G., Rodríguez-Labajos, B., & Schneider, F. (2013). Degrowth: from theory to practice. *Journal of Cleaner Production*, 38, 1-6.
- Sen, A. (1993). Markets and freedoms: achievements and limitations of the market mechanism in promoting individual freedoms. *Oxford Economic Papers*, 519-541.
- Skrede, J., & Hølleland, H. (2018). Uses of Heritage and beyond: Heritage Studies viewed through the lens of Critical Discourse Analysis and Critical Realism. *Journal of Social Archaeology*, 18(1), 77-96.

- Spaargaren, G. (2000). Ecological modernization theory and the changing discourse on environment and modernity. *Environment and global modernity*, 41-71.
- Svenfelt, Å., Alfredsson, E. C., Bradley, K., Fauré, E., Finnveden, G., Fuehrer, P., . . . Malmqvist, T. (2019). Scenarios for sustainable futures beyond GDP growth 2050. *Futures*, 111, 1-14.
- Svenfelt, Å., Engström, R., & Svane, Ö. (2011). Decreasing energy use in buildings by 50% by 2050—A backcasting study using stakeholder groups. *Technological Forecasting and Social Change*, 78(5), 785-796.
- Tosics, I. (2004). European urban development: Sustainability and the role of housing. *Journal of Housing and the Built Environment*, 19(1), 67-90. doi:<https://doi.org/10.1023/B:JOHO.0000017707.53782.90>
- Trainer, T. (2012). De-growth: Do you realise what it means? *Futures*, 44(6), 590-599.
- Trainer, T. (2019). Remaking settlements for sustainability: the Simpler Way. *Journal of Political Ecology*, 26(1), 202-223.
- Tsebelis, G. (1995). Decision making in political systems: Veto players in presidentialism, parliamentarism, multicameralism and multipartyism. *British journal of political science*, 25(3), 289-325.
- UNHabitat. (2009). The right to adequate housing. *Fact Sheet No. 21*. Retrieved from <https://unhabitat.org/the-right-to-adequate-housing-fact-sheet-no-21rev-1/>
- Vale, B., & Vale, R. (2010). Domestic energy use, lifestyles and POE: past lessons for current problems. *Building Research & Information*, 38(5), 578-588. doi:<https://doi.org/10.1080/09613218.2010.481438>
- Vale, L., & Freemark, Y. (2019). The privatization of American public housing: Leaving the poorest of the poor behind. *The Routledge Handbook of Housing Policy and Planning*, 189-206.
- Van Tatenhove, J. P., & Leroy, P. (2003). Environment and participation in a context of political modernisation. *Environmental Values*, 12(2), 155-174.
- WCED, S. W. S. (1987). World commission on environment and development. *Our common future*.
- Winston, N. (2014). Sustainable Communities? A Comparative Perspective on Urban Housing in the European Union. *European planning studies*, 22(7), 1384-1406. doi:10.1080/09654313.2013.788612
- Xue, J. (2014). Is eco-village/urban village the future of a degrowth society? An urban planner's perspective. *Ecological Economics*, 105, 130-138.
- Xue, J. (2016). Eco-metropolis planning conditioned by the growth ideology: the case of Greater Copenhagen. *Proceedings of the Institution of Civil Engineers - Urban Design and Planning*, 0(0), 1-10. doi:10.1680/jurdp.16.00037
- Xue, J., Arler, F., & Næss, P. (2012). Is the degrowth debate relevant to China? *Environment, development and sustainability*, 14(1), 85-109.
- Aalbers, M. B. (2016). *The financialization of housing: A political economy approach*: Routledge.

Articles

Article 1

Arguing for a degrowth housing development that integrates social and environmental sustainability

Silvia Mete

Department of Urban and Regional Planning, Norwegian University of Life Sciences, Norway

Abstract

One of the main challenges of the pro-growth housing systems of most affluent countries concerns the lack of integration between environmental and social sustainability in cities and metropolitan areas. This argumentative article is based primarily on theoretical reasoning and argues for a degrowth housing development that can better integrate the social and environmental sustainability. The arguments are: first, an ontological perspective that takes a systematic and stratified notion on housing lays the foundation for integrating the social and environmental domains in housing development; second, by analysing the current conditions of Western pro-growth housing systems, it appears that there has been little integration between the social and the environmental domain; third, environmental sustainability necessitates decrease in the consumption level of housing per capita (degrowth), which presents social risks. To avoid social risks, it is fundamental to have housing systems where environmental and social sustainability are interconnected.

Keywords: degrowth, social sustainability, environmental sustainability, housing, social justice

Publication status:

Under review in the Nordic Journal of Urban Studies

1. Introduction

In both policy domains and research fields on housing, the environmental and social sustainability of housing development are often addressed separately within disciplinary traditions. Although recently emerging housing studies under the academic umbrella of just sustainability particularly address the tensions between environmental and social sustainability, these studies primarily focus on neighbourhood housing projects. This paper argues for a degrowth housing development that can better integrate social and environmental sustainability.

In this paper, the understanding of environmental and social sustainability derives from the definition of sustainable development in the Brundtland report *Our Common Future*, where environmental limits and equity are the core elements (WCED, 1987). The argument for integration is thus built upon a holistic understanding of housing sustainability: housing development operating within environmental limits, and meanwhile securing an equitable distribution and safeguarding everyone's access to housing. The environmental sustainability includes challenges in limiting energy consumption and pollution, as well as in protecting areas for biodiversity and for a healthy environment available for all groups, especially the most vulnerable. Through developing the arguments, the paper aims at a theoretical contribution to promote a degrowth housing development that can better integrate social and environmental sustainability in an urban and metropolitan context.

To achieve this aim, three cross-cutting but separate lines of arguments are put forth. Firstly, the paper provides an ontological foundation for integrating the social and environmental dimensions in housing development. The ontological discussion conceptualizes how the housing system functions, and how the social and the environmental domains interact with each other, suggesting the necessity of developing a holistic approach to housing development. However, the existing mainstream housing development, which is premised on a pro-growth system, fails to address social as well as environmental sustainability. Pro-growth housing, or housing for growth, as defined by Nelson et al. (2018) is the mainstream paradigm for the

housing sector of most affluent countries. Integral to the pro-growth system is a capitalist production of dwellings, alongside with buying and renting within the market. Consequently, housing becomes a major sector and force for the economy.

The paper considers this system flawed in its failure to address social and environmental sustainability. A scrutiny of the flaws constitutes the second line of argument for shift to a degrowth housing development. Although I acknowledge the geo-temporal differences, unevenness, and variations of a growth approach in housing development, the argument is developed with a certain level of abstraction. Based on this scrutiny, I arrive at the third line of argument, which promotes a degrowth housing development. I argue that in order to better integrate social and environmental sustainability, policies to reduce consumption and growth in housing for environmental sustainability must be accompanied with stronger policies for social equity and welfare to avoid an increased risk of social inequality with limited availability of housing resources. This argument goes beyond the actual and present housing development paradigm and proposes a housing future that can be both environmentally sustainable and socially just.

2. Ontological argument for integrating environmental and social sustainability in housing development

Housing represents an interconnected part of our built environment that encompasses social development, cultural aspects, economic elements, and environmental impacts, given from both the production of dwellings and their daily use. In housing research, some have argued for a more integrated approach in the conception of housing (Priemus, 2001), and this could be especially true when it comes to the environmental and the social domains.

Given the multifaced dimensions of housing, providing a single and univocal image of it is hardly possible. It is nonetheless possible to recognize what generates different housing systems. There are usually economic aspects in the picture (financialization,

property, market). A dwelling is thus a good tradable on the market. There are also typically welfare aspects among what generates a housing system: welfare provision might or might not influence and resolve questions of housing exclusion, affordability, and social sustainability issues. Those elements and their combination usually provide an image for how housing systems work in different contexts. At the same time, among those aspects, natural resources and environmental aspects are a fundamental part of the housing system, playing a significant role in the lifecycle of housing development. The environmental aspects need therefore to be intertwined and included, in order to discuss and recognise the their relation with the housing systems.

It is crucial to underline that humans relate and are part of a larger biophysical system. As part of nature, humans are not uprooted from or external to it. As shown in Figure 1, human society and culture are not aside of nature. Again, the market economy is only a subset of a larger set of layers, including social structures, culture and institutions (Human Society), which is part of the natural world (Planet Earth) (Gowdy & O'Hara, 1997). Bearing in mind the relation between these layers is crucial, especially when reflecting on housing systems.

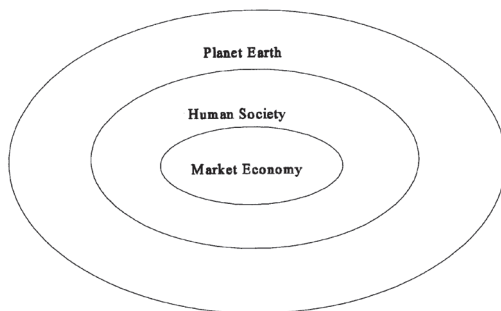


Figure 1. Hierarchies of Sustainability (Gowdy & O'Hara, 1997, p. 241)

To achieve a significant understanding of the concept of housing system, it is important to establish a meta-theoretical reflection that could deepen the ontology. The mechanisms behind the concept of housing system can be conceptualized, in a more general context, in the four-planar social being ontology developed by Bhaskar (2009).

This metatheory postulates that every social event occurs at least on four planes, that are interdependent: (a) the plane of material transactions with nature, (b) the plane of social interaction between people/agents, (c) the plane of social structure proper, (d) the plane of the stratification of the embodied personality of agents (Bhaskar, 2009).

The four-planar ontology includes nature within the social processes, differently from what traditional sociology does, being often “nature-blind” (Benton, 2001), as well as neoclassical economics, too centred on the “homo oeconomicus” image. Below, I will apply Bhaskar’s ontology (2009) to the housing system arguing for an integrated perspective on degrowth housing development.

The plane (a) represents material transactions with nature, which can be considered the biggest system, or the basis at which all the other transactions happen. Housing in its physical dimension has a materiality that is the main meeting point with nature. As a human artefact, housing has a materiality that is deeply intertwined with the space, the territory, and most of the environment as a whole. Its transaction with nature includes two specific aspects. First, the physical existence of housing is dependent on land. The areas on which dwellings are built were previously often natural ecosystems, or farmland. Second, the production and operation of housing need materials and consequently produce impacts on the natural environment.

At the same time, housing is a place for interaction, it is commonly the place accommodating daily activities and social interactions (b), at different levels, from family, to friends, to neighbours. Those interactions change according to cultural elements, which are able to influence the shape and materials of housing. Those interactions might design the idea of a dwelling, what functions it should perform, what social interactions it allows, and what level of privacy it offers. The interactions are not limited to socialization within a family/friends network, but also encompass legal and contractual socialisation. Those might include the interactions between tenants and landlords, in case of rental tenure form, or interactions between homeowners and bank representatives. Other aspects play a role in the (b) plane, as for instance the location of housing, different housing standards and characteristics of the built environment, which attract different social groups and condition the way people interact in society.

As a result, specific social phenomena, such as segregation, diversity and gentrification, may emerge within the housing system, having implications on the social equality. These social inequalities may be due to failures in the redistribution of the materiality of housing, of environmental resources, as well as in the distribution of economic resources among the members of a society.

The social structures mentioned in the (c) plane of the four-planar theory are subsystems of the major nature system. The social structures set conditions for how exchanges, transactions, social norms and distribution of benefits and disadvantages take place within a housing system. There are therefore structures linked to the materiality of housing, the economics (market and finance), the tenure, the supply and the distribution. The social structures related to housing condition and are conditioned by broader socio-economic and political structures in society. Other structures include the governance mechanisms of the housing system, how it is structured at a regulatory, policy, welfare and institutional level (housing as a primary right enshrined in constitutional laws for instance, housing as part of active governmental policies, housing as part of the basic welfare provision or not). Dynamics of power are included in this plane: they are present and can affect and limit the equity of the distribution of housing, the democracy as in the participation of inhabitants to the life of their communities, and to their choices. Some groups may therefore experience oppression or unfair domination from institutions or other groups with more power, creating a threat to social sustainability.

The fourth plane of the four-planar ontology (d) is the one of stratification of the embodied personality of agents. All the planes impact different levels of one person's being. In particular, the stratification of her personality, includes both her life's history, her narrative, and her internal stratified personality, which takes the form of her unconscious biography (Norrie, 2009). Thus, the role of our personalities in the way we relate to others and ourselves, our values and interests, all belong to this plane of the stratification. Impacts of the housing quality on physical and psychological health also belong to this plane. Housing quality affects socially the way housing is perceived, and the values connected to it. The agents in this plane include not only housing users, but

also professionals and operators intervening in the housing system (through regulations, provision, research etc). The role of their personality could affect their values, the way they choose to play their role: all this can influence the housing systems.

All those planes, with their different degree of complexity, operate in stratification in what Bhaskar (2009) depicts as a laminated system. There are therefore inevitable contact points between the planes and their interaction. Framing housing development in light of the different planes opens up a reflection on the interdependency of different domains. This ontology suggests nature as the biggest system within which other subsystems exist: in order comes first nature, then society and then economy. Following these ontological reflections, the need for integrating the social and environmental dimensions in a degrowth housing development derive from the dependency of the housing system on nature and the constant exchange between society and nature. The former implies that there is an environmental limit for housing development and strategies in the social domain need to respect this limit. A paradigm shift, as the degrowth development suggested for the housing sector, would respect environmental limits and would work only if able to respect the three layers of Gowdy & O'Hara's (1997) sustainability hierarchy: nature, society and economy.

3. Failures of the current housing development paradigm in achieving environmental and social sustainability

The ontological discussion puts forward the metatheoretical arguments indicating the need for an integrated housing development, but it does not enter the current sustainability debate and the major aspects of the current housing development paradigm. This section confronts the existing debates in housing research with its limits, and discusses both the social and environmental failures of the current housing development paradigm.

Considering the environmental sustainability, housing researchers have since the release of the Brundtland Commission's report (WCED, 1987) gradually increased their

attention to the necessity of combining the environmental sustainability agenda with the housing discourse (Brown & Bhatti, 2003). During the 1990s the debate expanded, with the first discussions on the concept of sustainable housing (Gibson, 1994; Huby, 1998). The debate was concerned with the environmental sustainability dimension of housing development and its inclusivity with the social and economic domain (Brown & Bhatti, 2003; Tosics, 2004).

The environmental sustainability aspects of residential development have been studied with different focuses. On one side, there is a focus on the sustainable design of housing, with the attention directed toward building technology and the operational impacts of the construction phase of housing (Priemus & ten Heuvelhof, 2005). Other studies point at impacts emerging from housing-related land-use, transport and habits on a day-to-day basis. Some researchers have expanded their focus from sustainable residential buildings to the different consumption impacts of housing on a larger spatial scale (Hoyer & Holden, 2001; Naess, Røe, & Larsen, 1995): for example, low density housing units require longer distance transportation, often car-based, resulting in higher energy use and emissions compared to a high density inner city housing unit. Research studies on the environmental sustainability of housing expand to include topics such as transport energy consumption and modes of transportation affected by different housing types and locations, as well as land-use, housing and urban planning (Hoyer & Holden, 2001; Naess, 1997).

Theorists of the environmental sustainability plane of housing have delved largely in the environmental implications (Bhatti, 1994; Hoyer & Holden, 2001; Morgan & Talbot, 2000). Lately, the possibility of solving environmental problems going beyond the sole eco-tech solutions has been recognized (Schweber & Leiringer, 2012). Within this framework, scholars have given major consideration to lifestyle choices, and the acknowledgement of the interaction between people and the environment they live in (Gatersleben, Murtagh, & Abrahamse, 2014; Moezzi & Janda, 2014; Vale & Vale, 2010). Some attempts at an interdisciplinary integration of the environmental and social dimensions of housing take the departing point of the social sustainability perspective. Chiu (2002, p. 156) proposes a framework in which the social sustainability of housing

should relate to four elements: (i) the social preconditions conducive to the production and consumption of environmentally sustainable housing, (ii) equitable distribution and consumption of housing resources and assets, (iii) harmonious social relations of the inhabitants within the housing system and (iv) an acceptable quality of housing and living environment. This framework incorporates the environmental aspect into a socially sustainable housing framework by developing social conditions for the implementing of environmentally sustainable measures.

The above studies make sensible and valuable arguments for integrating the social and environmental fields in housing development. They reveal potential conflicts between social and environmental sustainability in the current housing system, showing the importance of an integrated approach. Nevertheless, some gaps in the existing studies can be identified. Most studies point out the limitations of environmental perspectives in housing as ignoring significant social issues (Brown & Bhatti, 2003), while very few studies investigate the potential environmental consequences of strategies aiming at reducing housing inequalities. Reducing housing inequalities by lifting housing standards of the needy will inflate the overall housing consumption level, which increases environmental burdens. In addition, most of the studies focus on the neighbourhood level, whereas larger-scale (e.g. national and urban-regional scales) environmental and distribution problems are not addressed. New challenges and conflicts might emerge between the social and the environmental dimensions of housing development when the focus is scaled up to higher levels.

To address this need for interdisciplinarity in intellectual work towards a different paradigm, such as the degrowth one, it is crucial to recognise and discuss the features and the limits of the current housing development paradigm.

The currently dominant pro-growth system across Western countries is neoliberalised housing growth based on a premise of economic growth (Jackson & Senker, 2011). Despite contextual differences and unevenness, this is a common trend in many European and North American countries (Hodkinson, Watt, & Mooney, 2013; Rolnik, 2013). This housing development paradigm is characterized by some key features. The market provides the main mechanisms of supply and distribution of

housing, while the state provides only correctives to it (Bengtsson, 2018). As Clapham stated, “usually the state is viewed as a neutral arbiter between different interests, reacting to housing problems as they emerge” (Clapham, 2005, p. 7). The housing market responds with a continual growth in production of the building stock, without the aim of ensuring equal distribution. Under the influence of neoliberalism, states have often withdrawn from the provision of housing (Nelson, 2018). Being based on economic growth assumptions, the housing sector is typically very exposed to financialization (Jackson & Senker, 2011). As underlined by Nelson, the bottom line of the pro-growth system is, perversely, the insufficiency of housing for all, as the capitalist production of dwelling thrives on this unmet need. The pro-growth housing system has cultural repercussions: owning one’s home and associating housing to the status symbol are its typical cultural features. The cultural and economic aspects affect the political dynamics and the policies: Nelson underlines (2018) that the pro-growth housing system binds households to growth capitalism and the policies around housing facilitate this process.

From a human perspective, a dwelling is first and foremost a good, a primary one, since inhabiting represents one of the most fundamental human needs; however, in this market-dominated setting, it is considered an economic good, tradable on the market. When following a neoliberal growth approach, housing mostly becomes a financialized object that people access by purchasing in a debt-based system (Jackson & Senker, 2011).

This model, configured to limit the state intervention into market mechanisms, tends to pose challenges and risks. The next section will be devoted to describing in details some concrete challenges and limits of the current housing paradigm, especially when it comes to its key generative structures.

Environmental challenges

The environmental footprint of both housing production and housing consumption in the growth model is quite severe. As suggested by Nelson (2018), housing, in all its forms, accounted in 2010 for the 32 per cent of total global energy consumption. The indirect energy use for the need for travel, which depends particularly on residential location and density, comes in addition. The impacts tend to be even more threatening in the future, due to urbanization and population increase. The footprint of the housing sector includes both construction impacts and operational impacts (Naess & Xue, 2016): construction impacts derive mostly from the building phase (consumption of materials, activities during the process), whereas the operational impacts are those deriving from day-to-day use. Within the day-to-day use, it includes the energy consumed in order to keep the temperature stable in the building, but also the impacts from housing-related transportation. Those include all forms of transport necessary to connect the residents to their workplaces, schools, leisure facilities, etc.

The growth model applied to the housing sector means an increase in per capita consumption. Even in Nordic countries, as for instance Denmark and Norway, where per capita housing consumption is already among the highest in the world, per capita housing consumption in residential floor area continues to increase. Especially in Norway it is important to underline though that the growth rate is lower than in the last half of the previous century. All new housing construction entails an environmental impact strongly linked with construction and operation of the buildings and housing-related transportation needs. The transportation needs depend mostly on the location of the dwelling, the density of the housing structure itself and the residents' habits, along with income, and education.

Planners and policy makers have in the last decades argued for the necessity of measures able to address the various environmental impacts deriving from a housing sector within a growth model system. The growth model is usually not per se in discussion, as it is still considered profitable for the households, the housing industries, and the public sector. Two main features of the recent environmental policies linked to

the housing sector can be identified: decoupling strategies at the detail level, and decoupling strategies at the macro scale.

The decoupling strategies at the detail level focus on reducing the environmental impacts of residential buildings *per se* through technological advancements. The measures are often punctual, limited in scale and related to retrofitting of the dwelling. Within the decoupling strategies at the macro scale in the housing sector, by far one of the most evident ones is “densification”, also called the “compact city” strategy, of which the benefits have been largely discussed (Frey, 2003; Jenks, 2000). Densification strategies have been saluted as the ones able to provide a sustainable urban and housing development, strongly intertwined with the public transport network, and able to reduce the distances for the everyday services and needs (Naess, Strand, Wolday, & Stefansdottir, 2019). This strategy, very diffused in the new developments of the Norwegian urbanised areas for instance, intensifies land use and allows growth in residential density, discouraging the most dispersed housing types, which impact in both the building phase and later in terms of everyday footprint (longer commutes, more car dependency).

However, densification strategies might not be sufficient to respond to long term challenges: eventually, when the potential of the building sites in the inner core is exhausted, it will nevertheless require an expansion towards the outskirts of the city, which can be only partially decoupled from negative environmental impacts by prioritizing higher-density housing types and through an extensive public transport policy. Even though densification strategies might limit the increase of new environmental impacts, the total environmental load often does not decrease. For example, Høyer and Næss (2001) mention the heating and/or cooling requirements, that are still considerable, even if the buildings are constructed in accordance with eco-efficiency measures and location. And even if the annual conversion of farmland and natural areas into sites for housing construction is reduced, the accumulated land take implies that as time goes by, less and less soil for food production and natural ecosystems will be left. In practice, environmentally friendly solutions can never be absolute and would always create impacts to different degree.

Social Challenges

The social challenges of the neoliberalised housing growth paradigm are associated with its negative consequences on housing affordability, accessibility, equal distribution, diversity, and inclusiveness.

When discussing affordability, the housing sector is no exception to the typical mechanisms of economic growth: the facilitation of debt-based consumption derives from an expansion of credit regulations and systems, and it is almost required when the economy is in a struggling position. Lately, especially in the conjunction of the 2008 financial crisis, deregulations in the financial sector have given the possibility for banks to issue loans with few restrictions. At the same time, the growth in housing prices has not stopped banks from offering those loans to households with lesser means; on the contrary, it persuaded them to take up even more loans (Jackson & Senker, 2011).

Even though this looks like a profitable occasion for many households to enter the housing market, escaping the poverty trap of housing exclusion, it only meant to trap the same people in very high loans that became unsustainable when the house price “bubble” collapsed in 2008. Scholars explain that the very deregulation that happened to the mortgage market has actually contributed to rise house prices in the decade 1996-2006, especially in the US (Gan & Hill, 2009). The reason is that more households were offered loans to purchase a house in a limited housing stock, which lets housing prices grow even more. More demand (more households eligible for a loan) for the same market meant an increase in willingness to pay among the buyers (leading to an increase in the housing prices).

These economic structures of the housing system play an important role in creating and amplifying socio-economic inequalities, especially after the 2008/2009 financial crisis (Arundel, 2017). Some scholars even point out that achieving progressive socio-economic change might only occur if housing questions are addressed (Aalbers & Christophers, 2014).

The public sector, the only one able to regulate the housing sector, could have prevented the credit-constrained buyers to enter the loan-based housing market at all

(Jackson & Senker, 2011), for example by providing housing support or social housing. On the contrary, the withdrawal of the public sector in social investments, which was already present before the crisis, was even more pronounced after it, leading to a severe rising of inequality, sharpening a situation already critical in the housing sector. This led to an increase in homelessness, difficult housing accessibility (Chamberlain & Johnson, 2013), and unequal distribution.

It is fair to say that the shortcomings deriving from the current housing system are linked to strong “structural inequalities”, as the one just mentioned, that have the effect of locking people into poverty, instead of easing their way out. A demonstration of it is given by the fact that a difficult mobility in “housing career” (Kleinhans, 2003) very often is the clear sign of a “poverty trap”: as an example, a person stuck in an unstable tenancy is less likely to get out of poverty (Clark, 2012). In addition to this, a person living in a poor neighbourhood is less likely to get a well-paid job than people with similar education and job experience, but living in a more affluent neighbourhood (Galster, Quercia, & Cortes, 2000; Lawrence, 2012).

These are some of the most visible outcomes in terms of social justice of the growth model applied to the housing sector. The economic growth model based on neoliberal premises has not been able so far to resolve inequality, affordability and accessibility questions, but has on the contrary proven to create more issues. As Jackson and Senker (2011) highlight, the economic growth model does not provide automatically prosperity, neither full employment nor full housing provision, which eventually causes evident disparity, rise of debts, and the vicious cycle of poverty.

What is more, the implicit assumption in the growth paradigm is that the system would eventually even out the inequalities through a trickle-down effect. According to a Rawlsian view (1999), an unequal distribution between the rich and the poor is acceptable if this results in an increase of benefits also for the poor, by stimulating a pulling effect. This view, though, when applied to housing development, creates high environmental impacts and uncertain social outcomes, representing yet another contradiction of the current model.

To sum up, the pro-growth housing system, based on economic growth, increased consumption, reliance on market solutions to housing supply and distribution as well as a high degree of financialization, tends to generate negative social and environmental consequences. The underlying political economic system of housing provision results in poor environmental outcomes and social consequences related to increasing inequality in the provision of housing.

Since decoupling measures and strategies are not sufficient to reduce the environmental impacts of a growing housing stock to a sustainable level, a reduction in the consumption level of housing per capita in rich countries seems to be necessary. It is therefore crucial to discuss models aiming at a per capita reduction of housing consumption in rich countries, which is precisely what the degrowth paradigm promotes for consumption in general among the affluent. Such a shift of model should also entail a mindful discussion on social justice and distribution, in order to avoid the social risks encountered in the current model and discussed above. I will argue along this line in the next and last argumentative section.

4. Imagining the future: towards a degrowth housing development

As stated in the introduction, an integrated housing development should respect the environmental limits, secure an equitable distribution and safeguard everyone's access to housing. To achieve this, would imply changing some of the main current features that are creating social disparity and environmental degradation. In particular, housing for degrowth (Nelson, 2018) has the endeavour of simplifying access to housing, reducing natural resources impacted by housing per today (land use, energy), redistributing access to housing. One strand of studies, within degrowth housing development, argues for conceptualising the integrated and inclusive nature of sustainable housing. Researchers have observed negative social impacts caused partly by strategies for environmentally sustainable housing, especially in the Nordic context,

as in Sweden and Denmark. Hagbert and Femenias (2016) have discussed whether new environmentally sustainable housing developments in Sweden facilitate or neglect social dimensions. A lack of social sustainability measures within new developments aiming at environmental sustainability, is mentioned also in Denmark (Jensen, Jørgensen, Elle, & Lauridsen, 2012), where the authors point out unmet social objectives within sustainable building developments. In a similar vein, Gallent (2001) points out the necessity of respecting the residents' needs while addressing urban compaction. If social structures are not addressed and included, the whole compaction strategy cannot be defined as sustainable.

The importance of a functional definition and application of sustainability measures in the housing sector, is made clear by different studies. However, some of the limits, typical of the current paradigms, can only be eliminated by challenging the current physical characteristics typical of the growth housing paradigm. Regarding the social domain, it is compelling to find a suitable model for the housing sector able to increase equality in housing accessibility and affordability.

How does a different paradigm reframe the economic, social and the environmental dimensions of housing development? A constructive model to frame the relation can be the so-called "Doughnut model" (Raworth, 2017). This model aligns the hierarchical nature of sustainable development as shown in Figure 1: in this model, environmental and social issues are given priority over the economic growth and are considered as the ends of housing development. The economic structures of the housing sector are only a means to achieve the social and environmental ends and should therefore be reframed in order to facilitate the achievements of a sustainable and just housing development.

I argue that a degrowth development within the housing sector is the most adequate model for combining environmental sustainability and social equity. It promotes the satisfaction of basic needs as it considers housing as a right, ensures social justice by promoting equitable distribution of the housing stock, and respects environmental limits by reducing housing consumption.

In its wide understanding, degrowth entails a necessary reduction of housing consumption within a more general reduction in production and growth in all economic sectors.

Accordingly, a degrowth development within the housing sector has to include a discussion and implementation of a maximum cap in consumption.

A degrowth housing development would entail the reduction of consumption and production of housing. Measures introducing a max cap to the per capita housing consumption in society would be at the very core of this paradigmatic shift from a neoliberalised housing sector to degrowth (Mete & Xue, 2020). Along with capping consumption, measures to promote efficient use of the building stocks would need to be in place: these could include the division of large dwellings into smaller units (Næss & Xue, 2016) and the promotion of sharing or co-living schemes. Regulations and progressive taxation measures on floor space consumption would be relevant instruments for promoting such changes. Consumption exceeding the maximum standard would be subjected to taxation to discourage overconsumption of housing. Such taxation revenues could be then reinvested to promote eco-efficiency improvements within the existing housing stock. All these measures could promote a successful shift towards a degrowth paradigm. However, as suggested all along the paper, a sustainable future housing development must be able to perform on the social aspects too. The degrowth paradigm could lead to some drawbacks in terms of social justice: if redistribution and affordability mechanisms are not considered, the risk of inequality is heightened.

Hence, the aspects of affordability of dwellings within an acceptable standard are crucial. Næss and Xue (2016) suggest setting a limit to the price per square meter of floor area instead of risking inflating the prices via subsidies. Implementing and bettering the social housing offer is another way of ensuring to meet affordability while securing adequate dwellings.

The arguments presented above show the importance of promoting the integration of the social and environmental domains in the housing sector. I also argue

for a degrowth paradigm, as a viable path for realising a just and sustainable housing development. However, I acknowledge risks and limits of certain policies linked to degrowth, which need to be discussed to avoid increasing social risks.

5. Conclusions

This paper argues for a degrowth housing development that can better integrate the social and environmental dimensions of sustainability. Putting forward a new paradigm for housing development is essential, given all the limits of the current growth housing development. Nowadays, the economical elements have gained more importance than others have. The main trend in the housing sectors of most affluent countries leads to little integration between the social and the environmental domains. Policies tend to be fragmented and targeted to specific issues, with little integration between the two domains in the responses. Neglecting and underestimating the importance of integrating the environmental and social aspects in housing has triggered impacts on the environment and created even more inequality.

A degrowth paradigm shift in housing development can function if both environmental and social sustainability are ensured. The importance of integrating the social and environmental dimensions in a degrowth housing development derive from the dependency of the housing system on nature, given the perpetual exchange between society and nature. A degrowth model for the housing sector must necessarily respect environmental limits and can work only in compliance with the three layers of Gowdy & O'Hara's (1997) sustainability hierarchy: nature, society and economy.

Degrowth could successfully promote a long-lasting sustainability of housing development, as shown in argument three, if certain social conditions are accounted for (accessibility and affordability). Through the application of measures to reduce consumption, while ensuring equitable forms of redistribution, degrowth could perform as a valuable and plausible model in housing development.

While this article makes a contribution in suggesting the need for an integrated pathway, more research and reflection is still needed about the implications of a degrowth paradigm for the housing sector. Even though the discussion remains at a hypothetical level, and the paradigm shift is not here yet, there are interesting implications of the degrowth model to be discussed.

References

- Arundel, R. (2017). Equity Inequity: Housing Wealth Inequality, Inter and Intra-generational Divergences, and the Rise of Private Landlordism. *Housing, Theory and Society*, 34(2), 176-200. doi:10.1080/14036096.2017.1284154
- Bengtsson, B. (2018). Theoretical Perspectives vs. Realities of Policy-Making. *Housing, Theory and Society*, 35(2), 205-210. doi:10.1080/14036096.2017.1366942
- Benton, T. (2001). Why are sociologists naturephobes. *After postmodernism: An introduction to critical realism*, 133-145.
- Bhaskar, R. (2009). *Scientific realism and human emancipation*: Routledge.
- Bhatti, M. (1994). Environmental futures and the housing question. *Housing and the Environment: A New Agenda, Coventry: Chartered Institute of Housing*, 14-33.
- Brown, T. I. M., & Bhatti, M. (2003). Whatever Happened to 'Housing and the Environment'? *Housing studies*, 18(4), 505-515. doi:10.1080/0267303030304253
- Chamberlain, C., & Johnson, G. (2013). Pathways into adult homelessness. *Journal of Sociology*, 49(1), 60-77. doi:<https://doi.org/10.1177/1440783311422458>
- Chiu, R. L. (2002). Social equity in housing in the Hong Kong special administrative region: A social sustainability perspective. *Sustainable development*, 10(3), 155-162. doi:<https://doi.org/10.1002/sd.186>
- Clapham, D. (2005). *The meaning of housing: A pathways approach*: Policy Press.
- Clark, W. A. (2012). Residential mobility and the housing market. *The SAGE Handbook of Housing Studies*, 66-83.
- Frey, H. (2003). *Designing the city: towards a more sustainable urban form*: Taylor & Francis.
- Gallent, N. (2001). Housing, homes and social sustainability. *Planning for a Sustainable Future*, 115.
- Galster, G. C., Quercia, R. G., & Cortes, A. (2000). Identifying neighborhood thresholds: An empirical exploration. *Housing Policy Debate*, 11(3), 701-732. doi:<https://doi.org/10.1080/10511482.2000.9521383>
- Gan, Q., & Hill, R. J. (2009). Measuring housing affordability: Looking beyond the median. *Journal of Housing economics*, 18(2), 115-125. doi:<https://doi.org/10.1016/j.jhe.2009.04.003>
- Gatersleben, B., Murtagh, N., & Abrahamse, W. (2014). Values, identity and pro-environmental behaviour. *Contemporary Social Science*, 9(4), 374-392. doi:<https://doi.org/10.1080/21582041.2012.682086>
- Gibson, M. S. (1994). *Housing and the environment: A new agenda*: Chartered Institute of Housing.
- Gowdy, J., & O'Hara, S. (1997). Weak sustainability and viable technologies. *Ecological Economics*, 22(3), 239-247. doi:[https://doi.org/10.1016/S0921-8009\(97\)00093-1](https://doi.org/10.1016/S0921-8009(97)00093-1)
- Hagbert, P., & Femenías, P. (2016). Sustainable homes, or simply energy-efficient buildings? *Journal of Housing and the Built Environment*, 31(1), 1-17. doi:10.1007/s10901-015-9440-y
- Hodkinson, S., Watt, P., & Mooney, G. (2013). Introduction: Neoliberal housing policy–time for a critical re-appraisal. *Critical Social Policy*, 33(1), 3-16. doi:<https://doi.org/10.1177/0261018312457862>

- Hoyer, K. G., & Holden, E. (2001). Housing as basis for sustainable consumption. *International journal of sustainable development*, 4(1), 48-58. doi:<https://doi.org/10.1504/IJSD.2001.001545>
- Huby, M. (1998). *Social policy and the environment*: Open Univ Pr.
- Høyer, K. G., & Næss, P. (2001). The ecological traces of growth: economic growth, liberalization, increased consumption—and sustainable urban development? *Journal of Environmental Policy & Planning*, 3(3), 177-192. doi:<https://doi.org/10.1002/jepp.84>
- Jackson, T., & Senker, P. (2011). Prosperity without growth: Economics for a finite planet. *Energy & Environment*, 22(7), 1013-1016.
- Jenks, M. (2000). *Achieving sustainable urban form*: Taylor & Francis.
- Jensen, J. O., Jørgensen, M. S., Elle, M., & Lauridsen, E. H. (2012). Has social sustainability left the building? The recent conceptualization of “sustainability” in Danish buildings. *Sustainability: Science, practice and policy*, 8(1), 94-105. doi:10.1080/15487733.2012.11908088
- Kleinhans, R. (2003). Displaced but still moving upwards in the housing career? Implications of forced residential relocation in the Netherlands. *Housing studies*, 18(4), 473-499. doi:<https://doi.org/10.1080/02673030304248>
- Lawrence, R. (2012). The SAGE Handbook of Housing Studies. In. doi:10.4135/9781446247570
- Mete, S., & Xue, J. (2020). Integrating environmental sustainability and social justice in housing development: Two contrasting scenarios. *Progress in Planning*, 100504. doi:<https://doi.org/10.1016/j.progress.2020.100504>
- Moezzi, M., & Janda, K. B. (2014). From “if only” to “social potential” in schemes to reduce building energy use. *Energy Research & Social Science*, 1, 30-40. doi:<https://doi.org/10.1016/j.erss.2014.03.014>
- Morgan, J., & Talbot, R. (2000). *Sustainable social housing for no extra cost? Achieving sustainable urban form*, London: E&F Spon.
- Naess, P. (1997). *Fysisk planlegging og energibruk*: Tano Aschehoug.
- Naess, P., Røe, P. G., & Larsen, S. (1995). Travelling distances, modal split and transportation energy in thirty residential areas in Oslo. *Journal of Environmental Planning and Management*, 38(3), 349-370. doi:<https://doi.org/10.1080/09640569512913>
- Naess, P., Strand, A., Wolday, F., & Stefansdottir, H. (2019). Residential location, commuting and non-work travel in two urban areas of different size and with different center structures. *Progress in Planning*. doi:<https://doi.org/10.1016/j.progress.2017.10.002>
- Naess, P., & Xue, J. (2016). Housing standards, environmental sustainability and social welfare. *Crisis System: A Critical Realist and Environmental Critique of Economics and the Economy*; Næss, P., Høyer, KG, Bhaskar, R., Price, L., Eds, 130-149.
- Nelson, A. (2018). *Small is Necessary : Shared Living on a Shared Planet*. PB - Pluto Press.
- Nelson, A., & Schneider, F. (2018). *Housing for degrowth: Principles, models, challenges and opportunities*: Routledge.
- Norrie, A. (2009). *Dialectic and difference: Dialectical critical realism and the grounds of justice*: Routledge.
- Priemus, H. (2001). The wider goals of housing policy in the 21st century. (1/2001), 4-5.

- Priemus, H., & ten Heuvelhof, E. (2005). The long way to sustainable housing areas. In: SAGE Publications Sage UK: London, England.
- Rawls, J. (1999). *A Theory of Justice (1971)*: na.
- Raworth, K. (2017). *Doughnut economics: seven ways to think like a 21st-century economist*: Chelsea Green Publishing.
- Rolnik, R. (2013). Late neoliberalism: the financialization of homeownership and housing rights. *International Journal of Urban and Regional Research*, 37(3), 1058-1066. doi:<https://doi.org/10.1111/1468-2427.12062>
- Schweber, L., & Leiringer, R. (2012). Beyond the technical: a snapshot of energy and buildings research. *Building Research & Information*, 40(4), 481-492. doi:<https://doi.org/10.1080/09613218.2012.675713>
- Tosics, I. (2004). European urban development: Sustainability and the role of housing. *Journal of Housing and the Built Environment*, 19(1), 67-90. doi:<https://doi.org/10.1023/B:JOHO.0000017707.53782.90>
- Vale, B., & Vale, R. (2010). Domestic energy use, lifestyles and POE: past lessons for current problems. *Building Research & Information*, 38(5), 578-588. doi:<https://doi.org/10.1080/09613218.2010.481438>
- WCED, S. W. S. (1987). World commission on environment and development. *Our common future*.
- Aalbers, M. B., & Christophers, B. (2014). Centring Housing in Political Economy. *Housing, Theory and Society*, 31(4), 373-394. doi:10.1080/14036096.2014.947082

Article 2



Contents lists available at ScienceDirect

Progress in Planning

journal homepage: www.elsevier.com/locate/progress

Integrating environmental sustainability and social justice in housing development: two contrasting scenarios

Silvia Mete*, Jin Xue

Department of Urban and Regional Planning, Norwegian University of Life Sciences, Fredrik Dahls vei 15, 1430 Ås, Norway

ARTICLE INFO

Keywords:

Housing development
explorative scenarios
ecological
modernisation
degrowth
housing sustainability

ABSTRACT

The article discusses futures in housing development by applying the approaches from 'future studies' to design two explorative scenarios reflecting alternative strategies for achieving sustainable and just housing development. The main aim is to develop scenarios that can achieve a specific normative goal: a future housing development that is both environmentally sustainable and socially just. Two scenarios are built – ecological modernisation and degrowth – that reflect different degrees of societal change, ranging from conventional to radical. The scenarios are applied to the two selected cases of the Milan and Oslo regions, drawing on the statistics of the contextual housing system and the document analysis on planning and housing. We further discuss how the specific scenarios can take place and which challenges will be encountered.

1. Introduction

This article aims to explore housing futures towards an integrated, normative sustainable development to meet the urgent need for addressing the environmental and social failures of the present dominant housing development model. Using the scenario approach in futures studies, we build two contrasting scenarios for housing development and contextualise them in two city regions – Milan and Oslo. The article is explorative in the sense that it starts with the recognition of the need for shifting the housing development trajectory and then envisions possible alternatives as a catalyst to liberate us from the existing constraints for a better future. Before taking the explorative journey, we will take a moment in the Introduction to address why such a need for shifting the housing development trajectory is crucial and urgent.

1.1. The failures of the present dominant housing development model

Since the late 1970s, housing policies in many Western countries have experienced the process of neoliberalisation (Sager, 2011). Despite the variegated forms, processes and contexts with which neoliberalism unfolds in housing policies, a general housing development model across Western countries can be identified. Central to this model is the perception of housing as a commodity that is traded and exchanged on markets. The market provides the main mechanisms of the supply and distribution of housing, whereas the state only provides correctives to it (Bengtsson, 2018). Deregulation, financialisation and privatisation are

common features of neoliberal housing policies. Access to housing is primarily an individual responsibility, determined by purchasing power. This neoliberalisation of housing rationalises and promotes a growth agenda for housing and urban development (Sager, 2011).

However, although a housing development model may be an effective driving force for growth and capital accumulation, it poses both environmental and social risks. Considering the latter, because access to housing is primarily determined by household purchasing power, this leads to uneven distribution in the housing stock and intensifies the risk of inequity (Chiu, 2004). In addition, the general trend of neoliberalisation, weaving with other socio-economic contexts, results in different levels of housing segregation, gentrification and exclusion (Arbaci, 2007). On the environmental side, the housing sector represents a major challenge to environmental sustainability, particularly in terms of energy consumption, greenhouse gas (GHG) emissions and encroachment on land (Høyer & Holden, 2001; Priemus, 2005; Suzuki, Oka, & Okada, 1995). These impacts are caused both in the construction and operation phases of housing, with the latter also including the impacts of housing-related transportation. However, the strong belief in decoupling a growing housing stock from negative environmental impacts through advanced building technologies and compact urban development has not yet fully materialised, leading to increased residential energy consumption and land consumption (Xue, 2015). These failures suggest that the present housing development model does not meet the social and environmental objectives of equity and sustainability (Spangenberg, 2010).

* Corresponding author.

E-mail addresses: Silvia.mete@nmbu.no (S. Mete), Jin.xue@nmbu.no (J. Xue).

<https://doi.org/10.1016/j.progress.2020.100504>

Received 8 August 2019; Received in revised form 11 May 2020; Accepted 13 May 2020
0305-9006/ © 2020 Elsevier Ltd. All rights reserved.

1.2. The need for integrating the social and environmental sustainability of housing development

Studies on housing have a multidisciplinary character and are rooted in different traditions such as sociology, economics, technology, policy studies, building engineering and urban design. Regarding social and environmental sustainability studies, conventionally, the two dimensions are separately discussed. On the environmental sustainability side, the wave of environmentalism since the release of the concept of sustainable development by Brundtland Commission in 1987 has led to a rise of academic debates on environmentally friendly housing. The debates have been concerned with the sustainable design of residential buildings, building technology, building materials and housing-related land use as well as its impacts on transport (Næss, 2012; Priemus & Ten Heuvelhof, 2005). On the social sustainability side, scholars have explored a wide range of topics related to housing, such as gentrification (Smith, 1987), social exclusion (Marsh & Mullins, 1998), segregation (Arbaci, 2007), affordability and accessibility (Neuteboom & Brounen, 2011). For a long time, these two dimensions of housing development have been studied without much engagement with each other. However, the recent realisation of the intermingled social and environmental challenges drives a holistic approach to address housing development. First, environmental sustainability initiatives such as neighbourhood eco-renovation generate negative social consequences, such as ecological gentrification (Cucca, 2012). Second, attempts at enhancing the living standards of the poor to reduce housing inequality can lead to the increased total housing consumption that imposes further pressures on the environment. Finally, the adoption of a more radical environmental sustainability strategy such as limiting the construction of new and spacious housing – as a way to respect environmental limits – is likely to worsen the inequality in access to housing (Næss & Xue, 2016). These existing and potential dilemmas and trade-offs between the social and the environmental sustainability of housing development suggest the need to consider the socio-environmental challenge as a whole.

So far, several scholars within the field of housing have explored the possibility of combining the social and environmental domains of housing but often mainly focus on one side. For example, the theories of Ancell and Thompson-Fawcett (2008) have mostly focused on the social consequences of the application of environmental policies onto the built environment and housing. On the contrary, Chiu (2004) has worked towards the inclusion of environmental sustainability within the realm of social sustainability. Although this approach helps in reducing reductionism in the concept of social sustainability of housing, it still raises questions on how to achieve inter-disciplinarity between environmental and social sustainability in housing research and development.

1.3. Scope and outline of the study

The limitations of the current housing development model and the need for integrating social and environmental sustainability suggest the necessity to rethink future housing development. Our study aims to contribute to the emerging debate on housing development that can break the disciplinary divide. To this end, we draw on a scenario approach that builds alternative future housing development images. We start with a clarification of the ultimate goals of housing development that include both environmental sustainability and social justice. In terms of environmental sustainability, we ground our understanding on an acknowledgement of the environmental limits. This means that achieving an environmentally sustainable housing future requires a reduction in the absolute environmental impacts of housing development (both housing itself and housing-related transportation), including energy use, GHG emissions and land. In terms of social justice, we primarily aim to safeguard adequate housing for all, which includes equitable access to housing of acceptable standards and to the facilities,

services and jobs that are associated with the location of housing. In addition, we hold the opinion that a certain level of equality in housing consumption will contribute to a more just society than the one with a high degree of inequality in housing consumption.

Departing from these two ultimate goals of housing development, we explore different possibilities to achieve them. We first question which theoretically informed futures could help us achieve these normative goals in housing development. Next, we look into real world cases to see how the theoretically based future scenarios might apply to real contexts. In building up the scenarios, we draw upon two sustainable development discourses that challenge the current mainstream society paradigm and housing development model to different degrees: ecological modernisation (EM) and degrowth (DE).

EM and DE are two ways of conceptualising sustainable development, which also lead to different pathways to achieve it. The scenarios are based on general principles, which draw from their theoretical conceptualisations of sustainability. On the environmental side, the scenarios focus on three main aspects: domestic energy consumption in the housing sector, residential land consumption at the metropolitan level and housing-related mobility. On the social side, the scenarios focus on adequate housing for all and a certain level of equalisation in housing consumption. Challenges arise when both the social and environmental goals are to be met.

Both theories hold the belief that they can achieve sustainable development, although they resort to different development principles and strategies. In simple terms, EM considers economic growth as the major driver in the development of society and that growth can be reconciled with the betterment of the environmental condition, whereas DE considers social foundations and basic needs, including food, water, health and housing, as central priorities. In the DE theory, the economy is functional to ensuring that the basic needs, or social foundations, which together promote well-being within specific environmental limits and which safeguard the integrity of the biosphere, are met. EM builds upon the belief that growth can be fully decoupled by applying technological measures, environmental governance and changing consumption habits. On the contrary, DE advocates disagree with the basic tenets of growth in economy and the commodification of nature. They argue for a society in which the growth paradigm is set aside to achieve reduction in consumption and an active decrease in production. The main argument is that decoupling infinite growth on a finite planet is not possible.

The paper is organised into five sections. After this introduction section, section 2 will elaborate on the basic tenets and principles of the two sustainability discourses – EM and DE – and their implications for the principles of housing development. The methodology of the study will be introduced in section 3. Section 4 will introduce the background of the two cases of the Milan and Oslo metropolitan areas, with particular attention to the housing sector. Sections 5 and 6 will respectively build two empirical scenarios for housing development in Oslo and Milan. The last sections of the paper will compare the two scenarios across cases and briefly reflect on the challenges of achieving each of them against the existing socio-economic and political settings. Although we do mention some possible policies and solutions, it is not within the scope of the study to identify pathways and propose actions to achieve the two scenarios. An elaboration of these will be an interesting research enterprise in the next step.

2. Theoretical background

2.1. Two contrasting theories on societal paradigms for sustainable development

Since the start of contemporary environmentalism in the 1960s and 1970s, environmental debates have experienced three major waves that characterise different ideologies and discourses. The first wave started in the 1960s with a critical stance on economic growth as a culprit of

environmental deterioration. The debate was backed up by a number of publications calling for limits to growth and a steady-state economy (Meadows et al., 1972, Daly, 1993). During the 1980s, the growth critique was gradually replaced by the idea that negative environmental impacts can be decoupled from economic growth. This second wave of environmental debates began with the publication of the UN Our Common Future report in 1987 (Wced, 1987) in support of sustainable development. The 'decoupling' idea was also emphasised in a number of publications focusing on 'EM' (Hajer, 1995; Mol & Spaargaren, 1993; Spaargaren & Mol, 1992). Since then, eco-modernist thinking has been the dominant ideology and strategy for dealing with environmental problems across the globe. The global financial crisis in 2008 and the subsequent great recession triggered a third wave of environmental debates that reinvigorated the growth critique of the 1960s and 1970s. The discourse and movement framed in the term 'DE' quickly gained momentum from both the civil society and academia (Dietz & O'Neill, 2013; Jackson, 2009; Schneider, Kallis, & Martinez-Alier, 2010) and have recently entered into political debates at the European Union (EU) level, as manifested in a European Parliament conference in 2018 exploring the possibilities for a post-growth Europe. These debates are not only about discourses on how to perceive and tackle environmental issues but also about how the society should be organised to realise long-term sustainable development. As such, they represent different opinions on the societal paradigm.

2.1.1. Ecological modernisation (EM)

The EM theory originated in the 1980s. Although the positions on many of its dimensions have changed during the maturation of the theory, its belief system and core tenets have remained rather constant. The overarching belief of EM is that economic growth and environmental sustainability can be reconciled (Mol & Janicke, 2009; Spaargaren, 2000). Although capitalism in its current form is acknowledged as a major source of environmental problems, ecologically sound capitalism and green growth are possible as long as these contemporary institutions go through a process of reform and reconstruction. This belief in a win-win situation between society, environment and economy is, according to EM advocates, in a major contrast with the notions prevalent in the 1960s and 1970s that were anti-capitalist and anti-modern. Fundamental to achieving reconciliation between capitalist society and environmental protection is the independence of ecological rationality and its increasing importance in governing social and economic policies (Mol & Spaargaren, 1993). However, ecological rationality should not prevail over economic and political rationalities. The antithesis between ecology and economy can be transcended by 'ecologising the economy' (ibid.).

This belief lays the foundation for reforms in different spheres for achieving an eco-modernist society, including technological innovation, environmental governance, consumption and lifestyle.

Technology and technological innovation have been the key characteristics of EM. Although positions amongst EM scholars are different regarding the importance of technology in developing an eco-modernist society, they all share technology optimism. The eco-modernist conceptualisation of technological change has widened from add-on end-of-pipe technologies, through preventative technologies, to more complex socio-technological systems (Mol & Janicke, 2009). The latter 'combines technological hardware with new management concepts, new ownership relations, new pricing mechanisms, new roles of the state and the like' (ibid., pp.21). The diffusion of technological innovation should be led by private sectors following market mechanisms. A wide range of technologies throughout the lifecycle of a product can be adopted, including technologies for obtaining new sources of resources, eco-efficiency, recycling and waste and emission treatment (Huber, 2009).

Solving environmental problems within the market economy and in light of market logics implies a central role of market actors in environmental governance. Instead of regarding economic actors as

antithetical forces to environmental protection, they are seen as potential contributors to improving environmental quality. Thus, eco-modernists call for political modernisation, shifting from a hierarchical, bureaucratic, regulatory governmental pattern to a more innovative, flexible, decentralised and deliberative way of governance (Mol & Janicke, 2009). This requested reform in environmental governance is a response to both the intractability of the persistent environment problems (e.g. climate change and biodiversity loss) and the increasing interconnections and interdependencies among a growing number of actors at different policy levels (Janicke & Jörgens, 2006). The role of state and non-state actors should therefore be reshaped. Direct command and control as well as law and regulations by environmental authorities and state are considered indispensable but should be limited (Huber, 2009). Instead, more innovative environmental policy making, approaches and instruments should be adopted. According to Van Tatenhove and Leroy (2003), policy innovations can take place in four dimensions: policy coalitions, resources, rules of the game and policy discourses.

Since the late 1990s, EM has experienced a 'consumerist turn', compensating for the original disregard of consumer behaviours and lifestyle patterns and applying the concept of sustainable consumption (Spaargaren & Van Vliet, 2000; Spaargaren, 2003). According to Spaargaren and Cohen (2009), the theoretical foundations drawn by EM scholars for enquiring sustainable consumption are quite diverse. The authors distinguish three major approaches to sustainable consumption. The first deals with the 'infrastructure of consumption' that focuses on how networks can be built to provide households with green choices of energy, water, electricity and other services. The second approach is framed as 'political consumerism', aiming to enable citizens-consumers' purchasing power as a driver of sustainable transition. Here, labelling and certification schemes are considered as an efficacious instrument. The third approaches centres on 'sociotechnical changes in everyday consumer practices'. Co-evolution in social practices, technology, values and norms is needed for sustainability transition. Regarding the modes of change in the consumption sphere that are promoted by EM scholars, despite the lack of consensus on a normative definition of sustainable consumption, it seems that the focus has been on improving resource-efficient consumption and changing the consumption patterns by replacing more environmentally harmful products with green products. Reducing the consumption level is not addressed.

EM is not at the outset a theory revolving around the principles of just and equal distribution or social justice. Over time, a more 'reflexive' type of EM was developed within the theory (Hajer, 1995). In reflexive EM, one addresses the incorporation of social justice, redistribution and democratisation (ibid., p.12) in the process of making changes to production and consumption (Gibbs, 2000). However, the attention to social justice in the EM theory is in terms of deontology – that is, procedural justice concerning decision-making and participation at the local level.

2.1.2. Degrowth (DE)

A fundamental difference of DE from EM is that DE challenges the growth hegemony of the capitalist society as well as any non-capitalist productivism. This challenge is radical and transformative in the sense that it calls for repoliticising the ethical premises of societal development and envisages a deep socio-economic-political restructuring beyond the growth paradigm (Sekulova, Kallis, Rodríguez-Labajos, & Schneider, 2013). The important values of DE include respecting the environmental limits, ensuring social justice and safeguarding the satisfaction of basic needs. Instead of economic growth, securing a good life for all within the planetary boundaries is the overarching goal of the DE society. Principles of well-being take precedence over economic profitability towards a more just distribution within the ecological boundaries. Interestingly, Holden, Linnerud, Banister, Schwanitz, and Wierling (2017) illustrate the key sustainability themes in terms of three fundamental moral imperatives that express well the basic

understanding of DE. The first moral imperative addresses the satisfaction of human needs with two key sustainability themes: eradicating extreme poverty and enhancing human capabilities. The second imperative points towards ensuring social justice by enhancing participation and ensuring fair distribution. The third touches upon the respect of environmental limits through the mitigation of climate change and the protection of the integrity of the biosphere. DE calls for 'a democratically led redistributive downscaling of production and consumption in industrialized countries as a means to achieve environmental sustainability, social justice and well-being' (Demaria, Schneider, Sekulova, & Martinez-Alier, 2013).

Contrary to the EM perspective on market-based solutions to environmental issues, DE is a critique of the commodification of nature and the expansion of market values and logics. It is argued that the commodification of the environment clashes with the limits of biophysics, institutions and social domains (Gomez-Baggethun, 2015). The biophysical limit stems from the non-separable nature of the ecosystem, which makes dividing the ecosystem into tradable units difficult. The public good nature of many ecological commons means that it is difficult to prevent others from accessing them, thus constituting the institutional limit. When commodification expands to the fields that intrude basic needs, it will encounter social limits in the form of fierce social opposition (ibid.). DE does not support abandoning markets but suggests defining the role of markets against the social, economic and political conditions that can promote human well-being. A limit to commodification will be set. However, a discussion on where this limit should be placed and what may or may not be commodified should be informed by debates on ethical values such as environmental justice, basic needs, human rights and intrinsic values.

In terms of sustaining our lives within the biophysical limits, the technological optimism of eco-modernists is strongly disputed by DE scholars (Jackson, 2009; Victor, 2018). Historical evidence shows that absolute decoupling between economic growth and resource use or pollution has not yet taken place as we have desired through technological fix. Because we have trespassed several planetary boundaries, relying on technological innovation alone to solve environment problems is not sufficient. Furthermore, the direct and indirect rebound effects of efficiency improvement partly offset environmental benefits from environmental technologies. The more intractable issue is that rebound effects can hardly be avoided in a growth society (Nørgård & Xue, 2016). DE addresses the importance of a sufficiency strategy that aims at reducing the consumption level among the affluent, in addition to the functional environmental technologies. The impacts of technologies should be evaluated to ensure that the innovation fulfils the DE values. As such, DE is not against eco-efficiency technologies and does not deny their environmental benefits but argues that a sufficiency strategy should be adopted along with eco-efficiency strategies.

The sufficiency strategy relates to the idea of simplicity – a simple way of life that is the 'minimally sufficient material standard of living' (Alexander, 2015). Connoted to this concept is a new understanding of the good life that is disassociated with material wealth. Well-being or happiness can be obtained through non-materialistic sources such as relaxation, engagement in social and political life, being with family and a fulfilling job. What could be regarded as a 'minimal' material standard has to be decided with reference to basic needs. Although there are different theories of human needs, they all distinguish needs from wants, desires and preferences such that needs are objective, non-negotiable and universal across cultures and over time (Doyal & Gough, 1991; Max-Neef, 1992). This means failure to satisfy them will always produce serious harm – for example, poor physical health – whereas failure to satisfy wants or preferences will not.

The sufficiency strategy in accordance with basic needs is both a solution to the current ecological crisis and the only way to secure everyone's access to a decent life within a limited planet. A fair distribution of ecological space and reduction of inequality within biophysical limits can only be possible through "less competition, large

scale redistribution, sharing and reduction of excessive incomes and wealth" (Demaria et al., 2013). The challenges of distribution are larger in a DE society than an eco-modernist one in which growth can to some extent benefit the poor through the trickle-down effect- although in a disproportionate way - which eases up the conflicts between social strata. In a DE society where there exists a ceiling for production and consumption as a result of environmental limits, further increase in material living standard among the rich will imply less available for the poor.

Degrowth scholars underline that the key to avoid worsened inequality in a DE society resides in the political commitment and the willingness to take the social justice and equality issues seriously (Büchs & Koch, 2017; Jackson & Victor, 2016). Proactive redistributive policies do have an important role in mediating the outcome of a Degrowth path. A more intense state intervention to maintain high employment through work sharing will decrease potential severe inequalities caused by unemployment in a degrowth situation. In addition, equalizing income can also help diminish inequality. Furthermore, removing financialization - a driver of inequality, will contribute to check speculation and thus reduce the wealth creation from non-labor activities (NEF, 2014). All these possible measures for dealing with a potential risk of increased inequality in the DE society entail state intervention and the outcome is a redistribution of wealth from the affluent to the poor.

2.2. Principles of the EM and DE scenarios for housing development

Considering housing as a societal sector, the two societal paradigms will have different implications for how the housing sector can be developed, leading to different perceptions, regimes and policies for housing development. This section aims to translate the two sustainability discourses to the principles of the housing sector, which provides the theoretical foundations for building the two empirical scenarios for housing development. Table 1 summarises the major principles for the two scenarios for housing development, which will be contextualised in the subsequent cases. As shown in Table 1, both types of scenarios share a common population projection variable, based on the figures provided by national bureaus of statistics; that part is labelled as 'fixed element' in the table. The trend of population development and its size in future will have significant impacts on the demand of housing in terms of both number and type. Demographic changes are a result of both natural growth/degrowth and migration policies. Despite being aware of the impacts of the demographic strategy (in controlling the size and spatial distribution) on social and environmental policies, we will take population change as a given condition in both the EM and DE scenarios to avoid overcomplicating the scenarios. The two scenarios differ in the overall socio-economic structure, understanding of the nature of housing, strategies for the environmental sustainability of housing development (consumption, technology, physical structure) and principles of housing distribution. The reasons for these differences are attributable to the ground tenets of the two sustainability discourses. All these elements appear under 'shifting elements' in the following table.

2.2.1. Principles of the EM scenario

In general, the EM scenario of housing development is embedded within a socio-economic setting dominated by capitalist market economy. The economy follows the cyclic form, typical of growing economies, with alternating periods of peaks in growth and unexpected economic crises. Such a society is characterised by a built-in imperative for capital accumulation and an associated materialist and consumerist culture. Without challenging these fundamental characteristics, the EM scenario aims at promoting growth by greening the economy. Within this overall setting, housing development considers that growth in the housing sector can be reconciled with both environmental sustainability and social justice. The scenario therefore follows or pursues a

Table 1
Principles of ecological modernisation and degrowth scenarios for housing development

Ecological modernisation scenario (EM scenario)	Degrowth scenario (DE scenario)
'FIXED' ELEMENT: POPULATION: both types of scenarios will use a 'middle' population growth projection	from statistics bureaus
SHIFTING ELEMENTS Overall socio-economic structure: A capitalist growth paradigm with inherent growth imperative, strong materialism and consumerist culture but incorporates environmental rationality for green growth	SHIFTING ELEMENTS Overall socio-economic structure: A DE paradigm that downscales production and consumption levels, reduces commodification and promotes distributive justice and democracy
NATURE OF HOUSING: Housing is to a great extent a commodity. The degree of it as a right/welfare depends on the economic-political regimes The typical tenure form is ownership Often, housing is an investment object and is financialised Building sector is considered a crucial part of economic growth Housing is considered a positional good, representing an indication of social status	NATURE OF HOUSING: Housing is consistently considered a right and a part of welfare Diversified tenure forms Housing is unburdened from its financial implications Housing is detached from social status
CONSUMPTION: No limits imposed on the consumption of housing (m ² /capita) Increased share of the 'marketed sharing economy; in housing	CONSUMPTION: Upper and bottom limits to the consumption of housing (m ² /capita)
TECHNOLOGY: Eco-efficiency measures 'Green' technologies	TECHNOLOGY: Eco-efficiency measures 'Green' technologies
PHYSICAL STRUCTURE: Metropolitan level: high-rise and high density urbanisation, eventually leading to new expansions to accommodate a growing housing stock Promoting accessibility in transport planning	PHYSICAL STRUCTURE Metropolitan level: high-rise and high density, centralised urbanisation, eventually leading to 'stabilisation' or even 'active urban shrinking', depending on population trends/size and structure Pursuing a sufficiency strategy on accessibility in transport planning
DISTRIBUTION: Trickle-down effect Market as the main distribution mechanism in housing, coupled with interventions by governments, non-profit organisations and foundations for the more exposed groups at risk Ensures basic-standard living conditions Social justice and process equity are pursued through participatory processes to ensure that low-income groups benefit from green practices and green projects	DISTRIBUTION: The state plays a major role in housing distribution Redistribution from those who own big shares of housing stock to those who do not

steady growth in per capita housing consumption. Housing is seen as an important pillar of the capitalist economy, representing a driver for boosting the economy. Consumption of housing is encouraged. Academic debates have, since a long time, recognised housing as a 'wobbly pillar under the welfare state' and positioned it as 'half in and half out' of the welfare state (Allen, 2006; Torgersen, 1987). The EM scenario sees housing as, to a large extent, out of the welfare state and as a commercial good. Therefore, access to it is mainly through market competition on an individual basis. As a result, the more common tenure form is homeownership, which is encouraged by policy makers and politicians. Housing plays a central role as a financial object for both consumers and investors. Consumers access housing through banks and financial systems that lend the funds for purchasing a dwelling. Investors use housing as a form of accumulating capital by both building new dwellings and acquiring estates in profitable markets. Therefore, housing can, as an element, manifest the social status and the economic success of the individuals.

For achieving an environmentally friendly housing development, the EM scenario promotes strategies to decouple a growing housing stock from harmful environmental consequences through advanced eco-efficiency technologies. Here, environmental sustainability is not limited to energy use and carbon emissions but is envisioned in a wider perspective, including land consumption, use of raw materials and biodiversity loss. Eco-efficiency measures are enhanced and increased by institutions at the local and national levels. These institutions use eco-friendly materials for buildings from a lifecycle perspective; in addition, they ensure the application of more renewable energy, the increase of land-use efficiency, the retrofitting of existing housing and the promotion of energy-efficient buildings.

Eco-efficiency strategies in land use operate through densification strategies. New constructions required to satisfy the needs of the inhabitants first take place in the existing brownfields or underused urbanised areas and are later channelled to the outer neighbourhoods

close to transport nodes through dense transformations or expansions. The compact urban structure is conducive to reduce not only is transport-related energy consumption but also the demand for converting farmland or natural land to built-up areas. Because encroachment on non-built-up environment creates a significant impact on farmland loss and biodiversity loss, containing sprawl by building in a dense manner can to a certain degree reduce the pressure on the available farmland and promote biodiversity preservation.

A potential risk of applying the environmental part of the eco-modernist housing policy is the associated negative social consequences. Recent studies on neighbourhood green projects point to the unintended or even intended consequences of a green growth housing strategy on displacement and lack of housing affordability and accessibility (Checker, 2011; Dooling, 2009). This suggests that the level of social justice achieved in housing is intertwined with and dependent on the specific housing regime that is pursued under the capitalist welfare state. Stamsø (2009), by invoking Esping-Andersen's typologies of welfare regime (Allen, 2006), distinguished three housing regimes: the social-democratic, liberal and corporatist regimes. The three regimes are characterised by the different levels of housing decommmodification, the different roles of the state, market and family, the principles of housing allocation and the targeted groups. In the EM scenario, because housing is to a large extent considered as a commercial good, it is supposed that the market plays a significant role in providing and distributing housing, with a low level of state involvement. Through the trickle-down effect, the state accrues part of the benefits from a growing economy to support the most vulnerable groups to enhance their living standard. Such a principle for housing distribution is largely in line with the corporatist or liberal housing regimes.

2.2.2. Principles of the DE scenario

In the DE scenario, the ultimate purpose of the economy is to serve the well-being of people and not economic growth. Given the attention

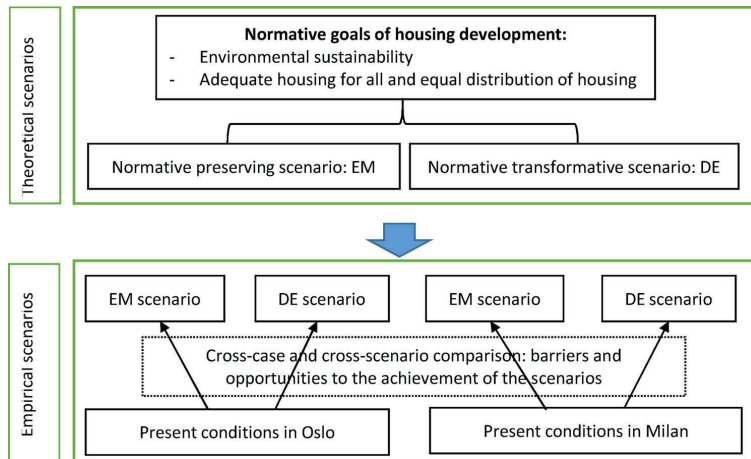


Fig. 1. Methodology.

posed on the basic needs and well-being of human beings, the economic traits of DE need to discard the typical components of the pro-growth economic tenets. Productivity in terms of labour and financialisation ought to be reduced. In the short term, this means increasing the unemployment, which can be counterbalanced by measures such as reduced working hours – to share the reduced level of production efforts among all workable inhabitants instead of leaving some of them unemployed. Within the DE setting, the nature of housing takes the form of a right and is gradually unburdened from its financial implications (Schneider, 2018). Housing is not a positional good anymore and takes a more visible place within the welfare system. Understanding housing as a human right highlights the importance of achieving a more equal housing system. The redistribution of the housing stock needs to ensure affordability and quality for all.

Regarding the environmental goals for a sustainable housing sector, the DE scenario ensures that the environmental goals are met by both adopting eco-efficiency technologies and reducing the per capita housing consumption. Reducing the per capita housing consumption is one of the main aspects of the DE scenario that is grounded on an understanding of sufficiency in housing. Sufficiency in housing is based not on the luxury standard and spacious size of housing but on the basic human needs fulfilled by housing. In practice, this means applying the cap on per capita housing consumption, which addresses both primary and non-primary dwellings (such as vacation homes).

Regarding the land-use dimension of residential development, the scenario we designed deviates from most of the positions expressed within the DE movement. Some DE advocates have promoted localisation and spatial decentralisation as important moves towards a sustainable society (Latouche, 2009; Trainer, 2019). Drawing on the criticisms on decentralisation as the desirable DE spatial development (Xue, 2014, 2018), we imagine an urbanised and a centralised spatial development in the DE scenario. The scenario advocates densification strategies in addition to reduction in per capita housing consumption. The densification strategies are paired with location aspects. For example, densely building in very remote areas, where access to workplaces or services is low, does not necessarily reduce travel distance and its related negative effects (Næss, Strand, Wolday, & Stefansdottir, 2019). In the DE scenario, the need for travel is low and accessibility is promoted through proximity rather than mobility. Different from the EM scenario, we argue for sufficiency in accessibility, meaning that the DE scenario does not aim for ever-enhancing accessibility.

Housing development, as an important component of the DE

society, also faces the challenge of increased inequality if not properly addressed by social policies. Increasing inequality in housing with a limit on total consumption leads to worse repercussions than those in a growing society because the ones who are affected are likely to lose access to the minimum-standard housing and leave their basic needs for shelter unsatisfied. In the DE scenario, housing as a welfare right justifies the need for ensuring everyone's access to housing, which suggests a strong redistributive policy from those who have higher housing consumption to those who have lower consumption. Such distribution leads to a more equal access to housing and certain equalisation of housing consumption. In contrast to the EM scenario, the housing regime in the DE scenario is closer to Esping-Andersen's social-democratic regime typology (Allen, 2006), characterised by the strong intervention by the state in regulating the market – for example, controlling price, reducing financialisation and monitoring speculative activities. In addition, the state plays an important role in housing provision on a universal basis and allocates housing based on need to guarantee high-level housing quality for the entire population.

3. Methodology

Because our enquiry projects into housing future, we use scenarios as the main methodological approach. The scenario approach belongs to the 'future studies' field that explores the methods and tools to discuss future choices and changes (Börjeson, Höjer, Dreborg, Ekvall, & Finnveden, 2006). A scenario approach can focus on either the building of future images or the pathways to the images, or both. In this paper, we primarily address the building of future images and only briefly discuss the possible favourable and hindering conditions leading to the achievement of the images. The overall methodology of the study is shown in Fig. 1.

The use of scenarios within the "Future Studies" field has been often contested (Börjeson et al., 2006). Future studies field itself is considered a "fuzzy field" (Marien, 2002), with different positions taken among so-called futurists and researchers. The approach taken by the Nordic literature includes several elements that appeal to our research. First, the broad use of the scenario concept: this approach covers also predictive attempts using sensitivity testing. "Sensitivity testing" is borrowed from medical sciences and indicates the ability of a test to correctly identify those with a disease: regarding the scenario techniques, it allows testing the efficacy of the scenario itself post-design. Second, the approach by Börjeson et al. (2006), offers a re-arranged typology of scenarios

(predictive, explorative, normative), along with a framework of techniques (generating, integrating, consistency).

The scenario approach has been widely used in different contexts such as business environment, military, energy management and transport planning for various purposes. In the more recent decades, the scenario approach has become an increasingly important research method applied to the topics on long-term sustainable development. Given that the current trend often points to an unsustainable future, a combination of explorative and normative scenarios has been employed to explore alternative futures that can better fulfil the sustainability vision. In urban studies, the scenario approach is rather popular in the transport sector (Banister & Hickman, 2013; Geurs & Van Wee, 2000) but has been rarely applied to the exploration of urban housing futures (Xue, 2017).

According to the scenario typology suggested by Börjeson et al. (2006), three main categories of scenarios can be identified: predictive, explorative and normative scenarios; these respectively correspond to the following three questions about the future. What will happen? What can happen? How can a specific target be reached? In our study, we combine the explorative and normative scenarios.

The normativity in our scenarios means that the scenario building aims at a specific goal for the housing future: environmental sustainability and an equitable and just distribution of housing. Such a strong normative statement in housing is chosen for two reasons. The first reason derives from international statements and acknowledgments: the necessity of equity in sharing resources and meeting the needs of the poor (Weed, 1987) and the right to adequate housing for all (Unhabitat, 2009). Sharing resources must happen between generations, with consideration to the needs of future generations, as well as within each generation, hence giving priority for the needs of the world's poor (Weed, 1987). In addition, part of the fundament for environmental sustainability is a moral obligation to the preservation and well-being of other species and nature (Weed, 1987).

The second reason for the development of a sustainable housing future has an ethical and philosophical dimension to it in the form of human needs theories (Assiter & Noonan, 2007). Although the needs and necessities of human beings are culturally relative, some specific needs are essential across cultures and must be satisfied and met. Drawing on human needs theories (Assiter & Noonan, 2007), we could argue that housing indeed represents a universal life necessity and a necessary satisfier to some basic needs – or better, an intrinsic need. The intrinsic needs include necessities in the strong sense, which have to be met to avoid 'objective harm' (Assiter & Noonan, 2007). For example, in the case of lack of adequate dwelling, the person would suffer from objective harm. The person could re-interpret the need and settle for a worse dwelling but only to a certain limit, which is the limit of adequate standard of living wherein some qualitative standards are met. If a re-interpretation of the final goal or the need is possible without causing harm, then it is not objective harm but 'need deprivation'. As Assiter and Noonan (ibid.) exemplify, instrumental needs and functional needs are those that have to be met to attain to a certain goal. For example, to play the cello, a person needs a bow; the lack of a bow is a need deprivation but not an objective harm because life can move on if the person can revise his or her self-interpretation of the need or the scope. Housing and the adequate standard of living instead belong to the intrinsic human needs because the lack of them (e.g. evictions and homelessness), even after their re-interpretation, can cause severe distress and objective harm to the person.

Within the normative scenarios, it is possible to distinguish between preserving scenarios (aimed at suggesting slight changes to the current situation and maintaining the status quo) and transformative scenarios (aimed at removing the structure blocking the space for changes). The use of transformative scenarios would allow the study to investigate rather radical and unexpected futures without the typical compromises and implementation issues that planners encounter when working with preserving scenarios for their plans (Gunnarsson-Ostling & Højer,

2011).

In our building of scenarios of housing development that encompass both environmental sustainability and social justice, we explore two different images based on different theoretical understandings of sustainable development: EM and DE. The two explorative scenarios reflect different degrees of changes needed for realisation. The EM scenario tells the story of a more preserving future, in which some present mechanisms that are typical of the current housing sector are maintained, paired with certain necessary changes to achieve a significant degree of sustainability and justice in the housing future. This scenario is typical of a future that presents a technological optimism or, so to say, the belief that technological advancement can decouple the environmental impacts of the housing sector and, in general, a faith in the growth model. The DE scenario tells a more radical story, with different standpoints from those in the current conditions, where the growth model, which is widely applied to the housing sector, is challenged. This scenario requires significant changes at the societal level and implies a society in which an active form of DE is applied to different sectors. We anticipate that DE in the active form is a chosen path of society and not a passive form of reduction of consumption or production owing to cyclical and unpredictable economic crises. The two types of scenarios have their basis on normative assumptions, as previously described.

In the paper, we contextualise the two types of scenarios in the contexts of two metropolitan areas: Oslo in Norway and Milan in Italy. The two cases offer some elements in common in the housing sector but also some divergences, especially in the economic aspects. Norway is a country experiencing economic growth, represented by growth rates that are slightly fluctuating but still relatively stable since the 1990s. Economic growth in the Italian context has been fluctuating in the past 30 years; the situation is worsened by a severe debt and several financial crises of different severities, the worst being the one in 2008. In addition, the two countries represent different traditions of housing welfare regimes in terms of housing provision and distribution policies (Allen, 2006). The two city regions can be regarded as 'typical' cases in their respective contexts – namely, in the Nordic region and Southern European region (Yin, 2017). Through replicating the scenario approach to the two cases, we can see how the two futures (EM and DE) unfold in the two parts of Europe. Meanwhile, the two city regions represent two comparative cases with some significant contextual differences that offer the basis for implementing the futures. The comparison between the two cases will demonstrate how the same future scenarios (EM and DE) can manifest differently in different contexts.

The construction of the scenarios in the cases is based on different data sources. We collected documents from planning agencies, institutions and governments and performed document analysis to picture the current conditions in the housing sector of the two countries and metropolitan areas. In addition, we collected data from the national census, energy institutions and statistical projections for the future of the Oslo and Milan metropolitan areas. The data were processed, analysed and interpolated to pinpoint trajectories of their futures. The scenarios shown below for both cases are the result of our analysis. Some asymmetries in the data are present between the two cases owing to the availability and quality of the data.

For each case, we developed two scenarios. The time span for all the four scenarios is from now to 2030. We chose this year in the future because it allows for a high degree of reliability of data interpolation, which we have used for the energy and environmental considerations of the future images. In fact, we were able to retrieve reliable data for both metropolitan areas up to 2030; therefore, for the sake of credibility of the energy figures shown in the scenarios, we had to limit the period up to 2030. Moreover, for consistency between the different aspects of the scenarios, both qualitative and quantitative, we had to adhere to the year 2030.

The scenarios for Oslo and Milan are based on the assumption of growing projected population. In both cases, we selected data from

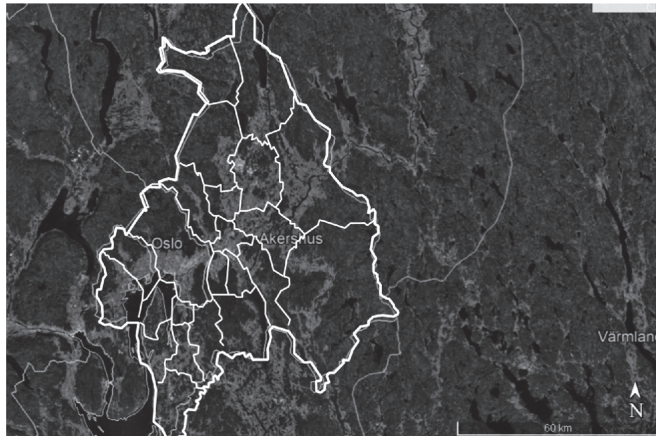


Fig. 2. The Oslo metropolitan area. Source: author's elaboration on Google Earth (2019).

national and municipal agencies that prospect middle growth demographic projections. All the scenarios are normative and aim to achieve an environmentally sustainable and socially just housing development. For environmental sustainability, we worked on different dimensions: we made calculations for the stationary energy use, for the land consumption and distribution of housing in the metropolitan areas and for housing-related transportation impacts.

In terms of stationary energy use, housing impacts the environment at various levels: it consumes land and therefore threatens biodiversity, consumes raw materials in its production stage and requires energy during the use stage, including operational energy, water and energy for maintenance and repair. For our purposes, it will not be possible to use the values that include all possible variables and impacts, and for consistency reasons with existing statistics and research, we used for our calculations the unit of measurement, toe (tonne of oil equivalent), which covers the widest possible sources of consumption in the use stage of housing. For practical purposes and for simplifying our results, we decided to convert the results in a more accessible unit of measurement, kWh/m², which will be used from now on in all the four scenarios. We utilise the environmental targets formulated in national and local policies in the respective countries and metropolitan areas. In the Milan case, the national goals are in compliance with the EU ones. We therefore referred to the national and supranational goals to assess the need for adjustments in the stationary energy use. The ways in which the goals are met are different in the two scenarios: in the EM scenario, reduction happens mostly through eco-tech innovation in the housing sector, whereas the DE scenario limits the consumption of square meters per inhabitant.

Under the environmental sustainability aspects, we always addressed the question related to land consumption in the two scenarios as well as the transportation impacts of different housing futures. The land consumption figure for the two metropolitan areas is retrieved from the current planning documents for future developments. Then, the two scenarios, through different strategies (e.g. densification strategies), assess the distribution of housing increase, or eventually cuts it.

Regarding transportation impacts, a number of studies worldwide have shown that low-density suburban development increases the need for motorised travel, particularly by car, whereas densification within existing urban area demarcation, especially the densification in areas close to the city centre, reduces car travel and encourages the use of non-motorised travel modes (Ewing & Cervero, 2010; Næss, 2012; Næss et al., 2019). Based on the data from a recent study in the Oslo metropolitan area (Næss et al., 2019), we were able to roughly estimate

the energy use for intra-metropolitan travel in the Oslo case for the 2015 situation (when the data of the above-mentioned study were collected) and for the business-as-usual (BAU) EM and DE scenarios of 2030. Owing to the lack of data, no similar quantification has been made for the Milan case. The transportation energy consequences of the Milan scenarios will nevertheless be qualitatively discussed.

Controlling for the demographic and socio-economic characteristics of the residents as well as for residential preferences, the study in the Oslo metropolitan area showed that intra-metropolitan travelling distances by car and by transit were mainly influenced by the distance from the dwelling to the city centre of Oslo. No other built environment variables showed statistically significant effects on travel distances by car or by transit. We have therefore applied the regression coefficients for the effects of residential distance to the city centre of Oslo on weekly car travelling distance and distance travelled by transit, respectively, to the 2015 situation as well as for the BAU EM and DE scenarios of 2030. Energy use per person kilometre travelled by different travel modes has been calculated from the empirical data for the Oslo metropolitan area available from Akershus Fylkeskommune (2019) and VY (2019). The results of the calculation should be interpreted with a great deal of caution because we have assumed that the influence of residential location on travel distances by car and transit will remain the same in 2030 as in 2015 and that energy use per person kilometre travelled by the different travel modes will also remain the same. In reality, these parameters, particularly the energy figures, could be expected to change. To illustrate the main differences between the scenarios, we still think the estimates may be illuminating.

4. Current conditions in the two metropolitan areas

Before addressing the scenarios, it is crucial to contextualise the trajectory and status quo of housing development in the Oslo and Milan city regions with a focus on the features of the housing sectors. The contextualisation provides a baseline for the following scenario building. We will delve into the social, environmental and economic aspects that shape housing development and its structure. The following table gives some information about the aspects related to the two contexts and shows some differences. Nevertheless, the specificities of the two contexts will be discussed in detail in the upcoming sections.

4.1. The Oslo region

The Oslo metropolitan area includes both the central core

municipality of Oslo and the county Akershus (Fig. 2). Today, the metropolitan area covers approximately 5 000 km² and includes 22 municipalities with 1 305 122 inhabitants, of which ~681 000 live within the core municipality of Oslo (SSB, 2019). The Oslo metropolitan area extends from the Oslo Fjord in the South up to the Mjøsa Lake in the north. It is the most populated region in Norway and is one of the most important economic areas of the country.

Oslo, as the largest Norwegian metropolitan area, is attractive for business and newcomers. The relative stability of the Norwegian economy, which has kept growing since the 1990s, enables Oslo to be a growing arena for housing and business. The growth trend in the finance and economic sectors keeps increasing the values of the building sector and the real estate market in the city of Oslo. Moreover, housing consumption, which is measured in monetary expenditure, increases owing to the governmental policies aiming at stabilising the interest rates on housing mortgages. The positive demographic trends of Oslo and its metropolitan area concur with the pressure on the housing market in Oslo, making the housing market attractive and raising the financial values of the stock.

Low rates of unemployment and profitable access to mortgages facilitate the entry into the very expensive housing market in the Oslo metropolitan area. As Statistics Norway underlines in its 2018 report (SSB, 2018), housing prices in the Oslo metropolitan area increased by 815% from 1992 to 2017, even though a slight decrease was observed in 2017. The housing sector is strongly marketised and has a very significant share of homeownership, which is the preferred and most common form of tenure. The housing market, with its elevated costs, is not counterbalanced by the presence of a large social housing stock, which partly contributes to the observed social segregation in Oslo. Some segregation patterns of relocation have been underlined (Turner & Wessel, 2013): these patterns hint at a population distributed according to income, ethnicity and education, especially between the eastern and western areas of Oslo. Housing prices and distribution are therefore different too, with the west being more affluent and having higher housing prices and the east being more diverse but typically having lower housing prices.

In terms of the public provision of social housing, Norway represents an exception among the Nordic countries. The share of social housing is quite small in Norway and amounts to around 5% of the entire housing stock (Andersson et al., 2010). Some scholars have pointed out that the small share of social housing in general and of the rental sector in particular might have caused a segmentation of the housing sector (Skifter Andersen, Andersson, Wessel, & Vilka, 2016). The presence of large co-operatives seems, however, to have been able to bridge the gap between ownership and the rental sector. This was true especially in the past, when the establishment of these co-operatives (OBOS, USBL, etc.) enabled many workers and citizens to access housing on a more affordable basis. The largest housing estates in Oslo have been built by co-operatives and their units were sold at an affordable price to the inhabitants. Many of their larger estates were located in the eastern part of the city, thus contributing to the concentration of certain social groups as mentioned above. Even though co-operatives still play the bridging role (Skifter Andersen et al., 2016), they have increasingly been offering dwellings at the private market price, thus acting as private actors. The responsibility of the public provision of social housing usually belongs to the different municipalities and this includes providing dwellings at a low rental price for persons in financial or personal distress. The public provision of social housing usually addresses individuals or families presenting financial problems, which more often are accompanied by some other problems (sickness, drug addiction, etc.). An important question related to housing future is whether the path taken nowadays leads to more segregation or integration in the city. The main policy from the government side to secure accessible housing for all is to secure a stable interest rate for housing mortgages (Andersson et al., 2010).

On the environmental side, Norway, and mostly Oslo, has been very

progressive. In particular, the Norwegian authorities have encouraged the compact city strategy in most of the big urban areas. The compact city strategy promotes the construction and densification of areas within the inner core of the city, near crucial public transportation nodes and hubs, thus reducing the conversion of rural land or natural environments in the outer areas of the city. The result is decreased environmental impacts owing to the reduction of car transport and travelling distances in general. The promotion of this strategy is even more evident in the latest regional plan for the development of the Oslo metropolitan area (Akershus Fylkeskommune, 2015). The plan reaffirms the goals and suggests growth corridors along the public infrastructure axes and existent major transportation nodes. Densification strategies of the housing stock in the Oslo metropolitan area are accompanied by the positive fertility rates and the longer-living population (SSB, 2016).

Some changes can be observed in the housing habits and lifestyle of Norwegians. On average, the dwellings in Norway have four rooms, compared to 3.6 in 1980 (SSB, 2018). The increase of space available per person could have been one of the reasons for an increase in the domestic energy consumption. The increase in per capita floor area can lead to increased total energy consumption, despite increased energy efficiency. Particularly in the Oslo Metropolitan area, the trend of domestic energy consumption has been increasing over the years, reaching a very high level in 2008, which has then decreased and stabilised to 172 kWh/m² in 2015.

The economy in Norway is healthy and booming according to major indicators and standards, and it is widely supported by population growth. Statistics Norway projects an increase in the population of Oslo by ~284 000 inhabitants within the next 15 years (SSB, 2016), which is a significant element to be considered when planning for a strategy at the metropolitan level. Norway is referred to as an example of eco-modernisation and care for the environment in urban development (Næss, Næss, & Strand, 2011), both for the quality in the housing stock and for the clear aim of discouraging sprawl in the regional area, which has been pursued in the past 30 years (Næss et al., 2011). The preserving approach towards natural areas, active policies towards the reduction of emissions and the improvement within the public transport sector have been the core reasons for Oslo being appointed as the European environmental capital of 2019.

4.2. The Milan region

The Milan metropolitan area includes as many as 133 different municipalities for a total of 3 234 658 inhabitants (Città Metropolitana Di Milano, 2017) (Fig. 3). It covers 1 575 km² and is located in the northern part of Italy. The core municipality of Milan accounts for almost half of the inhabitants, 1 372 810 (ISTAT, 2018). The Milan metropolitan area is situated inland at the northern end of Po valley, which makes it topographically quite flat. The Milan metropolitan area is considered as one of the most affluent city regions in Italy and the most important economic area in Italy based on Gross Domestic Product (GDP).

The economic, social and demographic conditions of Italy tell a different story from Norway. Economic growth in Italy has seen extreme fluctuations in the past 30 years; the situation is worsened by a severe debt and several financial crises of different severities, the worst being the one in 2008. All the economic strategies that have been used since the financial crisis of 2008 have aimed at containing the public debt, imposing a form of economic crisis containment and the so-called austerity measures with the clear aim of re-establishing economic growth. The result has been a rise in the income taxes along with fewer investments in different sectors, elevated unemployment rates, especially among the younger generations, and increased emigration rates. Even after almost 10 years, the economy has not reached the level of the pre-crisis decade, but some signs have pointed at positive changes.

This is the typical case for the national level; for the other regions

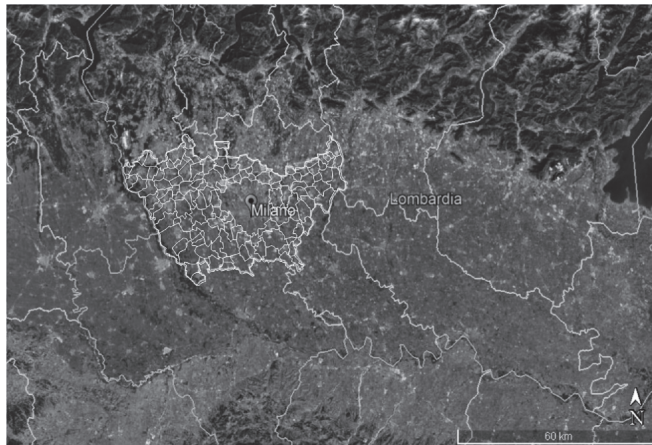


Fig. 3. The Milan metropolitan area. Source: author's elaboration on Google Earth (2019).

and the more remote areas of the country, some exception might occur. Milan might be included among the exceptions because it is a central node and hub for business and attracts investors, city users, tourists and workers from the rest of the country. The city is counted among the so-called global cities (Sassen, 1991), a conceptualisation representing the cities that can attract jobs, tourists, investments, flow of capital and goods. In this sense, Milan represents a space of opportunity and an arena for new businesses and investments. At the same time, the metropolitan area presents significant unresolved social issues: inequality and poverty. They might be visible in the form of homelessness (Tosi, 1994), ranging from the more critical forms that include sleeping rough to overcrowded housing situations or insecure forms of tenancy and risks of eviction. Homelessness might be attributable to different reasons: migration, financial distress and economic crisis affecting the poorest groups and structural causes linked to the housing sector and its financialisation. In general, even if Milan has an economic background that is similar to Oslo, it presents differences within the housing sector, which are worth noticing. The gap between the rich and poor in access to housing as well as the risks concerning marginalisation, segregation and housing exclusion in general are much more significant in Milan than in Oslo.

The housing sector in Milan is highly financialised and has high costs; moreover, some of the stock is bought as an investment object. The Italian housing sector shares several common points with the Norwegian one, especially when comparing Oslo and Milan. First, the housing sector is significantly marketised, meaning that after the 1980s, most of the public housing stock has been sold, leaving to the market the complicated redistribution responsibility. Second, as in Norway, homeownership is the most common tenancy type in Italy, followed by the private rental market. Third, similarly, the public sector has retreated from the production of social housing and often retreated from the maintenance of the stock as well, leaving a very low quality of dwellings for the poorer groups. Owing to the global financial crisis, affordability has quickly become a significant issue in the housing sector: households have diminished their expenditure, and at the national level, cuts were made in public policy investments (Baldini & Poggio, 2014).

At the same time, land conversion into residential areas has considerably increased in the past 30 years, particularly in Milan and Rome. Governments and economic policies have endorsed the building sector, considering it a fundamental trigger for economic growth. The Institute for Protection and Environmental Research (ISPRA) has released in 2015 a very rich report that shows how weak the links

between housing production and demography have become (ISPRA, 2015). As ISPRA (2015) underlines, in the past, population growth was positively and stably correlated with urbanisation. However, in recent decades, the link between demography and urbanisation processes is no longer coherent. The paradox here is that housing production has increased over the years but apparently not the population.

As previously underlined, land consumption (including land for housing) does not relate anymore with a real increase in population. The Italian population is actually ageing and fertility rates are at one of the lowest levels ever, whereas land consumption and the production of new dwellings have been on the rise in the past decades. This manifests through the longstanding problem of vacancy in the housing sector. The paradox, therefore, involves a population struggling to access housing owing to unemployment and tense economic contingencies and, on the other side, an underused housing stock. This problem is well-known in the housing literature and occurs both in major cities and in smaller areas (Glock & Häusermann, 2004; Hospers, 2014).

If some of the housing stock cannot be used because of private ownership, there is still the public share of housing stock to be discussed. The public sector hardly manages to mobilise funds to ensure new social housing. Municipalities could hypothetically work with the private owners to mobilise the unrented and vacant dwellings using incentives and tax discounts. In terms of the existing social housing stock, issues related to the very low level of maintenance of the dwellings exist. The public sector, by law, cannot rent out for social purposes houses with very low standards; moreover, because of the economic crisis, many municipalities have not managed to keep up with the maintenance work of their housing stock, leaving many empty unused dwellings behind. On the contrary, the over-production of the pre-crisis period has created a housing bubble in some cities in Italy, leaving many units empty.

The housing market is difficult to access owing to the rising costs both for purchasing and renting. In terms of social housing, state intervention represents a very small percentage in the housing provision: only 4.5% of the entire Italian housing stock is social housing (Boatti, Quaranta, & Tripodi, 2012). In the Milan metropolitan area, the figure is slightly more positive, where social housing accounts for 9.8% of the entire housing stock (Regione Lombardia, 2018).

The mismatch between the social housing stock and the housing needs of the Milan metropolitan area today is quite alarming. In 2012, a research group of Politecnico di Milano (Boatti et al., 2012) had estimated for the year 2018 an unmet need for social housing of ~281 000 units. The figure was very high: one third of the entire amount

represents a normal and cyclical need, which includes new couples and households, divorces, etc. The rest, as underlined by the association, includes different forms of housing deprivation typical of several degrees of homelessness (Edgar, 2012). As stated in the ETHOS typology, homelessness includes both the forms of inadequate housing (overcrowded, insecure conditions, etc.) and the most extreme forms, such as rooflessness. Regarding the most extreme forms of homelessness, the Italian National Statistics office (ISTAT) periodically releases a report including the mapping of homeless persons in the entire country, with specific data for the major cities. In the case of Milan, the count for 2014, which the latest available count (ISTAT, 2015), has a figure of 12 004 persons.

The share of social housing needed to meet the needs of the poor is significantly high. At the same time, however, the free market has an excess of ~85 000 private housing units in the Milan metropolitan area (Boatti et al., 2012). These units are plausibly vacant dwellings that are neither sold nor rented out for various reasons not explicitly stated in the data. There might be several reasons for this; we can only speculate. The economic crisis has hit different sectors, including the housing market. As a result, large-sized units are too expensive for low-income groups, and the demand for such dwellings has diminished. The supply of housing has kept increasing owing to the policies within the building sector to boost the economy and economic growth, creating an exceeding amount of dwellings on the market. In certain areas, the financial value per square meter of these dwellings might have decreased, discouraging owners from selling them. Other vacant dwellings might be the result of evictions; in other cases, the dwellings might have been re-acquired by banks as a result of unpaid mortgages. Other reasons for the presence of vacant dwellings within the Milan metropolitan area might include the high costs of renovation, which the owners choose not to bear before renting or selling the units. The presence of vacant dwellings on the market does not automatically represent an opportunity for the poor. Even if the units were to be rented out or sold, they would do so on private-market-based transactions with significantly high real estate values. This element creates quite a visible mismatch in the current housing sector, leaving open questions about the equity of the system.

The 2017 report from the General Commission on Social Policies, Housing and Disability (Regione Lombardia, 2018) underlines that the current distribution issue derives from the fact that the private housing market does not seem to be able to satisfy the housing needs of the inhabitants. The available large-sized dwellings are expensive and therefore raise difficulties for the increasing number of single-household groups to access those dwellings. One of the reasons mentioned in the report is that the housing needs have become more segmented and differentiated (ibid.). Within the definition of segmented and differentiated, we could include different phenomena. Today, people need more temporary and flexible accommodations to reflect their jobs and lifestyles. These same people who tend to relocate often and have only one income per household might not be interested in some of the expensive features offered in some dwellings (e.g. terrace, garage and double bathrooms). They might not be interested in the bigger properties available on the market. Families today are not as large as before and have become more prone to separations. Some families prefer to invest in other leisure activities, or hobbies, instead of prioritising a very large-sized dwelling.

The same report (Regione Lombardia, 2018) also mentions that the vacant housing phenomenon represents an alarming signal, which highlights the difficult distribution situation in the Milan metropolitan area. This phenomenon is referred to as an increasing misalignment between supply and demand in the housing sector and responds to the examples we just presented. Within this frame, which the report addresses as a real 'housing emergency' (ibid., p.26), the institutions have decided to reinstate forms for housing welfare. These housing welfare measures might include financial support to low-income households as well as funds to increase the share of social housing in the metropolitan

area. In 2017, the metropolitan area of Milan had 144 884 social housing dwellings. Further mapping has revealed that in the sole municipality of Milan, hence excluding the rest of the municipalities in the metropolitan area, 10 900 social housing dwellings were vacant. Note that the figure of homeless people in the same municipality amounts to ~12 000 persons. The reasons for the dwellings being vacant are different: some might be simply on hold to be rented, some do not meet the quality standards set by law and some others are illegally occupied.

Regarding the environmental aspects, Milan has paid attention to the creation of green spaces for recreational purposes in urban areas and to the eco-tech advancements in the building sector that can help in reducing the environmental impacts. However, priority has been given to economic growth partly through the housing sector. This has certainly produced a higher level of ecological impacts. These impacts might have been partially decoupled through eco-tech measures (e.g. better insulation, more sustainable materials and more efficient heating and cooling systems) but have surely led to increased land use and emissions in the building phase of the sites.

4.3. Different conditions, different challenges

In the domain of environmental sustainability, the Oslo city region seems to be a forerunner owing to its more ambitious and proactive land use policies in pursuing sustainable housing and urban development. Its strategy is more in line with the eco-modernist paradigm. The Milan city region, however, is less active in adopting measures for housing and urban sustainability owing to the political priority of boosting economic growth over environmental issues. In terms of social justice in housing development, both metropolitan areas face inequality, unaffordability and segregation issues to varying degrees. The neoliberalisation of housing policy is a common general explanation to the generation of these social issues in the two metropolitan areas. However, the growing economy in Norway helps to relieve the hardships of the poor and soothe the potential conflicts between the social groups regarding access to housing. In contrast, the passive DE condition in Italy worsens social inequality that is manifested in a more severe form than that in the Oslo region.

These similarities and differences between the two countries and between the metropolitan areas provide rich settings to explore alternative futures for housing development. The scenario building below will show that given the different baseline conditions and challenges, the scenarios manifest differently in the two cases.

5. Housing development scenarios in the Oslo metropolitan area

5.1. EM scenario applied to the case of Oslo

In the current scenario for the Oslo metropolitan area (comprising the municipality of Oslo and the county of Akershus), the population would grow during the period from 2012 to 2030 by 24.3%, which makes up a total growth of ~284 000 inhabitants. The EM scenario, following the present growth rates in the housing sector, would require 142 000 new dwellings for the year 2030. The calculations are based on the same housing distribution rate as today, which is 2.0 persons/dwelling. The future imagined for Oslo in the EM scenario is optimistic in the technology and imagines that even without challenging the current growth model, decoupling the environmental impacts produced by a growing housing stock would be possible.

5.1.1. Environment and technology in the EM scenario

In 2008, the stationary energy use per dwelling in Oslo was already high: at the rate of 1.88 toe. This decreased to 1.76 toe/dwelling by 2015. Considering the same level of consumption and the increase of dwellings required owing to the 24.3% increase of population by 2030, the total residential energy consumption would consequently increase by 17%. An increase in the per capita housing consumption in square

Table 2
Key figures of the contexts.

	MILAN	OSLO
Extension	1 575 km ²	5 000 km ²
Population	3 234 658	1 305 122
Domestic energy consumption	193 kW h/m ² (in 2015)	172 kW h/m ² (in 2012)
Square meter per person (dwellings)	41	50.5

meters could be assumed. However, the EM scenario aims at a reduction in energy consumption and environmental impacts, which would be especially performed by the introduction of technological measures and regulations to reduce such impacts.

To compensate for the population growth and reach a 0% increase in energy consumption by the housing sector, the energy consumption would have to be reduced to 1.42 toe/dwelling (Table 2). This value would stabilise the total residential energy consumption, even with the increase of 142 000 new dwellings from 2015 to 2030. An increase in square meters per person is assumed. Based on an increase of 1 m²/person from 2009 to 2012, the total residential floor area per capita is estimated to be 56.4 m²/person by 2030. This increase reflects the fact that the future imagined in the EM scenario does not imply a reduction in consumption per capita but instead allows for an increase. Thus, assuming an increase in population size, the number of dwellings and per capita housing consumption, stabilising the total residential energy consumption would mean a decrease of energy intensity from the current 172 to 124 kW h/m² by 2030 for the entire housing stock. Note that the latter figure should apply to not only the newly built dwellings but also the entire housing stock, which suggests the need for large-scale retrofitting of the existing buildings.

However, the latest building regulation for energy efficiency applied in Norway (TEK17) only suggests that buildings should reach an energy efficiency level of 158 kW h/m², which is much higher than what the stabilisation of residential energy consumption would allow. Consequently, following TEK17 would lead to a 28% increase in the total energy consumption.

5.1.2. Physical structure of the city in the EM scenario

In terms of spatial development, the metropolitan area will follow the already existing densification strategies by developing high-rise and high-density residential areas around the key public transportation nodes. This policy is already taking place, ensuring the further reduction of land consumption and the increased use of public and non-motorised transport. The Oslo city region spans 5036 km², including the Oslo municipality and the entire county of Akershus. It comprises 480 km² of urbanised areas, of which 199 km² of area is residential (4% of the total area). The current plans require an estimated increase of 29 km² in the residential area, of which 22 km² will take place in the outer municipalities and 7 km² in the Oslo municipality (based on program plans).

The way the land is disposed in the plans might include the construction of new low-density housing, especially in the municipalities in the outer areas and on the fringe of the metropolitan area. Fig. 4 shows the areas allocated for residential construction in the municipal plans of the Oslo metropolitan area. Even though many transformations are in line with the densification strategy, it is fair to question whether the transformations towards the borders and fringe of the metropolitan area actually serve the same purpose. The regional plan for the Oslo metropolitan area (Akershus Fylkeskommune, 2015) shows the green structures of the entire metropolitan area. The classification made distinguishes between three typologies: the protected forest areas (Marka), the biodiversity corridors and the farmland areas and their interconnections. According to our rough estimates, approximately 30% of the residential transformations in the Oslo metropolitan area

will most likely take place on either farmland or biodiversity corridors. The rest of the transformations will occur on urbanised fringes or in underused areas.

In the EM scenario, we aim at further reducing the need for urban expansion by strengthening the densification strategy that is also applicable to the outer municipalities. The calculations we produced for the EM scenario show a different future image from the one shown in Fig. 4 (left). By 2030, a reduction in land consumption for residential construction will be observed. We assume a higher density than that estimated in the plans using one of the denser neighbourhoods of the Oslo municipality, with an average density of 13 913 persons/km². A centre-periphery gradient in density will still exist, with on average 50% higher density than the overall mean in the inner-city neighbourhoods of Oslo, on average 50% lower density than the overall mean in the outer municipalities of the metropolitan area and a gradual decrease in-between as the distance from the city centre of Oslo increases. The required space will only be ~20 km², a 30% reduction of the planned residential expansion (Fig. 4, right). The ratio of residential to urbanised area will be 46%. As visible in Fig. 4 (right), the areas will be reduced in the municipalities towards the border of the metropolitan areas and in the municipalities using valuable farmland.

An increased urbanization, of 20 km² will lead eventually to an increase in the need for mobility. The EM-scenario considers increased mobility as progress, hence invests resources in providing better roads, trails etc. Even though the EM-scenario is able to limit the expansion towards farmland, it still requires effort and big distances for many inhabitants to reach their daily activities: work, leisure etc. The residents' travel to places they need to reach to carry out their regular activities represents an important part of the energy consumption and causes substantial greenhouse gas emissions.

Due to the much higher share of densification and a more centralized location of housing development in the EM than in the BAU scenario, estimated energy use for intra-metropolitan travel is lower in the EM than in the BAU scenario. Whereas the pattern of residential location implies an increase in estimated energy use per capita for intra-metropolitan travel increases by 32 % in the BAU scenario, the increase is 14 % in the EM-scenario. Because there is also population growth, the total energy use for intra-metropolitan travel is estimated to increase by as much as 42 % (with an even higher increase of 63% in the BAU scenario). Although some improvement in the average energy performance of vehicles is expected over the period 2015-2019, it seems evident that additional measures to promote sustainable mobility will be required in the EM-scenario, such as increased road pricing.

5.1.3. Housing distribution in the EM scenario

Oslo has a very vivid and active housing market, with rising prices per unit of floor area. In this setting, which has a high level of homeownership, most people would access housing through financial channels (bank mortgages). In the EM scenario, neither the current consumption rates nor the distribution patterns of housing are challenged. In the case of the Oslo metropolitan area, using data from Statistics Norway, the dwelling occupation rate is estimated to be 2.0 persons/dwelling in 2012. The exact data for the distribution rate of inhabitants per dwelling is unfortunately not available for Oslo, which leaves open questions about the effective size of the households and whether they match the housing size.

A peculiar trend visible in the Oslo metropolitan area is the cohort of dwellings of size less than 30 m² (Fig. 5), which is in the number of 20 000. The TEK17 regulations for Norway (LOVDATA, 2019) do not set a specific minimum size for dwellings, which leaves open the possibility for smaller units. Municipalities usually set specific minimum standards, which, in new constructions, builders ought to comply to.

The EM scenario would continue following the increase in per capita floor area in a marketised housing sector. In the EM scenario, more dwellings would be available within the frame of the so-called marketised sharing economy.

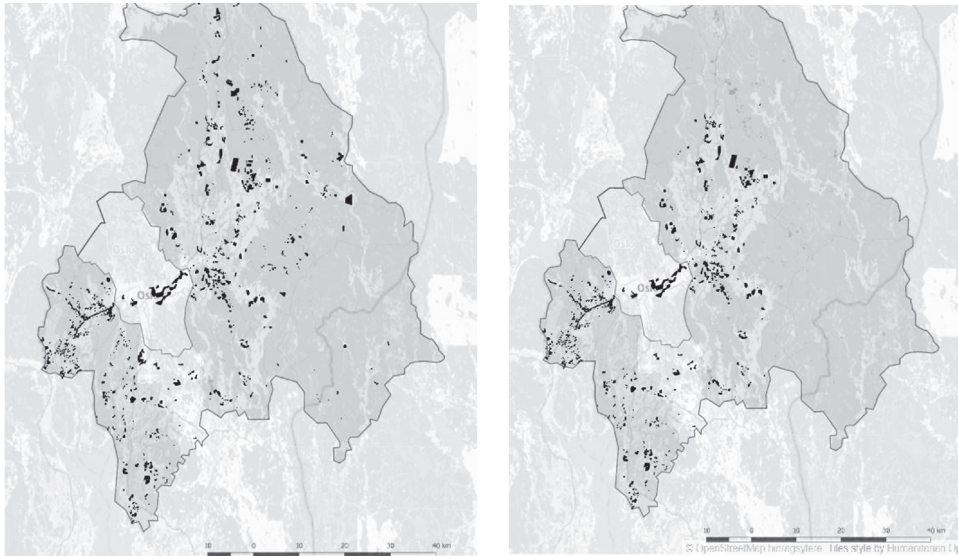


Fig. 4. New residential areas in the Oslo metropolitan area according to existing plans (left) EM scenario of new residential areas in the Oslo metropolitan area (right). Source: authors elaboration.

Regarding the social justice aspects of the EM scenario of Oslo, it is crucial to overcome what Andersen and Skrede (2017) have defined as a 'reproduction of a segregated municipality'. Historically, the city of Oslo has been socially divided by the west-east axis. Among the measures to improve social sustainability and social justice, the Oslo municipality has promoted the densification plan and strategy. However, this densification strategy mostly takes place in the eastern area of Oslo, whereas the western part, which is more affluent and less dense, avoids much of the expected growth (Andersen & Skrede, 2017).

Following the concepts of 'reflexive EM' (Hajer, 1995), a broad change incorporates both the ecological concerns and economic structures of society through redistribution, social justice and democratisation (Gibbs, 2000). Therefore, the Oslo metropolitan city will boost the fair distribution of the densification strategies among the east and west and, above all, will provide a change through participatory actions involving different groups, especially the hard-to-reach ones. A more

equal distribution also attempts at resolving the present lack of social justice in recent projects. The case of the waterfront regeneration is namely discussed (Andersen & Røe, 2016) as a failed attempt to apply the 'just city' concept. In reality, this recent development has aimed at attracting wealthy and creative classes instead of providing any social housing in this specific area. To resolve these flaws and the unjust distribution, in the EM scenario, the municipality will more actively engage in the construction phase by, for instance, promoting and regulating a percentage of affordable or social housing within new development areas and possibly the existing areas too.

In terms of environmental innovation for the buildings and neighbourhoods, these eco-tech measures will involve not only the wealthier neighbourhoods but also the low-income ones. As Gilbert (2014), the current 'green neoliberalism' concurs with aggravating the existing polarisations. She mentions that low-income neighbourhoods are very seldom the objective of innovation, which is typical of the green

Distribution of dwellings sizes 2017

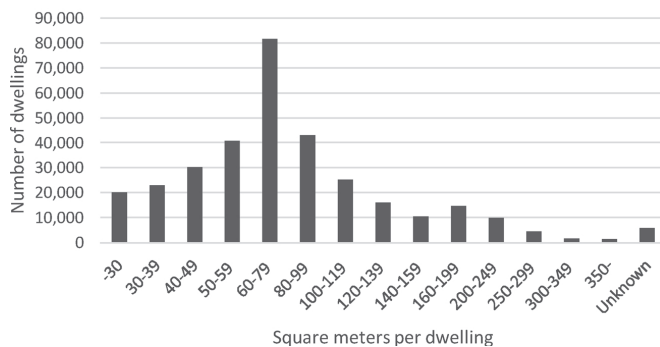


Fig. 5. Distribution of dwellings in Oslo.

agenda. To achieve social sustainability, the EM scenario in the case of Oslo will diffusely promote eco-tech measures even in the social housing estates and in the low-income and high-density areas mostly located on the eastern side. This approach will promote social justice as well as environmental justice with the aim of improving the well-being of most inhabitants.

5.2. DE scenario applied to the case of Oslo

5.2.1. Environment and technology in the DE scenario

To achieve sustainable future housing development, a crucial difference of the DE scenario from the EM one is that the DE scenario limits per capita housing consumption in addition to employing eco-efficiency technologies. The DE scenario does not allow for growth in the total number of dwellings, thus posing challenges in the allocation of space and energy consumption and distribution. As shown in Table 4, the aim is to maintain a stable level of energy consumption from 2012 to 2030 and possibly to decrease it. For simplicity, we decided to set the value to 0%. We later analysed the data and imagined two different strategies to achieve the stabilisation of the total energy consumption.

The first strategy, as observed in the last row of Table 4, is to set the limit of square meters per person to the levels of 2012, which would still require some retrofitting to improve building energy efficiency. This would be viable if a reduction in the consumption per capita were not possible or if, for example, a transitional period towards a more radical policy is expected. The value of 50.5 m²/person would still be quite high compared with, for instance, the case of Milan. Within the DE scenario, however, this first strategy would resemble a non-growth scenario, which stabilises the levels of per capita housing consumption.

The second, more radical strategy that would rapidly stabilise the total energy consumption would be to only set a limit on the square meters per person, which would mean reducing the current values to 44.2 m²/person (Table 4, the second last row). This reduction in per capita consumption is quite demanding and would require both policies and regulations in place to encourage the current population to reduce their space consumption.

Nevertheless, this table quite clearly shows how high the energy consumption of our volume of housing consumption is. A reduction of 5 m² in our average housing consumption can have a significant impact on the environment. Moreover, this result does not include other forms of retrofitting or eco-efficiency improvements of the old housing stock. If, instead, the maximum housing consumption per person is set to the levels of 2012, the energy consumption would have to be reduced to 138 kWh/m², which would mean retrofitting 89 000 dwellings (12% of total dwellings). If we add to the reduction in energy consumption deriving from the retrofitting policy, the reduction in total energy consumption would be even more significant. Our investigation unfortunately lacks adequate data on the future application of clean energy and renewables in residential areas. Including these sources within the ones that we currently use and envisioning more efficient use of the energy resources is quite crucial and can be an object of a more specific future investigation.

5.2.2. Physical structure in the case of Oslo

According to our estimations, following the DE scenario, it is possible to imagine a future wherein there is a decrease in the per capita housing consumption. Such a decrease will allow avoiding new constructions for residential purposes beyond what is required to replace the existing dwellings demolished within the time horizon of the scenario. In the DE scenario, suburban dwellings at unfavourable locations from a sustainability point of view will be demolished instead of being renovated when they get worn down. The built environment in such neighbourhoods will then gradually be 'given back' to nature or, when soil conditions allow, will be converted into farmland. The neighbourhoods in question will partly be the residential areas in the outskirts of the metropolitan area with poor public transport access and/or

the neighbourhoods that are fragmenting continuous natural and outdoor recreation areas. The dwellings to be demolished in the DE scenario will partly be those in villa areas adjacent to the inner city of Oslo, where existing single-family houses will be replaced with dense apartment buildings.

The new densities in these transformed areas will be similar to the average inner-city density in the EM scenario. As a result, despite no net increase in the housing stock, the dwellings in the DE scenario will on average be located closer to the city centre of Oslo and in denser neighbourhoods than in the present situation. Because the demolishing of environmentally unfavourable dwellings in the outskirts of the metropolitan area will incrementally take place over a longer period (tentatively, about 30 years) than the 2030 time horizon, only a few of the peripherally located residential areas will be completely depopulated and converted into non-urban land within this period, whereas the population density of several other unfavourably located residential areas will decrease as some of their existing buildings will be demolished. We therefore estimate that the size of the residential areas in the Oslo metropolitan area will be reduced by 0.25% by 2030 in the DE scenario (i.e. from 199 to 198.5 km²), whereas the mean distance from the inhabitants' dwellings to the city centre of Oslo will be reduced by 2%. Owing to the high population growth in the study period and the slight reduction in the size of residential areas, the average population density of the residential areas will increase by as much as 25%. (Similar replacement of older, unfavourably located office buildings with new, eco-efficient buildings in the high-density areas closer to the city centre will take place for specialised office workplaces in the DE scenario.)

Fig. 6 is a clear contrast to the EM scenario (Fig. 4, right) and the residential expansions of the current plans of the Oslo metropolitan area (Fig. 4, left). The DE scenario is based on a more urban and dense development of cities. As mentioned earlier, different from what has been advocated by some DE proponents of decentralised human settlements, our DE scenario emphasises a centralised and dense urban structure as the environmentally sustainable spatial structure. Because no non-developed land is appropriated for residential purposes, the DE scenario leaves farmlands and biodiversity corridors available for their current use.

The approach we chose for the physical and territorial aspects of the DE-scenario also lead towards a different future in transportation policies. Instead of facilitating mobility, policies in the DE-scenario revolve around proximity and sufficiency in the mobility practices. The strong urban containment resulting from not developing any new residential areas in the DE-scenario contributes to considerably lower transportation energy use and emissions than in the EM-scenario. Nevertheless, the DE-scenario would need more investments in the current infrastructures, given that a population increase is assumed. This would result as well in increased consumption, but would also aim at transportation policies with an eye for proximity and vicinity of services, works, leisure.

In the DE-scenario, no further urban expansion takes place and there is also no growth in the housing stock. However, as mentioned above, there is a replacement of unfavorably located peripheral dwellings and low-density dwellings in neighborhoods close to the city center with dense apartment buildings in the latter areas, resulting in a slight reduction in the metropolitan residents' average distance to the city center of Oslo (as well as to lower-order centers). Other things equal, the per capita travel distance by car is estimated to decrease by 1.5 % and by transit to decrease by 1.1 %. Overall per capita energy use for intra-metropolitan travel is estimated to be reduced by 1.4 %. Compared to a 7.9 % increase in the BAU scenario and a 3.6 % increase in the EM-scenario, this is a more favorable result, seen from an environmental perspective. However, due to the presupposed population growth, the estimated total energy use for intra-metropolitan travel still increases by 22.6%. As mentioned in the discussion of the EM-scenario, improvement in the average energy performance of vehicles is not



Fig. 6. DE scenario in Oslo. Source: authors elaboration.

taken into consideration in these estimates. With expected vehicle energy improvements, the DE-scenario may be able to keep energy use more or less constant. However, in order to obtain a substantial reduction in transportation energy use, additional measures will be required, such as more extensive road pricing, reduced parking availability, awareness campaigns, and maybe quota for maximum car driving distances.

Housing distribution in the DE scenario

Housing is not considered a right by law in Norway (Andersson et al., 2010). There are different degrees of assistance provided to the poor and of obligations that municipalities need to comply to. For instance, municipalities must respond in case of housing emergency or when the situation is acute or extreme. Some of the units from the social sector therefore are intended for the sole use of people facing critical situations. In the EM scenario, no specific measures are aimed at containing the housing prices in the capital, which make the market inaccessible to some groups. The mismatch between income and housing prices has increased over time (ibid.). Even though interest rates might be stable, with the incomes growing slowly and housing prices growing fast, the market becomes prohibitive, especially for single parents and young adults.

The marketised housing sector is challenged in the DE scenario that aims at changing the structure of housing and its financialised aspects. The main aim of the economic aspects revolving around housing is to ensure the well-being of the inhabitants and accessibility to housing to all groups. In the DE scenario, economic measures will be in place to equalise the incomes and the consumption per capita of square meters through taxation and consumption cap for housing.

In this scenario, the city region will have a distribution in which household size more fittingly corresponds to the dwelling size, thus reducing the risk for unfair distribution and overcrowded situations. This will be achieved by regulations imposing a cap on consumption per person. These measures will allow a broader mix of inhabitants in the different neighbourhoods and could potentially help in solving the historical pattern of segregation (Andersen & Skrede, 2017) existing between the eastern and western parts of Oslo. Oslo presents a financialised housing market wherein some areas of the city are exposed to the risk of investment finance, making significant part of the stock unavailable for rent or sale. Within the DE scenario, housing will become a part of the welfare care and a right by law, differently from today and the EM scenario. In this context, housing units will not be kept as financial objects, and supposedly, this will be a further step to gain more social justice in the city.

Similarly to the EM scenario, the social justice aspects meet the environmental justice ones: eco-tech measures to improve the performance and ecological standards of the housing stock will be available for all types of neighbourhoods ranging from low-income to wealthy ones.

6. Housing development scenarios in the Milan metropolitan area

6.1. EM scenario applied to the case of Milan

Within the EM scenario, Milan will attempt to keep its economic growth rates rising. The growth rates will apply to the economy at large but will most certainly have repercussion on the housing market, which

will be growing. The EM scenario will follow a middle demographic growth projection, with a population growth of 4.8% by 2030 from 2015 (extrapolation data available from 2001 to 2022 for the Milan metropolitan area). Within this scenario, the housing stock will keep growing, meaning that new constructions are welcome to meet the need deriving from the projected population growth. In the EM scenario, housing will be still a commercial, tradable good having significant financial implications. Housing will represent a significant share of the internal economy of the city in terms of both economic values in the building sector and in its real estate values. A housing sector dependent on physical growth assumptions means the addition of an important variable: no limits will be applied to the per capita housing consumption in the EM scenario and will therefore keep growing.

6.1.1. Environment and technology in the EM scenario

The Italian Ministry of Economic Development (MISE), in accordance with the Ministry of Environment, has adopted the European Commission's proposal for environmental constraints for 2030. The goals are clear: 1.5% of total energy annually needs to be spared, emissions need to be lowered by 33% compared with the 2005 levels and renewable energy sources need to reach 27% of the total energy use (MISE, 2017). What is crucial is that this level of reduction in energy consumption (1.5% annually) implies a reduction of 9 MToe by 2030. The Italian MISE very clearly indicates that the residential sector is indeed the sector that needs to reduce its current energy consumption the most. In the estimates, the residential sector will need to take on 34%–38% of these reductions.

In Milan, the energy efficiency level for residential use has worsened from 171 kW h/m² in 2008 to 193 kW h/m² now (Odyssee-Mure, 2019). These figures do not include secondary energy uses linked to housing: for instance, transport energy consumption resulting from the residents' need to travel as well as the energy needed to renovate a dwelling, let alone to build it. Given the fluctuations in the per capita housing consumption (m²/person), the total energy consumption might possibly be even higher than the estimates.

Under the current conditions, in Milan, the average number of persons per dwelling is 2.04 (Dati Open, 2019). Hence, by 2030, following the demographic projections and the current trend of distribution of population, we estimate that the Milan metropolitan area will need ~172 000 new dwellings to accommodate the surplus. Given no specific changes in terms of technology, the total energy consumption owing solely to population increase will thus continue increasing by an additional 5% by 2030. In addition to the need of housing for the projected new population, there will be an increase in the consumption per capita (m²/capita). According to statistical trends, we considered that in 10 years, the consumption per capita will increase by 4.5 m²/person; therefore, a continued trend will allow a final estimate of

housing consumption of 46 m²/person by 2030.

The EM scenario for Milan needs to meet the ambitious goal established by the European Commission and ratified by the Italian MISE. Given the increase in dwellings described above, this will require a reduction of toe/dwelling from 1.40 in 2015 to 1.20 by 2030. This reduction in domestic energy consumption will be achieved by introducing measures to eco-proof the dwellings, thus reducing as much as possible the energy consumption and energy losses. The threshold value that ensures no energy consumption increase even if all the new dwellings are to be built is 163 kW h/m². A consumption of 1.20 toe/dwelling will mean a reduction of 14% in the energy consumption per dwelling and will ensure a reduction in the total domestic energy consumption (Table 5).

6.1.2. Physical structure of the city in the EM scenario

The EM scenario requires increased and significant land consumption to meet the demand of housing owing to population growth. As discussed in the housing distribution section, the household composition is not challenged. As we anticipated in the previous section, under present conditions, more and more households comprise single inhabitants owing to cultural as well as social changes in society. In the EM future of Milan, the physical repercussions of these demographic changes would first occur through a more intensive use of the present housing stock. The policies for densification would aim at increasing the high-rise housing in the city center and in the areas of major pressure. The city and its metropolitan region would need to develop the currently underused areas. The metropolitan plans would develop the areas already assigned to growth along with the development areas in the municipalities, which compose the greater metropolitan area of Milan.

Reflecting further on the land consumed for new residential areas, we gather significant data from the Strategic Plan of the Metropolitan City institution of Milan (Città Metropolitana Di Milano, 2016). The strategic plans provide insights on the size of future residential transformations and their location and proximity to natural areas. Today, the total residential area of the Milan metropolitan area accounts for 274 km². According to the plans, the new residential transformations will be conducted over a total area of 26 km², 60% of which will be on already urbanised land and 40% on natural land. The total residential area will account for 19.1% of the total metropolitan area or 47% of the urbanised area.

The EM scenario will assume higher land use efficiency, as demonstrated in the plans. We set the average density of all new housing to the levels of the inner core of Milan, which presents a density of 12 649 persons/km², but with higher densities in the more central and lower densities in the more peripheral parts of the metropolitan area. With this high density, only 11.6 km² is needed for the new residential

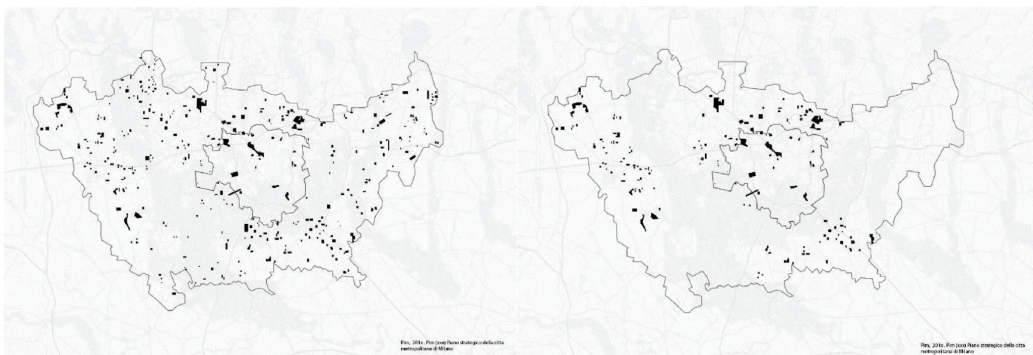


Fig. 7. Current plan (left) and EM scenario (right). Source: authors' elaboration on the Piano Strategico Metropolitano (Città metropolitana di Milano, 2016).

areas. This is less than 60% of the 26 km² configured by the municipal plans and strategic plan, which means the residential areas can all be constructed on urbanised land (Fig. 7, Figureright). The 11.6-km² increase will increase the total residential area to 286 km² by 2030. The residential area will account for 18.2% of the total area and 45% of the urbanised area. This increase will first take place in the underused areas within the core municipality or in already urbanised areas in the metropolitan suburbs. The high density strategy and the consequent reduction in required residential areas will allow us to exclude from the map all the areas that require the use of natural land.

According to the current estimations made by the Strategic Plan for the Metropolitan Area (Città Metropolitana di Milano, 2016), ~10 km² of the total 26 km² of new residential expansions will indeed happen on the so-called available land. This available land is a mix of underused urbanised areas and farmland. Maps clearly show that transformations towards the outer parts of the metropolitan area tend to mostly affect the farmland. These transformations appear to happen on the borders of the small municipalities, thus expanding villages and small cities far from the centre. This will result in a threat for the farmland, which is already quite impacted by urbanisation processes. On the contrary, regional parks and protected areas are excluded and protected from this process. Nevertheless, the impact of urban transformations on farmland is quite significant. The EM scenario aims at reducing such a threat and, by requiring ~11 km² of new residential areas for the future, it can indeed condense the need for new housing within the already urbanised areas. This is possible based on the figures shown by the strategic plan that has mapped a residual sum of urbanised areas, which can benefit from renovation processes.

The EM-scenario for the Milan area requires also an assessment of transportation and mobility for the future needs of the inhabitants. Because new dwellings constructed over the period 2015–2030 make up a much smaller proportion of the existing housing stock in the Milan than in the Oslo case, the differences between the scenarios in terms of energy use for intra-metropolitan travel are smaller in the Milan case than in the Oslo case. The EM-scenario is still characterized by a considerably higher emphasis on densification and a more centralized location of new housing construction than in the BAU scenario. Therefore, motorized travel distances per capita by car as well as by transit, and the related energy use for intra-metropolitan travel, could be expected to be somewhat reduced in the EM-scenario compared to the BAU. And since population growth is moderate, only a slight increase from 2015 to 2030 in the total energy use for intra-metropolitan travel could be expected.

6.1.3. Housing distribution in the EM scenario

Regarding the distribution aspect of the housing sector, in the EM scenario, the authorities will not promote housing policies targeted to reduce consumption and to promote better distribution of the housing stock. On the contrary, they will not intervene in the market but may provide housing for the people in need and the groups that are unable to enter the market. Authorities will encourage, or at least not stop, marketed forms for sharing economy, such as the Airbnb model and other public or private initiatives. The public sectors can make development agreement with developers to guarantee certain share of social housing in new housing projects, which is partially ongoing in the current state.

According to further statistical analysis on the Italian census data (ISTAT, 2018), the average square meters per person in Milan is 41.46. Some peculiarities are evident in the distribution of inhabitants per dwellings. Fig. 8 shows that in all the size categories, houses with only one inhabitant are common. This per se does not indicate a mismatch between the housing sector and households. Nevertheless, towards the right end of the graph, for the larger sized dwellings (80–150 m² and more), the share for one or two inhabitants can indicate a potential for a more equal distribution. Of all the dwellings larger than 80 m², 31% are inhabited by a single person. For the dwellings smaller than 80 m², 54%

are inhabited by a single person.

Building regulations for Milan (Di Milano, 2016) set a minimum size of 30 m² per dwelling and do not consider basements that are below the ground level as dwellings. Moreover, regulations in the past for bathrooms have imposed the presence of a window for ventilation, denying the possibility of smaller bathrooms and blind toilet units. These specific regulations for the dwellings have contributed to increasing the minimum legal size, expressed in square meters, of a dwelling.

The EM scenario aims towards a more participative and democratic approach. This is part of the typical EM approach to social justice. Inclusion and participation are in fact part of procedural and process justice. Regarding the goals of EM, the achievement of an equal and socially just housing future needs to acknowledge the importance of matching the housing structure with the population structure as much as possible. This means recognising the households' sizes and the dwellings' dimensions to avoid overcrowded situations or, on the contrary, excessive use of space.

The trends under current conditions point towards an increased share of single-parent families, more people living alone and scarce policies towards the adaptation of the current housing stock to societal changes (i.e. remodelling of the dwellings). The existing housing stock also presents an interesting share of adequate- to large-sized dwellings (in the range of 60–79 m²) inhabited only by a single person, as observed in graph 3.

The EM scenario aims at a just housing sector by applying measures to discourage the disparity at the edges of the chart (graph 1). In particular, the EM scenario intervenes by implementing and increasing welfare policy measures targeted towards vulnerable people and the homeless. Thus, the EM scenario will implement further measures to reinstate more interventions of the institutions within the social housing stock by increasing funds and rehabilitating empty dwellings. Measures may include taxation instruments, incentives, regulations and policies. Moreover, the EM scenario will extensively include the forms of 'marketed' shared economy that may help in resolving the mismatch. This will give more incentives to the subdivision of bigger units and to renting parts of it. The negative externalities of the distribution trends will be reduced by the intervention of government and public institutions to prevent and solve homelessness, overcrowded situations, energy poverty, etc. However, the institutions will not prevent the private market from growing or producing dwellings that do not meet the societal needs of the inhabitants.

6.2. DE scenario applied to the case of Milan

6.2.1. Environment and technology in the DE scenario

As shown in the EM scenario, the goal of reduced energy consumption in the residential sector is achievable only if the parameter of 157 kWh/m² is met (Table 5). In the DE scenario, technological innovation is not the sole intervention that the achievement of the goal would rely on.

In the DE scenario, to illustrate the effect of redistribution of housing, we have kept the numbers of dwellings and average dwelling size in 2030 equal to those in 2015. The result of the DE scenario is a 14% reduction in the total consumption as opposed to the 4% reduction in the EM scenario (Table 6). The DE scenario entails a reduction in square meters consumption per capita. In the case of Milan, we decided to perform some simple calculations to hypothetically show what maximum square meters per capita redistribution will nullify the need for the construction of new housing according to projected population growth. This exercise, which is in no way to be taken as very accurate, shows that by decreasing the per capita consumption from 40.8 to 39.0 m²/person, the housing stock will allow to take in even the projected population growth in the existing housing stock.

Without additional housing construction, the DE scenario gives the chance to roughly diminish the total energy consumption by 14%. Moreover, the additional energy burden caused by other impacts of

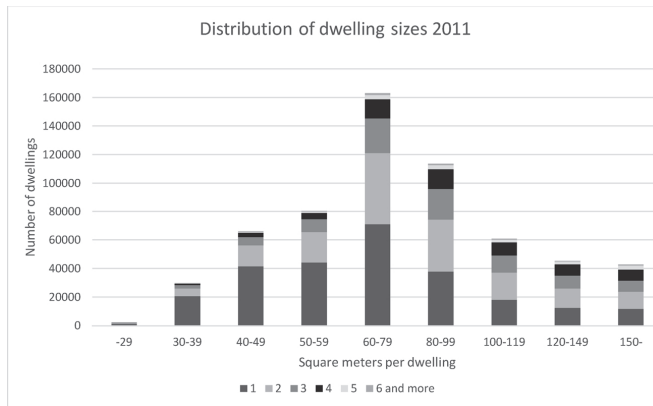


Fig. 8. Residents in different dwellings sizes.

housing – in the building phase, during renovations and in its final demolition phase – as well as other impacts (biodiversity loss and impacts from the construction of housing materials) will be completely eliminated if the future stock will not increase. Further, in addition to a cap in consumption, we consider that retrofitting and ecological efficiency measures will result in more energy saving in a relatively short time span.

6.2.2. Physical structure in the case of Milan

Through reduction in the per capita housing consumption from 41 to 39 m², the DE scenario nullifies future expansion of residential areas. Within this future image, the total areas used for housing in 2030 in the metropolitan areas of Milan will stabilise at the level of 2015, which was 275 km² with no increase. In this way, the estimated residential area completely avoids the 4% growth estimated in the EM scenario or the 9% growth given by the original municipal plan. Similar to the Oslo DE scenario, existing dwellings that are environmentally unfavourably located and have reached a stage where they would need to be significantly renovated will not be modernised or replaced with new buildings on the same plots. Instead, such relatively worn-down dwellings will be replaced with new, energy-efficient dwellings in the urban core (such as the areas shown in Fig. 9, right), resulting in additional environmental and social benefits. Because the to-be-demolished dwellings are scattered on individual plots in many different residential areas, only a few and small areas will be ‘given back’ from urbanised land to natural areas or farmland. We therefore estimate that the total size of the housing areas will only slightly decrease by 0.25% (as in the Oslo case) – that is, from 274 to 273.3 km². Thus, this scenario, as we designed it, does not require new expansions. Hence, the risk of threatening the biodiversity by building processes and urbanisation is significantly reduced. In addition, some small areas at the

urban fringe are converted from urban land to forest areas or farmland.

Since the DE-scenario implies that no increase in the building stock and only small changes in the residential location patterns take place compared to the 2015 situation, the inhabitants’ average distances to the city center of Milan as well as to lower-order centers will only be slightly reduced, compared to 2015. Other things being equal, energy use for intra-metropolitan travel therefore will also be only slightly reduced. Due to population growth, energy use for intra-metropolitan travel will still be higher than in 2015. Moreover, since the EM-scenario but probably also the BAU scenario implies a somewhat more centralized pattern of housing construction than in the 2015 situation, the DE-scenario of Milan implies, other things equal, a higher amount of motorized intra-metropolitan travel than the EM-scenario and probably also than the BAU scenario. There will be a clear need to compensate this by measures such as road pricing, reduced parking opportunities, quota for maximum car driving distances, and general awareness raising.

6.2.3. Housing distribution in the DE scenario

The DE scenario requires a discussion on the distribution of housing itself and the way we consume and produce housing today. The challenges of today’s housing distribution in the context of Milan are multiple and complex.

In the DE scenario, the unbalanced and unfair distribution characteristics of the current housing sector would be tackled. This primarily means addressing the needs of the poor and addressing in general the present mismatch. In this regard, the state, through the Milan metropolitan area institutions, would need to primarily resonate on the current share of social housing available. The average share of 9.8% can be enhanced without necessarily adopting new building sites. Actions and policies aiming at renovating the old housing stock would help



Fig. 9. Maps of planned housing scenarios in Milan. Planned transformations (LEFT), transformations in the DE scenario (RIGHT).

bring back a valuable share of units. As previously mentioned, according to the estimations of the Regional Council (Regione Lombardia, 2018), 10 900 social housing dwellings are currently vacant in the Milan metropolitan area. Social housing units that do not meet basic quality standards cannot be rented out by law.

In the DE scenario, distribution is rethought and aligned with the main goal of seeing housing as a welfare right, together with the right to health care or education. Hence, the goal would be achieved by mainly rethinking the current way of distribution of the housing. The redistribution of the housing stock according to specific policy actions and regulations would only be possible under circumstances that are specific to the context of active DE. Differently from the EM scenario, a policy of active DE in the housing sector aims at the redistribution of the existing housing stock.

The current distribution of the housing sector can possibly be improved by reducing the average residential space per person. For example, a rough estimation shows that by increasing the average number of persons per dwelling to 2.5, the need for new housing according to the population projections eventually would be nullified. This value does not represent an accurate or absolute figure, but it has the purpose of exemplifying the possibility given by the reduction in housing consumption. Reaching this figure would require incentives, for example, for co-housing and reducing the share of vacant apartments. Such measures would, however, depend on specific social and technical processes: a major willingness to share and dwellings fit for the purpose (the remodelling of dwellings and their retrofitting would help in this sense). The measures could include the subdivision of spacious dwellings into smaller units according to the number of inhabitants and needs. At the same time, there would be a risk of even more severe marginalisation of the housing for the poor if specific policies are not in place. It could increase the risk of overcrowded and inadequate forms of housing, thus increasing the share of homeless people. According to the ETHOS typology (Edgar, 2012), inadequate housing and overcrowded conditions correspond to a first form of homelessness. If policies to ensure minimum housing standards as well as policies for improving the overall quality of the dwellings are not in place, risks for the poor might increase.

According to our estimations, a maximum cap in per capita consumption could also reduce the need for the construction of new housing. If the cap is extended to all inhabitants, the risk of creating more marginalised groups and people at risk of homelessness would significantly decrease. The same applies to setting a minimum standard, which is another way to secure the welfare right of the poor. The estimate that would nullify the need for new housing is 39 m² on average per person in the Milan metropolitan area, which could be quite controversial. This figure would need to be considered in a context in which the housing sector would be decommodified from the current market logic.

7. Discussion

Based on a strong normative assumptions regarding the future of housing development, we have developed two explorative scenarios in each case (Milan and Oslo). The EM scenario has been demonstrated to be the conservative one, whereas the DE scenario represents a radical approach. The two types of scenarios present some similarities in

certain aspects but also significant differences, limitations and challenges. In this section, we will briefly reflect on the general limitations, challenges and potentials of materialising the two scenarios within the current socio-economic and political contexts. This reflection is not meant to be extensive but aims at discussing the potential implications for societal reforms or transformations.

First, we present some general considerations derived from our analysis and scenarios. In general, we observe some significant differences in the housing sector and the consumption habits of the population of the two city cases. The Milan metropolitan area does not present a particularly high projected population growth. According to our data interpolation, the scenario for 2030 will present a plausible population growth of around 5%. The population of Oslo, on the contrary, according to the projections of the national statistical institute, could increase by 24%. The population figure is an interesting and significant element in both cases. In Milan, the discussion on the real housing needs leads to a discussion on the better use of the current stock and eventually a decrease in new construction to avoid the risk of vacant units. In Oslo, apart from a reflection on the needs for housing for the expected increased population, the scenarios have helped define how the per capita housing consumption matters and how a decrease in today's housing consumption could drastically reduce the need for new construction.

A reflection on the environmental impacts of the two scenarios is compelling, given the differences in the per capita housing consumption in the EM and DE scenarios. As shown in Table 4 and Table 6, the best results in terms of reduction of environmental impacts are given by the DE scenarios both in Oslo and in Milan. In the context of technological optimism, as in the EM scenario, which is a future in which technology is supposedly able to decouple to its best ability the environmental impacts of residential energy consumption, it is interesting to observe whether technological improvement is sufficient to counteract the environmental impacts. We will start with the potential and limitations of the EM scenario, followed by those of the DE scenario.

7.1. Potentials, limitations and challenges of implementing the EM scenario

7.1.1. A stricter and higher building energy standard than today is necessary

Even though housing consumption is not encouraged in the EM scenario, the trend will remain the same as today. This means that up to 2030, the average per capita housing consumption will keep increasing by 13% in Milan and 17% in Oslo (Table 3 and Table 5). In the case of Milan, the reliance on technological progress to stabilise residential energy consumption while accommodating a growing housing stock (owing to growth both in population size and per capita housing consumption) will require considerable decrease of energy consumption per square meter to meet their goals of energy saving. Note that this decrease in energy intensity has to be applied on the total housing stock, including the existing housing stock, and not only on new residential buildings. Enforcing higher building energy standards for real estate developers to comply with and initiating large-scale rehabilitation processes for existing residential buildings may pose enormous challenges. These challenges apply to Oslo too. To achieve zero growth in total residential energy consumption in Oslo, the average residential energy intensity has to be reduced to 124 kWh/m² compared with

Table 3

EM scenario in the Oslo metropolitan area

EM scenario	Population	Energy intensity of residential buildings	Square meters per person	Increase in total energy consumption from 2012 to 2030
Year	persons	kWh/m ²	m ² /person	%
2012	1 169 539	172	50.5	
2030 (0% increase)	1 453 335	124	56.4	0
2030 (TEK17 on new buildings)	1 453 335	158	56.4	28

172 kWh/m² in 2012 (Table 3). However, even applying the most up-to-date building standard, TEK17, that requires an average energy intensity of 158 kWh/m² for new buildings is not sufficiently efficient to achieve the goal. A stricter and higher building energy standard is necessary.

Underlining this result is important because it shows that even a consistent and continuous effort in applying eco-tech measures, such as the TEK17, will not be sufficient in the long run to create a sufficient level of energy reduction. To achieve zero increase by solely applying the TEK17 standard, 71% of the housing stock will need to meet the requirements. Hence, the sole application of the TEK17 standards to new dwellings will not be sufficient. An alternative for decreasing the total energy consumption involves retrofitting the existing housing stock. Considering the total of 71% of the housing stock that will meet the requirements, ~376 000 or 64% of the 2012 housing stock in the Oslo metropolitan area will have to be retrofitted. Within the time frame of 2030, such extensive intervention on the existing housing stock in the Oslo metropolitan area seems unreachable, thus putting at risk the goal of the EM scenario.

The dominance of the private sector may hinder the implementation of stricter environmental policies

Achieving higher building energy efficiency may technically be possible. The challenge may lie in the implementation of the technology on a larger scale and within a short time frame. In the EM scenario, the market is considered to play the central role in innovating and disseminating eco-technologies, enabled by the public sectors. It is, however, questionable whether the private sectors are sufficiently ambitious and motivated for, and capable of engaging in a rapid transformation process. In particular, when neoliberalism dominates the political system, as is the case for the two cities, the government lacks effective mechanisms in implementing actions that are urgently needed. The rising power of private sectors in the negotiation with the public sectors often prioritises profits over environmental concerns. In Oslo, for example, housing developers refuse to build climate-friendly residential buildings in locations where they consider this to be unprofitable (Andersen & Skrede, 2017).

7.1.2. Long-term energy efficiency improvement is technically challenging

The challenges for fully implementing the EM-scenario for environmental sustainability may not only lie in reforming the institutional settings to mobilize private sectors as discussed above, but also the entailed continuous efforts in enhancing building energy efficiency so long as the housing stock is increasing. Although the scenarios in this study have a time horizon of 2030, growth in the housing stock is expected to continue. Hence, attempts at further increasing energy efficiency will be necessary. However, further improvement in efficiency is argued to be more technically and institutionally challenging than picking up the 'low-hanging fruits' at the outset of a low energy efficiency. Moreover, it is not sufficient merely to stabilize total residential energy consumption at the level of 2012/2015. Reaching a sustainable future requires reduction in total energy consumption. As shown in the case of Milan (Table 5), to reduce the total energy consumption by only 4% would require a much higher efficiency improvement than that with a zero-growth goal.

7.1.3. Limitations of eco-efficiency technology in protecting land, materials and biodiversity

So far, our scenarios have only focused on residential energy consumption as an indicative example of environmental impacts. In comparison, other housing-related environmental impacts, such as land loss, biodiversity loss and raw material consumption, are more difficult to be decoupled from a growing building housing stock using efficiency measures. The physical existence of buildings has to rely on materials and land, regardless of how eco-efficiently they are built. Any environmental gains from a more efficient way of using land and building materials are in a relative sense, compared with a sprawling and

resource-demanding development. Moreover, associated infrastructure and services related to residential buildings will eventually increase. New constructions will in any way put more strains on resource extraction and land consumption.

7.1.4. Dilemmas between environmental sustainability and social justice in housing in a neoliberal context

As mentioned in section 5, the theory of EM has mainly approached the justice issue from a procedural dimension. However, a just process will not necessarily lead to the just outcome that is our concern here (Fainstein, 2010; Purcell, 2009). With a point of departure that distributive justice in housing is to be achieved in the EM scenario, we aim at inequality reduction in housing distribution and security of everyone's access to housing. Nevertheless, increased housing consumption in Oslo and Milan might be compatible with the environmental sustainability goals for a certain period ahead but hardly for 100 or 200 years into the future. Moreover, the EM approach, relying on the trickle-down effect plus a social security net, may secure welfare for the Oslo and Milan inhabitants, but the consumption of finite resources of wealthy cities might have a repercussion on poor people.

To guarantee that everyone reaches a basic housing and living threshold, the EM scenario has drawn on the trickle-down mechanism so that the benefits from a growing economy will eventually 'fall down' to the least well-off. This will be achieved through limited welfare policies targeted only towards the homeless people and vulnerable groups. Arguably, the trickle-down mechanism widens the gaps between the rich and poor through accruing more benefits to the rich (Woodward & Simms, 2006). This suggests an internal contradiction between achieving inequality reduction and security of basic needs satisfaction through a trickle-down mechanism. For the EM scenario to achieve a more equal housing consumption, more active redistribution policies have to be in place. However, if housing distribution sticks to a neoliberal principle, as what is currently applied in Oslo and Milan, the public sector has limited room to play an active role in intervening in the distribution process. Returning to the Keynesian approach that designates a strong state interventionism will more effectively tackle the inequality issue, but this is contrary to the currently dominant political ideal. In addition, improving the housing conditions of the poor while maintaining or even increasing inequality can only be possible on the premise of economic growth. A higher economic growth rate will pose more challenges in decoupling it from the negative environmental impacts through eco-efficiency improvements.

7.1.5. Easier to be accepted politically and by the wider public

Despite these challenges, the implementation of the EM scenario is advantageous in terms of a high level of cultural, political and institutional acceptance. Increasing the energy efficiency of buildings (e.g. through better insulation) requires smaller behavioural changes of consumers than shifting to live in smaller dwellings. In Oslo, the generational shift in residential preferences from suburban single-family houses to inner-city apartment buildings provides a favourable cultural condition for the implementation of densification and the promotion of dense living. Furthermore, taking housing mainly as a commodity does not challenge its symbolic character as a social status good, which is in line with the basic rationality of a competitive, capitalist market society.

7.2. Potentials, limitations and challenges of implementing the DE scenario

7.2.1. More efficacious in achieving environmental sustainability by reducing consumption level

Compared with the EM scenario, as suggested in Table 4 and Table 6, the DE scenario is more efficacious in achieving the goal of stabilising residential energy consumption because it includes reduction in per capita housing consumption in addition to energy efficiency measures. In the case of Milan, a decrease in per capita housing

Table 4

DE scenario in the Oslo metropolitan area.

Scenarios	Population	Energy intensity of residential buildings	Square meters per person	Increase in total energy consumption from 2012 to 2030
	persons	kWh/m ²	m ² /person	%
2012	1 169 539	172	50.5	
2030 (Limits to square meters per person)	1 453 335	158	44.2	0
2030 (Limits to square meters per person & retrofitting to TEK17)	1 453 335	138	50.5	0

consumption from 40.8 to 39.0 m² will nullify the need for new housing construction. In Oslo, changing the per capita consumption from 50.5 to 44.2 m² will nullify the need for new housing and thus maintain the same level of total residential energy consumption. If reduction in housing consumption is combined with energy efficiency improvement in buildings, it will be even more efficacious in reducing the total residential energy consumption. Other advantages of achieving environmental goals through addressing 'sufficiency in consumption' include the relative ease in tackling other types of environmental impacts such as the aforementioned raw material consumption and land consumption. Strains on resource extraction and land conversion will be largely minimised.

The DE scenarios of the present study imply that there is no increase in the number of dwellings in either of the metropolitan areas; instead, the average number of inhabitants per dwelling is increased. In addition, the DE scenarios slightly reduce the size of the current residential areas by replacing the unfavourably located peripheral dwellings and low-density dwellings in central neighbourhoods with dense apartment buildings in the latter areas. Although tearing down old buildings and constructing new ones involves material and energy consumption in the short term, the spatial redistribution of the non-growing housing stock will have long-term environmental benefits including not only reduced residential energy consumption but also reduced residents' average distance to the city center and regenerated natural land. Nevertheless, the demolishing of old buildings will not take place before they get worn down, which suggests that the building of replaced dwellings will not pose unnecessary extra strains.

Whereas the EM scenario might foresee an increasingly heightened challenge in accelerating technological innovation in the long run to counteract the negative environmental impacts of a growing housing stock, the DE scenario will attenuate this challenge through eventually moving to a steady state. Nevertheless, reducing the per capita housing consumption represents a considerable challenge because the hindrances are deeply rooted in the existing economic, political and cultural structures.

7.2.2. The market logic is antithetic to capping consumption in housing

Housing, in both Oslo and Milan, is to a large extent treated as a commodity. As such, the consumption of it is mainly determined by market logics. To reduce consumption levels is, therefore, in contradiction with the basic market rationality that seeks ever-increasing profits through stimulating effective demand and higher levels of consumption. Strong regulations might have to be imposed on real estate developers, building and financial sectors to constrain their dominance

in housing provision, if a reduced housing consumption is to be achieved. Such regulations will need to highlight housing as a welfare right more than a commodity.

Today, since the access to housing is primarily an individual responsibility and dependent on purchasing power, the attached social meaning of it is often related to individual social status. Housing, with its type, size, standard and location, is symbolic of wealth and social class. In Oslo, the class division between the eastern and western part is significantly manifested through housing conditions (Andersen & Skrede, 2017). Affluent western residents typically live in spacious villas with spectacular views; while middle to high-rise apartment buildings dominate the landscape of the poor east. To equalize housing consumption among residents through putting a cap on housing consumption violates the mainstream cultural understanding of housing as a reward of individual economic success. Especially, reducing housing consumption among those who have an 'overconsumption' will meet strong resistance. It is indeed not meaningful for a person to become affluent if he/she cannot be rewarded by e.g. buying and living in a luxury dwelling.

7.2.3. The growth-dependent economic structure and ideology are deep-rooted barriers

The possible resistance from the market and individuals as discussed above stems from an ingrained economic structure designed for growth and the associated political ideology of economic growth. The housing sector is a key driver and booster of global, national and local economy. It contributes to economic growth through driving the development of upstream and downstream industries (e.g. construction, finance), absorbing large amount of labor force and surplus capital (Harvey, 2011). Under present political-economic conditions, it is hard to imagine the existence of a political will to reduce housing consumption since it will lower the rate of economic growth. Without abandoning the growth ideology, it seems to be politically unfeasible to implement policies targeting for reducing housing consumption.

The removal of these hindrances for realizing the DE-scenario demands structural transformations rather than mere reforms. It appears that implementing the EM-scenario will meet less resistance, but it is no less challenging to achieve the environmental goals through technological innovation and application, if we take the goals seriously. Our studies suggest that we can be more assured of goal achievement if we opt for the DE-scenario than for EM. In this sense, reduction in consumption is more of an imperative than an option, given that we have to acknowledge and respect environment limits.

Table 5

EM scenario in the Milan metropolitan area.

EM scenario	Population	Energy intensity of residential buildings ^a	Square meters per person	Increase in total energy consumption from 2015 to 2030 (%)
	persons	kWh/m ²	m ² /person	%
Years				
2015	3 077 556	193	41	
2030 (0% increase)	3 224 318	163	46	0%
2030 (goals of reduced consumption)	3 224 318	157	46	-4%

^a conversion factor of 11630 kWh/toe (STATISTICS RESOURCES, 2019).

Table 6

DE scenario in the Milan metropolitan area.

	Population	Energy intensity of residential buildings	Square meters per person	Increase in total energy consumption from 2015 to 2030 (%)
	persons	kWh/m ²	m ² /person	%
Degrowth	2015	3 077 556	193	41
	2030	3 224 318	166	39
	Percentage increase	5%	-14%	-14%

7.2.4. Stronger redistribution mechanisms are needed to avoid potentially heightened inequality risks

According to Piketty (Jackson & Victor, 2016), slow growth rates lead to rising inequality. This is true in a passive DE situation, which was the case after 2008 financial crisis in southern European countries. No growth or degrowth in total housing consumption poses serious challenges to achieving equality and human needs satisfaction if those who already overcome housing further increase their consumption levels. Securing social justice is a more demanding enterprise in the DE scenario than in the EM one because no growth can be trickled down to the poor even with an unproportioned share. Constrained by a limited consumption level, wealth redistribution from the rich to the poor is the only way to prevent the likely heightened inequality.

As exemplified in the two cases, redistributive mechanisms could include recovering underused or vacant dwelling units, compartmenting too spacious dwellings, capping individual or household housing consumption, providing social housing for the ones in need, levying progressive tax on excessive housing consumption, encouraging sharing and co-housing schemes and implementing rental control. Although these strategies appear radical and contradictory to the individual liberty promoted in the current neoliberal society, they are by no means alien. For example, progressive income taxation is common in many countries and thus has the possibility to be extended to the housing sector. Norwegian housing policy before its liberalisation in the 1980s managed to limit the size of new dwellings and control the price and rent to make housing affordable through financial incentives (Stamsø, 2009). The reminiscent welfare elements in the Norwegian housing policy may render these policies acceptable by the public to a greater extent. However, the current political setting dominated by neoliberalism is unfavourable for reinvigorating strong redistributive policies. In Milan, reutilising empty dwellings can be an effective strategy to providing affordable housing for those excluded by the market. This measure could be expanded, given the high share of empty social housing units. Other measures to counteract the effect of financial crises and the impacts of financialisation on social justice could be to implement rental control in some areas and to limit the access of international capital within Milan's housing sector. Financialisation of the housing market, especially in some central locations, has become a significant trait of the market.

8. Conclusions

This paper has explored the possible scenarios for future housing development until 2030 under normative and theoretical assumptions. The normativity of the study is mirrored in the future goals expressed in the scenarios: both scenarios aim at a socially just and environmentally sustainable future housing development. The theoretical basis is also reflected in the scenarios and is derived from two sustainability discourses: EM and DE. On such premises, throughout the paper, we contextualised the future development of two metropolitan areas, Milan in Italy and Oslo in Norway.

The article shows that all the scenarios can successfully score in terms of substantial betterment of the environmental and social aspects of housing in the future for Oslo and Milan if certain conditions are met. However, realising these conditions in the two types of scenarios implies different challenges. The EM scenario ensures that technological

improvement applied to the housing sector leads the way to a more sustainable future. At the same time, however, in the EM scenario, the energy consumption in the building phase will still be an environmental impact and will only partially be reduced if eco-friendly measures are in place. The allocation of new areas for urban development will burden the environment, thus threatening biodiversity. Moreover, associated infrastructure and the services related to residential buildings will eventually increase. Technology can reduce a variety of environmental impacts but only to a certain level, and the reduction in the domestic consumption of energy alone, even if significant, will not be able to cover for all the environmental impacts.

Higher building energy efficiency than today's is possible, as shown in the EM scenario for both Oslo and Milan. This kind of implementation within the given time frame might be challenging. In particular, the innovations required are often typical advancements produced by the private sector. In this sense, it is difficult to imagine that within a short time frame, the private investors, tech companies and building sector can provide such a rapid transformation. A large-scale and rapid implementation of the theoretical potentials for energy efficiency will probably require a degree of public coordination and control (NORDIC COUNCIL OF MINISTERS, 1999) that does not sit well with the current neoliberal conditions.

Among our most interesting findings is that reduction in energy consumption can be achieved only to a certain degree, after which only a decrease in the square meter per capita is efficacious in ensuring an environmental sustainable housing future. The EM scenario in this sense scores low because it does not allow the possibility, in the current growth model, to ensure a reduction in square meter per capita consumption. Here we discover that the tenets of EM theory, if applied to a real-world case, might not hold up when discussing the ability of technology for fully decoupling environmental impacts. This is attributable to the fact that according to our calculations, the technological progress applied to the housing sector, if not supported by policies to reduce the actual housing consumption per capita, is simply not sufficient. According to our estimations, for both city cases, the decrease in housing production seems to play a major role in decreasing the environmental impacts, far more than the application of eco-tech standards and eco-friendly measures in housing development.

A change towards a non-marketised housing sector, such as the one designed within the DE scenario, if supported by overall economic changes, will result in a more environmentally friendly housing development. In this perspective, the existing housing stock does not need to be increased but needs to be improved, retrofitted and adjusted to the needs of the population and the underused or vacant units and areas of the city need to be recovered. If a maximum cap to consumption is considered, the current housing stock might possibly be able to include the groups that are currently excluded by the market mechanisms. Even though the viability of such extreme measure needs to be discussed, the DE scenario will rely on similar reductions in consumption to function. The DE scenario in both cities will easily achieve a result in terms of reduction of environmental impacts because the designed scenario itself will occur in a non-consumeristic housing future.

One of the key questions arising from our study is whether technologies alone are sufficient in reducing the environmental impacts in the future. This supposedly is the starting point of the EM principles and the strategies we discussed when designing the scenarios. The

remaining open questions are indeed whether we can develop these technologies, have sufficient time to do so and can do so on a large scale. We mentioned that the environmental impacts of housing construction and the housing sector in general are not only linked to domestic energy consumption. Housing construction has impacts on land use, material production, transportation, accessibility, etc. The location of housing affects travelling distances and modes as well the need for energy to cover the daily travels.

Regarding the land consumption for housing, we made estimations in the different scenarios, which show how much territory is consumed by different future images. In the case of Oslo, following the current municipal plans of the metropolitan area, an increase of 29 km² in the land consumption for residential areas is expected. This kind of increase has effects on natural land, the environment and biodiversity. The EM scenario for Oslo lowers this level to 20 km², whereas the DE scenario leads to 0 km² increase in residential expansions. The case of Milan, similarly, shows the tendency of increasing land use in the current plans: 26 km² of expansions for residential purposes are currently expected according to the strategic planning documents. Of this 26 km² of expansion, almost half (10.4 km²) is supposed to happen on natural areas and farmland. These areas converted into sites for housing construction will threaten the biodiversity corridors and the biodiversity and will lead to other consequences. In our EM scenario for Milan, the area needed will be reduced to 11.6 km², nullifying the need to build on natural areas and farmland. The DE scenario for Milan does not entail new constructions.

Similar considerations can be made for transportation and accessibility. Following a path of housing growth entails improved and increased accessibility. As in the EM scenario, increased accessibility is considered as a sign of progress; hence, the mobility levels do not present limitations. The EM scenario will focus on accessibility rather than mobility per se and will improve accessibility through proximity rather than through increased mobility. In the DE scenario, on the contrary, a sufficiency limit exists because mobility is considered to have serious environmental consequences. Because our DE scenarios will not entail new residential expansions, mobility will be developed under the principles of sufficiency. On the contrary, in the EM scenarios, the densification potential within the urban demarcations might eventually be used up, requiring new constructions as outward urban expansions even if the policies indicated by planners pursue a compact city strategy. These expansions will require more motorised transport, often car travel. This represents an important part of energy consumption and causes substantial GHG emissions.

Regarding social justice, some questions of redistribution and equity need to be addressed. As previously discussed, the EM scenario provides a future in which the basic needs of more marginalised groups and the more extreme housing deprivation situations are solved, but inequality in terms of housing consumption might be widened. EM also ensures that there is process equity and that decisions are taken in a democratic manner. Moreover, the implementation of the EM scenario is less challenging when it comes to acceptance because it is based on today's growth premises. DE addresses redistribution and social justice as a final goal; therefore, redistribution measures from who owns the most to who owns the least could indeed resolve and create a more just housing sector.

Through presenting and comparing the two types of scenarios that follow different paradigms and pathways, our study opens the discussion on possible housing futures. The achievement of either scenario will require a deviation from the BAU. Our principal finding is that although the DE scenario is more effective in achieving the social and environmental goals than the EM scenario, it is less feasible than the EM scenario owing to the existing dominant socio-economic and political conditions. By decommodifying the housing sector and designing it around a set of needs, obtaining a higher level of justice is possible. Limiting the dwelling construction for the future and ensuring better utilisation of the current stock, as in the DE scenario, gives more

effective results in terms of decreasing housing-related environmental impacts than employing technological measures, as in the EM scenario.

Declarations of interest

None.

CRedit authorship contribution statement

Silvia Mete: Conceptualization, Methodology, Formal analysis, Data curation, Writing - original draft, Visualization, Investigation, Writing - review & editing. **Jin Xue:** Conceptualization, Writing - original draft, Writing - review & editing.

Acknowledgements

We thank Professor Petter Næss for the useful discussions and the insightful suggestions.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.progress.2020.100504>.

References

- Akershus Fylkeskommune (2015). *Regional plan for areal og transport i Oslo og Akershus*. Akershus Fylkeskommune (2019). *Klimagatuslipp Fra Kollektivtrafikk I Oslo Og Akershus*. Alexander, S. (2015). Simplicity. In G. D'alisa, F. Demaria, & G. Kallis (Eds.). *Degrowth: a vocabulary for a new era*. Oxon/New York: Routledge.
- Allen, J. (2006). Welfare regimes, welfare systems and housing in Southern Europe. *European Journal of Housing Policy*, 6, 251–277.
- Anzell, S., & Thompson-Fawcett, M. (2008). The social sustainability of medium density housing: A conceptual model and Christchurch case study. *Housing Studies*, 23, 423–442.
- Andersen, B., & Roe, P. G. (2016). The social context and politics of large scale urban architecture: Investigating the design of Barcode, Oslo. *European Urban and Regional Studies* Article 0969776416643751.
- Andersen, B., & Skrede, J. (2017). Planning for a sustainable Oslo: the challenge of turning urban theory into practice. *Local Environment*, 22, 581–594.
- Andersson, R., Dhalmann, H., Holmqvist, E., Kauppinen, T. M., Magnusson Turner, L., Skifter Andersen, H., et al. (2010). *Immigration, housing and segregation in the Nordic welfare states*.
- Arbaci, S. (2007). Ethnic segregation, housing systems and welfare regimes in Europe. *European Journal of Housing Policies*, 7, 401–433.
- Assiter, A., & Noonan, J. (2007). Human needs: a realist perspective. *Journal of Critical Realism*, 6, 173–198.
- Baldini, M., & Poggio, T. (2014). The Italian housing system and the global financial crisis. *Journal of Housing and the Built Environment*, 29, 317–334.
- Banister, D., & Hickman, R. (2013). Transport futures: thinking the unthinkable. *Transport Policy*, 29, 283–293.
- Bengtsson, B. (2018). Theoretical Perspectives vs. Realities of Policy-Making. *Housing, Theory and Society*, 35, 205–210.
- Boatti, A., Quaranta, F., & Tripodi, M. R. (2012). *L'offerta e il fabbisogno di abitazioni al 2018 nella Regione Lombardia-Compendio*. DIAP Cisl.
- Büchs, M., & Koch, M. (2017). *Postgrowth and wellbeing: challenges to sustainable welfare*. Springer.
- Börjesson, L., Höjer, M., Dreborg, K.-H., Ekvall, T., & Finnveden, G. (2006). Scenario types and techniques: towards a user's guide. *Futures*, 38, 723–739.
- Checker, M. (2011). Wiped out by the "greenwave": Environmental gentrification and the paradoxical politics of urban sustainability. *City & Society*, 23, 210–229.
- Chiu, R. L. (2004). Socio-cultural sustainability of housing: a conceptual exploration. *Housing, theory and society*, 21, 65–76.
- Città Metropolitana Di Milano (2016). *Piano Strategico Metropolitanano* [Online]. Available: http://www.pianostrategico.cittametropolitana.mi.it/PSM/piano_strategico_metropolitano/index.html [Accessed August 2019].
- Città Metropolitana Di Milano (2017). *Annuario 2017 I Dati Dell'area Metropolitana Di Milano. Sistema Statistico Nazionale*.
- Di Milano, Comune (2016). *Regolamento Edilizio*.
- Cucca, R. (2012). The unexpected consequences of sustainability. green cities between innovation and ecogentrification. *Sociologica*, 6 0-0.
- Daly, H. E. (1993). The Steady-State Economy: Toward a Political Economy of Biophysical Equilibrium and Moral Growth. In H. E. DALY, & K. N. Townsend (Eds.). *Valuing the earth: economics, ecology, ethics*. Cambridge: MIT press.
- Dati Open (2019). *Superficie media per occupante dell'abitazione e comune* [Online]. Available: <http://www.datopen.it/it/opendata/>

- Censimento_2011_Superficie_media_per_occupante_delle_abitazioni_e_comune [Accessed].
- Demaria, F., Schneider, F., Sekulova, F., & Martínez-Alier, J. (2013). What is degrowth? From an activist slogan to a social movement. *Environmental Values*, 22, 191–215.
- Dietz, R., & O'Neill, D. (2013). *Enough is enough: Building a sustainable economy in a world of finite resources*. Routledge.
- Dooling, S. (2009). Ecological gentrification: A research agenda exploring justice in the city. *International Journal of Urban Regional Research*, 33, 621–639.
- Doyal, L., & Gough, I. (1991). *A theory of human need*. New York: Guilford.
- Edgar, B. (2012). The ETHOS definition and classification of homelessness and housing exclusion. *European Journal of Homelessness*, 6, 219–225.
- Ewing, R., & Cervero, R. (2010). Travel and the built environment: A meta-analysis. *Journal of the American planning association*, 76, 265–294.
- Fainstein, S. S. (2010). *The just city*. Cornell University Press.
- Geurs, K., & Van Wee, B. (2000). Backcasting as a tool to develop a sustainable transport scenario assuming emission reductions of 80–90%. *Innovation. The European Journal of Social Science Research*, 13, 47–62.
- Gibbs, D. (2000). Ecological modernisation, regional economic development and regional development agencies. *Geoforum*, 31, 9–19.
- Gilbert, L. (2014). Social Justice and the 'Green' City. *urbe. Revista Brasileira de Gestão Urbana*, 6, 158–169.
- Glock, B., & Häussermann, H. (2004). New trends in urban development and public policy in eastern Germany: dealing with the vacant housing problem at the local level. *International Journal of Urban and Regional Research*, 28, 919–929.
- Gomez-Baggethun, E. (2015). Commodification. In G. D'alisa, F. Demaria, & G. Kallis (Eds.). *Degrowth: a vocabulary for a new era*. Oxon/New York: Routledge.
- Gunnarsson-Ostling, U., & Höjer, M. (2011). Scenario planning for sustainability in Stockholm, Sweden: environmental justice considerations. *International Journal of Urban and Regional Research*, 35, 1048–1067.
- Hajer, M. A. (1995). *The politics of environmental discourse: ecological modernization and the policy process*. Oxford: Clarendon Press.
- Harvey, D. (2011). *The enigma of capital: and the crises of capitalism*. Profile Books.
- Holden, E., Linnerud, K., Banister, D., Schwanitz, V. J., & Wierling, A. (2017). *The imperatives of sustainable development: needs, justice, limits*. Routledge.
- Hospers, G.-J. (2014). Policy responses to urban shrinkage: From growth thinking to civic engagement. *European Planning Studies*, 22, 1507–1523.
- Huber, J. (2009). Ecological modernisation: Beyond scarcity and bureaucracy. *The Ecological Modernisation Reader*, 42–55.
- Hoyer, K. G., & Holden, E. J. (2001). *Housing as basis for sustainable consumption*. 4, 48–58. ISPR (2015). *Consumo di suolo, dinamiche territoriali e servizi ecosistemici*. Roma: Istituto superiore per la protezione e la ricerca ambientale.
- ISTAT (2015). *Le Persone Senza Dimora*. ISTAT.
- ISTAT (2018). *Popolazione residente al 1 Gennaio* [Online]. Available: http://dati.istat.it/Index.aspx?DataSetCode=DCIS_POPRESI# [Accessed].
- Jackson, T. (2009). Beyond the growth economy. *Journal of industrial ecology*, 13, 487–490.
- Jackson, T., & Victor, P. A. (2016). Does slow growth lead to rising inequality? Some theoretical reflections and numerical simulations. *Ecological Economics*, 121, 206–219.
- Jänicke, M., & Jörgens, H. (2006). *New approaches to environmental governance. Environmental Governance in Global Perspective. New Approaches to Ecological and Political Modernisation*. Berlin: Preite Universität Berlin. 167–209.
- Latouche, S. (2009). *Farewell to Growth*. Cambridge, UK: Polity Press.
- LOVDATA (2019). *Forskrift om tekniske krav til byggeverk* [Online]. Available: <https://lovdata.no/dokument/SF/forskrift/2017-06-19-840> [Accessed August 2019].
- Marin, M. (2002). Futures studies in the 21st century: a reality-based view. *Futures*, 34, 261–281.
- Marsh, A., & Mullins, D. (1998). The social exclusion perspective and housing studies: origins, applications and limitations. *Housing Studies*, 13, 749–759.
- Max-Neef, M. A. (1992). *Human scale development: conception, application and further reflections*. Meadows, D. H., et al. (1972). *The limits to growth: a report for the Club of Rome's project on the predicament of mankind*. New York: Universe Books.
- MISE (2017). *Strategia energetica nazionale, firmato il decreto* [Online]. Available: <https://www.mise.gov.it/index.php/it/198-notizie-stampa/2037347-strategia-energetica-nazionale-oggi-la-presentazione> [Accessed August 2019].
- Mol, A. P., & Janicke, M. (2009). *The origins and theoretical foundations of ecological modernisation theory. The Ecological Modernisation Reader. Environmental Reform in Theory and Practice*. Routledge.
- Mol, A. P., & Spaargaren, G. (1993). Environment, modernity and the risk-society: the apocalyptic horizon of environmental reform. *International sociology*, 8, 431–459.
- NEF (2014). *Inequality and Financialisation: a Dangerous Mix*. London: NEF.
- Neuteboom, P., & Brounen, D. (2011). Assessing the accessibility of the homeownership market. *Urban Studies*, 48, 2231–2248.
- NORDIC COUNCIL OF MINISTERS (1999). *Factors 4 and 10 in the Nordic Countries: the Transport Sector, the Forest Sector, the Building and Real Estate Sector, the Food Supply Chain*. Temanord Report. Copenhagen.
- Næss, P. (2012). Urban form and travel behavior: Experience from a Nordic context. *Journal of Transport and Land use*, 5, 21–45.
- Næss, P., Næss, T., & Strand, A. (2011). Oslo's farewell to urban sprawl. *European planning studies*, 19, 113–139.
- Næss, P., Strand, A., Wolday, F., & Stefansdotir, H. (2019). *Residential location, commuting and non-work travel in two urban areas of different size and with different center structures*. *Progress in Planning*.
- Næss, P., & Xue, J. (2016). *Housing standards, environmental sustainability, and social welfare*. Crisis System. Routledge.
- Nørgård, J., & Xue, J. (2016). *Between green growth and degrowth: Decoupling, rebound effects and the politics for long-term sustainability. Rethinking Climate and Energy Policies*. Springer.
- Odyssey-Mure (2019). *AVERAGE ENERGY CONSUMPTION PER DWELLING* [Online]. Available: <https://www.odyssee-mure.eu/publications/efficiency-by-sector/households/average-energy-consumption-dwelling.html> [Accessed].
- Priemus, H. (2005). How to make housing sustainable? The Dutch experience. *Environment and planning B: planning and design*, 32, 5–19.
- Priemus, H., & Ten Heuvelhof, E. (2005). *The long way to sustainable housing areas*. SAGE Publications Sage UK: London, England.
- Purcell, M. (2009). Resisting neoliberalization: communicative planning or counter-hegemonic movements? *Planning theory*, 8, 140–165.
- Regione Lombardia (2018). *Rapporto Al Consiglio Regionale Anno 2017. DIREZIONE Generale Politiche Sociali, A. E. D. Milano*.
- Sager, T. (2011). Neo-liberal urban planning policies: A literature survey 1990–2010. *Progress in Planning*, 76, 147–199.
- Sassen, S. (1991). *The global city*. New York.
- Schneider, F. (2018). *Housing for degrowth narratives. Housing for Degrowth*. Routledge.
- Schneider, F., Kallis, G., & Martínez-Alier, J. (2010). Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. Introduction to this special issue. *Journal of cleaner production*, 18, 511–518.
- Sekulova, F., Kallis, G., Rodriguez-Labajos, B., & Schneider, F. (2013). Degrowth: from theory to practice. *Journal of cleaner production*, 38, 1–6.
- Skifter Andersen, H., Andersson, R., Wessel, T., & Vilkkama, K. (2016). The impact of housing policies and housing markets on ethnic spatial segregation: comparing the capital cities of four Nordic welfare states. *International Journal of Housing Policy*, 16, 1–30.
- Smith, N. (1987). Of yuppies and housing: gentrification, social restructuring, and the urban dream. *Environment and Planning D: Society and Space*, 5, 151–172.
- Spaargaren, G. (2000). Ecological modernization theory and the changing discourse on environment and modernity. *Environment and global modernity*, 41–71.
- Spaargaren, G. (2003). Sustainable consumption: a theoretical and environmental policy perspective. *Society & Natural Resources*, 16, 687–701.
- Spaargaren, G., & Cohen, M. J. (2009). *Greening lifecycles and lifestyles: Sociotechnical innovations in consumption and production as core concerns of ecological modernisation theory. The Ecological Modernisation Reader. Environmental reform in theory and practice*. Routledge.
- Spaargaren, G., & Mol, A. P. (1992). Sociology, environment, and modernity: Ecological modernization as a theory of social change. *Society & natural resources*, 5, 323–344.
- Spaargaren, G., & Van Vliet, B. (2000). Lifestyles, consumption and the environment: The ecological modernization of domestic consumption. *Environmental politics*, 9, 50–76.
- Spangenberg, J. H. (2010). The growth discourse, growth policy and sustainable development: two thought experiments. *Journal of Cleaner Production*, 18, 561–566.
- SSB (2016). *Befolkningsframskrivinger 2016-2100. Økonomiske Analyser*. Oslo: Statistisk Sentralbyrå.
- SSB (2018). *Dette er Norge 2018*. Oslo: SSB.
- SSB (2019). *Areal og befolkning, etter region, statistikkvariabel og år* [Online]. Available: <https://www.ssb.no/statbank/table/11342/tableViewLayout1/> [Accessed August 2019].
- Stamø, M. A. (2009). Housing and the welfare state in Norway. *Scandinavian Political Studies*, 32, 195–220.
- STATISTICS RESOURCES (2019). Available: <https://www.iea.org/statistics/resources/unit-converter/> [Accessed August 2019].
- Suzuki, M., Oka, T., & Okada, K. (1995). The estimation of energy consumption and CO2 emission due to housing construction in Japan. *Energy and Buildings*, 22, 165–169.
- Torgersen, U. (1987). Housing: the wobbly pillar under the welfare state. *Scandinavian Housing Planning Research*, 4, 116–126.
- Tosi, A. (1994). *La casa: il rischio e l'esclusione. Rapporto IRS sul disagio abitativo in Italia*. FrancoAngeli, Milano.
- Trainer, T. (2019). Remaking settlements for sustainability: the Simpler Way. *Journal of Political Ecology*, 26, 202–223.
- Turner, L. M., & Wessel, T. (2013). Upwards, outwards and westwards: Relocation of ethnic minority groups in the Oslo region. *Geografiska Annaler: Series B, Human Geography*, 95, 1–16.
- Unhabitat (2009). *The right to adequate housing. Fact Sheet No. 21*.
- Van Tatenhove, J. P., & Leroy, P. (2003). Environment and participation in a context of political modernisation. *Environmental values*, 12, 155–174.
- Victor, P. A. (2018). *Managing without growth: slower by design, not disaster*. Edward Elgar Publishing.
- VY (2019). *Se hvordan tog, buss, bil og fyt påvirker miljøet vårt*.
- Weed, S. W. S. (1987). *World commission on environment and development. Our common future*.
- Woodward, D., & Simms, A. (2006). *Growth isn't working: the unbalanced distribution of benefits and costs from economic growth*. New Economics Foundation.
- Xue, J. (2014). Is eco-village/urban village the future of a degrowth society? An urban planner's perspective. *Ecological economics*, 105, 130–138.
- Xue, J. (2015). Sustainable housing development: decoupling or degrowth? A comparative study of Copenhagen and Hangzhou. *Environment and Planning C: Government and Policy*, 33, 620–639.
- Xue, J. (2017). Eco-metropolis planning conditioned by the growth ideology: The case of Greater Copenhagen. *Urban Design and Planning*, 1–10.
- Xue, J. (2018). *Housing for degrowth: Space, planning and distribution. Housing for Degrowth*. Routledge.
- Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage Publications.

Silvia Mete is a PhD Candidate at the Faculty of Landscape and Society at the Norwegian University of Life Sciences. Her research field is that of housing policies and housing sustainable development. She worked with challenges and issues related to populations unable to enter the housing market (Young adults, migrants) and she previously did research on homelessness, methodologies, and policies to tackle it. Currently works with housing sustainable development, future studies, and new models to achieve just and environmentally sustainable housing sector.

Jin Xue is Associate Professor in the Department of Urban and Regional Planning at Norwegian University of Life Sciences. Xue's research interests are in urban and housing sustainable development, interface between environmental and social sustainability in urban regions, degrowth and urban development and planning, urban futures based on scenario planning, and critical realism. Her research builds on comparative studies between Nordic and Chinese city regions. Since 2016, Xue has been a member of Urban and Regional Planning education program council at NMBU.

Article 3

Towards Degrowth Housing Development? Lessons from a Scenario-based Gaming Session in the Oslo Region

Silvia Mete

Department of Urban and Regional Planning, Norwegian University of Life Sciences, Norway

Abstract

This article focuses on the potentials and barriers to the realisation of a degrowth scenario in housing development in the Oslo region. The point of departure is a previously designed radical degrowth scenario, which depicts a future housing development that is both environmentally sustainable and socially just. Through a gaming session with housing stakeholders in the Oslo region, I investigated the elements hindering or facilitating the degrowth scenario. This paper analyses the results of the gaming session using morphogenetic theory, theory of political economy of environmental sustainability and critical urban theory. The results of the gaming session reveal important structural hindrances to the scenario within the current housing model, which directly depends on the socio-economic structures of capitalism. The article promotes a debate concerning housing for degrowth and a reflection on the deep socio-economic conditions for degrowth transformation.

Keywords: degrowth; housing development; sustainability; scenario; serious gaming

Publication status:

Accepted for publication in Local Environment Journal.

1. Introduction

With the point of departure of a previously designed degrowth housing scenario in the Oslo region of Norway (Metz and Xue, 2020), this paper asks which potentials and barriers exist within the current socio-economic-political settings to achieving the scenario. The degrowth scenario depicts a future housing development that, through reduction in average per capita housing consumption and a strong redistributive strategy, can contribute to both the environmental and social sustainability of housing for current and future generations. As an essential degrowth strategy, a reduction in housing consumption per capita has been argued to be important to respect the environmental limits (*ibid.*). This means that redistribution mechanisms from those possessing large shares of the housing stock to those possessing less should be established to secure everyone's access to housing within a limited housing stock. Degrowth is defined as a 'voluntary, smooth and equitable transition to a regime of lower production and consumption' (Schneider, Kallis, & Martinez-Alier, 2010). It opposes the unplanned negative growth happening within a pre-existing growth regime (Schneider et al., 2010). The goal of degrowth is environmental sustainability and social sustainability: they are both reached by respecting the planetary boundaries and promoting a good quality life for all.

Conversely, ecological modernisation is the theoretical background of the so-called green growth strategy. It considers economic growth a lever for increasing sustainability (Gunnarsson-Östling & Höjer, 2011), and it is a technological optimistic theory, meaning that, according to its tenets, technological advancement can always decouple the impacts of the increased growth and consumption.

This paper focuses mainly on the housing sector. The degrowth scenario, which will be scrutinised in the gaming session (Section 5), opposes the mainstream economic paradigm for the housing sector: growth-based housing development and the neoliberal housing model. As underlined by Nelson (2018), although with contextual differences, growth-based housing development is the mainstream paradigm for housing in affluent countries. Growth-based housing developments include capitalist forms of production, consumption and distribution of dwellings. Especially, considering

the neoliberal traits, housing presents the typical financialisation aspects: housing has become a tradable good, following the markets rule and increasing the speculation tendencies (Jackson & Senker, 2011), which put housing accessibility and affordability for all at risk.

Considering these three ideal types – degrowth, ecological modernisation and growth-based housing development, the degrowth scenario offers a radical alternative to growth-based housing development and to the prevalent green growth agenda for sustainable housing development (Nelson, 2018).

The radicality of the degrowth scenario implies that reaching this future can meet various challenges. In this study, the degrowth housing scenario is given as a desirable future. The aim is, therefore, to identify socio-economic-political barriers and potentials for achieving such a degrowth housing future. The study is original in its attempt to include many practitioners in identifying the favourable and unfavourable conditions for materialising a degrowth housing future in an affluent Western city – Oslo. Thus, the study contributes to moving from a degrowth imagination to the exploration of possibilities for its realisation.

Distinct from the existing housing degrowth studies that have reflected mostly on measures specific to individual housing projects such as eco-housing or co-housing (Ferrerri, 2018; Schneider et al., 2013), this study points to the urban regional level and inquires macro-scale structures that can enable or block the change. Thus, this study identifies barriers and potentials both within the housing sector itself and in the current structural conditions at the societal level.

The investigation of barriers and potentials was conducted through a participatory backcasting approach (Robinson, 2003) based on a gaming session, which is rather innovative in the study of housing field. Professionals and stakeholders in Oslo's planning and housing sector were involved in a backcasting gaming session, which aimed to gather knowledge on barriers to and enablers of a degrowth housing future.

Thereupon, the empirical analysis of hindrances and potentials has been informed by the metatheoretical grounds for social change through structure and agency interaction, the theory of the political economy of capitalism and critical urban theory. This study acknowledges the metatheoretical grounds for social change through the dynamics between structure and agency (Archer, 2013; Danermark, Ekström, & Karlsson, 2019).

The rest of the paper is structured as follows: After the introduction, a methodology section (Section 2) follows. The theoretical perspectives informing the discussions on the findings of the gaming session are presented in Section 3. Section 4 introduces the general features of the housing sector and the relevant housing policies in Norway and the Oslo region. Based on the gaming session, Section 5 presents societal conditions for the materialisation of the degrowth housing scenario, as identified and articulated by the game participants. Section 6 endeavours to interpret the findings from the gaming session following theoretical arguments. Finally, the conclusions (Section 7) follows, where the study makes a preliminary attempt at suggesting steps towards a degrowth housing future.

2. Research Design and Methods

2.1 Scenario and Backcasting

As mentioned above, the starting point of this study is a pre-designed degrowth scenario that ensures a just and sustainable housing sector for the future (Metz & Xue, 2020). The space here does not allow a thorough depiction of the scenario, except a simplified reiteration. The core of this scenario is a reduction in consumption of per capita residential square meters and eco-tech measures to ensure environmentally sustainable development of the housing sector. The scenario covers the Oslo region (including the Oslo municipality and the metropolitan municipalities). In particular, the scenario shows that reducing the square meter per capita consumption from the present figure of 50.5 m² to 44.2 m² would promote an important decrease in residential energy consumption. Such a limitation would nullify the need for additional

housing, even with the anticipated increased population of the Oslo region by ~284,000 inhabitants within the next 15 years (SSB, 2019). Nullifying additions to the housing stock means reduction in the total energy consumption and decreased impacts normally produced by the provision of raw material, construction, land consumption and travel impacts resulting from new settlements. Such measures are combined in the scenario with energy efficiency improvements in existing buildings, which makes them even more efficacious than the present path regarding the reduction of total energy residential consumption. Still, the important aspects of social justice need to be addressed. A degrowth scenario, with a reduction in square meter per capita consumption, also means heightening the risk for overcrowded dwellings and inadequate housing solutions. Therefore, a just redistribution was a core element in the scenario building: considering the remodelling of bigger units and the reduction of the overcrowding in others.

Scenario building is a method from the field of 'futures studies'. The developed degrowth housing scenario belongs to the type of normative scenarios that depicts a desirable future that cannot be achieved by following the current trajectory and within the existing conditional frameworks (Börjeson, Höjer, Dreborg, Ekvall, & Finnveden, 2006). Associated with normative scenarios is the backcasting technique, which, according to Robinson (2003), can be used to explore the feasibility of reaching desired end-points. With this technique, it is possible to start from an endpoint (in this case, the degrowth future) of a normatively defined future and investigate the steps that might be required or those conditions that might hinder the realisation of the desired future situation. Backcasting can be conducted by purely theoretical exploration (Wangel, 2011) or in a participatory manner with societal actors.

In this article, I will employ the backcasting approach to identify barriers and potentials towards the degrowth scenario in the housing sector in the Oslo region. The backcasting is developed by synergising theory and participation: empirical data is collected through a serious gaming session (see Section 2.2 below) in a participatory manner, followed by an analysis using theoretical lenses (see Section 3).

2.2 The serious game in this study

Serious gaming is meant to do more than entertain the participants (Michael & Chen, 2005). It is often explicitly used to educate or investigate and has a vast application nowadays, including urban planning and development studies (Heinonen, Minkkinen, Karjalainen, & Inayatullah, 2017; Poplin, 2012). There are diverse forms of serious games. In this study, the gaming session was based on the causal layered analysis (CLA) gaming method. CLA gaming is a multi-layered and integrative technique for serious gaming (Heinonen et al., 2017; Inayatullah, 2004). The method addresses issues within four layers: litany, systemic causes, worldviews and metaphors. Litany refers to the trends and the factual aspects of the story, in this case, the scenario. Systemic causes focus on the causal logic and the factors underpinning the scenario. They are grouped in a PESTEC table, which is an acronym for the aspects it synthesises: political, economic, social, technological, ecological-planning and cultural aspects. The participants in the gaming session fill in the table. The worldviews layer refers to the view given by the agents in the game, a roleplay with allies and enemies. The metaphors, at last, include the illustrations and perceptions of the scenario for each agent.

The version of the CLA game used in this gaming session was adjusted to the number of participants, time and researchers available. The gaming session focused on the first two layers, litany and systemic causes. A reflection on the worldview and the role of the agents was done by the researcher in the analysis phase, which followed the gaming session. CLA guided me to prepare a pre-constructed serious gaming meeting and structured the gaming process. The analysis (Section 5) is built on but does not strictly follow the layers of the game because the CLA technique is not an analytical tool, but it is a guide to prepare a serious gaming session. As a method, it does not require its use to further analyse the results of the game, but it only speaks to what happened in the session. Therefore, the analysis (Section 5) followed a specific method, expounded in Section 2.3, namely a theoretical interpretation via structure/agency, and existing body of social theories.

In the gaming session, a group of 10 experts in the field of housing sector and planning in the Oslo region were invited (figs. 1 and 2), including architects, urban

planners, real estate developers, public administrators and a researcher. The participants were divided into two groups: each group needed to have one representative from each area of expertise. In the gaming session, they learnt about the scenario, reflected in groups and identified hindering and enabling factors for the scenario. The game was conducted in the following steps:

First, both groups were given instructions on how to participate in the gaming session, and each participant was given an imaginary page of a fictitious future newspaper, which gave them information and data on the degrowth housing scenario (fig. 3). The newspaper (fig. 3) represents the first phase of the CLA gaming: the litany phase. The newspaper is a fictitious description of the situation in Oslo regarding a degrowth scenario. It is the scenario itself told in a narrative and more visual form. I prepared the newspaper ahead of the gaming session to summarise the effects of the degrowth scenario on the housing sector and the city region. It is written in Norwegian and touches upon aspects of the sustainability of the city, mobility, the redistribution policies of the housing sector and the implied planning transformations.



Figure 1. Participants in the gaming session. Source: author



Figure 2. Newspaper of the future. Source: author

Second, the participants started interacting freely with one another in their groups after they became acquainted with the future scenario via the newspaper. The second step aimed to enable the game players identify the blocking and enabling present conditions to achieve the designed future. The participants played their own professional role. Each group was given a synthesis table to be filled in agreement. The table chosen follows the PESTEC method (Heinonen et al., 2017) used in other experiments to explore the elements derived from different spheres. Under each theme, the participants identified the enabling and blocking conditions of a degrowth housing future in the Oslo area (fig. 4).

Third, each group presented its table, triggering further discussions and new inputs. The analysis considered the PESTEC tables, the conversations and the plenary presentations. I acted only as a moderator in the game since I was not directly involved in the discussions in groups or in the plenary moment.

	ENABLING CONDITIONS	BLOCKING CONDITIONS
POLITICAL	<ul style="list-style-type: none"> - ^{point} idealism of capitalism - restrictions of needs - totalitarian society - less individualistic 	<ul style="list-style-type: none"> - focus on capitalism, consumerism, growth - freedom/individualism
ECONOMIC	<ul style="list-style-type: none"> - high taxes on sp. m - reimbursement - taxes on extra houses - bad economy 	<ul style="list-style-type: none"> - abolishes car/bike - Bopplekt - banking, finance, construction industries are dependent on housing growth
SOCIAL	<ul style="list-style-type: none"> - social movement supporting - moving out - community, closeness - less children - old people - out of the city 	
TECHNOLOGICAL	<ul style="list-style-type: none"> - remodeling the houses 	
ECOLOGICAL-PLANNING	<ul style="list-style-type: none"> - access to green/public space - cohousing 	
CULTURAL	<ul style="list-style-type: none"> - status - making cool living in small homes - logoin 	<ul style="list-style-type: none"> - pets - hytter - decoration of apartments - status

Figure 3. Example of PESTEC table filled by participants. Source: author

2.3 Analysis method of the game

The game was video-recorded and the conversations in the two groups were later transcribed. This material and the PESTEC tables form the basis of the follow-up analysis and discussion. The findings of the analysis are summarised in Table 1.

First, through the analysis of the transcriptions, the claims and arguments were sorted out according to the categories of structure and agency. In the table the conditions blocking or enabling the realisation of the degrowth scenario for the housing sector of Oslo, were also sorted out according to the remarks of the participants. Section 6, shows the interpretation of the the results shown in the PESTEC table using the political economy and critical urban theories.

3. Theoretical Background

3.1 Structure and agency in societal transformation

Achieving a degrowth scenario is about social transformation and change. This requires deep insight into structural conditions for the possibility of change. To gain such an insight, social change has to be understood first at a metatheoretical level where the dynamics between agency, structure and change are inquired. In particular, the study is based on an acknowledgement of the dualism of structure and agency as two connected, albeit separated, phenomena (Archer, 2013). Agents refer to the actors involved, whereas structures refer to relations among social positions occupied by the agents, such as power, competition, dependence, and also economic structures that define positions and relations. Structure is presently in existence for the agent, conditioning agents' actions (Danermark et al., 2019). The acting of the agents can maintain, modify and perpetrate a status. This understanding of how humans and agents operate and under which structural and cultural circumstances is pivotal to this study, as it provides a foundation for interpreting the enabling and blocking conditions of the degrowth housing scenario.

Discussing structure and agency is also increasingly emphasised by scholars applying a backcasting approach. Backcasting techniques have often been used in studies on sustainable development, targeting very complex future questions that call for major changes (Wangel 2011). Theorists have acknowledged the need to include social structure and agency when discussing 'far-reaching societal changes' (ibid. p. 873). Excluding structure and agency in the backcasting study risks maintaining the status quo, which can eventually obstruct change.

The results of the game were interpreted exploring some theories. On one side, political economy theory was used to explain the present dominant capitalist economic structures and their relationships with social and environmental sustainability. I also used critical urban theory as a key to recognising urban problems related to political

economic aspects. The theoretical reflections will be integral parts of the discussion of the findings of the gaming section (cf. Section 6).

3.2 Political economy of environmental and social sustainability

The political economic theory provides a critical angle to understand how the capitalist system functions and how it could positively or negatively affect realising the degrowth scenario in most affluent countries. The current political-economic system is based on growth premises. Growth and capital accumulation are the engines and the main traits of capitalist economies and housing systems (Marcuse, 2012).

Several critics have argued that capitalism is a barrier to long-term environmental sustainability. Capitalism and growth tenets promote a model that requires increased production and consumption, which impact the environment. In particular, as Foster (2011) underlined, the economy has grown to a level exceeding several planetary boundaries (climate change and biodiversity as examples), and the environmental impacts have become increasingly visible. Also, several critics have argued that the capitalist system by itself cannot provide a sustainable future (Foster, 2002; Kovel, 2007; Naess, 2006). There are several reasons for this, which can be expounded through three central topics: pursue profit, consumerism and growth.

The market economy includes two important aspects: marketisation and growth. Both are reproduced and enhanced by competition. Increased marketisation is due to pressure from investors who demand minimised social control on the markets, while growth is linked to the process of pursuit of profit through increased efficiency (Fotopoulos, 2007). Growth relies on efficiency in the division of labour and in specialisation towards a continuous maximisation of profit. The maximisation of efficiency guided by the pursuit of profit and capital accumulation could impede the realisation of the degrowth scenario, especially for increasing labour efficiency, which is often employed to increase production in the capitalist system. If an increase in labour efficiency is utilised to shorten working hours, it will properly parallel the degrowth paradigm. Therefore, efficiency per se is not necessarily in contrast with

degrowth, especially if it is related to technological efficiency, eco-efficiency or, more in general, reduction of costs or working days. Theoretically, the deepest barrier to degrowth is the entrenched growth imperative and its associated culture (e.g. consumerism, private ownership), regimes (e.g. deregulation of private sectors, housing as a commodity) and activities (e.g. speculation). In Section 4, in the game analysis, these aspects will be made explicit.

Degrowth implies a major social change to turn the economy towards the opposite of growth (Latouche, 2003), with a voluntary reduction of the GDP (Gross Domestic Product). As underlined by Foster (2011), this could not happen easily in today's capitalist economy because the latter is based on the concrete concept of capital accumulation, which contradicts the de-growth idea. Also, keeping capitalism in a degrowth scenario would require numerous regulations to tame the tendencies of the capitalist economy (Foster, 2007). Many regulations contradict a capitalist system, especially in its neoliberal form, and will likely face fierce opposition from the capitalists and their organisations' interest. Degrowth therefore needs to address the barrier created by the current capitalist system and the growth-based model, under which the housing sector functions today.

3.3 Critical Urban Theory

Regarding housing development, critical urban theory, given its focus on urban problems, provides interesting insights that parallel the above-mentioned perspective of political economy. (Brenner, Marcuse, & Mayer, 2012) underlined that cities are the main arena of economic accumulation. Harvey (2010, p. 314) stated that 'urbanism founded on exploitation is a legacy of history'. Despite the crisis tendencies and instabilities, capitalist urban development remains mainstream. Regarding critical urban theory, environmental degradation and human suffering are considered consequences of the urban crisis caused by the contradictions of capitalism (Harvey, 2014). According to Brenner et al. (2012), the urban space serves as the arena, the medium and the stake for the struggles created by capitalism. Under capitalism, the urban space is the 'point of collision' where the benefits of the few (linked to capital

accumulation and growth) collide with the needs of the discontented and deprived (Harvey, 2010).

Reaching equity and social justice under current conditions appears difficult. Let us consider that a just city would present three pillars: equitable distribution of housing, diversity and democracy (Fainstein, 2014). Achieving an equitable distribution would encounter multiple barriers associated with the main characteristics of the current housing model: commodification of housing, limited involvement of governments in restricting private profits and idea of ownership (Marcuse, 2012).

These aspects will be discussed in Section 5. Nevertheless, it is possible to anticipate that some of the features mentioned by Marcuse (ibid.) could be countered with specific measures, as in the case of ownership. Davis (2006) suggested adding varying forms of tenure beside the classic rental and ownership. Also, Marcuse (2012) also suggested a shift towards the vision of housing as a social good. The containments of the housing market traits would certainly benefit the environment and the society. The analysis of the gaming session would distinguish between the housing traits and the more systemic aspects using political economic and critical urban theories.

4. The context: Housing development and policies in the Oslo Region

As the largest Norwegian metropolitan area, the Oslo region is attractive for newcomers and businesses. It presents a relatively stable trend of economic growth, which reflects the housing sector, with an 815% increase in the values of the building stock from 1992 to 2017 (SSB, 2018). Furthermore, housing consumption is boosted by governmental policies aimed at stabilising the interest rates on housing loans or offering tax deductions from savings accounts for mortgage deposit. The high costs of housing in Oslo is partially caused by relatively easy access to mortgages and a low-level unemployment.

The most common form of tenure in Oslo and Norway remains homeownership. Neither the rental sector nor social housing is diffused. In particular, social housing in Norway accounts for only 5% of the entire housing stock (Andersson et al., 2010). Social housing refers to the provision of housing by municipalities to help groups struggling with entering the housing market or unable to access the private rental sector for economic or personal reasons. This low share of social housing makes Norway exceptional among the Nordic countries, and it is rooted in the history of housing provision itself. Before the liberalisation of the housing sector in the 1980s, the provision of affordable housing was fulfilled by co-operatives (OBOS, USBL, etc.), which have built the largest housing estates in Oslo and provided access to housing to many workers and citizens. The units were sold at an affordable price to the inhabitants, enabling them to access homeownership (Stamsø, 2009). Other schemes, such as housing loans provided by the Norwegian State Housing Bank, also supported the self-construction of single housing units. Other regulative and financial mechanisms were established to control both the price and rent before the liberalisation wave of the 1980s (Stamsø 2009).

After the housing sector liberalisation, the above-mentioned co-operatives remained active and continued to develop housing projects. However, they operate as private sector actors and develop housing with market prices while keeping certain co-operative features, such as membership access. The public sector provides for social housing only for severe housing deprivation issues due to financial or other personal distress. This portion of the social housing stock is eminently present in the east side of Oslo, creating a socio-spatial pattern of segregation between the east and west (Turner & Wessel, 2013).

Regarding per capita residential floor area, Norway presents a growing trend which reach over 50 m² nationally (Xue, 2018) and 50.5 m² in the Oslo area (Mete & Xue, 2020). From a global perspective, the standard is high. Arguably, it is environmentally implausible to raise this standard. Also, in most affluent countries, access to housing is considered an individual responsibility, and the purchasing power is often linked to social status.

The Oslo housing sector is boosted by a profitable housing market by raising prices and increasing the population size projected over the next years in the whole region. Therefore, Oslo's population growth, necessitating a substantial increase in the number of dwellings, represents a significant challenge concerning environmental sustainability if high per capita standards will remain similar to today. All the cultural aspects, such as population growth, economic traits and planning schemes, should be considered when discussing a future housing development that is challenging the growth-based one. Considering the specifics of the Oslo housing sector, which is almost exclusively marketised with a strong homeownership tenure diffusion, it is interesting to enter such a scenario gaming session that radically questions this model.

5. Analysis of the gaming session

Table 1 presents the analysis process. In this section, a summary of the findings of each step will be expounded and organised as follows. First, based on the statements from the game participants, the article summarises the blocking conditions for the degrowth scenario, both in the housing-specific and systemic conditions (Section 5.1). Systemic conditions refer to the aspects that are indirectly related to the housing sector but mostly related to the macro-dimension of society and economy, which, however, lays the foundations for the operation of the housing sector. Later, the conditions enabling the degrowth scenario are shown, again both the housing-specific and the systemic dimensions (Sections 5.2). Both Sections 5.1 and 5.2 are analysed considering the structure and agency categories. The structure is broken down into themes of the political, socio-economic, technological, built environment and culture. On the agency side, the participants were grouped by their vested roles: planners, public institutions representatives, researchers and real estate developers.

Table 1 Analysis of the results of the gaming session with barriers and enablers to the degrowth scenario, under structure and agency

		Structure (paraphrased)			Agency (excerpts from the transcriptions)				
		Political	Socio-economic	Technological	Built Environment	Culture	Planner	Private Developer	Resea Public Administration
Barriers	Systemic	<ul style="list-style-type: none"> -Complicated regulation processes -Local autonomy in the decision process leads to unwanted consequences (e.g. sprawl) -Lack of comprehensive measures and decisions -Lack of political cohesion and will -Lack of a 'deadline' political mindset -Lack of funds in the local administrations -Current planning instruments inadequate and weak (e.g. VPQR) 	<ul style="list-style-type: none"> -Tax system per today -Capitalist-driven logic -People struggle to accept too progressive changes -The State subsidizes housing ownership -Subsidies to districts but not cities -Lack of a top-bottom leadership model, as in Communism -Lack of adequate financial systems for a different future 	<ul style="list-style-type: none"> -Very expensive to be innovative, especially in the housing sector 	<ul style="list-style-type: none"> -Rigid housing stock (not easy to re-modulate) 	<ul style="list-style-type: none"> -Professionals and authorities are not used to think and solve social problems 	<ul style="list-style-type: none"> -Norwegian planners are not ready for this quick urbanisation -"But we do have a culture for it (ownership)" -"Do people really want a sustainable consumption?" -"What's in it for me?" -"If you are rich enough, you can always hire someone to lie for you!" 	<ul style="list-style-type: none"> "We are very dependent on political discussions" "There is a systemic aspect, you cannot expect to sell housing on an app." "Too many conflicts.." "Often we deal with a chessboard with 100 squares, namely 100 owners" "You must discipline owner interests, they must be whipped! If not, you need money! You must have whip, money, and planning!" 	
	Housing	<ul style="list-style-type: none"> -Lack of a right to housing law -Lack of appropriate and dedicated tenants protection regulations 	<ul style="list-style-type: none"> -Housing ownership -Too much speculation and too much money in the housing sector (financialization of the sector) 	<ul style="list-style-type: none"> -Current Tek standards, too stricts and still not adequate to renovation of old housing stock 	<ul style="list-style-type: none"> -Fear of heights in housing -Lack of adequate green/blue infrastructures 	<ul style="list-style-type: none"> -Culture of property 	<ul style="list-style-type: none"> "Very hard to consider housing consumption as an answer to the problem" "We took the pines with us in the cities, and we want it private and with the big bigges.." 	<ul style="list-style-type: none"> "Can we build new, or do we have to readapt? Sometimes it works but often not.." 	<ul style="list-style-type: none"> "Much is about how we think about it, also with psychology in mind"
Enablers	Systemic	<ul style="list-style-type: none"> -Presence per today of quite ecologically aware progressive political parties 	<ul style="list-style-type: none"> -Reinvestment of oil funds for the good of society (from oil fund to redistribution fund) -Changed role of banks and financial authorities -Crisis offer an opportunity to change financial tools in housing (e.g. shareholder) 	<ul style="list-style-type: none"> -Technological innovation in housing and tech efficiency on the rise 	<ul style="list-style-type: none"> -Individual environmental awareness -social status (is changed) -status: more green, more social network appealing 	<ul style="list-style-type: none"> "Densification strategy is good to create the critical mass" "It is important that you also have the carrot... if it is too far more global radical... (it won't work" 	<ul style="list-style-type: none"> "It is possible to consider alternatives to the State initiatives" "It is important that you also have the carrot... if it is too far more global radical... (it won't work" 	<ul style="list-style-type: none"> "It is possible to consider alternatives to the State initiatives" "It is important that you also have the carrot... if it is too far more global radical... (it won't work" 	<ul style="list-style-type: none"> "A diversified housing offer is important" "The big Oslo developers could join their forces and make this happen maybe? Instead of the State or municipalities.."
	Housing	<ul style="list-style-type: none"> -State incentives for green innovation -Existing housing instruments (e.g. bopitkt) and lessons from the past 	<ul style="list-style-type: none"> -Household composition (e.g. incentives to bigger families and collective solutions) -Cooperatives (e.g. OBSOS) have started to understand they have to do something since people cannot afford moving in the new apartments -Presence of the borettslag concept and cooperatives 	<ul style="list-style-type: none"> -Exclusive housing -cooperative -Enhanced housing quality 	<ul style="list-style-type: none"> -Housing as a service, not an object -Millennials and sharing culture -Ethical and moral awakening -Norway is becoming more and more urban 	<ul style="list-style-type: none"> "Housing as a service, not an object" "Millennials and sharing culture" "Ethical and moral awakening" "Norway is becoming more and more urban" 	<ul style="list-style-type: none"> "Housing as a service, not an object" "Millennials and sharing culture" "Ethical and moral awakening" "Norway is becoming more and more urban" 	<ul style="list-style-type: none"> "Housing as a service, not an object" "Millennials and sharing culture" "Ethical and moral awakening" "Norway is becoming more and more urban" 	<ul style="list-style-type: none"> "Housing as a service, not an object" "Millennials and sharing culture" "Ethical and moral awakening" "Norway is becoming more and more urban"

5.1 Blocking conditions against the degrowth housing scenario

5.1.1 Housing specific conditions

There are several structural and agential conditions specific to the housing sector that block or hamper the achievement of degrowth housing development. According to the game participants, in the political aspects of Table 1, the absence of an adequate regulation structure to protect tenants and to ensure housing as a basic right threatens the social cohesion and justice that are pursued in the degrowth scenario.

On the socio-economic side, the predominant ownership model in Norway is seen as a major limitation in reaching the degrowth scenario. The participants point to the necessary intricate process of redistribution of the existing housing stock in the degrowth future that can be hampered by the private ownership of housing. According to the game participants, the redistribution process is a demanding exercise given the primacy of private property right. However, participants underlined the expensive and bureaucratically slow nature of the process of changing the existing housing stock from the inside, considering the architectural and technical challenges. Compensation mechanisms for the lost part of the dwelling, for instance, also need to be designed and enforced through public actions, which, to some, seem to overcomplicate the system by an extra regulatory level of bureaucracy.

Changing towards a degrowth housing development would require reducing the financialisation and speculation on the housing sector, involving stark decisions from the state. To the participants, the present financial mechanisms represent an important barrier as they promote profit-seeking in the housing market and, thus, discouraging other forms of more equitable redistribution of the housing stock. The financialisation mechanisms that revolve around property ownership reflect the very core of the 'culture of ownership' in housing, which is mentioned by the game participants as another important blocking element to the degrowth scenario. Culture of ownership

includes a social status trait that is inherent in housing, which, according to the participants, is hard to dismantle.

Another aspect mentioned by the participants is that changing the ownership culture would imply facing important social consequences, especially referring to the risk of rising inequality and discontent. Particularly, the game participants expressed concerns about the knowledge and skills of Norwegian planners, regarding questions of social justice and equality. They opined that a shift in the ownership culture and redistribution would require knowledge of the subject from the actors operating in the housing sector.

'It surely has something to do with culture... we are not used to that and are not used to solving social problems' (Planner, about planners in Norway). Adding to the lack of knowledge, a planner underlines that the difficulty in facing social problems could derive from the cultural background of the planners. The participants' claim on culture points to two directions: 1) it hints at the education of the planners since they may lack social subjects in their formation and curricula; and 2) it also hints at a less heightened social inequality situation in the Norwegian cities and society, requiring therefore less expertise on the equality and social justice subjects.

Furthermore, costs linked to the eco-efficiency measures are repeatedly highlighted by the game participants as an important blocking condition for reducing housing-related environmental impacts. According to the participants, following the high environmental standards in the building phase (eco-proof materials and systems, better technologies) raises the costs to a level that threatens housing affordability, thus reducing the attractiveness of the eco-efficiency measures for developers and future inhabitants.

The existing land use structures also hinder the degrowth scenario. According to (Akershus Fylkeskommune, 2015), although the current regional plan and the law for the protection of the Marka forest have successfully managed to control sprawl trends over the years, low-density housing dominates in many of the suburban areas, as the participants mentioned. This specific urban landscape, often purely residential and

dispersed, has increased car dependency and presents a lack of mix functions in these areas. These areas would need to undergo a strong transformation, which made some in the gaming session raise an eyebrow. On the agency side, as commented by the planner, 'Norwegian planners are not ready for this quick transformation' (Planner).

When reflecting on a radical scenario, game participants forecasted that 'the next generation will do it because they are far more global and greener' (planner). Today, it seems that the strong cultures of property and privacy, alongside social status, hinder the realisation of the degrowth scenario. As exemplified by one of the game participants, 'We took the pines with us into the cities, and we wanted it private and with the thuja (juniper) hedges...' (planner).

The social aspects appear central to the debate on the future housing scenario and are, according to the participants, strongly intertwined with questions of culture. Regarding the social aspects that were addressed in the game, participants hinted at the housing offer as an important factor. They suggested that it needs to be diversified and affordable for the degrowth scenario to be appealing and successful. This means overcoming technicalities and remodelling the current housing stock from the inside.

On the built-environment aspects, there are concerns about the rigidity of the present building stock, which is difficult to re-modulate to accommodate more inhabitants or different household compositions according to the professionals in the room. Especially in the city centre where several buildings are categorised as cultural heritage, a degrowth scenario, applying today's regulations, seems complicated: this is due to strict procedures and regulations to preserve cultural heritage of the inner city's artefacts. Participants also added that Norway is not conventionally used to building in height, and a participant referred ironically to 'vertigo' of planners and inhabitants. Another element puzzling the participants was the current lack of adequate and equally distributed green and blue infrastructures. These are perceived as pivotal to the quality of living and necessary for conceiving a different future for the city.

From the agency side, the lack of motivation for being sustainable is recognised as a barrier by some game participants. For example, the private developer provokingly

asks, 'Do people really wish to have a sustainable consumption?', hinting at a doubtful collective awareness and drive. An even more worrisome note of this study is the lack of professional awareness of the important role that the housing sector can play in driving sustainable transformation. As the planner claims, 'it is very tough to consider limiting housing consumption as an answer to the environmental problems'. This last statement hints at an important question linked to the ecological awareness of the agents of change, notably among professionals.

5.1.2 Deep systemic conditions

The deep systemic conditions emerging from the gaming session appear at different levels. The major blocking structural conditions mentioned by the participants are linked to the regulatory dimension and the economic system, with its growth imperative. The participants underlined the importance of the regulative aspects and the planning system in the future scenario. Especially, reflections on the changes in these structures (e.g. regulations and plans), the conflicts arising (public–private) and the power (or lack of) of the local administrations are recurrent and considered crucial blocking conditions.

'Municipalities lack power in meeting the developers' (planner), and 'Too many conflicts... Often we deal with a chessboard with 100 squares, namely 100 owners' (planner). These excerpts, in the gaming session, underlined that both the question of conflict (with the local administrations feeling powerless) and the regulatory aspects are hard to change. These aspects could all act as barriers to the degrowth scenario, as they reveal that the current marketised structure of the Norwegian housing sector cannot be managed if major changes in power relations do not occur.

Still on the structure side, the participants identified several key socio-economic conditions hindering the degrowth scenario realisation. Participants were concerned that a degrowth future for the housing sector would burden the groups at risk of housing exclusion, and that the power imbalance between planners, politicians and developers might increase the social risks and conflicts due to uneven redistribution processes.

On the economic side, the gaming session participants highlighted that the current economic system is not suited for such a change, including the tax system, the financial system and the capitalist logic. The participants stressed the financial structure in which the Norwegian housing sector is situated as a blocking condition for degrowth. The presence of a consolidated market economy in a capitalist context is a recurrent element of discussion and is referred to as a major block on the path to a degrowth future for the housing sector.

Private developers who participated in the gaming session hinted at new ways of acting, which might involve different actors and new practices ('It is possible to consider alternatives to the State initiatives'). Planners also agreed on this aspect and claimed: 'The big Oslo developers could join their forces and make this happen. Instead of the State or municipalities...'. Regarding ways of achieving the degrowth scenario, private developers suggest incentives rather than regulations. 'It is important that you also have the carrot... if it is too radical... it will not work'. However, planners disagree with private developers on this aspect, suggesting that, for the scenario to work, you would also need to whip the private interests. 'You must discipline owner's interests, they must be whipped, if not, you need money! You must have whip, money and planning!'. But what private developers mentioned very clearly was the current individualistic culture of the 'What is in it for me?', which significantly blocks the achievement of the discussed scenario.

5.2 Enabling conditions for the degrowth housing scenario

5.2.1 Housing specific conditions

According to the participants, the contextual and housing aspects seem to offer several enabling conditions. Some of the participants stressed that it would suffice to learn from the past when housing cooperatives were promoting housing accessibility and affordability. It seems that the degrowth scenario discussed in the gaming session resonates with the social democratic welfare model typical of the Norwegian housing sector in the past (Esping-Andersen, 2013). In particular, degrowth could benefit from

some of the lessons of the past, such as corporatism, with co-operatives and schemes to improve housing accessibility and affordability.

Participants underlined that some of the mechanisms in use before the neo-liberal wave in the 1980s (Andersson et al., 2010) could be restored in the housing sector of Oslo to ensure redistribution and affordability of the stock.

Another positive aspect, according to the participants, is that architects are increasingly paying attention to and promoting shared and modifiable housing solutions. This change in mindset implies that designers are swiftly adapting to societal changes, for instance, the increase in single persons households, etc. They also mentioned that this aspect agrees with the technological measures and the role of the internet in facilitating sharing of housing or products. In general, technological innovation in housing was, in fact, hailed by the gaming participants as positive and enabling. The architects in the gaming session showed awareness both of the environmental and social side of housing as they are already aiming at the zero-energy consumption in their projects (as in the case of Fyrstikkbakken 14), and are familiar with remodulation of units for different needs, which is something that the degrowth scenario would benefit from. Another positive aspect discovered is the third housing sector initiative, including NGOs and groups active in the territory. It suggests the political willingness to make housing more affordable, which represents indeed an enabling condition for such a scenario.

On the agency side, the participants shared the acknowledgement of the importance of the political will to promote change. Participants highlighted that environmentally progressive parties at the Oslo municipal government have successfully nudged towards the achievement of environmental goals: the reduction of car use and implementation of incentives for electric cars have been pushed by the Norwegian green party, which has also put on the agenda for the future of a car-free centre. These parties are perceived as frontrunners who are successful at pushing ecological changes to the top of the agenda.

5.2.2 Deep systemic conditions

Considering the deep systemic enabling conditions, the game participants mentioned, on the socio-economic side, the Norwegian oil fund, which, according to them, can be potentially turned into a 'redistribution fund'. This economic tool would release the economic stress some groups might undergo in the future scenario, smoothing the redistribution process and ensuring life quality in cities. Innovation in finance is also considered beneficial. This, with a change in the role of banks in the housing sector, could boost a similar change.

On the cultural side, participants believed that there was a change happening in the social-status image of housing among the younger generations. It is more attractive to share, to have 'green' habits and to live in cities. However, participants were uncertain whether environmental awareness is equally high in all the population. The environmental awareness and its consequences could indeed be a deep systemic enabling condition as it deeply affects the way policies are intended and developed. Planners in the room were referring to densification that has been going on in Oslo for decades as an important engine for this transformation. This awareness is important; however, the degrowth scenario nullifies the need for additional housing. Hence, the densification strategy, although environmentally friendly in a relative sense, is not what the scenario aims for.

6. Discussion

In light of the theories introduced in Section 3 – political economy and critical urban theory – these sections further interpret and discuss the findings from the gaming session.

I found a tendency among the participants to talk about conditions enabling or blocking sustainable housing development based on green growth thinking (which means decoupling housing growth from environmental impacts) instead of talking about degrowth in the housing development. Such a tendency illustrates how deeply entrenched, among architects, planners and developers, the idea that we should build

more is, and that the challenge is to find environmentally friendly ways of doing it. Instead, the degrowth scenario shows that by limiting the per capita consumption of housing in the Oslo region, there is, in principle, no need to build more dwellings (as its existing size would accommodate all projected future inhabitants) (Metz and Xue 2020). In addition, it seemed that the participants were reluctant to acknowledge that per capita housing consumption can strongly impact the environment. To some, it was 'very hard to consider reducing housing consumption as an answer to the environmental problem' (planner).

Blocking conditions, all derivatives of a major barrier?

Most blocking conditions mentioned in the game appear to be entrenched with one deepest structure, namely the growth imperative: it has repercussions on the financial, social, cultural and regulative sides. From the perspective of political economy, the growth imperative stems from capitalist society and its currently dominating neo-liberal regime. As underlined in the game analysis, many of the aspects are entrenched with it, especially the ownership model and the financial mechanisms of today's Oslo housing sector. In Norway, interest rates on housing loans are low, policies for down payments are very favourable, and there are profitable banking schemes and tax deductions to promote savings to buy the first dwelling. These financial instruments and a small rental market make ownership appealing to those who can enter the housing market. Once in the market, most of the dwellers are happy with housing price increase. The system is powered by financial instruments and price increases despite the social polarisation created between those inside and those outside the market.

A degrowth scenario would challenge these existing premises. Housing would no longer constitute an object for profit since it would be redistributed from the perspective of equitable access and as a basic right. Achieving this would entail a loss of capital for current speculators and homeowners. Housing would not increase in value, which would make the market profitable. This contributes to a lack of political will since both investors and dwelling-owning inhabitants would be worried by such a stark

change. In contrary, those who do not own their dwellings (i.e. renters) would not have the same reasons to resist such change as they would benefit from it.

This discussion has roots in the agency, which is also expressed by the participants when considering their vested role: 'what is in it for me?', a private developer provocatively asked the group during the gaming session. In a degrowth scenario, private developers would lose much of their benefits. Degrowth, as such, would affect their vested interest, which would require them to adapt their business to a new model. If their business thrives on the increasing values of land in the current societal growth, in the degrowth scenario, their profit would depend on other mechanisms. They might use their businesses to promote change in the current housing stock and to function as promoters of eco-tech measures in the sector. However, it is not an easy shift.

But what if the scenario maintains the same tenets as the capitalist ones? Capitalism presents a growth tendency, even when the economy does not grow. Such a need for growth in the system hampers anti-consumerism, which is the very bottom line of the degrowth scenario. Capital itself, as underlined by (Harvey, 2011), is a process, not a 'thing'. Capital is created and transformed in a spiralling process. It is a long-run process that makes it difficult to effectively change through ad hoc measures or temporary policies. Therefore, tackling some aspects of capitalism through adjustments is not a definite solution, as it would keep the main mechanisms going. It would create a skewed situation in which some sectors would keep pursuing the growing model, and not others.

The model under which capitalism currently operates in most affluent European countries is neo-liberalism, which thrives under deregulation and the culture of individual profit and ownership. As Harvey (2011) underlined, the neo-liberal regime, despite the economic crises it causes, still has political legitimacy. According to Harvey (*ibid.*), taming the neo-liberal model through ethical measures or social-democratic ones would not suffice. Even if a more ethical neo-liberal model was in place, it would not be possible to fully decouple the environmental and social impacts of economic growth (*ibid.*).

As pointed out in the analysis, the lack of a regulative structure regarding the right to housing constitutes a barrier to the degrowth scenario. The claim made by the participants is reasonable since there is no regulation and other legislation in the Norwegian constitution pointing at housing as a basic right. Still, the so-called Sosialtjenesteloven allocates to the municipalities the responsibility of providing temporary housing solutions for those in need (Sosialtjenesteloven, 2009). Norway nonetheless was among the large majority of countries voting for the international conventions on human rights when they were adopted, and Norway has ratified those rights (Menneskerettsloven, 1999) as the right to a dignified life standard (including food, clothes and housing). This offers the leverage to improve the recognition of housing itself as a basic need. It needs to be included and promoted in the political agenda for it to become an enabling condition.

Regarding the redistribution of housing in the degrowth scenario, certain mechanisms must be in place to avoid skewed distribution of housing among the population. Redistribution can happen through changes in the physical structure of housing (e.g. remodelling and dividing bigger units) or through monetary compensation mechanisms (from who owns more to who owns less). All these mechanisms require both a change in regulations, but, more importantly, a structural change that would be unthinkable in a pro-growth housing sector.

Similarly, the gaming session highlighted questions of power concerning housing market interests in the Oslo area. The participants pointed out that the local authorities often feel powerless in the face of private and market interests. It would be even more so trying to promote a degrowth scenario. The local authorities' lack of power is a more severe barrier if the policy they want to promote is sharply at odds with the market logic. Because of neo-liberal policies, local authorities and smaller communities tend to lose their power. This is especially true in communities with lower incomes, pre-existing social problems or with no specific interest groups. Regarding this concern, Andersen and Skrede (2017) showed that, despite the aim of the Oslo municipality to ensure a socially sustainable city, the way projects are allocated and developed still shows that planners lack power in the face of developers, especially in certain areas

where power groups are not strong. As an example, the eastern Oslo is the part of the city receiving most of the densification projects, while the west undergoes fewer transformations given the low-density urban structure, the resistance and the local communities' power. Andersen and Skrede (2017) also showed that the projects developed in the east were of low quality and cheaper building materials. Some of these drawbacks of the current approach of planners and institutions could negatively affect the realisation of the degrowth scenario, and they show some conflicts arising from the current neo-liberal model.

Culturally, the current housing model thrives on individualism. Ownership culture and profit culture are just derivatives of neoliberalism, which are part of the discussions in the gaming session. A successful person can provide for herself, and in the case of failure, the system is not to blame. This cultural dominance makes poverty our own failure. It is not surprising that, in the gaming session, there were several discussions on cultural matters. Some of them were in fact described as 'typical Norwegian' whereas they could rather be termed 'typical neo-liberal' cultural traits (e.g. ownership culture, 'what is in it for me?'). Regarding the social status associated with housing in the Norwegian context, it appears from the gaming session that both the size of the housing and its location are crucial. As in the majority of the marketised housing sectors of affluent countries, housing plays a role in forming and manifesting social status. It is interconnected with income levels, education levels, ethnicity and age.

A redistribution, as the one proposed in the degrowth scenario, could have the force of limiting gentrification and segregation. The scenario aims to reduce the gap in inequality, acting therefore as a means of resolving some social problems linked to the city. Nevertheless, the process of reducing inequality through redistribution will most likely not be accepted easily by all the inhabitants. Such friction could create forms of resistance, which could happen through grass roots movement or political debates.

Hence, there are limits posed by the current capitalist and neo-liberal conditions if a degrowth future were to be pursued. In such a system, where the private sector seeks for profit, any anti-consumerist attempt would be almost impossible. A reasoned and functional degrowth future is dependent on the resolution of capitalistic bonds and

tenets. The realisation of a degrowth future cannot happen without a full understanding of the barriers posed by the current capitalist system and the various aspects linked to it. The current capitalist conditions cannot be tamed sufficiently to achieve greater goals for the sake of society or the environment.

From a critical urban theory perspective, under the dominant neo-liberal capitalist conditions, the housing sector, according to Marcuse (2012), experiences a crisis that is three-folded and inseparable from the mechanisms of capitalism.

- a- Commodification of housing
- b- Restriction of government involvement in housing
- c- Myth of ownership

I added, as a fourth pillar, the high environmental impacts of housing, which is one of the key dimensions of housing to be addressed in the degrowth scenario.

Commodification of housing is reflected in the actions of capitalism: financialisation and speculation are at the very core of the current housing system. As mentioned by the participants of the gaming session, these financial aspects partially constitute the ownership culture and act as structural barriers. However, as discussed by the participants, some features of the Oslo housing sector, if brought back in its entirety, could tame the strong commodification of housing and facilitate a degrowth housing scenario. In particular, the presence of housing and the so-called 'borettslag' (cooperative housing) work on principles of communality of spaces (yards, garages, etc.), participation of the inhabitants in the decision-making, and exclusive user rights of the single units. The model is still active, although it is slightly different from the past. The exclusive user right can now be sold on the housing market without any price regulation, and in general, cooperatives now operate as developers under the neo-liberal regime.

7. Conclusions

The article aimed to recognise elements blocking or enabling the achievement of a degrowth scenario in the housing sector in the context of the Oslo city region. It starts

from a pre-designed degrowth scenario (Metz and Xue 2020) in which housing is a right; and its consumption is limited by a maximum cap per capita in which an equitable redistribution of the existing stock is in place to keep consumption under control.

The analysis of the gaming session, using the theories of structure–agency relationships, political economy and critical urban studies, shows that the current growth-based housing development represents the main structural blocking condition to realising degrowth scenario. In particular, the current capitalist model creates a series of repercussions on the housing sector (Marcuse 2012), which concurs with the so-called housing crisis. It has cultural, economic and social repercussions, which are the most cited blocking aspects mentioned by the participants in the gaming session. These include regulatory aspects, financial, social and cultural aspects (social status and culture of ownership).

The article therefore shows that dissolving the bond that housing has with capitalism, at least in the Norwegian context, is fundamental but requires a major effort: it needs to happen in the whole economy to function in a consistent way. Schneider et al. (2013), however, suggested that housing itself could be a driver of wider economic degrowth. This would happen because reducing housing consumption would increase its availability, concurring in reducing debt (both private and state-owned) and consequently reducing dependence on economic growth.

This article shows that maintaining a partial version of capitalism in other sectors, whether more ethical or equitable, presents risks and challenges. Such a version of the future would require extensive use of regulations to put capitalism under control. It would still leave questions of power in different sectors untouched, and several sectors occupied with the maximisation of profit, with the consequential environmental and social impacts presented by several scholars (Foster, 2011; Fotopoulos, 2007).

The identification of societal conditions as potentials or barriers to degrowth also lays the foundation for a discussion of the steps to degrowth in an affluent Western city like Oslo. It is clear from the results of the study that the major neo-liberal traits of growth-based housing development need to be dismantled to promote the degrowth

scenario in the housing sector. Oslo region could be a frontrunner in reducing the financialisation of its housing sector by promoting a wide array of tenure forms, increasing accessibility and affordability and targeting the habits leading to extreme forms of overconsumption (too many square meters per capita or luxurious consumption of housing [second and third homes or investment dwellings in the Oslo region]). A study on the efficient use of the current housing stock and its occupancy rate could promote a reduction in new construction, which is ultimately to what the scenario would lead. As a result of this first step, different tenure forms would be more common (as rental, sharing solutions, etc.), and the social status connected to housing would be less impactful on the inhabitants' choices. Easing into the most radical measures of degrowth, as the consumption cap, is the key to avoiding friction and resistance.

Furthermore, the study contributes to housing research by applying future studies in the field of housing and degrowth. It used the backcasting method to define blocks and potentials to reach a degrowth scenario. This has helped to enlarge the scope of the studies on degrowth, from envisioning futures to questioning and challenging the structural conditions enabling or blocking degrowth. This method used in different sectors could be utterly beneficial in planning to imagine the unthinkable and to design the future of our cities too. The backcasting approach applied to a gaming session has been fruitful not only to the study itself but also to the participants who find this 'visionary' approach utterly inspiring for their practice as planners or designers too. Degrowth researchers and activists could benefit from a similar approach as they could apply it to different aspects of a society that degrowth would change (e.g. economy, development, education).

Concurrently, the method presents challenges. It needs to be grounded on a previously designed scenario, and it relies entirely on the quality of this scenario. If the designed scenario is unclear, it would create confusion and diminish the efficaciousness of the gaming session. The scenario, during the gaming session, must be conveyed clearly to the participants, as they solely rely on the knowledge brought to the table by the researcher designing it. In addition, the analysis of the gaming results requires

deeper analytical tools and skills that could benefit any multidisciplinary research group.

References

- Akershus Fylkeskommune. (2015). *Regional plan for areal og transport i Oslo og Akerhus*. Retrieved from <https://www.akershus.no/ansvarsomrader/samferdsel/samferdselsplanlegging/regionale-plan-for-areal-og-transport-i-oslo-og-akershus/>
- Andersen, B., & Skrede, J. (2017). Planning for a sustainable Oslo: the challenge of turning urban theory into practice. *Local Environment*, 22(5), 581-594.
- Andersson, R., Dhalmann, H., Holmqvist, E., Kauppinen, T. M., Magnusson Turner, L., Skifter Andersen, H., . . . Wessel, T. (2010). Immigration, housing and segregation in the Nordic welfare states.
- Archer, M. S. (2013). *Social morphogenesis*: Springer Science & Business Media.
- Brenner, N., Marcuse, P., & Mayer, M. (2012). *Cities for people, not for profit: Critical urban theory and the right to the city*: Routledge.
- Börjeson, L., Höjer, M., Dreborg, K.-H., Ekvall, T., & Finnveden, G. (2006). Scenario types and techniques: towards a user's guide. *Futures*, 38(7), 723-739.
- Danermark, B., Ekström, M., & Karlsson, J. C. (2019). *Explaining society: Critical realism in the social sciences*: Routledge.
- Davis, J. E. (2006). *Shared equity homeownership: The changing landscape of resale-restricted, owner-occupied housing*: National Housing Institute.
- Esping-Andersen, G. (2013). *The three worlds of welfare capitalism*: John Wiley & Sons.
- Fainstein, S. (2014). The just city. *International Journal of Urban Sciences*, 18(1), 1-18.
- Ferreri, M. (2018). Refurbishment vs demolition? Social housing campaigning for degrowth. In *Housing for Degrowth: Principles, Models, Challenges, Opportunities* (pp. 109-119).
- Foster, J. B. (2002). *Ecology against capitalism*: NYU Press.
- Foster, J. B. (2007). The financialization of capitalism. *Monthly Review*, 58(11), 1-12.
- Foster, J. B. (2011). Capitalism and degrowth: an impossibility theorem. *Monthly Review*, 62(8), 26-33.
- Fotopoulos, T. (2007). Is degrowth compatible with a market economy? *The international journal of inclusive democracy*, 3(1), 1-16.
- Gunnarsson-Östling, U., & Höjer, M. (2011). Scenario planning for sustainability in Stockholm, Sweden: environmental justice considerations. *International Journal of Urban and Regional Research*, 35(5), 1048-1067.
- Harvey, D. (2010). *Social justice and the city* (Vol. 1): University of Georgia press.
- Harvey, D. (2011). *The enigma of capital: and the crises of capitalism*: Profile Books.
- Harvey, D. (2014). *Seventeen contradictions and the end of capitalism*: Oxford University Press, USA.
- Heinonen, S., Minkkinen, M., Karjalainen, J., & Inayatullah, S. (2017). Testing transformative energy scenarios through causal layered analysis gaming. *Technological Forecasting and Social Change*, 124, 101-113.
- Inayatullah, S. (2004). Causal layered analysis: Theory, historical context, and case studies. In *The causal layered analysis reader: Theory and case studies of an integrative and transformative methodology* (pp. 1-52): Tamkang University Press.

- Jackson, T., & Senker, P. (2011). Prosperity without growth: Economics for a finite planet. *Energy & Environment*, 22(7), 1013-1016.
- Kovel, J. (2007). *The enemy of nature: The end of capitalism or the end of the world?* : Zed books.
- Latouche, S. (2003). Would the West actually be happier with less? The world downscaled. *Le Monde Diplomatique*.
- Marcuse, P. (2012). A critical approach to solving the housing problem. In *Cities for people, not for profit: Critical urban theory the right to the city* (pp. 215-230).
- Lov om styrking av menneskerettighetenes stilling i norsk rett, (1999).
- Mete, S., & Xue, J. (2020). Integrating environmental sustainability and social justice in housing development: Two contrasting scenarios. *Progress in Planning*, 100504. doi:<https://doi.org/10.1016/j.progress.2020.100504>
- Michael, D. R., & Chen, S. L. (2005). *Serious games: Games that educate, train, and inform*: Muska & Lipman/Premier-Trade.
- Naess, P. (2006). Unsustainable growth, unsustainable capitalism. *Journal of Critical Realism*, 5(2), 197-227.
- Nelson, A. (2018). Housing for growth narratives. In *Housing for Degrowth: Principles, Models, Challenges and Opportunities* (pp. 2).
- Poplin, A. (2012). Playful public participation in urban planning: A case study for online serious games. *Journal of Computers, environment urban systems*, 36(3), 195-206.
- Robinson, J. (2003). Future subjunctive: backcasting as social learning. *Futures*, 35(8), 839-856.
- Schneider, F., Kallis, G., & Martinez-Alier, J. (2010). Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. Introduction to this special issue. *Journal of Cleaner Production*, 18(6), 511-518.
- Schneider, F., Martinez-Alier, J., Asara, V., Schaefer, B., Sekulova, F. J. B. p. e. p. o., & open research questions, n. M. k. b. e. o. S. H., Barcelona. (2013). Sustainable housing in a post-growth Europe. 6-7.
- Lov om sosiale tjenester i arbeids- og velferdsforvaltningen, (2009).
- SSB. (2018). *Dette er Norge 2018*. Retrieved from Oslo: <https://www.ssb.no/befolkning/artikler-og-publikasjoner/dette-er-norge-2018>
- SSB. (2019). Areal og befolkning, etter region, statistikkvariabel og år. Retrieved from <https://www.ssb.no/statbank/table/11342/tableViewLayout1/>
- Stamsø, M. A. (2009). Housing and the welfare state in Norway. *Scandinavian Political Studies*, 32(2), 195-220.
- Turner, L. M., & Wessel, T. (2013). Upwards, outwards and westwards: Relocation of ethnic minority groups in the Oslo region. *Geografiska Annaler: Series B, Human Geography*, 95(1), 1-16.
- Wangel, J. (2011). Exploring social structures and agency in backcasting studies for sustainable development. *Technological Forecasting and Social Change*, 78(5), 872-882.
- Xue, J. (2018). Housing for degrowth: Space, planning and distribution. In *Housing for Degrowth* (pp. 185-195): Routledge.

ISBN: 978-82-575-1846-2

ISSN: 1894-6402



Norwegian University
of Life Sciences

Postboks 5003
NO-1432 Ås, Norway
+47 67 23 00 00
www.nmbu.no