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# Energy consumption and urban planning for sustainability.
# An Aggregate Indicator to envisage new space organization within cities

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# Abstract

The thesis discusses the ways in which urban planning can help organizing the cities' environment to welcome sustainability. Cities contribute a lot in terms of emissions, and are growing and expanding, often creating an unhealthy and chaotic environment.

I argue that Urban planning, enforced by new ideas of ecological living can represent the opportunity of reshaping the way in which we see cities and the urban landscape. Deepening this topic, the Degrowth theories connected to urban planning will be taken as an inspirational model to further explore sustainable living in the city.

In the following sections, building on the notion of localism, new planning frontiers that embed the role of Renewable Energy Communities as a tool for spatial organization, will be analysed. Connecting with a holistic approach towards the planning for sustainability, and with the aim of providing a useful planning tool, an Aggregate Indicator will be built with the aim of showing the outcome of planning decisions. Being planners situated in a policy context, the Aggregate Indicator will embed different indexes and it will be tested creating different socio-political scenarios.

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# 1. Introduction

By the end of September 2020, the clock that faces Union Square in Manhattan, New York, started to behave differently than it had always done.[1] From displaying the current time, it started to keep track of the time left to limit global warming to 1.5°C. Nevertheless, by looking at the pictures, the streets around the square are full of cars, asphalts, and great buildings, just some trees enclosed by pavements stand proudly in front of the clock.[2]

Especially in recent years, due to its effects, climate change started to gain more attention in the media. Cities are affected all over the world by heatwaves, droughts, and other dramatic events, but they also try to react and tenaciously improve the situation. From the ancient times, the design of cities was adapted to the local climate as in the case of Greek white cities or the densely built cities in the Middle East.[3] But lately the field of urban planning has started to embrace the challenge of fighting climate change, which surely is a harder task. To support the whole process, various approaches from different subjects are useful, but they are all very technical and need a precise management in the way they are considered. This management process allows for a good integration of the various disciplines but is a subject of debate between various thoughts and worldviews, which propose one rather than another solution to achieve sustainable living. One vision in particular, seems to be quite critical towards the status-quo and propose to reduce the attention given to the economic growth, expressing how difficult it will be to decouple the climate alternat emissions from the rapid progression of the economic machine. This vision is defined as Degrowth, and it evolves by embracing different aspects related to human living, revolving also towards the pillars of urban planning.

## 1.1. The Research problem

The Degrowth literature on planning, which will be deeply addressed in Section 3, is the starting point in this thesis, indeed it proposes a different vision and embrace the climate change problem in cities in a different, and rather holistic way. Nevertheless, even inside this view there is no complete agreement on the preferred scale (urban or rural), and mostly on the relevant drivers to be sustained to foster a real change in the way humans live.

Some strongly believes that a small scale, a rural ecological village for instance, embeds positive values of purity and sustainable living which are lost in the cities, other instead believes city will be the place where change should happen first, creating a correct dialogue with all the other urban and rural dimensions.[4]

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[1] Colin Moynihan, 'A New York Clock That Told Time Now Tells the Time Remaining', *The New York Times*, 20 September 2020, sec. Arts, https://www.nytimes.com/2020/09/20/arts/design/climate-clock-metronome-nyc.html.
[2] 'Climate Clock', Climate Clock, accessed 18 May 2024, https://climateclock.world.
[3] Joachim Fallmann and Stefan Emeis, 'How to Bring Urban and Global Climate Studies Together with Urban Planning and Architecture?', *Developments in the Built Environment* 4 (November 2020): 100023, https://doi.org/10.1016/j.dibe.2020.100023.
[4] Jinghua Xue, 'Is Eco-Village/Urban Village the Future of a Degrowth Society? An Urban Planner's Perspective', *Ecological Economics* 105 (September 2014): 130–38, https://doi.org/10.1016/j.ecolecon.2014.06.003. And Hillary Angelo and David Wachsmuth, 'Why Does Everyone Think Cities Can Save the Planet?', *Urban Studies* 57, no. 11 (August 2020): 2201–21, https://doi.org/10.1177/0042098020919081.

The relevant evidence which in any case sustain the need to opt for a different view is well explained in the picture of the world clock, standing over people and cars streaming around as they have always done, before and after the acknowledgement that a change in climate is happening right now. Consequently, the Research Problem of this thesis starts directly from here: *since the ideal of Degrowth criticizes some basic pillars of the current economic trends and puts into discussions the way in which cities developed until now, but lacks some practical modelling which can support the decision-making, it will be worth exploring possible future drivers that will foster a sustainable living*.

Mitigation and Adaptation benefitted from a strong attention by scholars, even by creating a Vulnerability Assessment framework[5], and common principles have been developed to sustain informed policy decisions[6]. Still, the clock is ticking, and the actions are moving slow, revealing more than ever the necessity to expand the dialogue and welcome even more research and tools to ease the transition process.

## 1.2. Research Questions

With the aim of expanding the dialogue, welcoming more approaches and foster the creation of new tools, this thesis prefers and holistic perspective over the planning of space. Aware, that the space defines social relationships, and therefore the way in which people dialogue and act[7], I would like to welcome and discuss how the principles of Degrowth can help in a planning transition. Therefore, this thesis starts form the following Research Question (RQ).

**RESEARCH QUESTION**: *How to approach urban planning with the aim to create the means for a future sustainable living?*

Which in order to simplify the subject, should be divided into two smaller sub-questions focused on two topics.

- **Research sub-question 1** → By collecting insights from degrowth and sustainable development: *Is it possible to affirm that Urban Planning for Degrowth is a viable pathway?*
- **Research sub-question 2** → *How is it possible to create a tool that will help urban planner to gain a better understanding of how to project a sustainable city in future scenarios?*

For these aims, the research work is expected to deepen the current trends, study some examples, and finally draft an Aggregate Indicator that will help in future planning choices.

[5] Dalia M. Muñoz-Pizza, Roberto A. Sanchez-Rodriguez, and Eduardo Gonzalez-Manzano, 'Linking Climate Change to Urban Planning Through Vulnerability Assessment: The Case of Two Cities at the Mexico-US Border', *Urban Climate* 51 (September 2023): 101674, p.1. https://doi.org/10.1016/j.uclim.2023.101674.

[6] Sara Meerow and Sierra C. Woodruff, 'Seven Principles of Strong Climate Change Planning', *Journal of the American Planning Association* 86, no. 1 (2 January 2020): 39–46, p. 39. https://doi.org/10.1080/01944363.2019.1652108.

[7] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p.404. https://doi.org/10.1080/13549839.2020.1867840.

## 1.3. Methodology, Scientific and Social Relevance

The methodology which allowed the writing of this elaborate is composed by different methods. The first method used is desk research, with collection of academic works, useful to define the scope of action. Moreover, a comparative analysis of papers integrated with interviews of experts (see Annex), composing a more qualitative part of the study, supported the definition of degrowth values and scope. The analysis is also supported by the presence of case studies and existing examples, which aims at showing possible planning applications Finally, and specifically for the creation of the Aggregate Indicator, a quantitative analysis approach has been performed. The data used, made available in open access by the City of Rome and National Agencies, have been processed with the use of Microsoft Office Excel, which also allowed for the creation of tables and graphical representations.

The research is also Scientifically relevant because it contributes to the existing literature in the following ways. It provides a different point of view on the topic of urban planning, discusses consolidated literature over the topic of Degrowth, and tries to be as much holistic as possible to not follow in a policy making aimed just at compensating cost and benefits. As last, but not for importance, the research adds to the literature the Sustainable and Just Planning Indicator (SJPI) which is an aggregate indicator, representing a tool for scenario analysis in the field of urban planning for sustainability.

## 1.4. Reading Guide

The thesis will be structured in the following way:

*Section 2* starts with a literature review over the climate change issue and connects with the choice of a scale of analysis. More specifically it aims at discussing the suitability of the city environment for the application of urban planning sustainability policies.

*Section 3* focuses on urban planning and its relationship with Degrowth paradigm, to explore the possibility of setting targets and values.

*Section 4* matches the values and principles of Section 3 with current case studies and examples. It resorts to the analysis of Energy co-production and sharing projects, as a possible application and approach.

*Section 5* embraces the challenge of formulating a new point of view over the topic of urban planning. After having analyzed a current example in Section 4, a new tool to address spatial urban planning and project a sustainable living is formulates. This tool, called the Sustainable and Just Planning Indicator (SJPI), is an Aggregate Indicator I will create in this thesis and that can be used for planning purposes (further explained in Section 5).

# 2. Cities and Planet a literature review

## 2.1. The city as unit of analysis, a necessary choice

### 2.1.1. The importance of cities: an Overview

Cities are the place where 68% of world population is expected to live by 2050.[8] This is accompanied by an economic activity, developed inside city which today represents the 80% of the Global GDP generated worldwide.[9]

Starting by considering the present economic value that has been generated, and the future population trend, the scope of climate change will be considered connecting with the role of cities now and in the future. Cities are responsible, because of the dramatic economic growth they create, "for 75 percent of global CO2 emissions, with transport and buildings being among the largest contributors."[10], and this is why studying their functioning is important.

It is well acknowledged how cities and their agglomeration effects, generates positive economic outcome, but this also comes at the expense of the environment. Indeed, many believes that "[...] cities must be protected from climate hazards in order to ensure the reproduction of the global economic system."[11], being aware that the economic production generates benefits which can be of relevant value. Nevertheless, "[…] the majority of 'global cities' are located in areas that are particularly susceptible to climate hazards such as rising sea levels, increased storm frequency, heat waves, flooding, and drought."[12]

Remaining on the economic benefits cities create, it is important to further notice how the damages to their structure will likely impact the economic prosperity for which they are considered so relevant.

> "Recent estimates suggest that the economic impacts of climate change on cities (e.g. sea level rise, health and water resources, emergency services, infrastructure rehabilitation, etc.) will range between 2.3% and 5.6% of their total GDP by the end of the century, with the 'worst-off' cities experiencing nearly 11% GDP loss."[13]

Not considering just the damages, it is possible to foresee investment opportunity that the situation presented is likely to offer. Joshua Long & Jennifer L. Rice, estimate that: "to address this [issues related to climate change], some have estimated that as much as US$90 trillion will be required for investment in climate-resilient infrastructure over the next 15 years"[14].

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[8] '68% of the World Population Projected to Live in Urban Areas by 2050, Says UN', Unitied Nations, Department of economic and Social Affairs, 16 May 2018, https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html.
[9] 'Urban Development', Text/HTML, World Bank, 3 April 2023, https://www.worldbank.org/en/topic/urbandevelopment/overview.
[10] 'Cities and Climate Change', UNEP - UN Environment Programme, 26 September 2017, http://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities/cities-and-climate-change.
[11] Joshua Long and Jennifer L Rice, 'From Sustainable Urbanism to Climate Urbanism', *Urban Studies* 56, no. 5 (April 2019): 992–1008, https://doi.org/10.1177/0042098018770846.
[12] Ibid.
[13] Ibid. p.3
[14] Ibid.

Long and Rice, write while thinking about a city able to welcome sustainable development, and they hope also for a technological infrastructure able to sustain it in a fairly distributed way. Sustainable development is a core concern of this Elaborate, but it will be further addressed and analyzed in the following pages and will be compared in some cases with theories that do not accept development as a process and imagine a post-growth future.

For now, one thing is sure, "there is no longer a question of whether cities are important for sustainable development, but rather why and how the urban condition affects our common future"[15]

Building on this final statement, the following paragraph 2.1.2. will analyze first the importance of cities, then building on the literature, some already existent approaches and solutions.

### 2.1.2. Metropolitan scale. Why the city?

Introducing the scope of urban studies on cities can have a better framing if one starts from the consideration of problems. With the words of Hillary Angelo and David Wachsmuth:

> "Urban areas expand relentlessly while fears of global warming and environmental catastrophe loom ever greater, and the 'green' or 'sustainable city' is taking a leading role in planning and policy discourse (UN-Habitat, 2006; UNFPA, 2007; UN-Habitat, 2011)."[16]

The authors start by addressing the issue in the same way of the first Section of this elaborate (see The importance of cities: an overview), that is considering the problems cities face and the fact that they are more and more requested by the people.

But somehow, in the literature other scholars envisage cities as an alternative way to fight the problem of climate change. The alternative pathway is represented by the governance perspective on the issue and, with the words of Roger Keil it is possible to understand how even the decisional level can play a crucial role: "The USA has now formally withdrawn from the Paris Agreement. In this situation, scientists have turned to cities and communities as antidotes to national state inaction."[17]

Looking at this previous theory it seems like cities are envisaged as a solution not only by considering that they are the place where problem resides, but a possible way to unlock a change. At this point, "Current sustainability discourse reflects not just the assumption that cities can and should be green but also that they are the most likely solutions to our global environmental problems."[18]. And following Angelo and Wachsmuth reasoning:

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[15] Susan Parnell, 'Defining a Global Urban Development Agenda', *World Development* 78 (February 2016): 529–540, p.529. https://doi.org/10.1016/j.worlddev.2015.10.028.

[16] Hillary Angelo and David Wachsmuth, 'Urbanizing Urban Political Ecology: A Critique of Methodological Cityism', *International Journal of Urban and Regional Research* 39, no. 1 (January 2015): 16–27, p. 16. https://doi.org/10.1111/1468-2427.12105.

[17] Roger Keil, 'An Urban Political Ecology for a World of Cities', *Urban Studies* 57, no. 11 (August 2020): 2357–70, p. 2358. https://doi.org/10.1177/0042098020919086.

[18] Hillary Angelo and David Wachsmuth, 'Why Does Everyone Think Cities Can Save the Planet?', *Urban Studies* 57, no. 11 (August 2020): 2201–21, p. 2203. https://doi.org/10.1177/0042098020919081.

> "[…] in the last 20 years (Hamel and Keil, 2015; Keil, 2013), this period of time has also seen the emergence of something close to a policy consensus around the idea that urban density has environmental value, particularly with respect to the necessity of reducing greenhouse gas emissions and associated energy use."[19]

It is possible to argue that, even in the international sphere the awareness about climate change and its effects is not compensated by real actions. Cities represent a local and tailored solution to the problems of climate change that the international legislation has left un-addressed (not uncovered). There is, in the literature a common feeling that somehow the problem can be managed following the subsidiarity principle, and majors are the leading forces towards it.

### 2.1.3. City expansion and Climate Change

The paper 'Why Does Everyone Think Cities Can Save the Planet?' by Angelo and Wachsmuth considers three fundamental elements that allow to believe cities, given the problem they host, can be the place where significant solution can create huge benefits. These elements are sprawl, informal settlements, and Climate Change and, by analysing them, it will be easier to frame agglomeration effects and its repercussions on the economic, social, and environmental landscape.

This section, building on the mentioned authors' knowledge, aims at identifying "historical developments"[20] characterizing the urban environment we live in, defining "urbanism as a plausible policy solution to global environmental concerns"[21].

#### *2.1.3.1. Urban sprawl*

Even though a unique definition of sprawl has not been already acknowledged, "The Oxford vocabulary dictionary defines urban sprawl as an extensive area covered with buildings that has spread in an irregular way from the city to its surrounding."[22]

This kind of definition seems quite descriptive from the eyes of Hashem Dadashpoor and Gelare Shahhoseini, and even if this better allow to define the phenomenon it is worth specifying that all the various definitions focus on a specific aspect, and so combining them together allow for a better understanding[23].

For this elaborate, it will be necessary to focus on the effects generated and considering that "[…] urban sprawl has been a leading symbol of the city as a sustainability problem across a range of spatial and historical contexts."[24] and it is not just a problem concentrated in the USA, from where it was firstly analysed, but "It is now broadly understood as an urban challenge worldwide"[25].

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[19] Ibid.
[20] Ibid.
[21] Ibid.
[22] Hashem Dadashpoor and Gelare Shahhoseini, 'Defining Urban Sprawl: A Systematic Review of 130 Definitions', *Habitat International* 146 (April 2024): 103039, p.1. https://doi.org/10.1016/j.habitatint.2024.103039.
[23] Ibid.
[24] Hillary Angelo and David Wachsmuth, 'Why Does Everyone Think Cities Can Save the Planet?', *Urban Studies* 57, no. 11 (August 2020): 2201–21, p. 2204 https://doi.org/10.1177/0042098020919081.
[25] Ibid.

The issue of sprawl has been always connected to the pollution caused by mobility, which lead to conceive cities and their sprawl as an "[…] unsustainable patterns of resource consumption, land use and pollution."[26]. Later, with the advent of topics as the "compact city"[27]and by recognizing the benefits of agglomeration "the concrete imaginary of the city as a sustainability solution"[28] emerged. The reason why this happened is that cities offer less space *per capita* and make it more difficult to use the private cars, or freely produce waste.

> "Already by the mid-1980s, the architect Peter Calthorpe (1985: 1) argued that 'Ideally, the city is the most environmentally benign form of human settlement. Each city dweller consumes less land, less energy, less water, and produces less pollution than his counterpart in settlements of lower densities'."[29]

#### *2.1.3.2. Informal Settlements*

Informal settlements or the most commonly peripheral areas identified as slums, are usually considered as one of the drawbacks of living in a city. Historically speaking "Early 20th century urban slums were understood as by-products of industrial development and were expected to give way to formal settlements as that development progressed."[30]

Despite being a problem for lack of certain hygiene norms and being not reliable for safety in more broader terms, the slums are also kind of inspirational when it comes to imagine more sustainable practices.

This happened in the case of Alejandro Aravena, example proposed by Angelo and Wachsmuth, where the architect took inspiration from informal settlements to conceive a kind of modular house able to solve the social issues while addressing the environmental problems. After having been awarded with the Pritzker Architecture Prize, Mr. Pritzker said:

> "Alejandro Aravena has pioneered a collaborative practice that produces powerful works of architecture and also addresses key challenges of the 21st century. His built work gives economic opportunity to the less privileged, mitigates the effects of natural disasters, reduces energy consumption, and provides welcoming public space. Innovative and inspiring, he shows how architecture at its best can improve people's lives."[31]

This example perfectly shows how to transform an issue into an opportunity, also representing the trend for which cities "[…] are now seen as a potential resource(s) for sustainable urbanism."[32]

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[26] Ibid. p.2205
[27] Ibid.
[28] Ibid.
[29] Ibid.
[30] Ibid.
[31] 'Alejandro Aravena | The Pritzker Architecture Prize', accessed 3 March 2024, https://www.pritzkerprize.com/laureates/ale-jandro-ara-ve-na#laureate-page-1281.
[32] Hillary Angelo and David Wachsmuth, 'Why Does Everyone Think Cities Can Save the Planet?', *Urban Studies* 57, no. 11 (August 2020): 2201–21, p. 2207. https://doi.org/10.1177/0042098020919081.

#### *2.1.3.3. Climate Change*

Considering actions undertaken against climate change, it is after the Rio Conference that cities become a referral, mostly because of the problem they generate. Indeed:

> "[…] Rio 'had two important consequences for the role of cities:' it highlighted 'the potential role of cities in dealing with environmental issues' and 'emphasised the direct link between action on environmental issues and international cooperation between cities' (1996: 22–23)."[33]

More specifically, since there is a disparity in emission production coming from the northern cities and the southern ones, it is only by getting down to the scale of the city, that one can gain a correct overview on the differences they outperform in terms of emission, or virtuous ecological practices.

> "Publications in the late 1990s focused on ways to help cities realise their sustainable potential through case studies assessing Northern and Southern cities' inequality, morphology and resource use (Gilbert et al., 1996) and by offering ways to assess and improve 'the environmental performance of cities in regard to the meeting of sustainable development goals' (Satterthwaite, 1997). Because the majority of the world would soon live in cities, scholars and policymakers argued, it was in and through cities that sustainability goals must be pursued."[34]

Climate Change is to be considered as the most important issues when referring to cities as a solution. If sprawl and Informal settlements are considered as issues produced by cities and exiting the city to solve the issue could have a certain logic (at least initially and the paragraphs before have tackled this issues explaining why this is not solely the case), the same is not true for climate change, a problem that can be addressed only by looking at cities. The reasons why have been fully enlightened now; cities are the place where the most can be done to set up an impactful strategy that will address more targets at the same time.

What remains to be framed are the real problem humanity will have to face in the next years if no action will be seriously outperformed in the correct timespan.

## 2.2. The safe space for Humanity

In this paragraph the theory of Planetary Boundaries will be presented. While addressing climate change, for reasons of relevance, complexity, and completeness, it is not possible to avoid talking about a such specific yet alarming theory, which has the merit of defining a certain kind of safe and operational space for humans to live. Not only this, but the feeling of the author while inserting this section is that it could shine a light on the vastity and complexity of climate change and set the scene for the future explication composing this elaborate.

[33] Ibid. p. 2208
[34] Ibid.

Discussing Climate Change and trying to elaborate on possible mitigating solutions is at the core of this Elaborate, and even though the theory considers the scale of the Planet, the findings regarding the latter inform the decision making at the metropolitan level.

Even though nowadays there is a common understanding of climate change, many policy decisions reflect on the problem of physical capital disruption and the possible consequent economic crisis. Safeguarding the economy, and therefore the social conditions of billions of people is crucial, but this is just the effect and understanding the way it is generated is the purpose of this paragraph.

For now, at least one thing is sure: "The next 2-3 years will be crucial in bringing about a fundamental change of direction. We can build cities where we can move, breathe and be productive, we can foster ecosystems that are robust and resilient, and we can avoid the potential displacement of millions of people."[35]

Johan Rockström's theory of Planetary Boundaries, considers climate change as an effect of modifications to the Earth System. From the first lines of the paper one can gain an understanding on the vastity of the issues and how complicated it is.

> "[The planetary boundaries framework] Identifies nine processes that are critical for maintaining the stability and resilience of Earth system as a whole. All are presently heavily perturbed by human activities. The framework aims to delineate and quantify levels of anthropogenic perturbation that, if respected, would allow Earth to remain in a "Holocene-like" interglacial state."[36]

The name boundary is not decided casually but identifies a precise element of the model. Indeed, the authors explain: "The nine boundaries all represent components of Earth system critically affected by anthropogenic activities and relevant to Earth's overall state."[37]

### 2.2.1. The Earth System equilibrium

The Earth system resides in a permanent equilibrium state, a kind of balance between the various element that compose it.

> "For >3billion years, interactions between the geosphere (energy flow and non-living materials in Earth and atmosphere) and biosphere (all living organisms/ecosystems) have controlled global environmental conditions. Earth system's state changed in response to forcings generated by external perturbations (e.g., solar energy input and bolide strikes) or internal processes in the geosphere (e.g., plate tectonics and volcanism) or biosphere (e.g., evolution of photosynthesis and rise of vascular plants)."[38]

It happens that human activities can create, for example with carbon emission and other GHG emissions, a huge increase in the forcing the system has to manage. In the specific case of carbon emissions,

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[35] Global Commission on Economy and Climate (GCEC) (2016) The sustainable infrastructure imperative: Financing for better growth and development. p. 2. https://www.un.org/pga/71/wp-content/uploads/sites/40/2017/02/New-Climate-Economy-Report-2016-Executive-Summary.pdf

[36] Katherine Richardson et al., 'Earth beyond Six of Nine Planetary Boundaries', *Science Advances* 9, no. 37 (15 September 2023): eadh2458, p. 1. https://doi.org/10.1126/sciadv.adh2458.

[37] Ibid. p. 2.

[38] Ibid. p.1.

a huge increase from human activities, not absorbed by carbon natural sinks, as lakes, trees, etc… is going to cause an increase in the temperature of the atmosphere.

Indeed, the authors explain: "Today, human activities with planetary-scale effects act as additional forcing on Earth system. Thus, the anthroposphere has become an additional functional component of Earth system (3, 8), capable of altering Earth system state."[39]

And the relevant thing for human is that, if not controlling the impact they generate they are kind of trespassing the natural limit the Planet can support. For this reason, the name Boundary comes to the fore, explaining how there is a limit to all human activities, if the human wants to thrive and improve their conditions in the future. "The planetary boundaries framework formulates limits to the impact of the anthroposphere on Earth system by identifying a scientifically based safe operating space for humanity that can safeguard both Earth's interglacial state and its resilience."[40]

### 2.2.2. The main takeaways from planetary boundaries theory

This brief summary about the Planetary boundaries theory serves the purpose of understanding the limits imposed by the Earth system, on the activities humans can perform. Moreover "The planetary boundaries framework, has attracted considerable scientific and societal attention, inspiring governance strategies and policies at all levels."[41]

Considering the inspirational force lying beneath the theory, this thesis aims at discussing ways of descaling the human pressure on the earth system by reasoning on the urban planning and how to develop it in between the boundaries. This consideration wants to restate the importance of reasoning on human actions towards the Planet, having acquired that the mankind presence disturbed the system at the point of generating a new Earth system.

The existence of a term such as Anthropocene, already describes the effects humankind has on the environment, and considering the damages created there should be also space for conceiving a possible solution.

The interest reserved for Anthropocene and more in general the effect we produce on the earth system is because: "Today's business as usual puts the world on a trajectory to hit the trillionth metric ton of carbon, reaching the 2°C boundary - marking irreversible climate change - in 2035."[42] The time span to act is tight and the planetary boundaries theory helps us understand how much operating space will still have left to act.

#### *2.2.2.1. The undoubtable existence of the Anthropocene*

Alongside the human history development there have been also important changes of the Earth structure. As explained before the name given to this process is Anthropocene, a term used "[…] to denote the present geological time interval, in which many conditions and processes on Earth are profoundly altered by

[39] Ibid.
[40] Ibid.
[41] Ibid. p. 2.
[42] John Bellamy Foster, Hannah Holleman, and Brett Clark, 'Monthly Review | Imperialism in the Anthropocene', *Monthly Review* (blog), 1 July 2019, https://monthlyreview.org/2019/07/01/imperialism-in-the-anthropocene/.

human impact."[43] And this comes from having observed the consequences of the human activities who produced an impact which "[…] has intensified significantly since the onset of industrialization, taking us out of the Earth System state typical of the Holocene Epoch that post-dates the last glaciation."[44]

And to draw this conclusion: "On May 21, 2019, the Anthropocene Working Group, established by the Subcommision on Quaternary Stratigraphy of the International Commission on Stratigraphy, voted by more than the necessary 60 percent to recognize the existence of the Anthropocene epoch in geological time, beginning around 1950."[45]

Reading these lines, should at least evoque a sense of fear that shall be addressed not by causing an unexpectedly paradigm change but rather by correctly framing the intervention structure, programming, and implementing it to the very final stage. But the unsolved question here is: How to unlock this change?

### 2.2.3. Guiding human development to live in between the boundaries

Starting from the last question made, this paragraph will illustrate some of the possible ideas proposed in the literature.

A very famous and remarkable theory regarding the planetary boundaries comes from Kate Raworth with "A Safe and just Space for Humanity. Can we live within the doughnut?". Her "Discussion Paper sets out a visual framework for sustainable development – shaped like a doughnut – by combining the concept of planetary boundaries with the complementary concept of social boundaries."[46].

What stands out here, differently from the previous study that identified the boundaries, is the integration of the Climate risk with the social conditions that humans experiment in different parts of the world. In the first lines the author explains "Achieving sustainable development means ensuring that all people have the resources needed – such as food, water, health care, and energy – to fulfil their human rights".[47]

The connection between the environmental scope and the social one, in a mere holistic view, precisely represent the right balance humans should establish between their need of resources and the environment safeguard. The balance between these two dimensions is perfectly expressed with the so-called doughnut, representing the safe space. With Raworth's words:

> "The social foundation forms an inner boundary, below which are many dimensions of human deprivation. The environmental ceiling forms an outer boundary, beyond which are many dimensions of environmental degradation. Between the two boundaries lies an area – shaped like a doughnut – which represents an

[43] 'Working Group on the "Anthropocene" | Subcommission on Quaternary Stratigraphy', accessed 8 March 2024, http://quaternary.stratigraphy.org/working-groups/anthropocene/.
[44] Ibid.
[45] John Bellamy Foster, Hannah Holleman, and Brett Clark, 'Monthly Review | Imperialism in the Anthropocene', *Monthly Review* (blog), 1 July 2019, https://monthlyreview.org/2019/07/01/imperialism-in-the-anthropocene/.
[46] Kate Raworth, 'A Safe and Just Space for Humanity: Can We Live within the Doughnut?', *Oxfam Discussion Papers*, 13 February 2012, p. 2. https://doi.org/10.1163/2210-7975_HRD-9824-0069.
[47] Ibid.

environmentally safe and socially just space for humanity to thrive in. It is also the space in which inclusive and sustainable economic development takes place."[48]

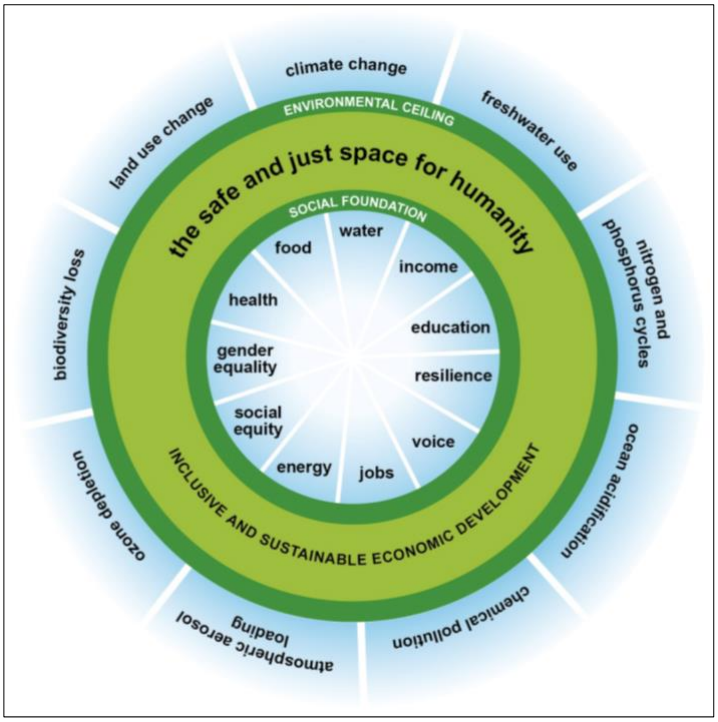


*Figure 1 First Illustration of "the Doughnut" from: Kate Raworth "A Safe and Just Space for Humanity" Oxfam Discussion Paper, February 2012.*

The safe space for humanity is not just envisaged as a doughnut. Andrew L. Fanning, Daniel W. O'Neill, and Milena Büchs, in "Provisioning systems for a good life within planetary boundaries" explore different theories derived from Kate Roworth's work with the aim of understanding "how provisioning systems mediate the relationships between biophysical resource use and social outcomes in the context of limits."[49]

In doing so, they expand the previous concept related to the planetary boundaries, as a safe space of intersection between human needs and environmental safeguard, and concentrate on defining even new patterns of change of the resource usage by saying that: "provisioning systems vary across societies due to differences in two broad groups of related elements, namely institutions and technologies."[50] These two steps better exemplify how to connect the theory with the challenges society encounters in transitioning. They explain this passage at the end:

> "To apply the framework, the first step is to measure resource use and social outcomes relative to the sustainability and sufficiency conditions of the SJS framework. Once a given society has an idea of where it stands relative to the safe and just space, the next step is to map provisioning systems onto individual need satisfiers in order to identify opportunities for, and barriers to, achieving the specific changes needed."[51]

[48] Ibid. p. 4.
[49] Andrew L. Fanning, Daniel W. O'Neill, and Milena Büchs, 'Provisioning Systems for a Good Life within Planetary Boundaries', *Global Environmental Change* 64 (September 2020): 102135, p.2. https://doi.org/10.1016/j.gloenvcha.2020.102135.
[50] Ibid. p. 5.
[51] Ibid. p. 8.

In between the lines of this last passage lies a call for awareness. Humankind should welcome the limits a safe life in between the planetary boundaries requires. To do so, measurability is the first step, and sufficiency follows in organizing a society who aims at doing more in the future while being aware of impacting less and less.

# 3. Spatial Urban Planning for sustainability

## 3.1. What is urban planning and how can it help in fighting climate change?

### 3.1.1. Urban Planning not an easy definition

Giving a definition of urban planning is not per se an easy task considering the numerous approaches who tried to do this. There is not a unique statement, and sometimes its framing is well understood by combining the term *urban*, which refers to urban villages, town and cities, and the term *planning* which gives an idea of organization. Still the scope is wide, leaving the possibility to be narrowed down to different areas of the social sphere. Indeed, some scholars studied it in relation to economics, others focused on social welfare, in relation to planning, and most recently, some focused on resilience, and smart cities.[52]

On the specific and final definition Raphaël Fischler explains: "Urban planning is hard to define and harder to practice because it is the unsteady, always renegotiated resolution of a number of contradictions, paradoxes, and tensions"[53] Nevertheless, a brief overview will be here presented in order to shine a light on the topic, understanding if there is a definition which better adhere to the purpose of this elaborate.

Historically speaking Hippodamus, a philosopher of the 5th century BCE, is considered to be the father of city planning, and we have track of this already from Aristotle.[54] Only later on, Urban planning became an accepted subject in the academic world, indeed "The first academic program on urban planning commenced at the University of Liverpool in 1909, and in 1924 it was taught at Harvard University."[55]

In the very same paper: 'The Landscape and evolution of urban planning science', M. Haghani et al., analyse 100,000 articles "[…] to objectively determine divisions, temporal trends and influential references and actors of urban planning."[56] They end up in creating 12 clusters of papers expressing the various lives Urban planning came across, but they also propose a temporal subdivision starting from the early 1900s. By looking at the latter, there is a particular element that is not present at the beginning and comes to the fore after the 2000 – 2010 classification, which is the increased attention towards the natural sphere. For instance, Cluster 13, urban resilience, gets more attention after the 2010, while Cluster 2 on welfare economics and agglomeration economies gains attention at the very beginning of the academic works.[57]

The concentration on different scopes reveals how the Planning subject well lends itself to providing its organising tools in order to achieve the best spatial division to create certain benefits or support certain

[52] Milad Haghani et al., 'The Landscape and Evolution of Urban Planning Science', *Cities* 136 (May 2023): 104261, p.1. https://doi.org/10.1016/j.cities.2023.104261.
[53] Raphaël Fischler, 'Fifty Theses on Urban Planning and Urban Planners', *Journal of Planning Education and Research* 32, no. 1 (September 2011): 107–14, p. 108. https://doi.org/10.1177/0739456x11420441.
[54] Milad Haghani et al., 'The Landscape and Evolution of Urban Planning Science', *Cities* 136 (May 2023): 104261, p. 1. https://doi.org/10.1016/j.cities.2023.104261.
[55] Ibid.
[56] Ibid. p. 2.
[57] Ibid.

interests. It is not a case that some scholars broadly consider planning to be a policy tool. For instance, Antonio Cappuccitti explains:

> "Town and country planning is the set of guidelines and public instruments for governing the transformation of the territory, both in the area and in urban areas. Strongly interrelated with economic planning, it is aimed at achieving a better quality of living, through a rational, fair and sustainable use of resources so as to guarantee the well-being of the community over time."[58] (My translation)

This kind of statement starts from a well acquired definition in the literature as in the case of the one coming form M. Haghani et al.:

> "Urban planning is a multi-disciplinary technical profession, an endeavour that aims to create better places and public spaces for people by balancing the built and natural environment. Urban planners address community needs, respect cultural significance and consider sustainable prosperity of urban and regional areas. Urban planning theories and professional conduct have been evolving from a mixture of physical surveys, design, mapping, and infrastructure engineering to consider broader social, environmental and economic issues."[59]

Nevertheless, there are a lot more elements here: first, the position of the urban planner as an agent, second, the acquired awareness about the most recent roles planner should outperform in preserving the natural environment.

Now, to finally come to a definition, having acquired that the role of planning has now many more dimensions to consider, a final statement should be wide and better focused on a holistic view of future planning choices.

A result that comes to the fore after reading all these definitions is that there are a lot of possible statements over the topic. The aim should be to overcome a separation if someone wants to plan in a holistic manner. To cope with the various limits previously stressed, Fischler in 'Fifty Theses on Urban Planning and Urban Planners', built a classification of the different definitions based on the focus of the specific definition.

For the sake of clarity and completeness, I will choose two definitions: the first on the substance, the second on the uses.[60]

The first one, answers to what urban planning substantially is, and enlightens the specific activity outperformed to plan urban development. "Urban planning is a design activity: it is the design of places of human habitation (from a residential subdivision to a metropolitan region) and the design of institutions and rules for managing their future development."[61]

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[58] *Pianificazione territoriale e urbanistica* di Antonio Cappuccitti in Claudia, *Ventuno Parole per L'urbanistica*, 2014: 199-218, p.199.

[59] Milad Haghani et al., 'The Landscape and Evolution of Urban Planning Science', *Cities* 136 (May 2023): 104261, p. 1. https://doi.org/10.1016/j.cities.2023.104261

[60] Both "substance" and "uses" are two classifications used by Fischler in 'Fifty Theses on Urban Planning and Urban Planners'.

[61] Raphaël Fischler, 'Fifty Theses on Urban Planning and Urban Planners', *Journal of Planning Education and Research* 32, no. 1 (September 2011): 107–14, p. 109. https://doi.org/10.1177/0739456x11420441.

The second one reflects on the needs that trigger the necessity of planning, giving an understanding of how planning intersects values, society, and the natural environment and how the social structure and the social space are interrelated within it.

> "Urban planning is the collective management of urban development, the use of purposeful deliberation to give shape to human settlements. It is the mobilization of community will and the design of strategies to create, improve, or preserve the environment in which we live. This environment is at once physical (natural and built) and cultural (social, economic, and political)."[62]

The hope is that, with the previous considerations, and a match between definitions coming from different spheres, there will be a good framing on the purpose of planning that is here considered to be the most proper (not right, nor correct) one.

### 3.1.2. Urban Planning and Climate Change

#### *3.1.2.1. From Vulnerability to Adaptation: a case study*

Urban planning and climate change are connected by considering that, if properly addressed, climate change related issues can be tackled by planning for climate change mitigation and climate change adaptation. The first is defined in this way: "Mitigation action lowers the GHG concentrations via reducing GHG emissions and adding carbon sinks, to meet the objective of reducing the pace of climate change and frequency of extreme events."[63] And the second approach, "Adaptation refers to the regulating strategies employed under actual or expected climatic stimulation; their objective being to mitigate climate change impacts and promote adaptive capacity."[64] In the application phase, the tools referring to this two scopes, aims at reducing the vulnerability of a particular system (or zone considering the planning approach), to climate change-related phenomena.

Vulnerability is a very relevant term, that will be recurrent in all the reports of the IPCC informing the possible and future likelihood that assets will be impacted by climate change. By definition Vulnerability is:

> "The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity."[65]

Sensitivity, an essential factor to develop the vulnerability definition is also specified in the same source.

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[62] Ibid. p. 108.
[63] Chunli Zhao et al., 'Adaptation and Mitigation for Combating Climate Change – From Single to Joint', *Ecosystem Health and Sustainability* 4, no. 4 (April 2018): 85–94, p. 85. https://doi.org/10.1080/20964129.2018.1466632.
[64] Ibid. p. 109.
[65] John E. Thornes, 'IPCC, 2001: Climate Change 2001: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Edited by J. J. McCarthy, O. F. Canziani, N. a. Leary, D. J. Dokken and K. S. White (Eds). Cambridge University Press, Cambridge, UK, and New York, USA, 2001. No. Of Pages: 1032. Price: £34.95, ISBN 0-521-01500-6 (Paperback), ISBN 0-521-80768-9 (Hardback).', *International Journal of Climatology* 22, no. 10 (August 2002): 1285–86, p. 995. https://doi.org/10.1002/joc.775.

> Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise).[66]

The only member of the function missing here is the adaptive capacity, always from the same 2001 report it is crystallized as: "The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences."[67]

Towards the definition of strategies aimed at easing the impact of climate change, the energies of planning studies elaborated on adaptation and mitigation actions. The consequence is a call to action for planners to measure the vulnerability of some areas they are called to operate on and manage the climate change impact thanks to climate adaptation measures.[68] As Muñoz-Pizza et. al. present in 'Linking climate change to urban planning through vulnerability assessment: The case of two cities at the Mexico-US border', when there is a lack of proper vulnerability assessment, the risk of being exposed to climate change- related disasters increase.[69]

The authors consider vulnerability following the IPCC definition quoted before "[…] a function of exposure, sensitivity, and adaptive capacity […]"[70], that in a holistic manner embeds impacts, risks, and adaptive capacity to minimize them. From the theoretical framework, they built a case study over the management of heatwaves in Mexicali and Tijuana, producing results that "[…] show [how areas] with higher vulnerability in both cities are informal settlements and low-income neighbourhoods".[71] They also address the responsibility of such actions to the government and its planning policies, well aware of how "[…] assessment of the underlying causes of vulnerability help understand socioeconomic and biophysical process and the urban context needed to be considered in designing actions to reduce vulnerability and create adaptation."[72]

Having expressed the details of vulnerability assessment, does not mean to exclude from the reasoning the broader perspective on which principles should be used in planning initiatives. Differently from the Mexican case, cities in the Global North are at the forefront: on a study of 885 cities in Europe 66% had mitigation plan and 26% an adaptation one.[73] Nevertheless, the actions contained in them "[…] were insufficient to achieve GHG reduction targets, and adaptation strategies were less common and concrete."[74]

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[66] Ibid. p. 993.
[67] Ibid. p, 982.
[68] Dalia M. Muñoz-Pizza, Roberto A. Sanchez-Rodriguez, and Eduardo Gonzalez-Manzano, 'Linking Climate Change to Urban Planning Through Vulnerability Assessment: The Case of Two Cities at the Mexico-US Border', *Urban Climate* 51 (September 2023): 101674, p. 1. https://doi.org/10.1016/j.uclim.2023.101674.
[69] Ibid.
[70] Ibid. p. 3.
[71] Ibid. p. 1.
[72] Ibid. p. 12.
[73] Sara Meerow and Sierra C. Woodruff, 'Seven Principles of Strong Climate Change Planning', *Journal of the American Planning Association* 86, no. 1 (2 January 2020): 39–46, p. 40. https://doi.org/10.1080/01944363.2019.1652108.
[74] Ibid.

For this reason Meerow and Woodruff, opted for the creation of 'Seven principles of strong climate change planning', that overall move among implementation and monitoring, justice, and coordinated efforts at all scales.[75] They finally present a call to all planners, to foster new studies and go in the direction of including the participation of communities and the public as a whole, which are, in our times, more and more aware of climate change issues.[76]

Resorting to the need of a policy intervention, or exhorting planners to reflect on a more realistic kind of implementation, both the last research and the approach towards planning, focus on the necessity to shape city-kind strategies. Continuing the same path, obstacles and possible solution focused on the policy realm will be taken to the fore.

#### *3.1.2.2. Embedding climate change adaptation/mitigation in urban planning*

Passing through the side of policy application requires the identifications of limits and possible strategies that adapt to the economical context. Not only, sometimes mitigation measures are most effective or at least extend even to people attitudes and allows to act on more complete level, when merged with adaptation.

To explore the field of policies and open the debate to the other topics of the section 3, approaches worth mentioning are related to the field of smart growth and tech-driven approaches, which are distinct from climate urbanism and vulnerability studies introduced before.

In this scenario, the first worth mentioning comes from Levenda, Mahmoudi, & Sussman in 'The Neoliberal Politics of "Smart": Electricity Consumption, Household Monitoring, and the Enterprise Form'. They investigate the functioning of smart grid in relation to the cycle of capital accumulation and the individual attitudes of consumers. In this regard, they start envisioning all the consumer as possible prosumer of data over their energy consumption attitudes. Sustaining a tech-optimistic view they write:

> "The smart grid fuels an exploitative and more alienating relationship in the realm of social reproduction wherein value is created in the quotidian use of energy and extracted in the accumulation of data and subsequent analysis that is not only "free", but also gained through a service consumers are charged for, electricity."[77]

Taking advantage of the presence of a strong digital development they explain how a kind of neoliberal approach towards sustainability is fostered by "[…] essentially creating a commodity from everyday life activities of energy consumption."[78]

Contrary to the previous example, F. Estrada et al. in 'A global economic assessment of city policies to reduce climate change impacts' describe the importance of climate actions in reducing Urban Heat Island

[75] Ibid.
[76] Ibid. p. 44.
[77] Anthony Levenda, Dillon Mahmoudi, and Gerald Sussman, 'The Neoliberal Politics of "Smart": Electricity Consumption, Household Monitoring, and the Enterprise Form', *Canadian Journal of Communication, Vol 40* (November 2015): 615-36, p. 632. https://ssrn.com/abstract=2529029.
[78] Ibid.

(UHI) effect and consider the local strategy as a founding piece of the global with which is in direct dialogue.[79] The risk is that global qualitative studies, ignoring UHI impact (that is local based) can see their expected results being spread out by temperature increase in cities and so "[…] if local action to reduce the effects of the UHI is not implemented, GCC (global climate change) mitigation would be significantly less effective in reducing climate impacts."[80] The findings are, on the side of solution and investments: first "UHI mitigation offers comparable or larger reductions in urban economic impacts than would be obtained from some combinations of reference and policy greenhouse gases emission scenario." [81] Second "The implementation of international actions to stabilize the atmospheric concentrations of greenhouse gases would make investing in local measures to control the UHI effect more attractive as it would have a higher return on investment […]"[82]

The point made by Estrada et al. is to create a strategy where adaptation grasp effectively the challenge of measuring and mitigating not for specifically growth-oriented decisions. They prioritize investment in carbon emission reduction (which lead to decrease in temperature) and focus on the economic generative capacity of cities to protect the very same city system from climate change effects.[83]

As a matter of fact, the cost of some measure is huge and need investment. But the point here relates to the process rearticulation aimed, not only at embedding new point of views and checking whether we are on the right page (for example the loophole founded by Estrada et. al.) but also on the kind of approach chosen which is informed by the idea behind sustainability.

On this topic, the already quoted Long & Rice in 'From sustainable urbanism to climate urbanism', express the importance to foster a passage to prioritises efforts to "[…] 'climate urbanism' a policy orientation that promotes cities as the most viable and appropriate sites of climate action and, protect the physical and digital infrastructures of urban economies from the hazards associated with climate change."[84]

Contrary to smart growth approach and tech-driven approach, expressed before by Levenda, Mahmoudi, & Sussman, climate urbanism reflects on limited resources and vulnerability, so it is not per se growth-oriented.

The follow-up matter would be here to explore whether urban planning is a tool to foster the downscaling of emission by facilitating and accommodating the policy aimed at reducing the climate change impact where the local talks with the global and vice versa, with aim of covering all the possible areas of interest.

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[79] Francisco Estrada, Wouter Botzen, and Richard S.J. Tol, 'A Global Economic Assessment of City Policies to Reduce Climate Change Impacts', *Nature Climate Change* 7, no. 6 (May 2017): 403–6, p. 1. https://doi.org/10.1038/nclimate3301.
[80] Ibid. p. 2.
[81] Ibid. p. 3.
[82] Ibid.
[83] Joshua Long and Jennifer L Rice, 'From Sustainable Urbanism to Climate Urbanism', *Urban Studies* 56, no. 5 (April 2019): 992–1008, p. 992. https://doi.org/10.1177/0042098018770846.
[84] Ibid.

## 3.2. Planning and Degrowth, a fruitful dialogue

Paragraph 3.2. will dig deeper inside spatial urban planning perspective, focusing on the connections and the inspiration taken from the Degrowth paradigm. The latter has been chosen in this research for its focus on finitude of resources, and the consideration of environmental limits to the human development. Even though, at least initially these two scopes, Degrowth and Planning, may seem unconnected they do have a lot in common, but further explanations are needed to comprehend the way they are envisaged in the literature.

Overall, the awareness lining behind this page starts from the findings of the Club of Rome's, 1972 book 'The Limits to Growth' which highlights the finite nature of the Earth's resources and the potential for overshoot in a growth-based economic system.[85] The reflection on economic growth and its benefits/drawbacks goes beyond the scope of this elaborate, but it will be taken into consideration the incompatibility of development models which do not aim at recognizing the importance of limits to growth. To make a comparison, there will be consideration of paradigms which do not consider environmental pollution and aims at removing it, inside the framework of planning and the effects it produces on the social and economic configuration.

Before addressing the whole topic and its feature a brief outline of Degrowth theory will be made. As an anticipation, the ideal of degrowth are here considered as inspirational food for thought and further in the description, I will point out how this paradigm can give a lot of help in the contrast to climate change.

### 3.2.1. Degrowth: a few points of clarification

Many thinks about Degrowth as a theory who directly oppose to capitalism growth and the ideal of always increasing the production to create more benefits for the individuals. This concept is for sure true, but it needs some clarification given the complexity behind the paradigm.

To give a definition, I would opt for saying that: "Degrowth is a planned reduction of energy and resource throughput designed to bring the economy back into balance with the living world in a way that reduces inequality and improves human well-being."[86]

This definition envisages a theory able to shape a world where throughput is reduced, and economy is cooling down considering that a productive rate of this kind is damaging the world in an irreversible way.[87]

The IPCC states that: "Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming […]"[88], and this should be read in connection with what explained in Section 2 about the Planetary Boundaries in order to grasp what is like nowadays for human activity.

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[85] Donella H. Meadows et al., *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind* (New York: Universe Book, 1972).

[86] Jason Hickel, 'What Does Degrowth Mean? A Few Points of Clarification', *Globalizations* 18, no. 7 (September 2020): 1105–11, p. 1106. https://doi.org/10.1080/14747731.2020.1812222. It is fair to stress that the author, as he specifies, built this definition reasoning on the work of serge Latouche and Giorgos Kallis.

[87] Ibid.

[88] IPCC, '2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (Eds.)].' (Geneva, Switzerland, n.d.), 10.59327/IPCC/AR6-9789291691647.001.

Specifically on this point Jason Hickel in 'What does degrowth mean? A few points of clarification', explains: "Contrary to the general narrative about the Anthropocene, this crisis is not being caused by human beings *as such*, but by a particular economic system: a system that is predicated on perpetual expansion, disproportionately to the benefit of a small minority of rich people"[89]

Moreover, it is important to specify one thing before proceeding further: Degrowth is not meant to destroy richness created by the economic growth, but believe, and sustain with scientific milestones, that "green growth hopes have little grounding"[90].

Having stated that Degrowth proposes an alternative vision to the one of infinite capitalist growth, even by expanding further in the literature, Jin Xue defines the Degrowth as: "[…] a social movement, a political debate and an academic research field."[91] And she continues by stating that: "A widely accepted understanding of a degrowth society is 'an equitable downscaling of production and consumption that increases human well-being and enhances ecological conditions at the local and global level, in the short and long term'"[92]

Two new elements come into place: well-being and ecological conditions, and these two will be very important in the following lines, because the side that will be explained is not the one where degrowth wants less, but the one where it can give more.

As a last quote I prefer to end up with the words of Serge Latouche that really explain how the term wants to represent first of all an alternative: "Degrowth is just a term created by radical critics of growth theory to free everybody from the economic correctness that prevents us from proposing alternative projects for post-development politics."[93]

As a last point of clarification, why one would avoid choosing growth if Degrowth is just a term? Hickel answers to this point saying that:

> "Growth is the ideology of capitalism, in the Gramscian sense. It is the core tenet of capitalism's cultural hegemony. The word degrowth is powerful and effective because it identifies this trick, and rejects it. Degrowth calls for the reversal of the processes that lie behind growth: it calls for disaccumulation, decommodification, and decolonization."[94]

Therefore, coming from the impossibility of decoupling growth from environmental destruction, it is possible to say that degrowth supporters believe in the benefits of building an entirely new society.[95] As Federico Savini explains:

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[89] Jason Hickel, 'What Does Degrowth Mean? A Few Points of Clarification', *Globalizations* 18, no. 7 (September 2020): 1105–11, p. 1105. https://doi.org/10.1080/14747731.2020.1812222.
[90] Ibid.
[91] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 404. https://doi.org/10.1080/13549839.2020.1867840.
[92] Ibid. Definition coined, as stated by the author, by looking at the work of Schneider, Kallis, and Martinez-Alier.
[93] Serge Latouche, 'Degrowth Economics', Le Monde diplomatique, 1 November 2004, https://mondediplo.com/2004/11/14latouche.
[94] Jason Hickel, 'What Does Degrowth Mean? A Few Points of Clarification', *Globalizations* 18, no. 7 (September 2020): 1105–11, p. 1107. https://doi.org/10.1080/14747731.2020.1812222.
[95] Federico Savini, 'Towards an Urban Degrowth: Habitability, Finity and Polycentric Autonomism', *Environment and Planning A: Economy and Space* 53, no. 5 (August 2021): 1076–95, p. 1077. https://doi.org/10.1177/0308518X20981391.

"Among numerous proposals (for an overview, see D'Alisa et al., 2015), they envision an economy built around notions of care and reciprocity; the divestment from (and taxation of) financial, rent, and fossil-based activities; de-commodified housing and the revaluation of domestic work; and expanded free-time through a basic universal income (Jackson, 2009; Kallis et al., 2012). Against consumerism, they urge a cultural shift toward values of *buen vivir*, sufficiency, and simplicity."[96]

### 3.2.2. The relevance of cities in the Degrowth paradigm

The city and its features have been enlightened in the previous section, but here for the sake of completeness, it will be interesting to quote the idea of cities that Degrowth scholars have. To begin with a general and shared acknowledgement of the city imaginary I will take advantage of the words of Angela Barbanenete, Barbara Pizzo, and Silvio Crtistiano.

"Cities are often treated as 'entities in their own right', as quasi-autonomous units, even when one is aware of making simplifications ('imposed' even if only on the basis of administrative competences). As a result, they tend to be the place of 'autotopia' par excellence, since one can 'play' with their different spatialities and temporalities, aiming at to 'resolve' them internally, all except those that one prefers to move outside their boundaries, or procrastinate in time. The materialisation of these political 'strategies' in our cities seems quite evident to us." (My translation) [97]

The approach these authors have in studying the city, being quite critical of the status quo, helps having a complete idea on the role of cities. As a first statement they express a doubt over giving to the city the burden of coping with climate change[98]. They also propose not to consider cities as an independent unit of analysis, but they affirm it is better to explore the metabolism making cities functioning.[99]

The metabolism of the city is composed by flows:

"These flows include capital, labour, technology, which are inextricably intertwined with water, energy, food and disposal systems that urbanisation requires. And they make evident the inevitable insufficiency of interventions that act on one or more of these flows, but not on all of them, or without seriously considering their relations and 'systemic' interferences, including the objectives that, beyond the narratives, the system guide." (My translation) [100]

The metabolism is a crucial point of the connection between cities and Degrowth paradigm, indeed it reflects upon the intrinsic functioning of the city's ecosystem. On this point, Karl Krähmer, in 'Degrowth and the City: Multiscalar strategies for the socio-ecological transformation of space and place' reflects a lot and comes to the same conclusion of Cristiano et al. quoted before.

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[96] Ibid.
[97] Apertura/Opening. Barbara Pizzo, Angela Barbanente, Silvio Cristiano, at p. 6 In 'Cities and Urbanism beyond Growth. Ecological Transition: Where Is It Going? Ecology, Economics, and Urban Planning between European Green Deal and Post-Growth Paradigms', Tracce Urbane, Tracce Urbane. Rivista Italiana Transdisciplinare Di Studi Urbani (December 2023), https://rosa.uniroma1.it/rosa03/tracce_urbane.
[98] Ibid.
[99] Ibid.
[100] Ibid.

At first, he expresses how a reflection "[…] on degrowth's spatial implications is its critique of growth-oriented capitalism as unjust and unsustainable"[101] meaning that "Much of this critique focuses on capitalist metabolism and has already an implicit spatial dimension, e.g. in the concepts of externalisation and unequal ecological exchange."[102]

Secondly, he expresses how a short-sighted strategy that does not take all systems of the metabolism into account will prove to be ineffective in the long term, by saying that "Holistic approaches in urban policies could help overcome sectorial solutions which lead to dualistic choices between environmental sustainability (e.g. limiting land consumption) and social justice (e.g. building new houses for low-income families)"[103]

### 3.2.3. A new perspective on Urban Planning

Talking about urban planning mostly refers to plan the new urban development. More specifically planning asks for detailed solutions on how to project the future development. Where are we going to place this building? What would be the costs? And whether they will be compensated by benefits, are all typical questions that planners try to answer.

As previously discussed, the historical period in which this elaborate is being written, is characterized by Climate Change and the Planetary Boundaries spread a kind of anxious feeling about the future in the heart of the ones who believes in a better future. Especially the future is what urban planning is trying to manage, of course considering the scope of Urbanistic. Reflecting on the function it has to cover, such an important discipline must be understood as a driver of safeness and a tool to generating hope.

The hope for a brighter environmental future lies in the transition, a process humans are embracing with the aim of reducing and nullify the negative impact of their activities. With this purpose, Cristiano et al, envisage the scope of Urbanistic "as 'agent' of transition"[104], strengthened by the fact that there is still a missing dialogue in between Degrowth perspective (which aims *per se* at finding the most environmentally friendly solution) and urban planning.

The focal point here lies in the effort the scholars are making here to explain how the strength of urban planning can be to meet the paradigm of Degrowth and let the latter be an inspirational muse.

#### *3.2.3.1. Planning in Degrowth literature: a brief Overview*

The scope of urban planning is somehow left unaddressed by many degrowth scholars. This is due to the contrast between the original concept of urban planning, inclined to foster growth. Historically speaking:

> "Since the neoliberal turn in the late 1970s, globally, mainstream planning has become increasingly growth-oriented and dependent. The rolling out of neoliberalism into the urban planning domain, although showing

[101] Karl Krähmer, 'Degrowth and the City: Multiscalar Strategies for the Socio-Ecological Transformation of Space and Place', *City* 26, no. 2–3 (4 May 2022): 316–45, p. 317. https://doi.org/10.1080/13604813.2022.2035969.
[102] Ibid.
[103] Ibid. p. 332.
[104] Apertura/Opening. Barbara Pizzo, Angela Barbanente, Silvio Cristiano, at p. 6 In 'Cities and Urbanism beyond Growth. Ecological Transition: Where Is It Going? Ecology, Economics, and Urban Planning between European Green Deal and Post-Growth Paradigms', Tracce Urbane, Tracce Urbane. Rivista Italiana Transdisciplinare Di Studi Urbani (December 2023), https://rosa.uniroma1.it/rosa03/tracce_urbane.

important geo-historical differences, shares certain common values, including entrepreneurialism, individualism and freedom of choice"[105]

The result is an aversity of some Degrowth scholars to the city, and most of all to urban planning the force which generated the metropolitan system. The approach that will be taken as inspiration in this elaborate is instead the one which focuses on establishing a dialogue and intersect degrowth and planning.

This paragraph specifically aims at enlightening the various degrowth ideas related to Urbanism. Federico Savini, in 'Towards an urban degrowth: Habitability, finity and polycentric autonomism' proposes "three macro-lines of debate"[106] focusing on urban areas.

| | Line of Debate | Description | Preferred Organizing principles |
|---|---|---|---|
| I. | Practices of de-commodified eco-living | Basic Degrowth normative statements. They focus mostly on co-living, cooperation and prefer decentralized system which are autonomous and focus mostly on the house-related and communitarians activity. | Ownership, Self-Regulation and Self Building, Autonomous energy production |
| II. | Symbiotic urbanization | Focus on criticizing the urban degrowth perspective. Instead, they aim for deleting the differences between urban and rural. They mostly rely on self-management of resources at a local level. | [r]urbanization, regeneration, de-concentration of urban settlements. |
| III. | Autonomy and regionalization | They believe in a more peaceful coexistence between local settlements and larger urban centres. Aims for benefits redistribution inside a system constituted by regional entities which governs directly and in a participatory way leveraging on the proximity principle. | Justice, Inclusion, Wealth redistribution, open localism, regionalization. [107] |

*Table 1 Macro-Lines of Debate - Degrowth and Urbanism (based on F. Savini, 2021)*

The first two approaches are to be considered more extreme in their preference for 'eco-villages' rather than large urban centres. The third approach combines the degrowth principle in a more moderated view, it seeks indeed for a more organized level of governance of the city that prefers proximity in various fields.

[105] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 408. https://doi.org/10.1080/13549839.2020.1867840.

[106] Federico Savini, 'Towards an Urban Degrowth: Habitability, Finity and Polycentric Autonomism', *Environment and Planning A: Economy and Space* 53, no. 5 (August 2021): 1076–95, p. 1078. https://doi.org/10.1177/0308518X20981391.

[107] Table elaborated based on the description provided by Federico Savini in 'Federico Savini, 'Towards an Urban Degrowth: Habitability, Finity and Polycentric Autonomism', *Environment and Planning A: Economy and Space* 53, no. 5 (August 2021): 1076–95, pp. 1078-1079. https://doi.org/10.1177/0308518X20981391.'

The structure of an "eco-village/urban village is argued to be the spatial organization suitable for implementing localism."[108] Even though, as Xue explains in 'Is eco-village/urban village the future of a degrowth society? An urban planner's perspective', there are problems of application that not only makes it difficult to imagine and propose as a solution but there are doubt on whether "[…] eco-village/urban village can fulfil the multi-objectives of a degrowth society by scrutinizing the impacts in the planning context."[109]

The third and last approach, 'Autonomy and regionalization', mostly concentrated on an organized structure allows for a wider view on the topic. Not only, considering the realistic view that accepts large urban centres and smaller villages, it seems to welcome even more Degrowth related principles which refers to different spheres. For example, social justice and wealth redistribution assumes a higher rate of organization present in the system. Moreover, the principles of inclusion and regionalization addresses both the practical need to welcome cities in the degrowth debate, and then to better organize the tasks that should be locally addressed and the ones which require higher intervention.

Proceeding further, the aim is to narrow down the debate until a more specific guidelines set can be stated, and thanks to it, inform the possible suggestion to be embedded in the policy discourse.

#### *3.2.3.2. The missing dialogue*

With J. Xue it is possible to open the debate on how planning can serve the purpose of ecology and of course, degrowth. It is commonly given for granted that planning is a tool for neoliberalism, but it is not true per se. Planning can be also a tool exploited by sustainers of the degrowth, as it facilitates downscaling of economy thanks to causal relationship between space and social conditions[110].

The author brings to the fore an important topic of discussion, letting understand that if the dialogue between Degrowth and planning will not take place there will be no practical application of the paradigm. As she explains: "The failure to recognise the causal powers of urban/urban regional spatial patterns and planning can weaken the transformative strength of degrowth-inspired social actions and even lead to contradictions between policy proposals and degrowth values."[111]

The contribution that can be offered from urban planning is huge because of the focal point of urban planning, which is manage the use of land. As Petra Wächter explains:

> "Spatial planning institutions have a decisive role in the transition process insofar as they take decisions regarding the use of land and its attributed space. Especially in three areas spatial planning has influential potentials to stimulate the transition process towards degrowth by enhancing: (i) a sustainable use of renewable energy sources; (ii) sustainable settlement structures; and (iii) the creation of social capital by more community-based facilities"[112]

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[108] Jinghua Xue, 'Is Eco-Village/Urban Village the Future of a Degrowth Society? An Urban Planner's Perspective', *Ecological Economics* 105 (September 2014): 130–38, p. 130. https://doi.org/10.1016/j.ecolecon.2014.06.003.
[109] Ibid.
[110] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 404. https://doi.org/10.1080/13549839.2020.1867840.
[111] Ibid. p. 405.
[112] Petra Wächter, 'The Impacts of Spatial Planning on Degrowth', *Sustainability* 5, no. 3 (March 2013): 1067–79, p. 1067. https://doi.org/10.3390/su5031067.

Reading the words of Wächter push to believe that the core element of planning, land, was shadowed to the eyes of scholars who believe Degrowth cannot welcome planning. If Wächter talks about land, Xue talks about space, saying that: "The possibility of urban planning to facilitate a downscaling of the economy, save the environment and secure distributive justice is predicated on the causal relationships between space and societal conditions."[113]

But why than the relation with a material element as the land or the space in more broader terms, as envisaged by Xue, is the key to understand the relationship among the two scopes?

For Xue the space, in a neo-Marxist vision, is: "[…] socially produced, being the product of economic, political and ideological forces"[114] and "is a medium through which production happens and social relations occur […]"[115]. And in the end, "Planning, through deploying land use and structuring spatial development, constitutes one of the many institutions that have an impact on societal changes."[116]

For Wächter managing the use of land means determining "[…] how many resources are needed […] and how the design of landscapes and cities is to be performed."[117] This shows how land should be considered as an important input in the count of resource inputs.

Xue and Wächter comes at the same conclusion, that Degrowth can find application thanks to urban planning because of space management. By managing space, it is possible to define how people move and carry out daily activities, even the economical ones. By defining attitudes, it is also possible to limit environmental pollution and aiming at a fairer distribution of resources.

Wächter also express how conviviality and social relations can be positively affected by planning in a degrowth oriented scheme:

> "As spatial planning institutions are responsible for settlement structures, the conclusion can be drawn that spatial planning indeed is responsible for spatial socialization, which in turn influences the formation of social capital. How inhabitants perceive space also influences daily routines and activities. Space produces societal dispositions similar to money or status and is therefore essential when discussing societal transitions such as degrowth. Settlement structures are one example how the organization of space has impacts on social capital."[118]

With the term social capital, she adjusts the economical definition for which "Social capital refers to features of social organisation such as networks, norms or trust which increase a society's productive potential."[119] The result applied to human beings in a community can be similar to the number of social benefits produced by the social interactions built in the space, "[…] such as knowledge, understandings or interpersonal

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[113] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 404. https://doi.org/10.1080/13549839.2020.1867840.
[114] Ibid. p. 410.
[115] Ibid.
[116] Ibid.
[117] Petra Wächter, 'The Impacts of Spatial Planning on Degrowth', *Sustainability* 5, no. 3 (March 2013): 1067–79, p. 1069. https://doi.org/10.3390/su5031067.
[118] Ibid. p. 1073.
[119] Ibid. p. 1069.

interactions."[120] Resulting in the re-definition in quantitative terms of a founding feature of Degrowth, i.e. "[…] a substantial decrease of the use of natural capital towards sustainable levels without any depletion of natural resources"[121] that goes together with an enhancement of social capital.

### 3.2.4. Localism: a problem of scale

The Degrowth literature, when addressing the topic of urbanization usually resorts against huge urban agglomeration and prefers smaller urban solutions. This point also proves to be rather divisive if we consider the debate among degrowth and planning. Some scholars, as previously said refuse the planning perspective as they envisage it as a derivative of the growth-oriented paradigm. The risk here, as evinced by Karl Krähmer, is to end up in a crude dualism between two opposites: "local = good and global = bad"[122].

Krähmer continues by stating: "[…] often (not always) the degrowth response to the critique of unjust global social metabolisms resorts to localism; […]"[123], this led to a problem because being too narrow, "[..] suffers from a limited consideration for the complexity of human geographies."[124]

Xue accurately describes the problem of localism not only from a dichotomic point of view, but also by enlightening the differences and cleavages it has with respect to other local agglomeration initiatives. She explains how the process of re-localization, proposed to exit the agglomeration effect of the city aims at "producing and consuming goods and services on a local basis"[125] and at "organizing life and making political and cultural decisions at the local level."[126] With all the most basic economic activities, re-localization affects even: decentralization of decisional systems, developing local mobility system all public and less efficient (in contrast to high speed mobility needs of a city), and also foster bioregionalism.[127]

Bioregionalism, refers to the creation of a bioregion: "A bioregion is a region defined by natural boundaries with a geographic, climatic, hydrological and ecological character capable of supporting unique human and non-human living communities."[128] The specificity of such a local geographical unit is sustained economically by its specificities and substantial elements, indeed: "A bioregion has a high capacity for ecological self-sufficiency in terms of basic resources and for self- sustainability in terms of being in perfect harmony with the ecosystem and ensuring awareness of where resources come from and where wastes go.[129]

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[120] Ibid.
[121] Ibid.
[122] Karl Krähmer, 'Degrowth and the City: Multiscalar Strategies for the Socio-Ecological Transformation of Space and Place', *City* 26, no. 2–3 (4 May 2022): 316–45, p. 317. https://doi.org/10.1080/13604813.2022.2035969.
[123] Ibid. p. 318.
[124] Ibid.
[125] Jinghua Xue, 'Is Eco-Village/Urban Village the Future of a Degrowth Society? An Urban Planner's Perspective', *Ecological Economics* 105 (September 2014): 130–38, p. 130. https://doi.org/10.1016/j.ecolecon.2014.06.003.
[126] Ibid.
[127] Ibid.
[128] Ibid p. 131.
[129] Ibid.

The first critique advanced by Xue and the other quoted scholars, refers to the lack of evidence over the fact that a degrowth society is better framed and organized at a smaller scale. There is no shared acknowledgement over the fact that democracy produce more benefits at a local level.[130]

Moreover, if someone just looks at eco villages, or other small scales urban agglomerates they might end up in loosing contact with other, and maybe more functioning scales, indeed: "Emphasizing on de-centralization of planning power to the locals as a means to reach these goals precludes the development and adoption of other scalar strategies which are more effective."[131] It is not possible to foresee autonomous local units alone without considering the broader structure they are connected to. "Viewing space not as a sum of distinct places, but as interconnected, in which supralocal and global flows do not simply disappear, answers need to be found on how these flows can be reshaped."[132]

In the following lines of the same paper, Krähmer proposes questions that should guide the debate on degrowth issues in urbanism. The message calls for a new wave in the debate over degrowth saying: "New lines of research could look at *how* these metabolisms are organised, taking up existing research; and how they should change."[133] Properly on metabolism, on the organisation of the space and the structure the organism of the city should obtain, will be the focus of the next pages. Going forward he explains how the aim of this organization should lead to a fairer and just special organization, underlining how much a multifaceted and holistic approach to city planning is needed[134].

Examples will follow in analysing the way in which the city should be organised and how the city should try to overcome the mere cost-benefit planning scheme embedding a holistic approach towards space organization.

Specifically, the next fourth Section will start again from localism but this time integrating the suggestions from the authors here quoted with the aim of not falling in the mere dualism previously illustrated.

### 3.2.5. Main takeaways from the Degrowth side of Planning

#### *3.2.5.1. Degrowth planning finally is?*

This paragraph will outline some founding principles on the degrowth approach toward planning. The aim is to lay out basic foundational principles that will inform the construction of a literature behind the new way of projecting a city.

For the sake of clarity, in the end of this paragraph I will conclude by stating the importance of some basic principles. First the holistic vision, considering various items together should be the approach followed in planning. Considering what previously said the social sphere is influenced by the space organization, and of course the social conditions create a specific kind of place.

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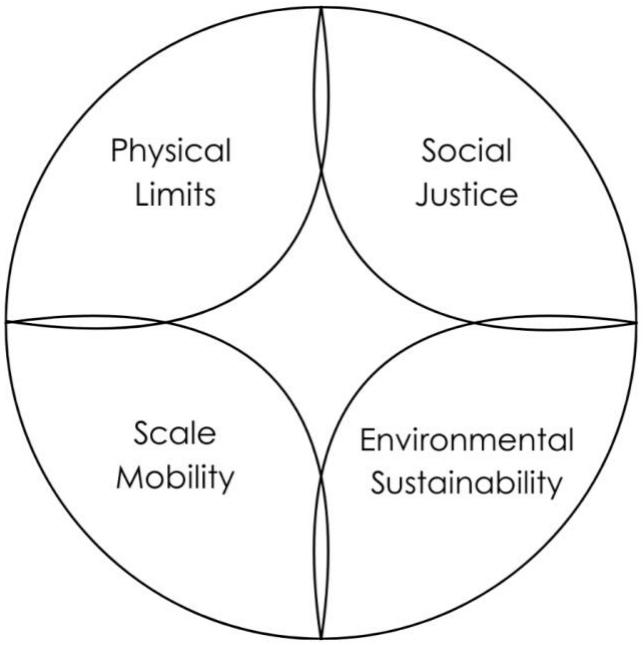
[130] Ibid. p. 135.
[131] Ibid. p. 136.
[132] Karl Krähmer, 'Degrowth and the City: Multiscalar Strategies for the Socio-Ecological Transformation of Space and Place', *City* 26, no. 2–3 (4 May 2022): 316–45, p. 336. https://doi.org/10.1080/13604813.2022.2035969.
[133] Ibid.
[134] Ibid.

Secondly the environment, sometimes it is envisaged as a limit, but is the newest dimension to be taken into account and should be putted at the forefront because it influences all the dimensions that follows. If environmental should not be seen as a limit but rather as a characteristic element of the local sphere, there are of course physical limits that the environment poses. Crossing them and crossing the boundaries at a higher level of analysis means building a future on fragile basis.

To complete, the scale is also important. The local project should be pursuit, but the level of produced benefits should reach the global sphere. This last point follows the multi-scalar property previously illustrated.

To summarize all the various dimension of this Section the graphical representation located below aims at facilitating the subdivisions of task in the Degrowth Planning, always leaving the space for the interconnection between them. Indeed, the various dimension grouped in four areas, should equally overlap, and intersect at each stage all aiming for the best output, that is obtained with the final circle all completed.




[135]

*Figure 2 The Tetra-Planning-Scheme (personal re-elaboration based on K. Krähmer, 2021)*

#### *3.2.5.2. VI Statements on Degrowth Planning*

With the aim to create a statement that will inform the future topics, and to set some kind of guidelines that can produce benefits for the ones who seeks for clarity in vast paradigm of planning, I decided to set out six sentences.

1. Planning is fundamental and crucial in transitioning towards a less impactful economy. It gives the possibility of envisaging a new society and takes into account various aspects as the social dimension, the governance and the environmental one.
2. Before taking specific decisions, planning requires to have an idea. Sometimes ideas can come from hopes in a diverse future. Even if they can sometimes be considered as utopians: "The utopian thinking

[135] The graphic representation comes from a personal elaboration. The names here presented comes from the interview Karl Krähmer did at *Post-Growth Planning* Podcast with Christian Lamker (University of Groningen). Source: *Becoming a Post-Growth Planner #7: Karl Krähmer*, 2021, https://www.youtube.com/watch?v=-H0LiqkdFnE.

can help urban planning to envision future urban development and address problems in a distinct way from the mainstream societal and planning paradigm."[136]

3. Taking the perspective of Degrowth on the city organism, helps in having a stronger holistic approach, because of the connection with the environmental scope and the natural capital.
4. The local approach is not wrong *per se*, instead the virtuous approaches developed on a local base shall "[…] contribute to face the challenges of reshaping social metabolisms at all scales."[137]
5. Degrowth and planning combined push to reflect on integration and multi-functionality of settlements and more in general buildings.
6. Sufficiency and self-sustaining models are worth implementing in the city because they show the path towards lower consumption levels, a basic element to realize sustainability.

[136] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 416. https://doi.org/10.1080/13549839.2020.1867840.
[137] Karl Krähmer, 'Degrowth and the City: Multiscalar Strategies for the Socio-Ecological Transformation of Space and Place', *City* 26, no. 2–3 (4 May 2022): 316–45, p. 337. https://doi.org/10.1080/13604813.2022.2035969.

# 4. Planning for self-sufficiency, a case study proposal

## 4.1. From localism to energy production

The previous section 3 reflected on Degrowth taking the important elements under the Planning standpoint. Starting from there, the present paragraph will bridge the previous approaches and ideas with solutions presented in the literature, following the open questions and suggestions, left from Degrowth Scholars.

A first relevant call for this elaborate has been left by Krähmer in a reflection on the metabolism of the city. He explains: "[…] the existing literature has focused on the important question of how the urban, suburban, rural places the globally wealthy inhabit could change to *reduce* metabolic inputs."[138] Considering a Degrowth scenario he talks about analyzing all the inputs involved in the production of something that is recognized as essential, this to realize the passage to a more sustainable way of living[139]. Essentially, beyond all ideological elements, Krähmer stresses out that if humanity needs certain kinds of products/services, then, to realize a sustainable living and/or degrowth there must be a full transformation of materials or other inputs.

By these means, if the aim of this research is to deepen into planning and use the Degrowth values to make it more sustainable, than a planner has to look also at the inputs inside metabolism of buildings, and subsequently the city. And one fundamental input that comes to the fore is energy. Most of all, in the form electricity used for daily activities of various nature, that is why, the attention of the public in the most recent years revolved to renewable energy, reflecting on the primary input and the necessity to 'green' it.

Normally, houses are connected to the grid, and in cities every unit is connected to the other resulting in a big network of consumers. Seen from the eyes of some Degrowth scholars, quoted before by Xue, Krähmer and others, the presence of eco-villages and similar solutions are in antinomy with the grid extension and efficiency typical of the city. Therefore, the reflection on localism become a point of cleavages between the ones who sustain planning, and the ones who have a radical vision of Degrowth (because of the reasons previously explained).

As sustained by Xue, there is no acknowledgement that localizing services and infrastructures automatically creates sustainability.[140] Even though, nowadays the solution of Energy Communities seems to, on the one side innovate the concept of a grid structure for electrical supply, and on the other to welcome the re-localization of service utilities.

What all of this has in common with Degrowth and its capability of inspiring new planning tools? First, it refers to the point of sharing of electricity that was not intended before. Secondly, it innovates the concept of the grid, by adding the possibility of valuing the production by the very same users who are consuming

[138] Karl Krähmer, 'Degrowth and the City: Multiscalar Strategies for the Socio-Ecological Transformation of Space and Place', *City* 26, no. 2–3 (4 May 2022): 316–45, p. 335. https://doi.org/10.1080/13604813.2022.2035969.
[139] Ibid.
[140] Jinghua Xue, 'Is Eco-Village/Urban Village the Future of a Degrowth Society? An Urban Planner's Perspective', *Ecological Economics* 105 (September 2014): 130–38, p. 133. https://doi.org/10.1016/j.ecolecon.2014.06.003.

energy. And finally, all of this resorts to the necessity of introducing more sustainable practices in the way we consume and put certain inputs into action, meaning, looking at the greening of inputs of processes that for us are indispensable, as the production (and consumption later), of electricity.

If localism does not present a response to Degrowth realization, and the mere connection with it has been criticized before (Section 3), why it does even come into place here? What shall be avoided is localism as a 'one solution fits all' kind of answer. This should be made very clear, re-localizing can be a good practice, and it is not denied even in the literature, but should be comprised in a planning strategy. Meaning with this, that a focus on the scale is crucial for what is intended as a multi-scalar strategy able to assess the various dimensions occurring in the city metabolism.

Before starting to talk about energy, it is also important to remember that a process which allow to green inputs, should regard all of them. To give an accurate description: energy is the focus, but this does not detract from the fact that living sustainable is accompanied by virtuous consume choices. Even in cities which use sustainable energy sources there can be a kind of "Apparent successes in decoupling [that] can frequently be explained by processes of externalisation."[141] And this is due to not counting the emissions produced by products imported, for instance food or other commodities produced elsewhere. Krähmer was here making a study on Copenhagen environmental policies, noting that being the city considered as a virtuous example of sustainability, it presents loopholes in the kind of consumes done in the city which does not count the consumption-based emissions.[142] The result of this imprecisions reports that improvements, in cycling, waste collection, energy production, buildings efficiencies "[…] are eaten up by the increase of total volumes of economic throughput."[143] Where the economic machine is still running smoothly, and the pollution is taken outside, sometimes is difficult to see if the process is really green. And this disclaimer sounding throughout the following pages lies as a statement for future contributions to include and to study how products move and interact with the system.

## 4.2. Energy Communities and their degrowing potential

### 4.2.1. The different forms of Local energy Production

Energy production is not anymore only in the hands of the ones who manage huge productive plants. Indeed, thanks to localized productive units (solar panels, wind turbines, etc.) it is possible to produce locally. What differs in the various configuration is the legal and governance structure behind them.

[141] Karl Krähmer, 'Are Green Cities Sustainable? A Degrowth Critique of Sustainable Urban Development in Copenhagen', *European Planning Studies* 29, no. 7 (November 2020): 1272–89, p. 1283. https://doi.org/10.1080/09654313.2020.1841119.
[142] Ibid.
[143] Ibid.

Some configurations of this kind can be called "bottom-up community energy initiatives (CEIs)"[144] and they have taken the name of: "[…] 'local energy', 'energy communities', 'energy cooperatives', 'local energy initiatives', 'community renewable energy' and 'community energies'"[145]

In the Italian legislation for example, after having welcomed the European directives and having proposed specifical guidelines on the formation of such entities, the Government decided to specifically define some kind of configurations. The latter are:

> "[…] groups of self-consumers of renewable energy acting collectively, active customer groups acting collectively, renewable energy communities (RECs), citizens' energy communities (CECs), the individual 'remote' self-consumer of renewable energy using the distribution network, the active 'remote' customer using the distribution network, the individual 'remote' renewable energy self-consumer with a direct line."[146] (My translation)

The configuration can vary, but what is important is their substance. As Ekhi Atutxa et. al. explains in 'Scalability of Low Carbon Energy Communities in Spain: An Empiric Approach from the Renewed Commons Paradigm':

> "From sustainability-oriented grassroots initiatives, to eco-cities and ecovillages, low-carbon based initiatives and communities, and sustainable communities and neighbourhoods, movements such as Transition Towns, low-carbon smart cities and on the whole, low-carbon or decarbonised cities, and even renewable energy cooperatives founded directly by citizens; they should all converge, acknowledge each other and be scaled in order to tackle issues that exist on a global scale."[147]

Most specifically citizen energy communities are nowadays one of the most famous examples of citizen being both producer and consumers of their own electricity. Indeed, if we look at the Italian GSE definition:

> "A Renewable Energy Community (REC) is a legal entity whose partners or members with controlling power within the CER can be citizens, small and medium-sized enterprises (for which participation in the CER is not the main commercial and industrial activity), territorial authorities and local authorities, including municipal administrations, associations with legal personality under private law, research and training bodies, religious bodies, third sector and environmental protection bodies, which share, through their consumption, renewable electricity produced by renewable energy installations."[148] (My translation)

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[144] Resilience, 'How Community Energy Initiatives Can Be an Effective Tool for Degrowth', resilience, 18 October 2023, https://www.resilience.org/stories/2023-10-18/how-community-energy-initiatives-can-be-an-effective-tool-for-degrowth/.

[145] Ibid.

[146] 'CONFIGURAZIONI PER L'AUTOCONSUMO DIFFUSO', accessed 12 April 2024, https://www.gse.it/servizi-per-te/autoconsumo/gruppi-di-autoconsumatori-e-comunita-di-energia-rinnovabile.

[147] Ekhi Atutxa, Imanol Zubero, and Iñigo Calvo-Sotomayor, 'Scalability of Low Carbon Energy Communities in Spain: An Empiric Approach from the Renewed Commons Paradigm', *Energies* 13, no. 19 (September 2020): 5045, p. 2. https://doi.org/10.3390/en13195045.

[148] 'Comunità Energetiche Rinnovabili', accessed 2 May 2024, https://www.gse.it/servizi-per-te/autoconsumo/gruppi-di-autoconsumatori-e-comunita-di-energia-rinnovabile/comunit%C3%A0-energetiche-rinnovabili.

This kind of configuration allows also for a local management of revenues which can produce social benefits for the community. The revenues are activated with the incentive's mechanism, which in the case of Italy are defined by the GSE rules. What is relevant is the capability of the EC to "[…] produce an 'energy income' to be redistributed, i.e. a profitable surplus from the energy produced. Energy savings translate into drops in consumption and costs on the bill, plus the GSE incentive mechanisms."[149] This economical advantage is sometimes considered as the leading benefit of the ECs. Nevertheless, relying only on this driver highlights a lack of strategy over the many other properties that connects with the spatial configuration.

Being ECs inside the urban space, it is possible to mention their good scalability properties. As a matter of fact, all the local initiatives can expand if the governance and legal conditions are settled to welcome the configuration. Instead of extended plants who needs certain space requirements, the urban space and the ECs configuration offer the possibility to share energy across a variety of actors.

The actors can differ in their structure and functions, for instance there can be a school, some offices, and shops nearby houses, and all of them generally have different consumption patterns across the day. Here comes the strength of sharing electricity, which is the key to unlock the right amount of energy distribution, when it is needed, and where it is needed. The multi-scalar property required by good urban projects correctly fits inside the ECs goals, and this is why their diffusion should open to a greener way of living in cities.

### 4.2.2. Energy Governance and the related effects

Given the premises made in the previous paragraph over the possible configurations, what is than the better way to implement the model? And especially from which considerations does they come from?

First, many configurations, such as Energy Communities (EC), are taken into consideration because they contribute to reducing energy prices.[150] And it is also estimated that their adoption will be led by Government incentives for the renewable energy produced. This kind of mechanism is purely market-based, leveraging on the possibility of price reduction, but there is more such kind of configuration can do. This thesis will sustain that there are vast possibilities related to the implementation of EC especially on the side of urban planning.

Considering how the current system of energy supply works it seems evident how the market-oriented mechanism is dominant. Historically speaking:

> "While the liberalisation of the energy market is accompanied by a narrative of empowered users/producers engaging along large utility providers or small-scale rooftop installations, the system of production relies on economic and political relations motivated by profit maximisation and propelled by fossil fuels."[151]

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[149] 'Comunità energetiche rinnovabili: cosa sono', Enel X, accessed 1 May 2024, https://www.enelx.com/it/it/storie/2020/05/comunita-energetiche-cosa-sono.

[150] 'Comunità Energetiche Rinnovabili, Online i Portali per La Richiesta Degli Incentivi', accessed 13 April 2024, https://www.gse.it/media/comunicati/comunita-energetiche-rinnovabili-online-i-portali-per-la-richiesta-degli-incentivi. See the relevance that incentives occupy in the speech.

[151] Chris Giotitsas et al., 'Energy Governance as a Commons: Engineering Alternative Socio-Technical Configurations', *Energy Research & Social Science (Print)* 84 (February 2022): 102354, p. 1.https://doi.org/10.1016/j.erss.2021.102354.

This mode creates a problem because it fosters the concept, as called by C. Giotitsas et al. in 'Energy governance as a commons: Engineering alternative socio-technical configurations,' of energy as a commodity to be produced and sold.[152] The reasons why this concept is damaging are multiple, but mostly the full potential of EC would remain unexplored.

Seeing this process in sustainability terms "Engaging at all stages of energy production may enable citizens and researchers to re-evaluate the costs and impact of energy production, rather than envisioning energy as 'free.'"[153] And the question is, what if all of this becomes to be difficult? Maybe people are not willing to really participate.

The thing is that somehow the whole community can have an interest into the management of energy supply, and this will not be solely an economical one. The matter here is related more to the governance standpoint, because the community which plays a role into the community matters, will gain a control and an economical benefit. Not only, the benefit produced can remain to the community. This is demonstrated by Tsagkari, Roca, and Kallis in 'From local island energy to degrowth? Exploring democracy, self-sufficiency, and renewable energy production in Greece and Spain', they quote the words of a member of an Island Energy Community who says: "It is important that the local government decides how to re-invest part of the gains. Because of that, social goals are a priority compared to the private interest which is mostly profit-oriented."[154]in this case they are referring to the subdivision of profit surplus generated, but a similar element can be identified even in the initial phase of Energy Communities implementation. The simple fact of having an autonomous system for energy generation allows for autonomy and more importantly under the degrowth standpoint it allows to gain sufficiency.

The view suggested by C. Giotitsas et al. over the management of the energy source is the one of commons instead of the market oriented. The authors believe this will help shaping a future where the condition of autonomy is fostered within a framework of increased awareness of the citizen-users.[155] Moreover, another important element that will work as a baseline even for the following lines, is that exiting the market-oriented mode of conceiving energy, fosters a holistic perspective on the role of energy and related technologies. This is also envisaged by C. Giotitsas et al. when they define "The commons as the binding element"[156] between the social sciences, and engineering. The sense here was that both of them combined under the sign of commons aims at the cooperation and analysis of different implementation stages of a technology. It becomes relevant here because it signs a boundary between the market-oriented mechanism and the commons one. In the first paradigm of the commodity, energy production does not really take into account

[152] Ibid.
[153] Ibid. p. 2.
[154] Marula Tsagkari, Josep Roca, and Giorgos Kallis, '"From Local Island Energy to Degrowth? Exploring Democracy, Self-Sufficiency, and Renewable Energy Production in Greece and Spain"', *Energy Research & Social Science* 81 (November 2021): 102288, p. 7. https://doi.org/10.1016/j.erss.2021.102288.
[155] Chris Giotitsas et al., 'Energy Governance as a Commons: Engineering Alternative Socio-Technical Configurations', *Energy Research & Social Science (Print)* 84 (February 2022): 102354, p. 3. https://doi.org/10.1016/j.erss.2021.102354.
[156] Ibid.

the possible impacts and environmental damages that are going to afflict, if not directly the community of reference, another one in the world, considering the fossil fuel production scenario.

The considerations made above could be seen as merely ideological or informed on the critique of the current state of the art, but there is something more. With the aim of making clear which are the interest at stakes and shine a light on possible opportunities behind the re-localization of the energy production, in the next subparagraphs two examples will be mentioned.

#### *4.2.2.1. The Tvindkraft case in Denmark (1978)*

To better frame what is like to manage an energy source collectively, the Tvindkraft case offer a privileged perspective being one of the first in its genre. First of all, the term comes from *Tvind*, the geographical place in the Danish countryside, and *Kraft* meaning wind turbine. This case is the first example of an EC built and managed in a purely bottom-up way and in a historical period where less attention was paid towards ecological sustainability. Nevertheless, some of the reasons who triggered the project were the "[…] reaction to the energy monopolisation that caused the 1970s oil crisis."[157] And the adversity of the population to nuclear plants as alternatives.[158]

The project was founded by teachers and students at the Travelling Folk High School, who could exploit the potential of the campus placed in Madum, a place near Ulfborg in Western Denmark, on the former Tvind farm.[159] Most of them had the technical capabilities to plan something this important, but they all cooperated together, and by reading the page of their website the sense of community easily emerges. It is specified they started the first dig all together, and that hired engineers who had to imagine something new which also had to fight against the important industries.

This kind of actions who lead the team to be "collectively responsible for the project, both in terms of design and practical construction work"[160] anticipates what Kunze & Becker calls: "[…] 'participatory and ownership structure' that allows for the inclusion of its goals"[161] being the mentioned goals "[…] political aspirations, which goes beyond the mere generation of electricity or heat from renewable sources."[162] The aspirations are therefore the final aim that drives the project in order to shape a different kind of model, with respect to the traditional market-oriented one, putting at the forefront the allocation of benefits, a collective decision-making process which, as stated share and co-manage the goals realization.[163]

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[157] 'The History of Wind Energy · Tvindkraft – How It Began', *Tvindkraft* (blog), accessed 14 April 2024, https://www.tvindkraft.dk/how-it-began-the-history-of-wind-power/.
[158] Ibid.
[159] Ibid.
[160] Ibid.
[161] Conrad Kunze and Sören Becker, 'Collective Ownership in Renewable Energy and Opportunities for Sustainable Degrowth', *Sustainability Science* 10, no. 3 (May 2015): 425–37, p. 427. https://doi.org/10.1007/s11625-015-0301-0.
[162] Ibid. p. 426.
[163] Ibid.

#### *4.2.2.2. The Ecopower case in Belgium (1991)*

Ecopower, established in Belgium in 1991, is a cooperative project focused on renewable energy consumption. It stood out by actively engaging citizens in generating clean energy and anticipating consumption of shared renewables before the popularity of ECs.

Starting from their website it is possible to see their "[…] mission is to build a democratic, decentralized, and sustainable energy system. We strive for 100% renewable energy for electricity, heat and mobility."[164] (My translation)

In this case the initiative started with a very small structure when a small group of activists decided to take part against the development of nuclear plants. They opted for a diverse kind of solution integrating different actors and strives to foster a cooperative governance model. They explain: "Ecopower works according to the international principles of cooperative entrepreneurship that have proven their usefulness to society for more than 100 years."[165] And connecting to the previously mentioned goals they explain: "Every cooperative has co-determination in the company, together we place ecological and social impact above financial profit."[166]

This example, different in the legal forms and in the interest that are mentioned, is nonetheless a founding milestone in the integration of goals. Not only, the experience is continuing nowadays, and it shows how aiming for goals beyond profits is not only possible but stable. Scalability is therefore another element one can grasp from the features of Ecopower, even though they are exceptions, remain worth to be mentioned.

### 4.2.3. Connection with the Degrowth statements

Deepening what previously expressed to anticipate the topic, here some points of contact between the two fields will be putted to the fore. What really matters, in the structure and the aims, is to find elements which allow to conclude the presence of ECs as a possible Degrowth-oriented solution. Here I present: The flexible boundaries of the projects, the minimal energy needs, the re-vitalization of economies, and the democracy-oriented approach.

#### *4.2.3.1. The flexible boundaries*

A concept that specifies the relation between ECs and the Degrowth values, lies in the structure of the project that one envisages. First, a point of view can change a lot, and in fact being this field new it has not been fully explored yet.[167] Expanding the definition of ECs project opens to new possibilities, that is why Kunze & Becker define them as: "collective and politically motivated renewable energy projects (CPE) [that] have an agenda of political aspirations, which goes beyond the mere generation of electricity or heat from renewable sources."[168]

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[164] Ecopower, 'Werking · Ecopower', Ecopower, accessed 14 April 2024, https://www.ecopower.be/over-ecopower/onze-werking.
[165] Ibid.
[166] Ibid.
[167] Conrad Kunze and Sören Becker, 'Collective Ownership in Renewable Energy and Opportunities for Sustainable Degrowth', *Sustainability Science* 10, no. 3 (May 2015): 425–37, p. 425. https://doi.org/10.1007/s11625-015-0301-0.
[168] Ibid. p. 437.

From this definition it is possible to understand that EC (or CPE as called more broadly in the paper), are renewable energy projects, not just local production energy initiatives. Even others agree that the name per se does not refers to local, M. Tsagkari et al, explain for instance that in most of the cases such projects aims at "[…] serving local consumers/users and becoming less dependent on imports."[169] Or other address ECs coming from the concept that it is not said human beings needs all of this energy, and that basically the minimum they need could be met even by smaller grids project.[170]

The second element is that they are politically motivated towards some objectives, relating to the field of sustainable consumption and collectivization of resources. Both approaches refer to the world of common goods, and of less consumption typically related to Degrowth as explained. Sometimes this kind of aim can even become the principal driver: "In Berlin, a strong commitment to a reduction of consumption per capita was part of the proposed model."[171]

This other kind of flexibility, allow to adapt the projects to: the physical place they are in, the social space in which they are managed. These features allow for the permeability of the ECs initiatives and makes them useful for all the other aims that will be further analysed, specifically the needs, the economic structure and governance model.

#### *4.2.3.2. The Minimal energy needs*

After having stated that the focus of ECs is local in the ideas, but its boundaries are permeable, another driver which connects ECs to the Degrowth realm is the acquired beliefs these projects are simple to be created. Simple means here that they are simpler to be realized than to opt for creating a Nuclear Plant for example. Not only, they will allow to avoid the creation of other buildings, for the specific use of energy production.

J. Millward-Hopkins, et al. in 'Providing decent living with minimum energy: A global scenario', developed a "[…] bottom-up model to estimate a practical minimal threshold for the final energy consumption required to provide decent material livings to the entire global population."[172] And they found out, the minimum energy consumption level per capita that will allow for a decent and sustainable living in 2050 is the one of 1960 despite a greater population[173]. Their proposal of course encourages a process of consumption reduction all over the world, calling for virtuous policies in this sense.

However, the ECs to provide a consumption reduction should also be placed in a contest of reduction, which is obtained by taking advantage of buildings rooftops. In another sense, this means not building other energy production plants avoiding the impact of the infrastructure on the natural environment. Building other plants is a problem first of all for soil consumption. For instance, in Italy, in 2018, the level of soil consumption

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[169] Marula Tsagkari, Josep Roca, and Giorgos Kallis, '"From Local Island Energy to Degrowth? Exploring Democracy, Self-Sufficiency, and Renewable Energy Production in Greece and Spain"', *Energy Research & Social Science* 81 (November 2021): 102288, p. 3. https://doi.org/10.1016/j.erss.2021.102288.

[170] Joel Millward-Hopkins et al., 'Providing Decent Living With Minimum Energy: A Global Scenario', *Global Environmental Change* 65 (November 2020): 102168, https://doi.org/10.1016/j.gloenvcha.2020.102168.

[171] Conrad Kunze and Sören Becker, 'Collective Ownership in Renewable Energy and Opportunities for Sustainable Degrowth', *Sustainability Science* 10, no. 3 (May 2015): 425–37, p. 434. https://doi.org/10.1007/s11625-015-0301-0.

[172] Joel Millward-Hopkins et al., 'Providing Decent Living With Minimum Energy: A Global Scenario', *Global Environmental Change* 65 (November 2020): 102168, p. 1. https://doi.org/10.1016/j.gloenvcha.2020.102168.

[173] Ibid.

reached 14 hectares per day, like in 2017 where 2 squared metres of soil per second was the rate of expansion of anthropogenic activity (data from SNPA Report n. 8/2019).[174]

Moreover, with the aim of safeguarding the environment, Luis Inostroza in 'Measuring urban ecosystem functions through 'Technomass'— A novel indicator to assess urban metabolism', proposes an indicator measuring the process of material accumulation, adding to the literature another tool to control and regulate the city metabolism[175]. The relevance of this indicator for the elaborate stands in the possibility of combining the expansion of ECs projects with a reduction of the technomass. This can be achieved if the policies are inscribed in a set of value which welcomes sustainability and sufficiency.

#### *4.2.3.3. The re-vitalization of economies*

Considering what previously said about the local application of ECs, some believe they can also provide a localized economic benefit. The idea is that local peripheral areas are not included in the great growth process, they mostly act as consumer of goods sold elsewhere. Therefore the "re-localization"[176] of production inscribed in a community which now is more self-sufficient is the first step to foster a local kind of economy.[177] Behind this idea lies the imaginary that "revitalization can take the form of new economies that do not reinforce the logic of capital accumulation, but centre on sovereignty, self-sufficiency, and well-being."[178]

The local economic benefits follow also other paths that are less local based and mostly oriented towards the extension of ECs projects inside blocks of the cities. In Italy, ENEA, delineates collaborative sharing platforms to foster the concept of Local Token Economy. The idea is that among the EC, people can organize a token market where to exchange internal service or goods. Indeed "The token economy attempts to recreate a circular economy through platforms that allow for the exchange of unused goods and services, which prove to be very useful when put back into circulation in the community through the sharing economy."[179]

Either with the use of tokens (instead of acknowledged currencies), or the application of local markets of goods in isolated contexts, go in the direction of fostering an alternative model of development, and an alternative kind of society. In line with the Degrowth practice of fostering the local community interactions and development.

#### *4.2.3.4. The democracy-oriented approach*

In ECs all the individuals benefit from direct participation in the production and sharing of electricity. To explain this, M. Tsagkari et al. present the case of Tilos where:

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[174] Munafò, M. (a cura di), 2019. Consumo di suolo, dinamiche territoriali e servizi ecosistemici. Edizione 2019. Report SNPA 08/19 ISBN 978-88-448-0964-5

[175] Luis Inostroza, 'Measuring Urban Ecosystem Functions Through "Technomass"—A Novel Indicator to Assess Urban Metabolism', *Ecological Indicators* 42 (July 2014): 10–19, https://doi.org/10.1016/j.ecolind.2014.02.035.

[176] Marula Tsagkari, Josep Roca, and Giorgos Kallis, '"From Local Island Energy to Degrowth? Exploring Democracy, Self-Sufficiency, and Renewable Energy Production in Greece and Spain"', *Energy Research & Social Science* 81 (November 2021): 102288, p. 3. https://doi.org/10.1016/j.erss.2021.102288

[177] Ibid.

[178] Ibid.

[179] Carla Pillitu, 'L'Enea propone una roadmap per l'evoluzione delle comunità energetiche', *Canale Energia* (blog), 23 March 2021, https://www.canaleenergia.com/rubriche/consumer/lenea-propone-una-roadmap-per-levoluzione-delle-comunita-energetiche/.

> "[…] the community participated in the design of the project through direct public consultations. As a result, there was a change in the location of the windmill to a less favorable one to protect an endemic bird species, and so as to not disrupt the soil close to agricultural land by the installation of the concrete bucket."[180]

Objectively, direct participation and the possibility of playing a role in the creation and consumption goes in the direction of empowering the citizens, but in the case of Degrowth:

> "The energy democracy concept aligns with degrowth ideas as they both require a re-imagining of energy politics, in which authority for decision-making is placed in the hands of the local population, energy consumers become energy citizens and energy a common good, democratically governed."[181]

## 4.3. Degrowth values and ECs, a possible planning way?

Here the connection with the realm of planning will be deepened, exploring current trends and new possible frontiers. Specifically, the topic of renewable energy applications in different contexts will be addressed, coming from the most peripheral areas to urban centres, the paragraphs will describe the future trends and models to foster the diffusion of ECs.

### 4.3.1. A study of the city space, current trends

Most recently the studies over the application of renewable energy have intensified. Specifically, there are areas of interest for this elaborate that I clustered in three groups.

Interested in the research over the capability to gain a good level of self-sufficiency the first cluster is *'Energy self-sufficiency'*. This cluster comprehend even the *'Home energy storage'* trend which gained a lot of attention in the study towards the self- sufficiency of urban buildings.

Considering the attention to planning and the connection established with ECs projects the second cluster is called *'Urban building energy simulation'*. This allow to include the GIS informed modelling which is a technology most recently used.

Finally, with the aim to explore the connection between renewables energy initiatives and planning the third cluster is a wide one called '*Energy communities and urban planning'*.

These clusters are made by specific keywords, that were previously mentioned as in the case of self-sufficiency, or that came to the attention during desk research. After this, by researching on www.lens.org, and inserting the specific keyword in the legend of Figure 1, it was possible to find how many scholarly works comprised that specific keyword sets. The result is here summarized.

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[180] Marula Tsagkari, Josep Roca, and Giorgos Kallis, '"From Local Island Energy to Degrowth? Exploring Democracy, Self-Sufficiency, and Renewable Energy Production in Greece and Spain"', *Energy Research & Social Science* 81 (November 2021): 102288, p. 5. https://doi.org/10.1016/j.erss.2021.102288.
[181] Ibid. p. 3.

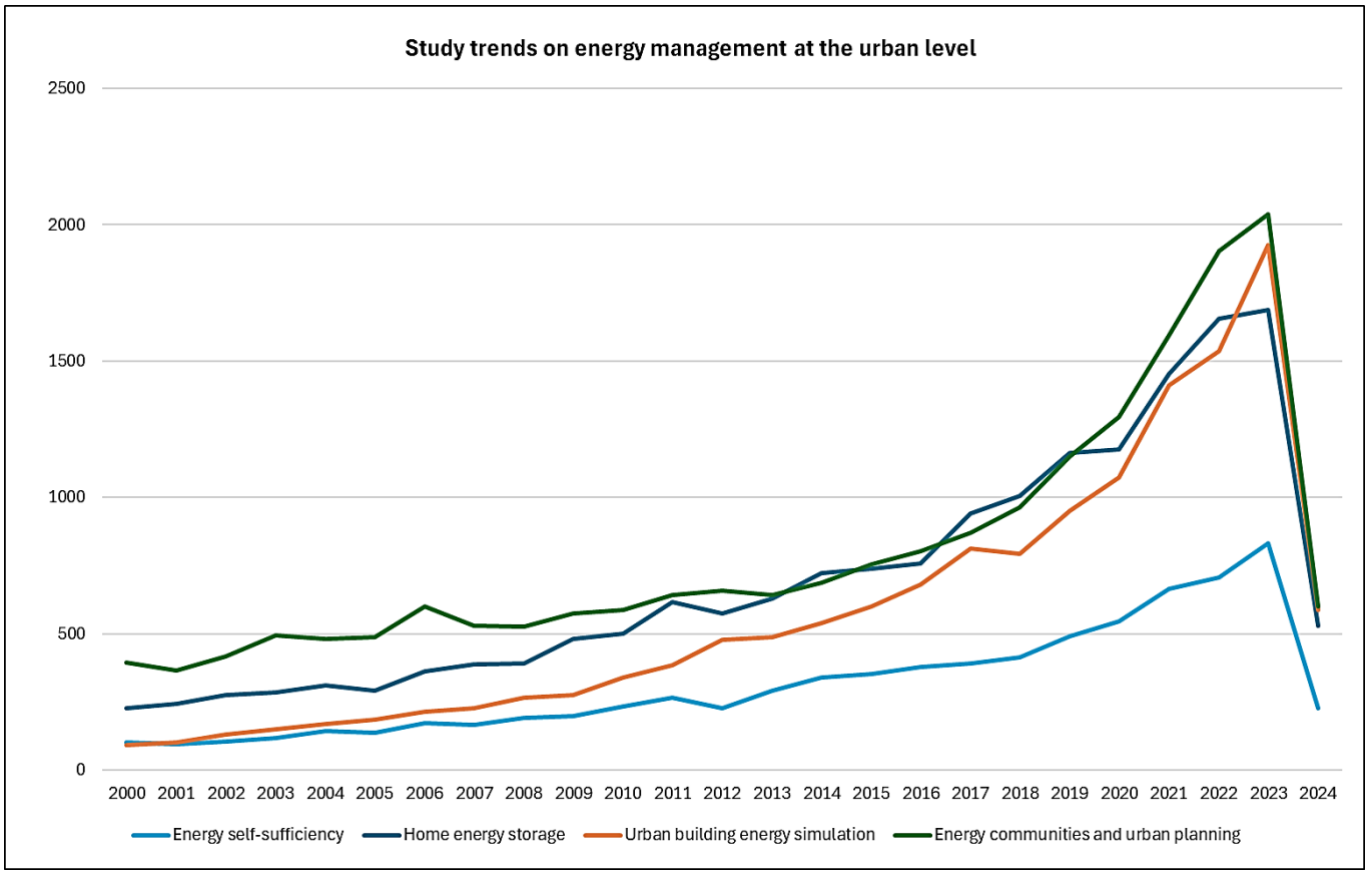


*Figure 3 Scholarly publication trend by keywords from year 2000 to 2024. Personal elaboration with data retrieved on https://www.lens.org/*

The chart in Figure 3, aims at tracing the trend encountered in the last 24 years in the field of localizing energy in the urban environment. These trends are all growing, but the most prominent one seem to be *home energy storage*, considering that is a specific technology devoted to promoting the energy sufficiency of houses.

The trend of self-sufficiency is a crucial one, and even if it presents a less dramatic increase over time, is still a broad topic to which much attention is being given.

Following the broad picture of the chart, many approaches are focusing also on the topic of modelling, to understand the capabilities of local renewable energy plants (here considered in cluster 2). This practice aims at pre-assessing the potential of energy communities' output and inform planning decisions. Usually this is done with "[…] four predominant types of data (and respective models) which are used to estimate energy demand and thus energy communities' outputs: real-monitored data, statistical data, modelling data, or geographic information systems-based data (GIS)."[182]

In this field another valuable approach to be considered is Urban Building Energy Modelling (UBEM).

> "Urban building energy modelling is defined as a bottom-up, physics-based approach to simulate thermal and energy performance of new or existing neighbourhoods and cities. The overall goals of UBEM are to provide

[182] Diana Neves, Patrícia Baptista, and Pedro J. Rosa, 'Solar Energy Communities: An Open Data and Georeferenced Based Modelling Framework to Pre-Assess Deployment Potential at Urban Level', *Energy* 282 (November 2023): 128838, p. 2. https://doi.org/10.1016/j.energy.2023.128838.

data-driven insights for different urban-level use cases, such as urban planning and new neighbourhood development, stock level carbon reduction strategies, and buildings-to-grid integration."[183]

This study becomes relevant in assessing that "[…] self-sufficiency in buildings increases when going from individual self-consumption to collective self-consumption, having the best results when combining diverse demand profiles."[184] This line of study believes indeed that an esteem of potential economic gains will be the baseline for the deployment of ECs projects, especially in the urban area. [185]

This modelling system should be implemented in a more holistic way for some other authors, as in the case of H. Yu, M. Wang, X. Lin et al., in 'Prioritizing urban planning factors on community energy performance based on GIS-informed building energy modelling', they express how GIS techniques, building energy modelling, and sensitivity analysis should be all used together to have the best results.[186]

The self-sufficiency cluster, which is supported by analysis of technology implementation (as in the case of battery storage), designs elements to facilitate the development of ECs and their diffusion. In the latter, Todeschi et al., in 'Towards Energy Self-consumption and Self-sufficiency in Urban Energy Communities' propose to implement studies of rooftop potentials with the integration of model that are able to consider "[…] architectural, cultural, energy, technical and economic feasibility."[187] Another important finding of the study reveals how the dimension of the building influences the rate of reachable self-sufficiency, and that if the urban unit considered has a good level of self-sufficiency (estimated with their model) it will be easier to create there an Energy Community.[188]

G. de Oliveira e Silva, P. Hendrick, in 'Lead–acid batteries coupled with photovoltaics for increased electricity self-sufficiency in households', explore how the level of self-sufficiency varies if implementing energy storage system. The study proposes that self-sufficiency level superior to 40% can be reached only with PV panels supported by energy storage.[189] With this in mind, they project an optimisation tool to help in shaping future policies aimed at increasing the distribution of photovoltaics and energy storage in urban areas.[190]

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[183] Irene Mansó Borràs, Diana Neves, and Ricardo Gomes, 'Using Urban Building Energy Modeling Data to Assess Energy Communities' Potential', *Energy and Buildings* 282 (March 2023): 112791, p. 3. https://doi.org/10.1016/j.enbuild.2023.112791.
[184] Ibid. p. 1.
[185] Diana Neves, Patrícia Baptista, and Pedro J. Rosa, 'Solar Energy Communities: An Open Data and Georeferenced Based Modelling Framework to Pre-Assess Deployment Potential at Urban Level', *Energy* 282 (November 2023): 128838, https://doi.org/10.1016/j.energy.2023.128838 and [185] Irene Mansó Borràs, Diana Neves, and Ricardo Gomes, 'Using Urban Building Energy Modeling Data to Assess Energy Communities' Potential', *Energy and Buildings* 282 (March 2023): 112791, https://doi.org/10.1016/j.enbuild.2023.112791.
[186] Hang Yu et al., 'Prioritizing Urban Planning Factors on Community Energy Performance Based on GIS-Informed Building Energy Modeling', *Energy and Buildings* 249 (October 2021): 111191, https://doi.org/10.1016/j.enbuild.2021.111191.
[187] Valeria Todeschi et al., 'Towards Energy Self-Consumption and Self-Sufficiency in Urban Energy Communities', *Heat and Technology* 39, no. 1 (February 2021): 1–11, p. 1. https://doi.org/10.18280/ijht.390101.
[188] Ibid.
[189] Guilherme Botelho De Oliveira E Silva and Patrick Hendrick, 'Lead–Acid Batteries Coupled With Photovoltaics for Increased Electricity Self-Sufficiency in Households', *Applied Energy* 178 (September 2016): 856–67, p. 856. https://doi.org/10.1016/j.apenergy.2016.06.003.
[190] Ibid.

Coming from these assumptions, the following paragraph will explore another possible dimension, which could add other tool to the future deployment of ECs projects.

### 4.3.2. ECs Spatial dimensions and urban impact

Considering the literature previously addressed it seems evident how the referral to the urban dimension is made by different clusters of paper analysed. Nevertheless, energy policies still lack the implementation of this component in a clear and extended way.[191] Due to this uncompletedness at the broader level, mayors and local authorities are the ones paying more attention toward spatial planning tool. [192] This is similar to the way in which mayors of metropolitan cities decided alone to take actions against climate change (this topic was addressed in Section 2).

In this field, it is not possible to affirm that the legislative bodies, both at the European and at the National (in this case in Italy) level, are not enough addressing the topic of ECs. But maybe that they are doing this forgetting about the spatial dimension. The Directive RED II (2018/2001/EU) addresses the topic of energy poverty, takes action against the lack of renewable energy implementation by incentivizing people to organize in new renewable energy projects, and of course states what ECs are.[193] It mentions that the States should implement policies devoted to realization of ECs, but it states how the primary aim of the configuration is to produce economic benefits, and its "[…] physical dimension is represented by the proximity to plants criterion."[194] (My translation)

Another recent improvement has been made by the EU Directive 2023/2314, which mentions how ECs could improve the resilience of the whole European energy system.[195] Moreover states the duty of States to "[…] encourage local and regional administrative bodies to include heating and cooling from renewable sources in the planning of city infrastructure where appropriate, […]"[196], resulting in a more planning-oriented explanation than the RED II directive. Nevertheless, the definition seems quite broad, and lacks a more bottom-up approach, resorting to incentivize the role of the network operators in the definition of suitable place for self-consumption.[197]

What would be desirable instead is the consideration of the space – society relation, as J. Xue and P. Watcher explains (see Section 3). This relation lies at the basis of ECs diffusions, and with that, the extensions of a community driven type of organization and common management of goods, or input, as in the case of

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[191] Karishma Asarpota and Vincent Nadin, 'Energy Strategies, the Urban Dimension, and Spatial Planning', *Energies* 13, no. 14 (July 2020): 3642, p.1. https://doi.org/10.3390/en13143642.
[192] Luna Kappler, 'Verso una definizione dell'impatto urbano delle comunità energetiche - n: Diritto ed Economia delle Comunità Energetiche', *Diritto e società*, 2022, https://www.rivistadirittoesocieta.it/wp-content/uploads/2023/09/Diritto-Societa-4-2022.pdf.
[193] 'Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the Promotion of the Use of Energy from Renewable Sources' (2018), http://data.europa.eu/eli/dir/2018/2001/oj/eng.
[194] Luna Kappler, 'Verso una definizione dell'impatto urbano delle comunità energetiche - n: Diritto ed Economia delle Comunità Energetiche', *Diritto e società*, 2022, p. 914. https://www.rivistadirittoesocieta.it/wp-content/uploads/2023/09/Diritto-Societa-4-2022.pdf.
[195] 'Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023' (2023), https://eur-lex.europa.eu/eli/dir/2023/2413/oj.
[196] Ibid.
[197] Ibid.

Energy. The relation here stated is at the basis of the propagation of Degrowth principles, which, as shown, inform the possible sustainable planning and therefore living that human should embrace to avoid planetary boundaries negative effects.

Another desirable output would be to have a regulation on the use of the soil able to define standards in the construction rules, aimed at including in the planning ECs implementation. Or even more, welcoming the definition of a space – society relation as an enabler of *care* in the management of the common goods, and resources available in the area.

In a nutshell, welcoming the spatial dimension is understanding which positive drivers are available underlining the space used to live, and activate them to accompany the human living towards a less impactful operating.

The aim of this last paragraph is to boost the awareness on the localized factors influencing the creation of ECs, and more in general on a consideration of all the connection between society and space, with the aim to foresee a new way of reading the phenomenon. The spatial dimension plays a prominent role in defining the impact of ECs, and this is why more attention should be given to this part together with the economic and legal aspects. By definition: "Urban impact can thus be understood as the set of voluntary and involuntary objectives and consequences that EC initiatives can pursue and generate in territories, cities, neighbourhoods, and communities."[198] The Result is the reciprocity in the relation between the impact generated by ECs on the spatial dimension, and how the spatial dimension itself is the key to unlock a change in the planning part of renewable energy *prosumerism*.

To conclude, I would opt to state how this last part of the research, is the most influential in shaping different energy consumption patterns and attitudes toward sustainability. Moreover, it intersects with a lot said in the previous section over the Degrowth values and statements, and the planning process that should be incorporated in the decisions.

[198] Luna Kappler, 'Verso una definizione dell'impatto urbano delle comunità energetiche - n: Diritto ed Economia delle Comunità Energetiche', *Diritto e società*, 2022, p. 921. https://www.rivistadirittoesocieta.it/wp-content/uploads/2023/09/Diritto-Societa-4-2022.pdf.

# 5. The SJPI. A discussion of sustainable urban planning

## 5.1. Premises: An Introduction to sustainable living

This fifth section will close the elaborate by providing different contents with respect to the previous ones. First, it will condensate together the most important concepts elaborated, and secondly, it will provide some guidance on the basis of the research outperformed. The mentioned guidance will be developed in the form of an Aggregate Indicator for urban planning means. This Indicator will be enriched by topics and data that are the most possible comprehensive, holistic but always human cantered.

With this last expression I want to stress out the importance of a comprehensive vision to analyse the urban environment. Therefore, to address the topic: environmental, social, and economic, dimensions will be embedded in the Aggregate Indicator structure.

All of this comes from a reasoning on the various relevant factors that comes from the Degrowth realm and that informed the decision to act with an aggregate indicator. The first assumption acknowledges the existence of a difficulty in decoupling economic growth from the resulting negative environmental impacts.[199] This kind of reflection inform other strategies which are related to planning for the explained relation between space and society (previously addressed in Section 3). It follows that, a space for reasoning on various driver influencing the urban metabolism is possible. An Aggregate Indicator will give the possibility to look together at various stages with indexes that photograph a particular urban dimension.

Considering the literature review, here the indicator will try to use the knowledge and the inspiration of Degrowth and provide a possible answer to the research question. Operationalizing the concepts behind the diffusion of a sustainable model for the city has been already deepened by looking at ECs case and how they connect with Degrowth ideal, but now a more empirical phase will complete the scene.

### 5.1.1. Management and Compensation in a transition scenario

Considering the scenario in which a current state of the art has to be modified can be seen as a threat. Nevertheless, a change is needed, as seen in the previous pages. This means, study and analysis are desirable elements which can place the planner in a better position.

What Degrowth explains is how the economical machine should decelerate and/or redirect its actions to avoid harm to the environment. As explained by Krähmer, from a Degrowth perspective, products should have non-impactful input, [200] therefore production should embrace new avenues and possibilities, and a research process which can foster it. At this point, which is the driver that one can rely on? The brief answer will be innovation, but it's role should be determined inside a framework of just and fair progress for all. First, can it play a role in the purpose of planning and management of the city?

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[199] Jason Hickel, 'What Does Degrowth Mean? A Few Points of Clarification', *Globalizations* 18, no. 7 (September 2020): 1105–11, p. 1105. https://doi.org/10.1080/14747731.2020.1812222.

[200] Karl Krähmer, 'Degrowth and the City: Multiscalar Strategies for the Socio-Ecological Transformation of Space and Place', *City* 26, no. 2–3 (4 May 2022): 316–45, p. 336. https://doi.org/10.1080/13604813.2022.2035969.

Innovation can be seen as an element in the construction of the human progress. As a matter of fact, its impact is meant to sustain all the other inputs that make an economy functioning. But there is something more if one envisages it as a process meant to meet sustainable aims, indeed:

> "[…] sustainable innovation is defined as 'innovations in which the renewal or improvement of products, services, technological or organizational processes not only delivers an improved economic performance, but also an enhanced environmental and social performance, both in the short and long term have the capacity to generate positive social and environmental impacts.'"[201]

Innovation is considered as a lever through which sustainable projects can be financed, insofar as a certain percentage of innovation completes the process of generating a good impact and foster human progress. In a figurative way, this last process can be seen as an equation that includes welfare and growth.[202]

This equation is meant to show how all the various drivers can be adjusted to obtain a good result in terms of progress even by lowering economic growth. Innovation is here intended as the level of technical progress which can create more efficiency by lowering the amount of input needed to produce the same output. Now, supposing to start from this composition: the level of wellbeing depends on favourable climate conditions, granted by a flourishing environment which offer resources and stability. Then, economic growth consumes the resources, and if this is too high it will lead to a disruption of environmental habitats leading to bad living conditions. In the end, humans develop new technologies that are more and more efficient and, without destroying the environment they reduce growth and increase the sustainability of their activities. As a matter of fact, here Innovation plays a crucial role in improving the efficiency of the inputs.[203]

$$\text{Wellbeing} = \text{Innovation} \cdot \textit{Economic Growth} \cdot \textit{Sustainability}$$ [204]

For example, for a reduction in growth it is possible to ensure the same level of wellbeing by increasing innovation. The final aim, considering innovation implementation, is to reach a better level of efficiency, for which less inputs produce the very same amount of output as before or even better.

Of course, this elaboration is a simplification but aims at explaining the relations occurring in the society. Most importantly the aim is also to downgrade the dominance of economic growth as the only beneficial factor. The beneficial power should be demonstrated and most of all contextualized inside a wider framework of study related to the economic impacts.

Other than economic progress, even the social structure should change and foster a positive transition. Management and Compensation tools, which create new opportunities, are lacking and the social structure

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[201] João Pedro de Almeida Couto and Maria Manuela Santos Natário, 'Sustainable Innovation', in *Encyclopedia of Sustainable Management*, ed. Samuel O. Idowu et al. (Cham: Springer International Publishing, 2023), 3544–49, p. 3544. https://doi.org/10.1007/978-3-031-25984-5_803.

[202] Furlani, Aleardo. (April, 2024). Personal Interview.

[203] Furlani, Aleardo. (April, 2024). Personal Interview.

[204] Original elaboration based on personal interview and technical exchanges with Prof. Furlani, Aleardo. (April, 2024).

seems also not able to receive them, as if an appropriate set of values and behaviour is missing. An equation of this kind can state a possible strategy to overcome the bias of just growth as progress, showing people a possible strategy exists, and hoping to state a call to a collective action. This allows to try even various combination and creating scenarios, and how to compensate the possible damages occurring in a scenario with lower economic growth. Envisaging this kind of society needs planning, preparation, and scenarios to transmit everything in the clearest way to a large public. Nevertheless, it is a starting point, and with that in mind the following pages will talk a lot about scenarios and compensations.

The starting point always refers to Section 3 and Section 4 with the topics: the needs of the people, and the extraction economies which are addressed by some scholars imaging the eco-village as the only alternative. To complete the framework, on the one side a correct assessment analysis should look at how much energy is needed[205] and how to redistribute it correctly among the people, especially by resorting to ECs projects. On the other one, exiting from the loop of believing extraction, accumulation is the only way through, and at the same time welcoming the reality that cities are the best place to spread change thanks to agglomeration and spillover effects, should work on the communicational side. This goes in line with the critique against eco-villages, indeed, the boundary approach (an eco-village is defined only taking in consideration where it begins and ends) can sometimes generate more problems. Staying within the national boundaries does not necessarily allow you to go in the direction of sustainability in reducing emissions, furthermore, a bioregion does not come to term with the system of states, and the fact that relation among them should be solidary and fair as much as possible, to not fall in an exploitation system.[206]

## 5.2. Indexes and Data

With the aim to address the communication side of the problem, and to perform actions that use data and projects scenarios, I will now introduce the most empirical side of this elaborate. The present paragraph 5.2. will explain the logic behind an Aggregate Indicator building, and Paragraph 5.3. will demonstrate it revealing its name, nature, and application.

### 5.2.1. First approach and development

To develop an Aggregate Indicator, I used different indexes, which provides information over a particular phenomenon. More specifically they define the state in which the observed phenomenon is. So, first an explanation of the reasoning behind the choice of the indexes will be given, and then they will be tested in a case study.

To choose the indicators the first phase of assessment has been performed using the Pressure-State-Response (PSR) model. By definition:

[205] It refers to minimal approach towards energy management for household. Topic addressed in Section four following the finding of: Joel Millward-Hopkins et al., 'Providing Decent Living With Minimum Energy: A Global Scenario', *Global Environmental Change* 65 (November 2020): 102168, https://doi.org/10.1016/j.gloenvcha.2020.102168.
[206] Krähmer, Karl. (April, 2024). Personal Interview.

> "The Pressure-State-Response model is a conceptual framework for impact analysis designed to facilitate the provision of relevant information for evaluating and analysing environmental management. The model, developed by the OECD and adopted by other international organisations is based on the connection between environmental pressures and the associated policy response."[207]

This process is mostly focused on identifying environmental issues, that are measurable with respective indexes. Nevertheless, indexes which defines a particular state can be found also in other realms as the social and economic one. As this elaborate is focused on the urban environment, the focus will remain the city. Throughout the explanation of this Section the scale will be the city, always considering that the multi-scalar property is an intrinsic character of the study itself.

To move forward, considering the model, the first element is Pressure: "The emission and concentration of greenhouse gases constitute the main cause or direct pressure that generates climate change."[208]

The second element is: state (of the environment):

> "The condition of the environment is referred to as its "state". In the case of climate change, state is typically described using essential climate variables, such as the concentration of the different greenhouse gases and related variables. However, more generally, when referring to the "state", how environmental change specifically impacts humans (e.g. in the increase in hazards and exposures) is of particular interest."

The third element is: Response (Policy Response):

> "Response refers to direct and indirect policy responses to address climate change and its impacts. These policies can be focused on the drivers or pressures or the state and impacts. More specifically, in the climate change policy sphere, response is defined as mitigation and adaptation."[209]

And finally, a representation of the various stages considering the urban environment. The pressures are selected considering the literature examined in the previous sections and the common understanding of cities issues.

[207] Oecd, *The Climate Action Monitor 2022 Helping Countries Advance towards Net Zero* (OECD Publishing, 2022), https://doi.org/10.1787/43730392-en.
[208] Ibid.
[209] Ibid.

| Pressure | State | Response |
|---|---|---|
| • Air pollution<br>• Noise pollution<br>• Traffic Congestion<br>• Soil Consumption<br>• Waste<br>• Floods<br>• Heatwaves<br>• Heating and cooling systems | • Air Quality Index<br>• Noise level<br>• Rate of soil consumption<br>• Rate of energy consumption<br>• Temperature<br>• Rate of recycling | • Traffic regulation with cap-and-trade systems<br>• Limits to the types of vehicles<br>• Increasing the fleet of public transportation<br>• Planting Trees<br>• Waste collection (circular economy strategies)<br>• Increase shading<br>• EC project with public funding |

*Table 2 PSR model environmental pressure on city example (by the Author).*

This is what concerns the environmental sphere and stays as an example to identify the most pressing issues. A very similar process can be used to foresee social issues and so identify some indicators to monitor it.

As an example, the urban degradation is a pressure on the environment and is related to the way in which people and local public administration manage space and common goods. This can be identified in the state sector, with the satisfaction for public services or on wellbeing, analysis conducted from local or national statistical offices.[210]

### 5.2.2. Demonstration: The various indexes

To create the aggregate indicator various indexes, sometimes addressed as rates or indicators, have been chosen and clustered. The purpose behind is to follow the reasoning of the PSR model, especially in the monitoring (or State) phase. Considering that the monitoring is used to inform the possible political choices it follows that indexes present a representation of the reality, which will even partially influence the decisions later. Consequently, reasoning on the point of view, on the perspective that a policy maker should follow, resorts to a choice in the nature of indexes. Therefore, a new policy devoted to planning for sustainability and justice should be tailored on specific indicators for the goals it attains to reach.

Finally, with the aim of favouring a different spot from which observe the reality, the aggregate indicator the author aims to create, will be generated based on three clusters of indexes, respectively (and in order of importance): Social, Environmental, and Economic.

[210] The mentioned indexes and indicators can be found in the ISTAT website for Italy https://www.istat.it/it/archivio/296044 or on Roma Capitale Dati e Statistiche BES https://www.comune.roma.it/web/it/dati-statistici.page

All the Environmental Indexes that will be used can be referred to as state indicators, given that they photograph a precise instant of a situation. As said in the previous paragraph, a defined state of a situation can be identified by social indicators or rates, for instance in the field of instruction the number of people with a certain degree. There goes a similar situation also in the economic realm, considering for example the real estate market or the attractivity of a certain investment in a particular geographical area.

More specifically, all the indexes inside the Aggregate Indicator can be placed in between the state monitoring and the policy design activity. This goes in the direction to make a bridge and respect the holistic viewpoint, of a policy informed on data and for the satisfaction of demonstrated needs.

### 5.2.3. Methodology

The clustering process refers to subdividing the three fields of indicators which can impact an urban planning process. In most of the cases urban planning resorts to considering the economic feasibility of projects both under the infrastructural and the housing point of view (see previous sections 3 and 4). Nevertheless, sustainability requires to welcome the positive/negative impact that a project has on the environment, embedding even the social acceptance, or the consequence that a certain project has on the community. That is why the first group of indexes are related to the social indexes which photograph a contextual situation.

To make the example and show the potential of the indicators, the city of Rome has been chosen as case study. The scale is therefore metropolitan, even though some indexes can have a more narrowed vision and for example focus specifically on district of the city. The temporal span considered is the year 2020, because of a greater clarity and availability of data.

The data used generally comes from: the statistical office of the City of Rome inside “Benessere Equo e Sostenibile a Roma 4° Rapporto – 2021” and “Benessere Equo e Sostenibile a Roma 5° Rapporto – 2022”. And the “Rapporto Immobiliare 2021” by “Osservatorio del Mercato Immobiliare” (“Agenzia delle Entrate”).

The various Indexes will be here presented than described and demonstrated. The first cluster of Indexes is “Social” which for the data of the city of Rome on the year 2020 comprehend:

- Rate of people with high school diploma,
- Satisfaction with friendships,
- Knowledge workers.

The second Cluster of Indexes is “Environmental” which for the data of the city of Rome on the year 2020 comprehend:

- Soil sealing from artificial cover,
- Municipal waste recycling rate,
- Total density of green areas.

The Third Cluster of Indexes is “Economic” which for the data of the city of Rome on the year 2020 comprehend:

- Employment rate,
- IMI,

- NTN (% of Rome).

### 5.2.4. Social Indexes

Social Cluster is composed by the following indexes, all retrieved on 'Benessere Equo e Sostenibile a Roma 4° Rapporto – 2021' and 'Benessere Equo e Sostenibile a Roma 5° Rapporto – 2022'. These indexes want to give to the urban planner information on the social spectrum and put at the forefront the wellbeing of the people.

#### *5.2.4.1. Rate of people with High school diploma*

It represents in percentage, for the year 2020, the number of people between 25 and 64 years with at least the high school diploma.[211] It serves the purpose of showing, at the city scale, which are overall the people who benefit from a good knowledge based. This is crucial to have good citizens that have the tools to create benefits for the whole society.

#### *5.2.4.2. Satisfaction with friendships*

It represents in percentage, for the year 2020, the number of people who declared to be really satisfied for the relations they have with friends and acquaintances.[212] This index wants to represent an intrinsic value of Degrowth, for which people should welcome a way of living oriented to socialization, and in an ideal way, they should spend more time with peers enjoying community life.

#### *5.2.4.3. Knowledge workers*

It represents in percentage, for the year 2020, all the employed people with a university degree, that have a merely technical occupation or perform a highly specialized kind of job.[213] The reason why it is considered refers to the capability that the people have to create and innovate starting from the competences developed. The aim is to analyse a form of wellbeing that goes beyond having a job and integrate the peculiarity of an occupation which is commonly considered as prestigious and can produce research and development.

### 5.2.5. Environmental Indexes

Environmental Cluster is composed by the following indexes, all retrieved on "Benessere Equo e Sostenibile a Roma 5° Rapporto – 2022". These indexes want to express the state of environmental issues that afflict the city. The idea is to monitor particular environmental pressures which affect the city and make it more difficult to reach a sustainable living.

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[211] 'Roma Capitale | Quarto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2021, https://www.comune.roma.it/web/it/scheda-servizi.page?contentId=BDS808789.
[212] 'Roma Capitale | Quinto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2022, https://www.comune.roma.it/web-resources/cms/documents/Bes_Roma_2022_agg15092022.pdf.
[213] 'Roma Capitale | Quarto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2021.

#### 5.2.5.1. *Soil sealing from artificial cover*

It represents in percentage, for the year 2020, the portion of soil which is not anymore capable of absorbing water, and it is covered with artificial means to favour the sprawling of the city (with buildings and streets).[214] The purpose of this indicator is to show how much the city is growing in general, and how than a planner should act pushing towards an integration of green into the new infrastructure and by leaving the right amount of soil free from coverage.

#### 5.2.5.2. *Municipal waste recycling rate*

It represents in percentage, for the year 2020, the amount of differentiated waste collected with respect to the total amount of waste.[215] The purpose of the indicator is to show how much people are reducing their impact on the environment prioritizing a circular economy approach.

#### 5.2.5.3. *Total density of green areas*

It represents in percentage, for the year 2020, the number of green areas on the total surface corresponding to the city of Rome.[216] As opposite to the first index this one wants to describe how much attention has been given to the presence of green areas which gives benefit to biodiversity and grant the presence of social spaces for people to meet.

### 5.2.6. Economic Indexes

Economic Cluster is composed by the following indexes, retrieved on 'Benessere Equo e Sostenibile a Roma 4° Rapporto – 2021', and 'Rapporto Immobiliare 2021' by Agenzia delle Entrate. These indexes wants to analyse economic inputs that characterize a city.

#### 5.2.6.1. *Employment rate*

It represents in percentage, for the year 2020, the number of people between 20 and 64 years who have an occupation.[217] It is crucial in economic terms to understand how many people could have the purchasing power to buy/ rent houses. Moreover, in a more social sense give an understanding of how many people have the economical possibility to buy goods or services.

#### 5.2.6.2. *IMI*

The IMI index, which (in Italian) stands for 'Real Estate Market Intensity', is an indicator that measures the vibrancy of the real estate market in a specific geographical area. Therefore, it represents in percentage, for the year 2020, the ratio between the sold houses with respect to the total stock in the market.[218] The idea is that from the eyes of a planner this number indicate how much the market conditions in the city are favourable, considering that for really low level of IMI some houses could remain unsold representing a loss.

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[214] 'Roma Capitale | Quinto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2022.
[215] Ibid.
[216] Ibid.
[217] Roma Capitale | Quarto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2021.
[218] Osservatorio del Mercato Immobiliare and Agenzia delle Entrate, 'RAPPORTO IMMOBILIARE 2021 Il settore residenziale', 2021, https://www.agenziaentrate.gov.it/portale/web/guest/rapporti-immobiliari-residenziali-2021

#### 5.2.6.3. *NTN (the percentage of Rome)*

The NTN index, short for 'Number of Normalised Transactions' (in Italian), is an indicator of the dynamics of the real estate market that represents the number of transactions, normalised with respect to the share of property bought and sold, that took place over a given period of time.[219] Therefore, it represents in percentage, for the year 2020, the quote of normalized transition performed in Rome with respect to the total of the country of Italy.[220] It has been chosen for the broad idea that can give on the number of economical transaction performed in the market.

## 5.3. Indicator Demonstration

### 5.3.1. Calculations and values

Considering the indexes previously mentioned, now the following step will be calculating the value of each cluster. In this way there will be three starting values that can be then pondered.

This process aims at first describing the factual situation for the year 2020 in Rome, second giving the planner the possibility to project a scenario by means of the ponderation (the process of stating the importance of certain cluster of indexes. It will be deepened in the following pages).

The values of the social indexes for the year 2020 is represented in the following table:

**Social 2020**

| **Indexes** | **Percentage Value** | **Numerical Value** |
|---|---|---|
| Rate of people with high school diploma | 78.20% | 0.78 |
| Satisfaction with friendships | 20.40% | 0.20 |
| Knowledge workers | 30.90% | 0.31 |
| **Total** | - | **1.29** |

*Table 3 Social Indexes for the city of Rome (2020).*[221]

[219] 'NTN (Numero Di Transazioni Normalizzate)', Immobiliare Living - Glossario, accessed 12 May 2024, https://www.living-re.it/glossario-definizioni-tecniche-economico-immobiliare-fabbricati-ed-aree-edificabili/ntn-numero-di-transazioni-normalizzate.html.

[220] Osservatorio del Mercato Immobiliare and Agenzia delle Entrate, 'RAPPORTO IMMOBILIARE 2021 Il settore residenziale', 2021.

[221] Elaboration on data from: Roma Capitale | Quarto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2021. And Roma Capitale | Quinto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2022.

The values of the environmental indexes for the year 2020 is represented in the following table:

**Environmental 2020**

| Indexes | Percentage Value | Numerical Value |
|---|---|---|
| Soil sealing from artificial cover | 23.50% | 0.24 |
| Municipal waste recycling rate | 43.80% | 0.44 |
| Total density of green areas | 35.60% | 0.36 |
| **Total** | - | **1.04** |

*Table 4 Environmental Indexes for the city of Rome (2020).*[222]

The values of the economic indexes for the year 2020 is represented in the last following table:

**Economic 2020**

| Indexes | Percentage Value | Numerical Value |
|---|---|---|
| Employment rate | 69.60% | 0.70 |
| IMI | 2.05% | 0.02 |
| NTN (% of Rome) | 32.60% | 0.33 |
| **Total** | - | **1.05** |

*Table 5 Economic Indexes for the city of Rome (2020).*[223]

As mentioned, the sum of the indexes should now be pondered. The ponderation is the numerical tool in the hands of urban planners that allows them to design future development scenarios from present data. Nevertheless, there are some more features to be specified.

The Ponderation makes the indicator more flexible and empirical in its definition. First, the flexibility in the decision-making process is possible because planners decide the ponderation value based on previous similar experiences, having in this sense a higher rate of discretion. Not only that, but a weighted factor also allows for the right space for a multi-stakeholder decision-making process to extend the representation of the various interests involved. Secondly, the empirical property comes from the possibility to adapt to empirically determined ambient conditions. The result is that flexibility and adaptation allow to make projections and scenarios balancing the different interests.

I chose to set values for the ponderation (indicated from now on with the letter P), as it is presented in the following Table 7.

[222] Elaboration on data from Roma Capitale | Quinto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2022.

[223] Elaboration on data from: Roma Capitale | Quarto Rapporto sul Benessere Equo e Sostenibile di Roma Capitale', Roma Capitale, 2021. And Osservatorio del Mercato Immobiliare and Agenzia delle Entrate, 'RAPPORTO IMMOBILIARE 2021 Il settore residenziale', 2021

**Values of Ponderation (P)**

| **Range of Values** | 1 ≤ P ≥ 10 |
|---|---|
| ***Low*** | 1 ≤ P ≥4 |
| ***Average*** | 5 ≤ P ≥ 7 |
| ***High*** | 8 ≤ P ≥ 10 |

*Table 6 Values that the Ponderation (P) can assume. (By the author).*

Now that all the numbers are available it is possible to come to the final definition of the Aggregate indicator this elaborate stated to present. The indicator will take the name: 'Sustainable and Just Planning Indicator' (SJPI) and its *formula* is:

$$SJPI = \frac{(total\ Indexs_{Social})P + (total\ Indexes_{Environmental})P + (total\ Indexes_{Economic})P}{3}$$

In the formula, the total values coming from the clusters of indexes (respectively Table 4, 5, and 6), are multiplied by the P value. As said the P value can move from 1 to 10 considering that (looking at Table 7), the planner can choose to give Low, Average, High, attention to either one of the group of indexes. This process aims at giving more importance to one or more of the clusters.

### 5.3.2. Final Demonstration

An example of the demonstration will be now given.

Three standard scenarios have been projected, by modifying the values of P throughout them.

Therefore, coming from the Starting Values previously elaborated, I have created three scenarios which differ because of the value (or score) determined by the SJPI. These three scenarios are: Capitalist Society, Sustainable Development Society, and Degrowth Society.

First a demonstration of the Capitalist Scenario where economic indexes are maximized.

**Capitalist Society**

| **Indexes Type** | **Indexes Values** | **Values of P** | **Final Value** | **Final SJPI Score** |
|---|---|---|---|---|
| **Social** | 1.29 | 4 | 5.16 | **5.91** |
| **Environmental** | 1.04 | 3 | 3.12 | |
| **Economic** | 1.05 | 9 | 9.45 | |

*Table 7 Values for the Scenario 'Capitalist Society'. (By the author).*

In this first standard scenario case, the planner prefers to maximize the attention towards economical return. The Scenario is called 'Capitalist 'considering what previously analysed in the Degrowth literature (Section 3 - 4) that represents Capitalism as the place where growth ideologically predominates.[224] As a result,

[224] Jason Hickel, 'What Does Degrowth Mean? A Few Points of Clarification', *Globalizations* 18, no. 7 (September 2020): 1105–11, p. 1107. https://doi.org/10.1080/14747731.2020.1812222.

aspects other than economic return are less considered inside the planning choices. Instead, the growth logic, prioritize production, exchange processes and accumulation, elements connected to urban-built environment and planning practices as sustained by J. Xue.[225] The SJPI is low and represent a poor sustainable living strategy. The graphical representation also explains how the other two clusters (social and environmental) are poorly maximized.

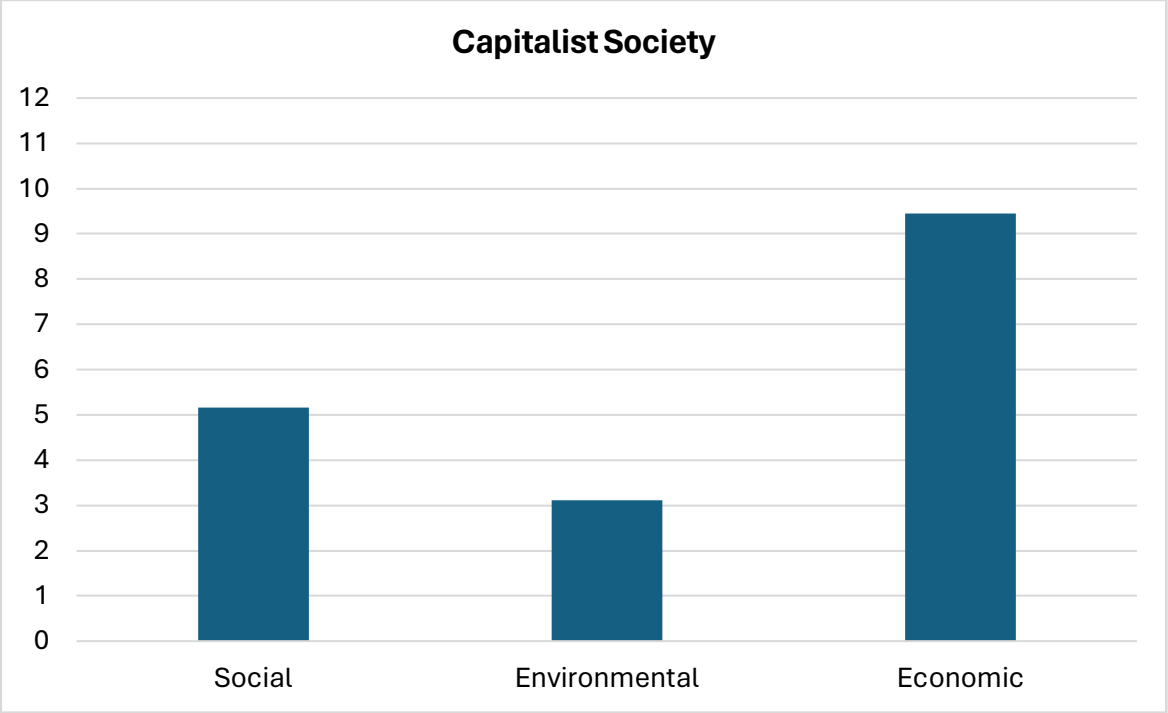


*Figure 4 Capitalist Society Scenario. (By the author).*

In the second Scenario instead, the planner welcomes the Sustainable Development best practices. The expected outcome is a model where the three dimensions: Social, Economic, and Environmental receive equal attention. The aim is to protect the environment without damaging the economic interest in a still growth-oriented economy.

**Sustainable Development Society**

| Indexes Type | Indexes Values | Values of P | Final Value | Final SJPI Score |
|---|---|---|---|---|
| **Social** | 1.29 | 5 | 6.45 | **6.33** |
| **Environmental** | 1.04 | 6 | 6.24 | |
| **Economic** | 1.05 | 6 | 6.3 | |

*Table 8 Values for the Scenario: 'Sustainable Development Society'. (By the author).*

The value of P is average for all the three clusters to give them equal attention, as also it is showed in the chart. The final value of SJPI is now higher than before and can be defined as sufficient. This scenario is

[225] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 411. https://doi.org/10.1080/13549839.2020.1867840.

defined as the 'Sustainable Development' one coming from the definition tackled in the Degrowth literature (Section 3). In particular, the scenario comes from an ideology which welcomes economic growth and profits, an believes that "[…] only some aspects of the present growth-oriented capitalist system need to change."[226] Sustainers of this view, mostly rely on technological improvements, new forms of energy production, and a strong responsibility coming from individual behaviours.[227]

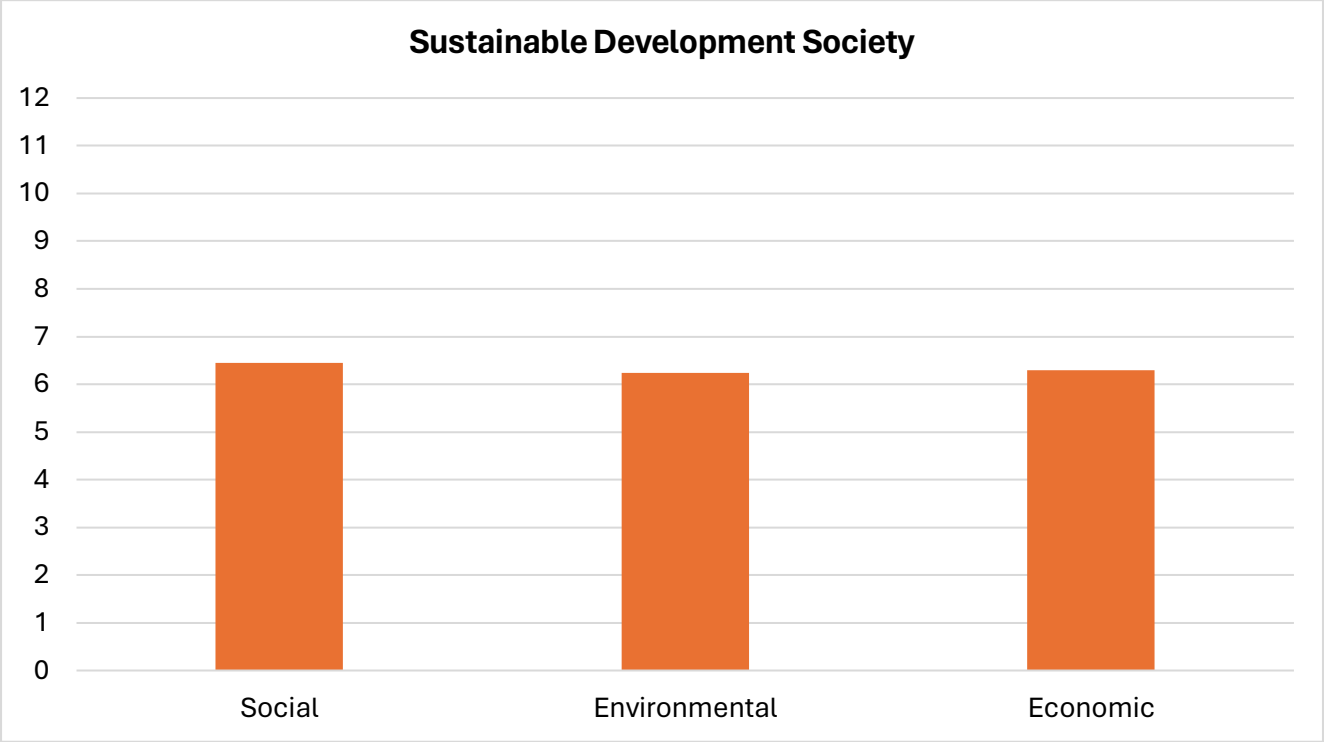


*Figure 5 Sustainable Development Society Scenario. (By the author).*

Considering the last Scenario:

**Degrowth Society**

| Indexes Type | Indexes Values | Values of P | Final Value | Final SJPI Score |
|---|---|---|---|---|
| **Social** | 1.29 | 9 | 11.61 | **8.39** |
| **Environmental** | 1.04 | 9 | 9.36 | |
| **Economic** | 1.05 | 4 | 4.2 | |

*Table 9 Values for the Scenario: 'Degrowth Society'. (By the author).*

In the third Scenario, there is an inverse trend with respect to the first one. The society welcomed the environmental care principles as a guiding light and focusing more on the social relation aspects, favouring a community-based life. The attention of planners is revolved toward the maximisation of social and environmental clusters, in a Degrowth oriented way. Indeed, the Degrowth paradigm assumes decoupling

[226] Karl Krähmer, 'Are Green Cities Sustainable? A Degrowth Critique of Sustainable Urban Development in Copenhagen', *European Planning Studies* 29, no. 7 (November 2020): 1272–89, p. 1273. https://doi.org/10.1080/09654313.2020.1841119.
[227] Ibid. p. 1278

pollution from resource consumption is impossible, and therefore that Sustainable Development could not be a virtuous way.[228]

Here the value of SJPI is maximized and P is increased for environmental and social clusters without taking into account the economical return. The graphic representation offers an inverse trend with respect to Capitalist Society's scenario.

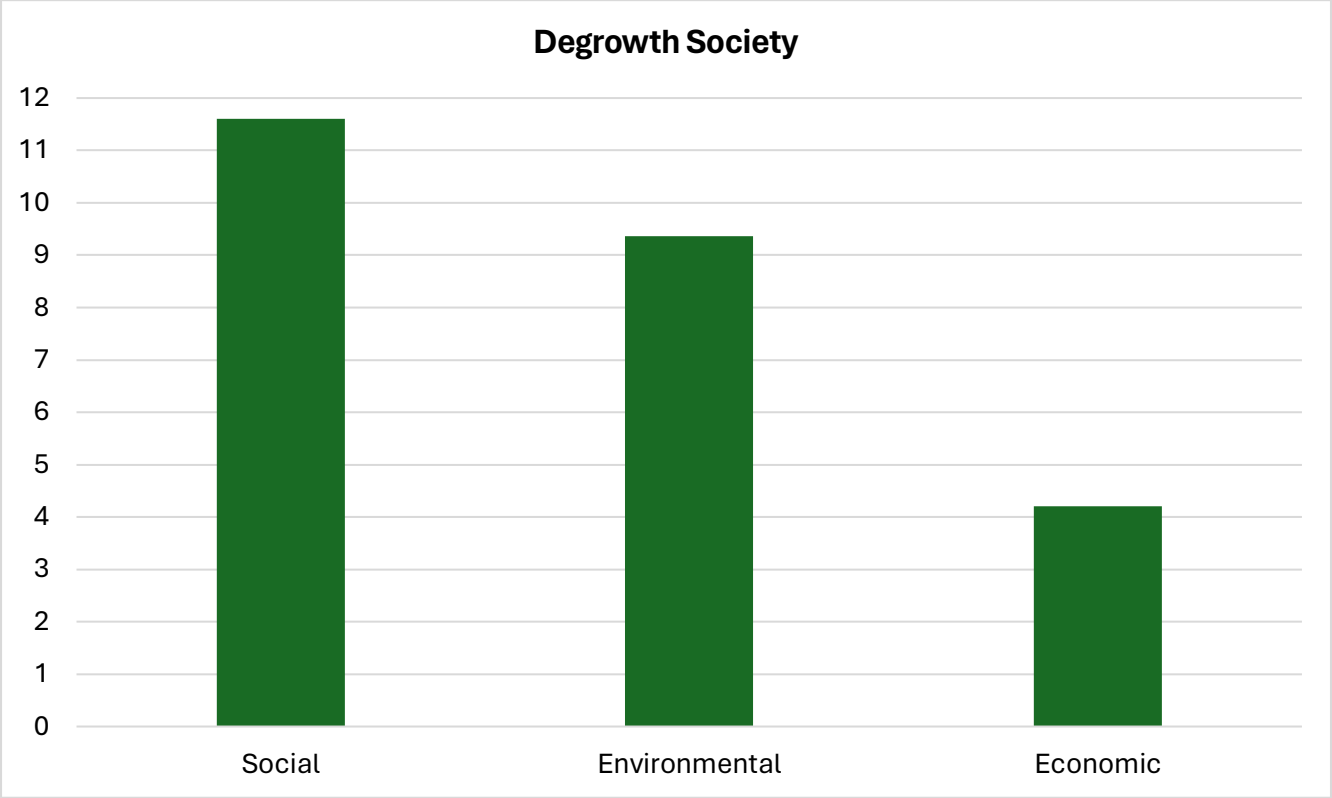


*Figure 6 Degrowth Society Scenario. (By the author).*

Now, in the chart of Figure 7 it is possible to observe the various trends all together. It becomes clear the huge differences between Scenario 1 and 3, and how in the Scenario 2 every cluster is equally considered.

The second chart (Figure 8) is slightly different. It takes the trends of the various clusters of indicators across the scenarios matching this with the SJPI score.

[228] Jason Hickel, 'What Does Degrowth Mean? A Few Points of Clarification', *Globalizations* 18, no. 7 (September 2020): 1105–11, p. 1105. https://doi.org/10.1080/14747731.2020.1812222.

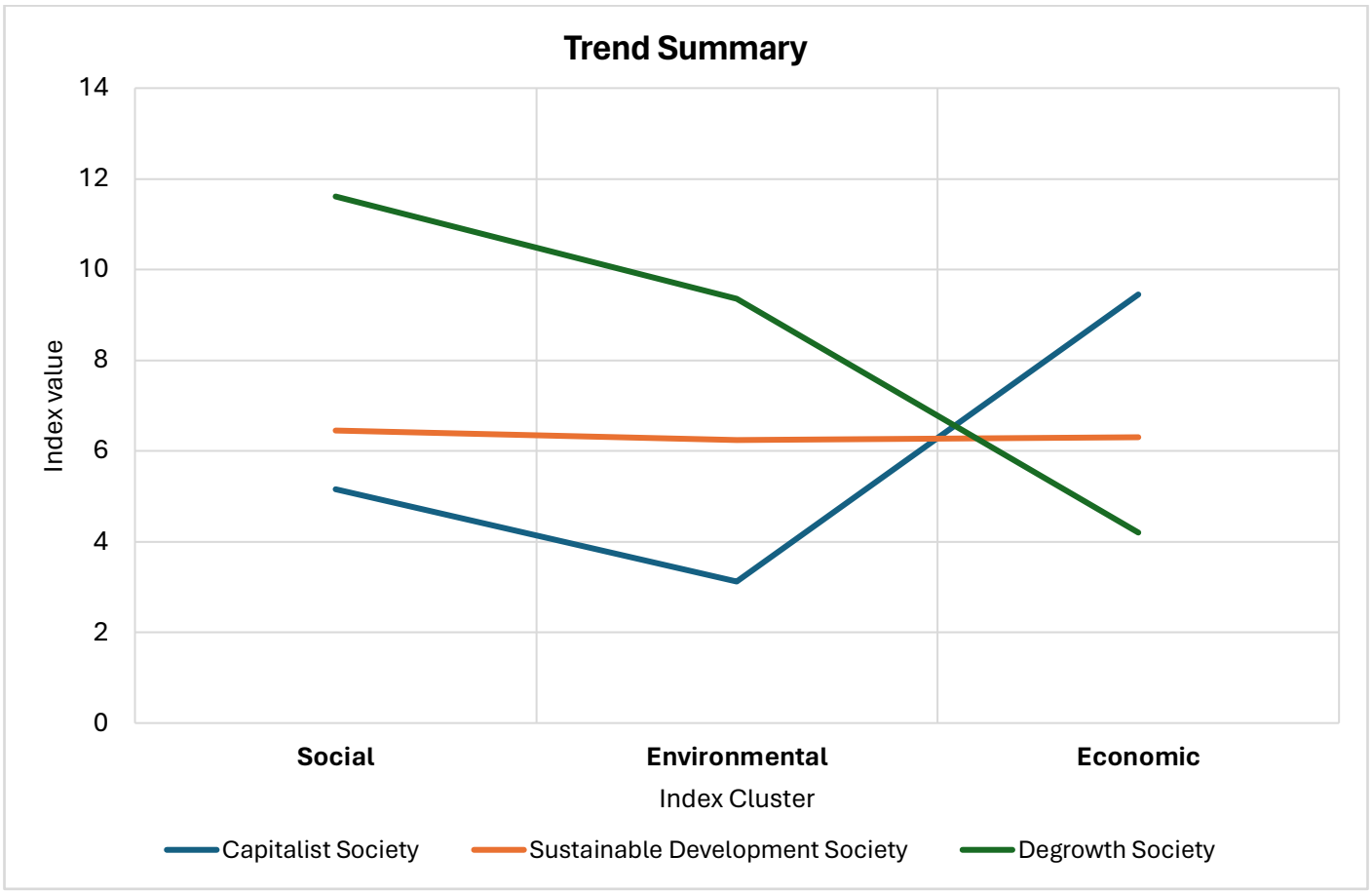


*Figure 7 Comparative view of indexes' clusters trends in the various scenarios. (By the author).*

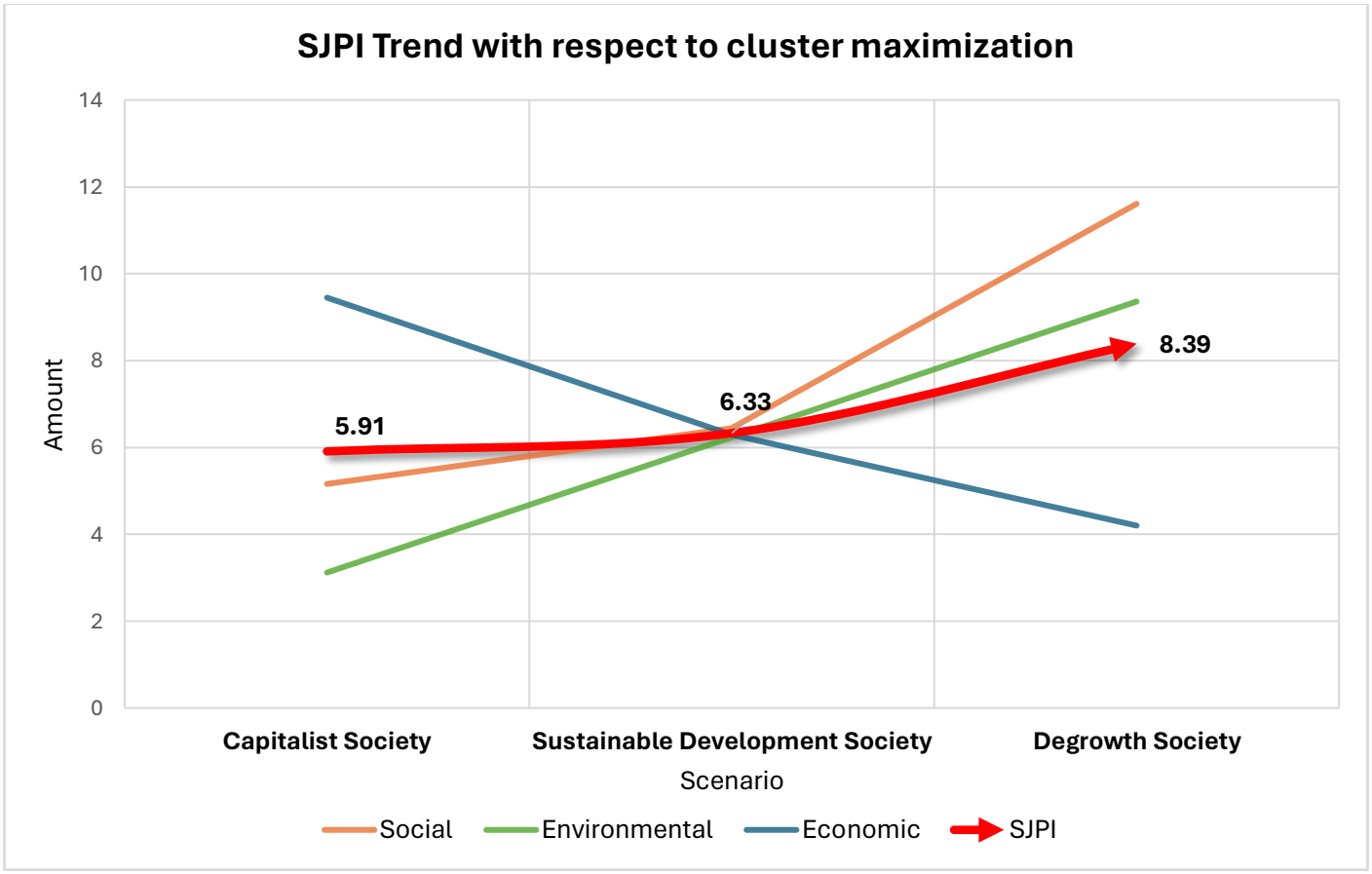


*Figure 8 SJPI Trend with respect to cluster trends. (By the author).*

Considering this last chart (Figure 8), it is possible to see how, across scenarios, the value of SJPI increases the more environmental, and social factors are maximized. The chart has been built by studying the relationship between the scenarios (on the *X* axis) and the values assumed by the SJPI, and the three clusters of indexes, across the various scenarios (explained in the *Y* axis).

Over the red-arrow-line, representing the SJPI, there are three values which are the score (characterizing each of the scenario as previously said). It is possible to notice the inverse proportionality relation between the economic cluster and the SJPI.

## 5.4. Results discussion

Placed at the conclusion of this elaborate, this last section presented a possible observation spot from which direct the city planning in a sustainable way. The main objective is to give voice to all the aspects regarding a city and not fall into the trap of the cost-benefit analysis, or economical return.

The Sustainable and Just Planning Indicator (SJPI), broadly and holistically propose to measure the impacts and redirect the policy action by putting at the forefront the aspects which are most pressing nowadays. It answers to the research question by identifying a standard to which adapt the city strategy, showing the possible combination to be performed with the aim of organizing a brighter sustainable city.

The SJPI stems from the study of the PSR model and as specified, the extension of the latter's approach to the measurement of social and economic phenomena through the identification of state indicators. By connecting with the PSR model, the SJPI assumes an empirical structure, composed by state indicators measuring a problem. The following step of the ponderation, meant to specify the importance of different clusters, represent the weight given to different aspects of the contextual situation in which planners operates. Reasoning on this phase of the project, the SJPI can help in studying the best strategy to address a change in a particular planning policy.

Other results coming to the fore, and a partial belief of the person who writes, is that there can be a shift in time. The Scenario analysis started from the Capitalism development, crossed the Sustainable Development, and reached the Degrowth. Beyond the Scenario *nomen iuris*, there is a shift for which more and more attention is being given to the environment health. With the hope to realize a more equitable and environmentally friendly society, the scenarios show a passage between pollution intensive activity to other much less impacting. This process is here called *Soft Switch,* which can be defined as the progress reduction of economic growth advantaging an increased attention towards environmental sustainability. Where the adjective ‘soft’ stresses out the presence of a progressive change, sustained by innovation as a balancing factor (see ‘Human progress’ equation).

As the SJPI showed, the objective of a sustainable future, and the soft switch process happens by integrating all the costs (Sustainable Development). The transition is consolidated by incorporating costs and understanding that, wellbeing does not pass through economic indicators alone. As human beings are complex, the economic criterion represents only one facet of them: hence the need for a holistic approach. At the final

stage, the arrival at degrowth is inscribed in a system of greater income equalisation, where social welfare factors prevail over economic ones, having agreed that it was not possible to decouple growth from environmental impact it is necessary to build a narrative on maximising environmental benefits.

# 6. Conclusions

At the end of this analysis, it is possible to conclude that starting from a Pressure-State-Response analysis it is feasible to answer the Research Question, '*How to approach urban planning with the aim to create the means for a future sustainable living?',* by means of modulating the policy response in line with the SJPI highest scores. Furthermore, literature and case studies serve the important purpose of informing the values that should guide the actions of planners towards achieving the highest level of well-being for the people.

Proceeding with order, the first research sub-question asks for an analysis of the Degrowth paradigm, that I proposed for its relevance in the field of sustainability and planning. Over this topic, J. Xue, states that Degrowth provide inspiration to rethink urban planning on the side of ideology, substantive values and utopianism.[229] With this three elements, she intends that: ideologically growth is not the only element which represent wellbeing, rather a set of substantive values aimed at environmental care, and social justice is more in line with the limited nature of our Planet's resources, and as last, that utopian thinking allow for a wider horizon of future choices to foster a positive social change.[230] After this research, I would add a fourth element to these three, that also allow to give a short and effective answer to Research Sub-Question 1 '*Is it possible to affirm that Urban Planning for Degrowth is a viable pathway?*'. Degrowth represent a paradigm of ideas and integrates by default a holistic approach. As analysed in section 3, the critiques authors present intends to show all the impacts that pursuing the growth objectives has had on other dimensions of humans' lives. Therefore, the fourth element could be called 'Degrowth-standard holistic approach', aimed at framing each action undertaken in the environment in relations with all the other dimension directly or indirectly influenced.

Starting from the pillars developed for Research Sub-Question 1, the thesis goes further analysing a possible pathway: ECs project. This case study opens to the possibility of imagining a diffusion of sustainable living pillars. Subsequently, well aware that one dimension is not enough to cope with climate change, I decided to prototype a possible tool which can guide the planning decisions in cities, following the fourth pillar mentioned before of Degrowth-standard holistic approach. In the end, with the aim of answering Research Sub-Question 2 '*How is it possible to create a tool that will help urban planner to gain a better understanding of how to project a sustainable city in future scenarios?'*. The answer refers to the SJPI, being it a tool which help in studying the conditions of the metropolitan area where planners will operate, and then, considering the importance reserved for each of the detected clusters, returns a score.

## 6.1. Limits and future research

The SJPI represents more a kind of conceptualization of the various topics analysed in the literature and in the ECs projects. The indicator generally aims at automatizing the responses in relation to planning

[229] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 404. https://doi.org/10.1080/13549839.2020.1867840.
[230] Ibid. p. 416.

decisions. Practically, it has the power to give a score to the planning decisions undertaken, and for example empowers the planner to optimize the use of soil, and consider the economic benefits, only if limited by the social factors that compose a human life. The value which SJPI brings, is more the embodiment of various dimensions, and the fact that is holistic by default in the three dimensions which shall be considered in policies. It answers by itself the Research Sub-Question, and quantify, even if by example, the possible application that degrowth ideas can have in a practical scenario.

Nevertheless, it considers just a limited number of indexes in the representation proposed, and surely can benefit, in a policy drafting scenario of other perspectives integration. Indeed, it is not meant to be the sole referral in a sustainable planning project and does not calculate an exhaustive representation of the phases to be outperformed. It focuses more on the assessment and aims at calibrating the attention of the decisive bodies on various aspects. For that reason, and by means of ponderation the indicator allows to be representative of various dimension and interests, also considering environmental protection.

For the future sustainable development of cities, it will be interesting to look at how they can implement ECs project in an easier, and more standardized way, by for example using them as a sort of planning unit, and this other element could join the Environmental cluster of the indicator or be consulted side-by-side with it.

Another possible application could be to use the SJPI to study contextual situations at different scales. In this elaborate, for the sake of clarity and considering the preferred point of view of the city, the indicator has been based on a city-metropolitan scale, serving the purpose of strategic planning. Nevertheless, the same approach, by for example modifying the indexes used, can be applied to a localized scale. This passage from city-scale to a project-based scale is not part of this elaborate discussion but could be a future research topic. As a matter of fact, the SJPI structure is composed of indexes that refer to the same time period and are non-dimensional, so by changing the kind of indexes, or creating new ones that are *ad hoc* for the project considered, the methodology, with the ponderation phase, could remain the same.

What should be taken into consideration is that one change does not determine the positive impact of a procedure, as well as ignoring the persistence of climate change negative impacts, will not allow for an emergency recovery in the following years. This to say that the numbers displayed on the Union Square, Manhattan (NY) clock are not meant to state how much time we have left before the catastrophe, but in how much time the impacts of our actions should fix the problem of climate change.

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# 8. Annex

The Annex section presents further information regarding the methodology adopted in the research, specifically addressing the interviews performed and their influence. These interviews were conducted in the month of April with the aim to gain a better and direct understanding over certain aspects mentioned in the elaborate.

- *Interview 1*: with Aleardo Furlani, Innova CEO and Professor in Z-Lab at Law, Digital Innovation and Sustainability, LUISS. Held online on April 2024.

  The first interview allowed me to develop the Wellbeing equation (see Management and Compensation in a transition scenario ), and to gain a deeper understanding on the possible policy strategy to implement planning interventions.

- *Interview 2*: with Karl Krähmer, Research Fellow in Human Geography at CPS Università di Torino, Co-President of the 'Movimento per la Decrescita Felice', Vice-President of 'Fondazione di Comunità Porta Palazzo'. Held in presence in April 2024.

  The second interview provided a closer look at the topics previously studied through desk research, specifically concerning Degrowth and the applications of its principles in urban planning.

# 9. Thesis Summary

## 9.1. Introduction

In Union Square, Manhattan (NY), there is a big digital clock that, instead of the current time, displays how much time there is left to intervene against a temperature increase of 1.5°C. Still, cars around it move freely and everything goes on nearly as normal. Despite the great attention in the media, when it comes to climate change, it seems that humans have not found an applicable strategy yet, and this is why further analysis is needed.

Cities all over the world, suffer from various effects of climate change, and even though urban planning has always tried to accommodate the houses construction to specifical climate conditions, now it seems insufficient. Urban planners from different cultural paradigms, embraced the challenge and started to propose new solutions, but there is one theory in particular who wanted to subvert certain cultural schemes favouring a more sustainable living and it is called Degrowth.

The pillars of Degrowth are the starting point of this elaborate, indeed they envisage a new society opposed to the economic growth pillar as the only driver for wellbeing. Instead, it prefers to move the attention on social and environmental aspects, that with a downscaling of economic activity will prove to be detrimental for a good living.

What expressed has been applied to the field of urban planning, informing planning decisions which envisage a sustainable and fair transition to lower intensive economies. With the aim to explore sustainable planning practices the research problem starts directly from here: *since the ideal of Degrowth criticizes some basic pillars of the current economic trends and puts into discussions the way in which cities developed until now, but lacks some practical modelling which can support the decision-making, it will be worth exploring possible future drivers that will foster a sustainable living*.

It follows that, studying possible applications will add knowledge to the field of planning, easing the process toward the temperature increase management. Since, I would like to welcome and discuss how the principles of Degrowth especially in the field of planning can help the transition, this thesis starts form the following Research Question (RQ).

**RESEARCH QUESTION**: *How to approach urban planning with the aim to create the means for a future sustainable living?*

Which in order to simplify the subject, should be divided into two smaller sub-questions focused on two topics.

- **Research sub-question 1** → By collecting insights from degrowth and sustainable development: *Is it possible to affirm that Urban Planning for Degrowth is a viable pathway?*
- **Research sub-question 2** → *How is it possible to create a tool that will help urban planner to gain a better understanding of how to project a sustainable city in future scenarios?*

The methodology used to study these questions, is composed of different methods which addresses each part summarized in the following pages. As first, desk research allowed to gain a wide understanding over the scope of cities, their problems in relation to climate change, the strategies already adopted and the subsequent pros and cons. In addition, especially on the topic of Degrowth a compared analysis of papers was supported by interviews allowing to get closer to the values of the paradigm. The analysis is also supported by the presence of case studies and existing examples, which aims at showing possible planning applications. As last quantitative analysis was applied in studying the SJPI, the Aggregate Indicator which I created to study the city environment.

## 9.2. Cities and Planet a literature review

The second section of the elaborate, defined as literature review, aims at setting the physical boundaries and a scale that will be also a structure for the whole elaborate. I opted to start from cities because there is no diffused acknowledged over their positive role in terms of sustainability, and it was worth to mention the debate on the scale before moving forward. Moreover, if literature review defines the scope, a literature review on the planning scale also defines the space that will be used as unit of analysis throughout the whole text.

The first sustaining factor of the importance of cities is the expected increase of the population living in them, which will be likely to reach nearly 70% by 2050.[231] For this purpose they should be the place where a rapid policy intervention is needed, but they also present a favourable place given the vast amount of people living there. Indeed, there is a quite widespread acknowledgement over their agglomeration benefits, and the fact that a proximity in the various places reduces the amount of emissions created by mobility.

Furthermore, Angelo and Wachsmuth, in 'Why Does Everyone Think Cities Can Save the Planet?', explain how, given the variegated set of problem cities host, the impacts of policies will grant more widespread benefits. Not only, but their features also represent a valid point from which to start acting to cope with climate change.

In this sense, a first element is the urban sprawl, if initially was considered just as a negative factor, nowadays with the application of concepts like the compact city, and by leveraging on the agglomeration benefits is also controllable. The second element are informal settlements, which were always considered to be an unhealthy and risky place, but thanks to the action of virtuous urbanists, many practices common in the peripheral areas have been recognized as sustainability oriented (given the low consumption patterns and the low mobility for instance). Furthermore, it is important to remember how many informal settlements have inspired architects to build new kind of modular homes, and blocks. Climate change as a last element, reminds us that the larger set of action should be taken in cities because of the large number of people who will benefit from it.

[231] 'Urban Development', Text/HTML, World Bank, 3 April 2023, https://www.worldbank.org/en/topic/urbandevelopment/overview.

Section 2 ends by making a bridge from the localized effects of climate change with the general theory behind it. Specifically, it connects to Johan Rockström's theory of Planetary Boundaries, explaining how, Climate Change is an effect of the modification of the Earth System. Not only this, but the theory explains how each of the nine boundaries represent a component of the earth system, which is negatively affected by human activities, that by altering the overall system equilibrium, can generate negative effect capable of putting at risk even their existence.

Here the name boundary comes into place explaining how there is a limit towards human activities, and that within this limit people should operate creating a safe and just space. This all ends up in the graphical representation of the "Doughnut"[232] (Figure 1), mixing Earth system limits (external boundaries) with the basic human needs (internal boundaries). Such a representation being studied at the Planetary level creates a valid scheme to understand climate change issues and frame risks and opportunities to cope with it.

## 9.3. Spatial Urban Planning for sustainability

Section 3 starts again from considering the central role of cities but this time from the urban planning perspective. Given the vastity of the area, and the huge, interconnected topic, urban planning is difficult to be defined just as a stand-alone subject, and for this reason I selected two kinds of definitions. One is focused on the design activity of human habitations and institutions governing them, and the second one resorted to urban planning as a collective action of the community toward the environment preservation.

After this explanation planning results as a set of tools that could be used for different purposes. How to use them to address climate change?

Planning for sustainability can help with the tools of adaptation and mitigation, two practices which aim together at reducing the negative effects of climate change and build solid foundations for the future. By order: mitigation lowers GHG concentrations reducing the GHG emissions, for example by stopping burning oil; adaptation refers to the set of regulating strategies which aims at easing the effects of climate change on the people and the environment, as an example increasing trees coverage for shading allow for a reduction of heatwaves in cities. These practices are a baseline for the definition of vulnerability, a concept which refers to measuring the level of climate variation to which a system is exposed, and it is finally used to assess how much a specific place, for example a city, is at risk. All these measures help in practically manage the climate change issue, by informing, with data, a set of policies that should tackle the issue.

The second part of the section, after having expressed which are the tools of planning, searches for an application of these principles inside a paradigm of ideas which will guide the decisions further. The Degrowth paradigm has important ideas on the planning scope and aims at revolutionizing some of its aspects in favour of a more sustainable living.

[232] Kate Raworth, 'A Safe and Just Space for Humanity: Can We Live within the Doughnut?', *Oxfam Discussion Papers*, 13 February 2012, p. 2. https://doi.org/10.1163/2210-7975_HRD-9824-0069.

First, as a definition "Degrowth is a planned reduction of energy and resource throughput designed to bring the economy back into balance with the living world in a way that reduces inequality and improves human well-being."[233] Such idea comes to cities envisaging them as machines of growth and results of this process, aiming to study their metabolism and understand possible drivers of change. On this topic, the literature presents three lines of debate: Practices of de-commodified eco-living, Symbiotic urbanization, and Autonomy and regionalization. [234]

These lines of debate differ in the organizing principles of the new society they envisage. The first 2 lines for instance believe in a stricter view of degrowth living, which prescribes extended practice of self-management and a preference for living in rural instead of urban areas. The third line instead focuses more on the interconnection between the urban and the rural scale, highlighting how society should welcome principles of wealth redistribution and justice. Starting from the question of which scale is best, the panorama of degrowth is characterised by the presence of a strand that embraces localism as the only virtuous solution, and a second that criticises it by proposing an open approach that does not deny the city.

On this very last point some Degrowth scholars demonstrate how it is possible to get inspired by the Degrowth values and understand how to adapt planning to them. Indeed, Jin Xue, among others, with the paper "Urban Planning and Degrowth: A missing dialogue", specifically expose all the reason to sustain an integration of the two sides without resorting to extreme solution as villages. She envisages planning as a sort of generative force which can be detrimental to foster a societal transition, and she also criticize a lot the localistic approach, chosen instead from other scholars as a beneficial solution.

This last part reflects on how planning can help fixing some societal acknowledged problems resorting to a more sustainable living; but being realistic on the place considered. As Petra Wächter explains, the institutions who decides over spatial planning can foster a sustainable change by acting on energy sources, sustainable settlements, and the creation of a social capital, as opposed to depletion of natural capital. This last expression means that, institution can sustain a switch from natural resources consumption to low consumption practices, that instead of depletion, sustain an increased rate of social interactions and a greater attention to knowledge and education among others.[235]

In accordance with this, Xue expresses how space is: "[…] socially produced, being the product of economic, political and ideological forces"[236] and "is a medium through which production happens and social relations occur […]."[237] She continues by observing the lack of evidence that a degrowth society is better

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[233] Jason Hickel, 'What Does Degrowth Mean? A Few Points of Clarification', *Globalizations* 18, no. 7 (September 2020): 1105–11, p. 1106. https://doi.org/10.1080/14747731.2020.1812222. It is fair to stress that the author, as he specifies, built this definition reasoning on the work of serge Latouche and Giorgos Kallis.

[234] Federico Savini, 'Towards an Urban Degrowth: Habitability, Finity and Polycentric Autonomism', *Environment and Planning A: Economy and Space* 53, no. 5 (August 2021): 1076–95, p. 1078. https://doi.org/10.1177/0308518X20981391.

[235] Petra Wächter, 'The Impacts of Spatial Planning on Degrowth', *Sustainability* 5, no. 3 (March 2013): 1067–79, p. 1069. https://doi.org/10.3390/su5031067.

[236] Jin Xue, 'Urban Planning and Degrowth: A Missing Dialogue', *Local Environment* 27, no. 4 (3 April 2022): 404–22, p. 410. https://doi.org/10.1080/13549839.2020.1867840.

[237] Jinghua Xue, 'Is Eco-Village/Urban Village the Future of a Degrowth Society? An Urban Planner's Perspective', *Ecological Economics* 105 (September 2014): 130–38, p. 135. https://doi.org/10.1016/j.ecolecon.2014.06.003

framed and organized at a smaller scale. And she adds that, there is no shared acknowledgement over the fact that democracy produce more benefits at a local level. That said, the best practices for sustainability, should overcome the localism trap and welcome a multi-scalar strategy, and pursue all of this by looking at the milestones of sustainable planning, which are: considering physical limits, welcome social justice in all the decisions, conceive environmental sustainability as a detrimental factor, and move across the various urban scales (see Figure 2).

## 9.4. Planning for self-sufficiency a case study proposal

The present section, continuing the previous insights left from the Degrowth paradigm and planning, tries to find out which are some relevant examples representing a starting point to envisage a degrowth society.

A first step to start reasoning sustainably would be to analyse the input in the system of interest. By reasoning on cities, a relevant polluting aspect that afflict them is surely the energy production and consumption. Beyond the need for a reduction in its consumption, there should be also a plan devoted to integrating sustainable energy production into planning.

The case study analysis revolves than to a current example of a virtuous energy consumption and production: Energy Communities (ECs). More broadly addressed as bottom-up energy initiatives, a term comprising all various names like: 'local energy', 'energy communities', 'energy cooperatives', 'local energy initiatives', 'community renewable energy' and 'community energies'.[238]

The apparent success of some cities in reducing their emissions, is sometimes due to an externalisation process, which is performed by consuming goods produced elsewhere. ECs, merging consumption and production allow for a diverse and more practical approach toward sustainability, as it is understandable by the definition: A Renewable Energy Community (REC) is a legal entity where citizens, small and medium-sized enterprises (whose main activity is not participation in the REC), local authorities, municipal administrations, private law associations, research and training institutions, religious organizations, and environmental groups collaborate. They share and consume renewable electricity generated by renewable energy installations.[239] The final outcome, is a local management of the production and distribution of energy among different actors, with different energetic needs. Practically they overcome the problem of energy production peaks not matching the energy consumption trends, as in the case of solar panels that are more productive in hours where houses are in most of the cases empty. So it happens that, in the working hours, when houses need less energy, and schools or nearby activities are in action, the energy produced can be directed to the place of consumption without needing a battery storage. In this way the produced energy is used when needed and can help people in establishing a sense of community by governing the common goods they have.

[238] Resilience, 'How Community Energy Initiatives Can Be an Effective Tool for Degrowth', resilience, 18 October 2023, https://www.resilience.org/stories/2023-10-18/how-community-energy-initiatives-can-be-an-effective-tool-for-degrowth/.
[239] 'Comunità Energetiche Rinnovabili', accessed 2 May 2024, https://www.gse.it/servizi-per-te/autoconsumo/gruppi-di-autoconsumatori-e-comunita-di-energia-rinnovabile/comunit%C3%A0-energetiche-rinnovabili.

All of this principles link with degrowth if there is particular attention to some governance aspects; but before going into details, two examples will shine a light over the possible applications of ECs.

The Tvindkraft case provides a pioneering example of collectively managing an energy source. Named after the merging of 'Tvind' a countryside area in Ulfborg (Western Denmark), and the word kraft meaning wind turbine, it represents the first energy cooperative built and managed by the people.[240] Motivated by the 1970s oil crisis and in opposition to nuclear energy, teachers and students at the Travelling Folk High School (the institution placed in the area) initiated the project. They leveraged their technical skills and collaborated closely, fostering a strong sense of community. This collective effort, involving shared responsibility in design and construction, embodies what Kunze & Becker describe as a "[…] 'participatory and ownership structure' that allows for the inclusion of its goals."[241] The project's goals extend beyond generating renewable energy to include political aspirations, aiming to create a model that emphasizes benefit allocation and collective decision-making over traditional market-oriented approaches.

For the second case it will be worth looking at Ecopower. Established in Belgium in 1991, it is a cooperative project that focuses on renewable energy consumption and actively engages citizens in clean energy generation. It aims to build a democratic, decentralized, and sustainable energy system, striving for 100% renewable energy for electricity, heat, and mobility.[242] Originating from a small group of activists opposed to nuclear energy, Ecopower integrates diverse actors and fosters cooperative governance. Adhering to international cooperative principles, it prioritizes ecological and social impact over financial profit, demonstrating that pursuing goals beyond profits is both possible and stable. Ecopower's ongoing success highlights the scalability and enduring relevance of such cooperative models.

These two examples demonstrate a specific attention behind the projects goals and are the baseline to foster a reasoning on ECs projects. Considering the Degrowth paradigma with its pillars, also inspiring planning approaches, it is possible to connect the examples illustrated and codify a future roadmap to include energy common management in planning practicing, only if focusing on four pillars.

In the first place, ECs projects should have *flexible boundaries,* meaning that they should aim to foster the sense of community, and distribute its resources in a fair and just way. Going beyond the profit oriented model and replace it with the social interest that a community gains from it, would be a preferred way.

Second, ECs projects connect with degrowth if they prescribe a consumption based on *minimal energy needs*. J. Millward-Hopkins, et al. in 'Providing decent living with minimum energy: A global scenario', developed a "[…] bottom-up model to estimate a practical minimal threshold for the final energy consumption required to provide decent material livings to the entire global population."[243] They discovered that the minimum energy consumption level per capita that will allow for a decent and sustainable living in 2050 is

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[240] [240] 'The History of Wind Energy · Tvindkraft – How It Began', *Tvindkraft* (blog), accessed 14 April 2024, https://www.tvindkraft.dk/how-it-began-the-history-of-wind-power/.

[241] Conrad Kunze and Sören Becker, 'Collective Ownership in Renewable Energy and Opportunities for Sustainable Degrowth', *Sustainability Science* 10, no. 3 (May 2015): 425–37, p. 427. https://doi.org/10.1007/s11625-015-0301-0.

[242] Ecopower, 'Werking · Ecopower', Ecopower, accessed 14 April 2024, https://www.ecopower.be/over-ecopower/onze-werking.

[243] Joel Millward-Hopkins et al., 'Providing Decent Living With Minimum Energy: A Global Scenario', *Global Environmental Change* 65 (November 2020): 102168, p. 1. https://doi.org/10.1016/j.gloenvcha.2020.102168.

the one of 1960 despite a greater population.[244] Which means that avoiding an increase of consumption should be a primary aim of the ECs project, which instead should foster a distribution among members who need energy monitoring the consumption. The ECs prescribing to use empty rooftops of houses already contribute in reducing the construction, and help by not increasing soil consumption.

Third, ECs have the possibility, of course with a correct governance, to foster a revitalization of the local economies. This also goes in line with degrowth statements, of preferring a low intensive economy able to sustain local actors. Virtuous governance process already started to play a role, by creating the so-called Local Token Economy: in which ideally people can organize a token market where to exchange internal service or goods.

As last, the democratic approach towards governance should be fostered. In a degrowth oriented view, there is shared consensus in the management of projects. In fact, both energy democracy, which in this case means to place the energy management in the hands of the people, and Degrowth, require a re-imagination of energy politics which relates to citizen empowerment and democratic approach with the aim to benefit the community.

This pillar would represent a guidance for all the future projects and leave a call also for future research. For now, considering the time span from 2012 and 2020, research focused more on aspects related to ECs. This is demonstrated by the brief research I made over four keyword clusters: *'Energy self-sufficiency', 'Home energy storage', 'Urban building energy simulation',* and '*Energy communities and urban planning'*, that displayed (Figure 3), an increased presence in scholars work from all over the world.

Nevertheless, this increased attention should always consider spatial requirements and focus on the integration within urban planning. The spatial dimension indeed plays a prominent role in defining which will be the outcome of spreading the ECs models. This impact can be considered as "Urban impact [which] can […] be understood as the set of voluntary and involuntary objectives and consequences that EC initiatives can pursue and generate in territories, cities, neighbourhoods, and communities."[245] The Result is the reciprocity in the relation between the impact generated by ECs on the spatial dimension, and how the spatial dimension itself is the key to unlock a change in the planning part of renewable energy *prosumerism*.

## 9.5. The SJPI. A discussion of sustainable urban planning

This fifth section will provide a new perspective by summarizing the key concepts discussed earlier and offering guidance based on the research conducted. This guidance will take the form of an Aggregate Indicator for urban planning, designed to be comprehensive, holistic, and human-centred, integrating environmental, social, and economic dimensions. The reasoning behind this indicator comes from the Degrowth paradigm, recognizing the difficulty in decoupling economic growth from negative environmental

[244] Ibid.
[245] Luna Kappler, 'Verso una definizione dell'impatto urbano delle comunità energetiche - n: Diritto ed Economia delle Comunità Energetiche', *Diritto e società*, 2022, p. 921. https://www.rivistadirittoesocieta.it/wp-content/uploads/2023/09/Diritto-Societa-4-2022.pdf.

impacts. This indicator aims to reflect various factors influencing urban metabolism and offers a combined view of different urban dimensions. Drawing from the literature review and Degrowth principles, it will provide an applied solution to the research question, building on previous discussions, including the ECs case study.

Degrowth advocates for decelerating or redirecting economic activities to prevent environmental harm, emphasizing that production should adopt non-impactful inputs and innovative approaches. What is the driver then to foster a kind of project? A first answer could be innovation, meaning the capability of ameliorating the input we use. Sustainable innovation, which enhances economic, environmental, and social performance, is crucial. It involves renewing or improving products, services, and processes to generate positive impacts in the short and long term, aligning with the principles of sustainable development and supporting overall human progress.

Innovation is considered as a lever through which sustainable projects can be financed, insofar as a certain percentage of innovation completes the process of generating a good impact and foster human progress. In a certain way, this last process can be seen as an equation that includes welfare and growth. In a kind of representation, the output could be:

$$\text{Wellbeing} = \text{Innovation} \cdot Economic\ Growth \cdot Sustainability$$ [246]

This equation illustrates how adjusting various drivers can help in achieving progress while reducing economic growth. Innovation, defined as technical progress that increases efficiency by reducing input needs, is central, but other dimensions also come into place. Wellbeing relies on a stable environment, but excessive economic growth depletes resources and harms habitats, worsening living conditions. By developing efficient technologies, humans can lower growth and enhance sustainability without environmental destruction, highlighting innovation's crucial role in improving input efficiency.

This representation works as a baseline to introduce the concept behind the SJPI. Considering that a compensation is possible, therefore the attention of the urban planners can adapt to the goals they aim to reach, by preferring social or environmental aspects over economical ones, where it is possible. The attention towards certain non-economic aspects is crucial when it comes to planning and should be a process more and more considered. Being this the purpose, an Aggregate Indicator aims to balance different indexes to approach a specific policy orientation.

Delving now into the structure composition of the indicator, it is important to assess on which basis this is built. Considering the environmental studies, a pretty much used model is the Pressure-State-Response (PSR) model, it enables to understand a pressure on the environment, monitor it (in the state phase) and then providing a response able to reduce the initial problem (policy intervention). Looking at Table 2 there is an

[246] Original elaboration based on personal interview and technical exchanges with Prof. Furlani, Aleardo. (April, 2024).

example made over the city environment. The model structure of analysis can be good also to study social trend for example, and therefore expanding the notion in a holistic way. This point specifically built the basis for the indicator and projects a new application of the PSR to study trends and plan intervention.

Starting from here, the Aggregate Indicator will be composed by various indexes (determining the state of a phenomenon), and that will come from the Social, Environmental, and Economic scope. The analysis will be composed of a demonstration of the index, that will be based on the city of Rome.

The data used generally comes from: the statistical office of the City of Rome inside “Benessere Equo e Sostenibile a Roma 4° Rapporto – 2021” and “Benessere Equo e Sostenibile a Roma 5° Rapporto – 2022”. And the “Rapporto Immobiliare 2021” by “Osservatorio del Mercato Immobiliare” (“Agenzia delle Entrate”).

The various Indexes will be here presented then described and demonstrated. The first cluster of Indexes is “Social” which for the data of the city of Rome on the year 2020 comprehend:

- Rate of people with high school diploma,
- Satisfaction with friendships,
- Knowledge workers.

The second Cluster of Indexes is “Environmental” which for the data of the city of Rome on the year 2020 comprehend:

- Soil sealing from artificial cover,
- Municipal waste recycling rate,
- Total density of green areas.

The Third Cluster of Indexes is “Economic” which for the data of the city of Rome on the year 2020 comprehend:

- Employment rate,
- IMI,
- NTN (% of Rome).

(For a specific description of each index see paragraphs from 5.2.4. to 5.2.6.)

In the following passage each of the index value is reported in the tables in percentage value for the year 2020 (see Table: 4, 5, 6). The values are then summed in their cluster providing a final result that will be used in the next passage. With the aim to assess the importance of each cluster of indexes, they need to be pondered with a variable value that is called Ponderation (P) defined in Table 7. The introduction of ponderation enhances the flexibility and empirical robustness of the indicator. Firstly, it provides flexibility in the decision-making process, as planners can assign ponderation values based on analogous past experiences. Additionally, a weighted factor accommodates a multi-stakeholder decision-making approach, ensuring a broader representation of diverse interests. Secondly, the empirical robustness is evidenced by the indicator's capacity to be adapted to the empirically determined environmental conditions.

Now that all the numbers are available it is possible to come to the final definition of the Aggregate indicator this elaborate stated to present. The indicator will take the name: 'Sustainable and Just Planning Indicator' (SJPI) and its *formula* is:

$$SJPI = \frac{(total\ Indexs_{Social})P + (total\ Indexes_{Environmental})P + (total\ Indexes_{Economic})P}{3}$$

In the final demonstration then, the previous Table: 4, 5, 6; are completed with the Ponderation as expressed in the SJPI formula. This allow to create a score depending on three standard scenarios that I created in order to express which are the possible outcomes of the indicator. Of course, the Planners has complete freedom to assign to each ponderation the value they retain most appropriate. The standard scenarios that can be obtained are the following:

Capitalist Society with a maximum attention on the economic indicator and a lower one on the social and environmental. It reports an SJPI score of 5.91 (see Table 8 and Figure 4).

Sustainable Development Society with an equal attention on all the three clusters provide a flat graphical representation (Figure 5). It reports and SJPI score of 6.33 (see Table 9).

Degrowth Society, as opposite to the Scenario 1 Capitalist society, offers a maximization of the social and environmental indexes, downgrading the economic relevance on the planning sector (Figure 6). It reports an SJPI score of 8.39 (see Table 10).

To conclude all the Indexes trends are reported inside Figure 7 and express how the trend of each scenario moves across clusters, depending on the values ponderation inside each cluster.

In addition, Figure 8, represents how each of the clusters of indexes, moves with respect to the SJPI score performed across the different Scenarios. In particular this result acknowledges how higher values of the SJPI score are obtained when the environmental and social clusters of indexes are maximized in the planning decisions. In this way, the SJPI could represent a good indicator of how much a certain policy response to the State of the art, inclined towards one of the three scenarios can be beneficial under non-economic aspects.

The Sustainable and Just Planning Indicator (SJPI), broadly and holistically proposes to measure the impacts and redirect the policy action by putting at the forefront the aspects which are most pressing nowadays. It answers to the research question by identifying a standard to which adapt the city strategy, showing the possible combination to be performed with the aim of organizing a brighter sustainable city.

## 9.6. Conclusions

In conclusion, starting from Pressure-State-Response analysis, after the mentioned case study and literature, the study proves to be effective in addressing the research question, *'How to approach urban planning to create means for future sustainable living?'* by aligning policy responses to the aims of a high SJPI score.

The first Research Sub-Question asking for the validity of the Degrowth paradigm in fostering sustainable planning proves to be effective: first by looking at the scholars' attention devoted to ECs projects, and secondly in the SJPI representation where Environmental and Social issue are driving factors. J. Xue proposes to look at how Degrowth inform planners and their choices in a positive way, and she suggests three elements. First, ideology, where growth is not anymore the only founding value, second, substantive values, where, instead of growth, sustainability and social justice come into place, and as last, utopianism, which summarize the way in which degrowth planning helps in thinking creatively about new planning schemes.

When developing the SJPI the preferred approach has been the holistic one, forcing the reasoning in a global way. After the three elements proposed by Xue, I would suggest adding a fourth element: which is: Degrowth-standard holistic approach. Meaning with that, the theory forces the planner to reason holistically and study how a change in a system influences the other in relation with it.

Considering the relevance of the topics addressed and how vast is the literature behind them, it is fair to state that the SJPI, material output of this research, has its limits. The choice of the indexes directly influences how the indicator approximates the reality, for instance. Surely, the SJPI will benefit from an integration of other indexes and approaches and could not be the sole instruments in planning decisions.

The SJPI can potentially be utilized to analyse contextual situations across various scales. In this study, the indicator has been applied at a city-metropolitan scale for clarity and alignment with the urban perspective. However, the methodology could be adapted to a localized scale by modifying the indexes used. Although this transition from a city-scale to a project-based scale is beyond the scope of this discussion, it presents a promising avenue for future research. The SJPI's structure, comprising time-period-specific and non-dimensional indexes, allows for such adaptability. By altering or creating project-specific indexes, while maintaining the ponderation phase, the methodology remains consistent.

For the future, it is important to recognize that a single change does not guarantee a positive impact, and ignoring the ongoing negative effects of climate change will hinder effective emergency recovery in the coming years. Studies on the various impact and the possible strategies to generate wellbeing should be fostered quickly. This to say that the numbers displayed on the Union Square, Manhattan (NY) clock are not meant to state how much time we have left before the catastrophe, but in how much time the impacts of our actions should fix the problem of climate change.