Are green cities sustainable? A degrowth critique of sustainable urban development in Copenhagen

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European Planning Studies

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Abstract

This paper proposes a case-based degrowth critique of sustainable urban development strategies. Copenhagen, European Green Capital in 2014, is considered a role model of planning for sustainability. Does this hold in a degrowth perspective?

Sustainable development assumes that environmental impacts can decline while the economy grows. Degrowth maintains that such a process of absolute decoupling is infeasible. Analysing Copenhagen's planning documents in this perspective, I find three factors that make the city's sustainability strategy ineffective for ecological sustainability. First, Copenhagen's strategy for climate neutrality is based on externalisation: only emissions produced locally are counted. Meanwhile, emissions produced outside of the city for products and services consumed locally remain high. Secondly, policies focus on the efficiency of activities rather than their overall impact: efficiency gains are considered reductions of impact, but really mean slower growth of impact. Finally, sustainability measures are proposed as a 'green fix', to increase competitiveness and promote economic growth, leading to increased consumption and impact. Analysing the critical case of Copenhagen in a degrowth perspective, sheds doubts on sustainable urban development, but does not imply the rejection of all its typical planning measures. This induces reflections on how these results can contribute to a degrowth-oriented urban planning.

Keywords: Degrowth; Decoupling; Urban Planning; Sustainable development; Sustainable urban development

1 – Introduction

Environmental change has become a central issue on both global and urban agendas (e.g. UN 2016). In response to this challenge a number of approaches have emerged, among which sustainable development and degrowth stand out. In this paper, in a case study on urban planning in Copenhagen, I use elements from the debate on degrowth to criticise urban policies based on sustainable development. The main goal is to find out if the criticisms degrowth advances towards sustainable development in general, can be applied also to policies at the urban level and to discuss if Copenhagen is to be considered a virtuous case also in a degrowth perspective.

For sustainable development and green growth[1] discourses only some aspects of the present growth-oriented capitalist system need to change (Brand 2012; Kothari, Demaria, and Acosta 2014; Wanner 2015). On the other hand, degrowth proponents argue that systemic change is necessary to achieve ecological sustainability, social justice and individual well-being (D'Alisa, Demaria, and Kallis 2014; Kothari, Demaria, and Acosta 2014).

The debate on degrowth and planning is quite recent and has so far mainly focused on general theoretical issues, such as a controversy on cities versus eco-villages as the adequate places for degrowth and the study of small, bottom-up alternatives (cf. Nelson and Schneider 2018). I have argued that this debate has had so far too little consideration for existing geographies (Krähmer 2018). Hence the choice of an empirical approach to contribute to this debate, critically analysing a city that has adopted a set of sustainable urban development policies (an approach similar to Mössner and Miller 2015; Xue 2015; 2018). Copenhagen has been much-

1 I consider sustainable development and green growth as synonyms, see section 2.

praised for its sustainability planning: it was awarded European Green Capital in 2014, it was recognised as a Green Economy Leader by the London School of Economics in 2014 and is the self-proclaimed Capital of Sustainable Development[2]. This makes Copenhagen a critical case: if this city does not manage to be sustainable, which other city possibly could? (Næss et al. 2011).

I proceed in section 2 with a short discussion of sustainable development and degrowth, in general and at the urban scale, taking from the degrowth debate in particular the criticism of the decoupling strategy of sustainable development. After an analysis of data on the climate impact of Copenhagen (section 3), stressing the importance of consumption-based accounting which reveals processes of externalisation, follows a discussion on the City of Copenhagen's main planning documents in section 4 in which I focus on how the city's strategy conceives the relationship between sustainability and economic growth. In section 5, I discuss the results of sections 3 and 4, pointing at three fundamental shortcomings of Copenhagen's strategy: externalisation of impact, focus on efficiency and the priority of growth, and conclude with some proposals for what could be learned from a degrowth perspective in section 6.

2 https://international.kk.dk/artikel/copenhagen-welcomes-un-sdgs (Last access: April 2020)

2 – Sustainable Development and Degrowth: from a general debate to the urban scale

Sustainable development and the myth of decoupling

This section addresses some key differences between the discourses on sustainable development and degrowth, in their views of society and economy in general and in the context of urban planning in particular. Sustainable development and degrowth can both be seen as proposals to make human life compatible with ecological limits, but they have at their core a different view on the possibility and desirability of achieving this goal while maintaining the existing socio-economic system. Although the concept of sustainable development has a complex history (Redclift 2005), it can be considered as the direct predecessor of green growth. In some occasions green growth has also been defined as a pathway to sustainable development, or as a subset of it (Wanner, 2015), but this does not change much for the scope of this article. With the definition of sustainable development in the Brundtland Report of 1987 the close relationship between sustainability and ecological limits began to be obscured (Kothari, Demaria, and Acosta 2014). For Wanner (2015) the invention of sustainable development had the goal to safeguard capitalism by counteracting environmentalist claims for limits to growth and the proposal of green growth is a further evolution of this strategy: both proposals claim that there is no contradiction between economic growth and ecological sustainability. Accordingly, here I use these terms synonymously. To be clear, the debate on sustainable development is huge and critical perspectives do exist, but this does not appear to be so in the institutional documents analysed in sections 4 and 5, where distinguishing the two terms would obscure rather than reveal insights. Sustainable development and green growth approaches assume that the current capitalist, globalised socio-economic system, oriented towards accumulation and growth, can

and should be reproduced and our current lifestyles should be maintained, achieving ecological sustainability by changing only a few subsystems – mainly on a technological (e.g. renewable energies) and individual behavioural level (e.g. 'don't use plastic bottles!') (cf. Brand 2012; Kothari, Demaria, and Acosta 2014; Wanner 2015).

In contrast, degrowth proponents argue that we need to radically transform the socio-economic system through 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." (Schneider, Kallis, and Martinez-Alier 2010, 512), bringing together multiple debates: anti-utilitarianism, critique of development, eco-feminism etc. (cf. D'Alisa, Demaria, and Kallis 2014). The scope of this article though is limited to why degrowth considers sustainable development incompatible with ecological sustainability[3]. Central here is the critique of the sustainable development strategy to decouple economic growth (through evermore efficient technologies) from environmental impacts. Decoupling is crucial to green growth – considering this separation feasible, allows its proponents to claim that there are no trade-offs between (unfettered) growth and the environment (Wanner 2015; Parrique et al. 2019). There are numerous types of decoupling (Tapio 2005; Parrique et al. 2019); most relevant here is the distinction between relative and absolute decoupling. Relative decoupling describes a situation in which environmental impacts grow at a slower rate than GDP, i.e. the quantity of such impacts *per unit* of GDP is reduced, while total impacts continue to grow. Absolute decoupling occurs when the economy grows while environmental impacts are diminished *in absolute terms* – only this change would be really relevant for ecological sustainability. As Parrique et al. (2019) show in an extensive literature review, relative decoupling is frequent: efficiency gains due to technological innovation have

3 Other criticisms are also important, but these arguments appear to be particularly useful to deconstruct the case of Copenhagen which centrally claims to be successful in ecological terms.

achieved it in many cases. In a growing economy though, these gains are compensated by a growing total volume of economic throughput. There is no empirical evidence of absolute decoupling occurring at a rate or to an extent sufficient enough to avoid environmental disruption and it is unlikely to occur mainly due to seven barriers, which include rebound effects, the shifting of impacts from one type to another and externalisation (Parrique et al. 2019). Consequently, degrowth proponents consider decoupling unfeasible (D'Alisa, Demaria, and Kallis 2014; Paulson 2017) and efficiency an insufficient strategy. Instead they propose sufficiency, integrated with efficiency. Sufficiency means behaviour that leads to the quantitative reduction of production and consumption, e.g. sharing homes to use smaller per capita living spaces or not having a car. The intention is not simply to appeal to individuals to consume less, but rather to build sufficiency policies which enable such behaviour, make it attractive and desirable (Christ and Lage, 2020). Degrowth not only maintains that our system is unsustainable, but also that it is undesirable. Undesirable it is to spend too much time working for money, mainly to spend other time spending the earned money. A sufficiency strategy, is the idea, could also improve human well-being, offering more time for social relations, arts, culture, politics. Furthermore, social and environmental justice is an important goal of degrowth. Where absolute decoupling has supposedly taken place, this can often be attributed to the externalisation of resource extraction, industrial production and their related environmental impacts to other parts of the world (Hornborg 2006; Lessenich 2016; Parrique et al. 2019). Consumption-based accounting includes impacts embodied in imported goods and services (Davis and Caldeira 2010; Dahal and Niemelä 2017) and is thus an important instrument to reveal limitations of sustainable development policies (see section 3).

Sustainable urban development and the priority of growth

Cities have assumed a central role in the sustainable development discourse, due to their demographic and economic significance and their high environmental impact. At the same time, urban planning is geared towards stimulating growth, supposed to make cities 'smart', 'creative' or 'green'. Kenworthy (2006) proposes ten dimensions of planning for an Eco-City. Several of them are focused around the idea of the connection between urban form and transport, proposing a compact city that reduces car usage through the compact and mixed spatial organization of the city around public transport, but he also gives centrality to public space and proposes economic growth through "innovation, creativity and the uniqueness of the local environment, culture and history, as well as the high environmental and social quality of the city's public environments." (p.68). According to Joss (2011), the eco-city concept has evolved from a marginal and bottom-up process to a main-stream phenomenon promoted by institutions around the world and is now characterised by a strong focus on technology and innovation. A central document for sustainable urban development is the UN's (2016) New Urban Agenda, which argues that "(...) sustained, inclusive and sustainable economic growth[4] (...) is a key element of sustainable urban and territorial development" (p.14). It includes policy guidelines for inclusive housing for all, proposals for sustainable urban forms (compact and mixed-use), sustainable mobility (transit-oriented development), cooperative and participatory planning processes, as well as smart-city policies that promote sustainability and growth through innovation and new technologies. But crucially, the agenda lacks an evaluation of whether these different objectives and strategies are compatible or conflict with each other. It is simply assumed that economic growth, social justice and environmental sustainability go hand in hand (cf. Muraca and Schmelzer 2017). In a similar

4 The goal of growth appears eleven times, in particular in the form of 'sustained, inclusive and sustainable economic growth'.

vein, a C40 Cities Network (2015) study about the "Co-Benefits of Sustainable City Projects" opens: "it is (…) a key challenge for cities (...) to initiate and implement measures that can contribute to sustainable city development and decouple economic growth from GHG emissions" (p.5).

In sum, the discourses promoting sustainable urban development share confidence that environmental, social and economic challenges can be solved through thoughtful planning (with mostly technical measures) and are not conflicting goals. Urbanisation is considered generally positive and cities are depicted as the forefront of sustainable development. Like in the general green growth discourse, absolute decoupling is, usually tacitly, assumed to be a concrete possibility. Moreover, consistent with the active role that urban policies and planning have taken in promoting economic growth, in some cases green solutions are even used as new drivers to stimulate growth; a 'sustainability fix' (While, Jonas, and Gibbs 2004) or 'green fix' (Holgersen and Malm 2015) for capitalism. This is crucial also in Copenhagen's strategy (cf. Section 5).

Degrowth and the City

The debate on urban planning from a degrowth perspective is recent. Several proposals can be identified: The first one (e.g. Xue 2014; 2018a) takes much from compact city approaches, focuses on the role of urban planning and efficiency and reflects on how to transform existing cities. Rydin (2013) proposes more community engagement to overcome growth-dependence in planning. Her preoccupation is about the resulting urban quality and does not relate directly to the degrowth debate. Lamker and Schulze Dieckhoff (2019) argue in their contribution for a change in planning procedures. In particular they ask to change criteria to evaluate success, to learn from errors, to favour inclusive processes and experiments, starting

from small changes for great transformations, while not simply delegating planning to an institutions. The second approach aims at re-localisation, criticises urbanisation as a direct expression of the growth society and emphasises the potential of radical alternatives in rural settings already in existence (Anson 2018; Dale, Marwege, and Humburg 2018; Nelson 2018; Trainer 2018). The third approach is radically utopian and proposes ideal settlement structures on a global scale, e.g. autonomous neighbourhoods and towns federated from the bottom-up (Widmer and Schneider 2018).

Most authors, close to the compact city discourse, share a critique that sprawling urbanisation is reliant on cars and associated with high levels of consumption. Latouche (2016, 92) complains about the loss of distinction between the urban and the rural and considers the current “systemic crisis of the territorial-urban-landscape complex” as part of a “crisis of civilisation” (ibid.) only solvable by the realisation of a degrowth society.

Common to all approaches is the critique of current consumption-oriented lifestyles and proposals reflect this in offering ways to reduce the consumption of living space and car mobility (Stefánsdóttir et al. 2018), rethink the metabolism of food (Widmer and Schneider 2018) etc. Furthermore, with the objective of the reduction of production and consumption, human wellbeing is no longer promised to be achieved by economic growth. Thus, the focus is on transforming space to favour social interaction, explore new ways of living together, e.g. co-housing and favour activities such as the self-production of goods.

All these approaches contain useful elements for degrowth urban futures, but I argue (Krähmer 2018), that they do not focus enough on the transformation of existing geographies and lack a systematic critique of the existing growth-oriented model at the territorial scale. While the first approach includes some elements which are more radical than sustainable urban development, it may not be sufficiently transformative. The second approach is

certainly more radical, but it seems very unlikely (and possibly unsustainable – Xue 2014) to imagine a world of eco-villages. The third approach is suggestive, but seems even less realistic as the world cannot be considered a *tabula rasa* available for the construction of idealised systems, but a complex system of stratified geographies.

A few authors (Alexander and Gleeson 2019; Trainer 2012) instead argue that there is potential to start degrowth transformations by 're-inhabiting' the suburbs with different lifestyles. Also Latouche (2019, 38) argues "instead of imagining how to build new cities, the degrowth city is in the first place another way of inhabiting the city". Re-inhabiting existing geographies certainly is a reasonable proposal but to make sense of it, to be coherent with the values of the degrowth project, a consistent set of degrowth urban policies and planning strategies needs to be developed, conscious of the limits of existing sustainable urban development. In fact, while the theoretical framework of degrowth is radically different from that of sustainable development, some practical proposals are shared, such as car-free mobility, transition towards renewable energy and energy efficiency (see also Gamberini 2020). What changes is how they are integrated in a set of policy proposals. These differences need to be clearly elaborated.

Externalisation at the urban scale

A recent stream of research has started to criticise sustainable urban development from a degrowth perspective . Mössner and Miller (2015) discuss the case of Freiburg, evidencing how its sustainability strategy is limited to the city being conceived as a sort of "island of sustainability", with contradictory results: around Freiburg single-family homes are built for people leaving the city due to unaffordable real estate costs and who consequently engage in lifestyles centred on large per capita living spaces and car commuting.

Næss et al. (2011) scrutinised the planning achievements of Copenhagen and Oslo, focusing on urbanised land and traffic. Their results show only relative, no absolute decoupling. Xue (2015) finds only relative decoupling between GDP and housing stock growth in Copenhagen and Huanghzou. Copenhagen's planning documents have already been assessed by Xue (2018b). She argues that they are permeated by a growth ideology which sees growth as favourable for environmental policies and vice versa environmental policies as useful to stimulate economic growth. She considers regional and national planning documents, showing ideological and strategic continuity between policy levels. Attempting to add to her work, I analyse policies together with data on climate impact (section 3) and analyse planning mechanisms more in detail, focusing on the municipal level (section 4). Notwithstanding these differences, encouragingly, our results and conclusions substantiate each other (sections 5 and 6).

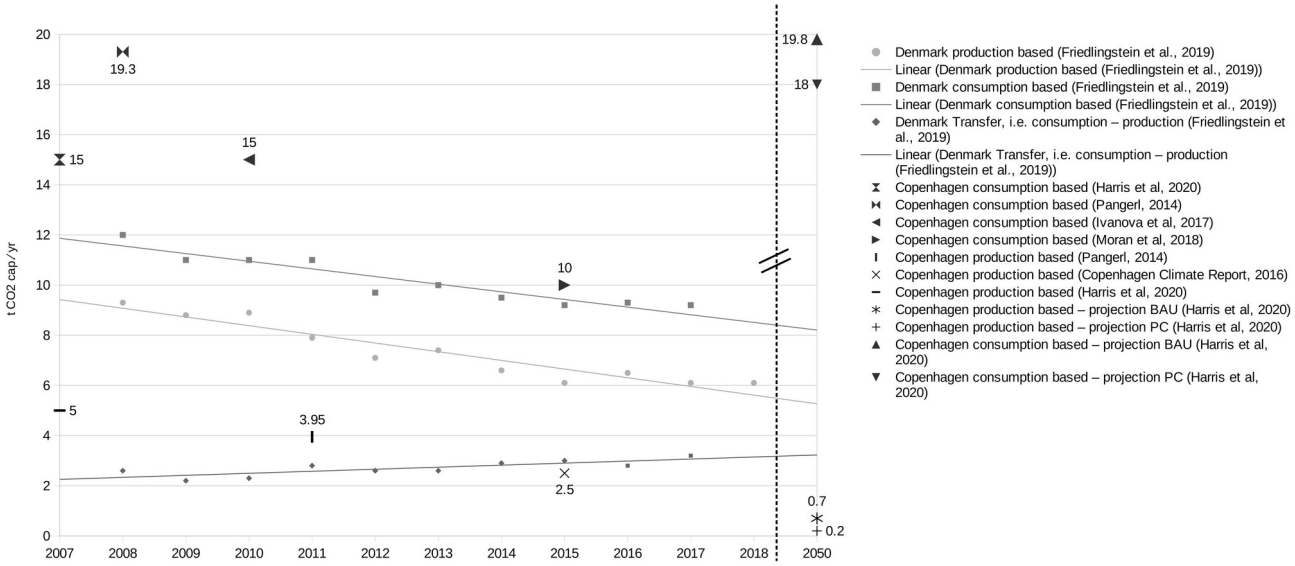
Summing up, the literature reviewed in this section points at three issues with which I will confront Copenhagen's sustainability strategy in the following sections. First, degrowth, adding to other lines of criticism, evidences how sustainable development is a fallacious strategy because decoupling to a sufficient scale is a myth. Apparent successes in decoupling can frequently be explained by processes of externalisation. Second, efficiency gains due to technological innovation, a main sustainable development strategy, are capable only of achieving relative decoupling, not of reducing total ecological impact. Third, growth remains a central goal in sustainable development policies at all scales. Thus, per se useful policies, be it for renewable energies or cycling, remain incapable to solve the environmental challenges they aim to address, as their achievements are eaten up by the increase of total volumes of economic throughput.

3 – Copenhagen's climate impact

Before the qualitative analysis of Copenhagen's sustainable development strategy, in this section I give some quantitative information on Copenhagen's environmental impact, summarising existing data. I focus on GHG emissions being climate change a key issue and has better data availability than other types of ecological impact.

Fundamental is the difference between production-based (PBA; as adopted by the municipality of Copenhagen: Dahal and Niemelä 2017) and consumption-based accounting (CBA) of GHG emissions. PBA includes emissions *produced* inside territorial boundaries, while CBA considers emissions produced by the production of goods and services *consumed* in these boundaries, also when emissions occur elsewhere. Considering only the emissions produced locally obscures processes of externalisation (cf. Section 2); CBA unveils these. Emissions excluded from PBA are emissions due to goods and services consumed in Copenhagen but produced elsewhere, e.g. air travel, clothing, food.

Currently, the most common way to account for emissions is PBA, while data availability on CBA is limited at the urban scale.



< Figure 1: Copenhagen: CO2 emissions per capita;

Source: developed by the author from multiple sources (see key) >

Figure 1 shows data on CO2 emissions per capita in Copenhagen and in Denmark. Any interpretation of this data needs to consider the different methods of estimation of different sources – only for the national level a coherent time series is available. CBA emission data at the local level refers to different spatial units[5]. Consequently, the emission data at the local level cannot easily be interpreted as a time series.

These precautions in mind, the following considerations can be made: at the national level there is a clear trend of reduction of per capita emissions with both PBA and CBA. At the same time, consumption-based emissions are higher than production-based emissions and externalisation is growing with the quantity of emissions transferred outside. For 2004 Davis

5 For 2007 (Harris et al., 2020) and 2008 (Pangerl, 2014) to the municipal boundaries, for 2010 to the capital region (Ivanova et al. 2017), for 2015 (Moran et al. 2018) to an area defined by a statistical gridded model. Implications may be for example that using data for the capital region referring to the municipality, emissions due to car usage are overestimated.

and Caldeira (2010) calculated that Denmark is, like other wealthy nations, a big net importer of embodied CO2 emissions: 4.5t per capita and year (while, compared to its GDP, the Danish economy is among the most efficient). In any case, all figures are distant from what is considered a sustainable personal emission budget of around 2.3t per year[6].

Locally, consistent across the different estimates is a far higher difference between production and consumption-based emissions than at the national level (Denmark itself is an important source of products imported to Copenhagen), stressing the relevance of CBA for urban policy-making. In 2007, 2010⁄2011 and 2015 emissions by CBA are between three and four times production-based figures.

Harris et al. (2020) modelled the evolution between 2007 and 2050 of ten cities' carbon emissions comparing PBA and CBA in two scenarios: Business as Usual and Post Carbon, i.e. with sustainable development policies (for Copenhagen those proposed in the Climate Plan, see section 4). Certainly a projection over 40 years only gives a rough idea of potential developments. Relevant here are not so much the (very high) estimated emission figures for Copenhagen, but the overall trend. While for all cities the model for 2050 expects a reduction of emissions by PBA, for eight out of ten cities (including Copenhagen) they expect an increase in emissions by CBA. For 2007 emissions by CBA on average double those by PBA, in the post carbon scenario in 2050 consumption-based emissions are expected to be around eleven times production-based figures. The authors explain this trend with economic growth and growing consumption which makes impacts increase outside the cities, increasing externalisation. Those cities for which a reduction of consumption-based emissions is estimated, have lower growth expectations. Product categories responsible for emissions show that around half of consumption-based emissions in the base year are due to

6 https://www.atmosfair.de/en/green_travel/annual_climate_budget/ (Last access: April 2019)

consumable goods and services (beyond housing, food, transport), a quota expected to increase. This is consistent with the hypothesis that more GDP and income lead to more consumption and emissions. In fact all reviewed studies on CBA find income as one of or the most important variable to explain variation over time and space. The C40 Cities Network (2018), of which Copenhagen is a member, has published a study showing that for member cities GHG emissions by CBA are on average 60% higher than by PBA for the year 2011; unfortunately, no data for individual cities has been disclosed.

In summary, while data availability limits the analysis, CBA clearly unveils higher emissions than with PBA, namely including sectors like air travel and imported consumable goods and services. This is an important element to contextualise the analysis of local policies in the following sections.

4 – Copenhagen's sustainability strategy

This section analyses the sustainability strategy in a selection of Copenhagen's planning documents, as shown in Table 1. These are the shortened English versions, sufficient for the scope of this research. The approach to the analysis of these documents is qualitative; not a formal discourse analysis, rather a content-focused critical interpretation of the planning strategy in the light of the degrowth debate. The goal is to identify possible contradictions between the overarching goal of climate neutrality and planning measures proposed, tracing in particular if and how an orientation towards economic growth permeates Copenhagen's planning documents and how this relates to its environmental goals.

The first documents tackled were the Planning Strategy and the Municipal Plan (which directly descends from the strategy). Reading these documents it became clear that further

elements could be useful. Accordingly, I extended the analysis to the Climate Plan, the Copenhagen Climate Report 2016 and the Business and Growth Policy. Further documents touched upon, such as other annual reports, sectoral plans etc. did not seem to add further substantial information. For the scope of this analysis, I consider these documents, all authored by the City of Copenhagen, as a coherent system, as the focus here are the general contradictions of a sustainable urban development strategy. Further research might deconstruct the idea of the Copenhagen Municipality as one coherent actor, in the vein of Flyvbjerg's (1998) work on Aalborg, which engaged with the conflictual genesis of such strategies.

Document	**Authority**	**Year**	**In the text referred to as**
The Coherent City – Municipal Planning Strategy 2014 for the City of Copenhagen	City of Copenhagen	2014	Planning Strategy
City of Copenhagen Municipal Plan 2015 – The Coherent City	City of Copenhagen	2015	Municipal Plan
CPH 2025 Climate Plan	City of Copenhagen	2012	Climate Plan
Copenhagen Climate Projects – Annual Report 2016	City of Copenhagen	2016	Copenhagen Climate Report, 2016
The City Of Copenhagen's Business And Growth Policy 2015-2020 - A Business Friendly Copenhagen	City of Copenhagen	nd	Business and Growth Policy

< Table 1: Municipal Planning documents analysed >

In Copenhagen's plans, environmental goals play an important role at all levels. Most prominent is the ambitious objective to become carbon neutral by 2025 set in the Climate Plan (p.4). The starting point is an analysis of the distribution of Copenhagen's current emissions over sectors. Emissions are considered by PBA (Dahal and Niemelä 2017), but this is not made explicit in the document. 2005 is the baseline year with total CO2 emissions of approximately 2.200.000t, which are expected to decrease by around 50% due to increased use of renewable energy in the electricity and heating sectors in Denmark and the Capital Region. The Climate Plan has the goal to reduce the remaining emissions, to arrive at net zero (Climate Plan 8) in five areas with the following contributions: energy production (74%), energy consumption (7%), green mobility (11%) (Climate Plan 13). In the field of energy production (Climate Plan, 36ff.), 43% of the reduction is to be obtained thanks to a new biomass-fired heat and power plant; new wind turbines shall contribute with 42%. To reduce energy consumption the focus is on efficiency, i.e. through retrofitting (Climate Plan, 29ff.), mainly in commercial buildings. The plan argues that new buildings need to be particularly efficient in order to reduce emissions notwithstanding the expected growth of the city (Climate Plan, 28ff.).

Also the Municipal Plan has a focus on housing. Due to an expected population growth of 100.000 by 2027 - welcomed, assuming that people moving from the suburbs to the city can live a less carbon intensive lifestyle without a car - the plan gives space to build between 48.000 and 50.000 new homes (Municipal Plan, 12-13) with an average surface area of 90sqm. This makes for an average of 2 - 2.22 people per home and thus an average per capita surface area of 40.5 – 45sqm, slightly higher than the average of 40.4sqm per person in 2015 – this average has been decreasing since 2010 (42,2) until 2017 (40), in 2018 it reached 40,1

sqm[7]. Additionally, the municipality requests 75% of new dwellings to have a larger average size of 95 sqm (in 2015 dwellings in CPH had an average size of 80.4 sqm) responding to a demand for larger homes to be shared; but no measures are included to further favour house sharing. The compact city strategy plays an important role in the planned localisation: the aim is to build up to 95% of new residential development close to train and metro stations and building density is also fostered (Municipal Plan).

In the field of mobility, emission reductions are planned through the promotion of cycling (30%), public transport (22%), intelligent traffic systems (30%) and new fuels (18%) (Climate Plan, 42ff.). The overall objective of the Municipal Plan for transport is a modal share of 1/3 car (max), 1/3 bicycle (min), 1/3 public transport (min) by 2027, while the Climate Plan also includes walking and aims for 75% of traffic to be down to cycling, walking and public transport by 2025 (Municipal Plan, 17). To achieve this, the Municipal Plan plans the expansion of bicycle lanes, public transport and lower speed limits for cars in the city centre.

The secondcentral objective in Copenhagen's planning documents is economic growth, seen as positive and necessary, with the ambitious target of +5% GDP per year (Planning Strategy, 30). Even the Climate Plan (p.11) has a section entitled "Green Growth", stating: "With its initiatives [in the Climate Plan] up to 2025, the City of Copenhagen is actively contributing to green growth."

A series of drivers for growth are identified in the plans. As already mentioned, growth is motivated by an expected increase in population (Municipal Plan, 7) and a consequent need for more housing (ibid., 12) and jobs (Planning Strategy, 30). But the most stressed argument

7 https://www.statbank.dk/statbank5a/Graphics/mapanalyser.asp?maintable=BOL106&lang=1 (Last access: April 2020)

for growth is competition with other urban regions, e.g. Hamburg and Stockholm (ibid., 28). As Copenhagen has experienced less growth than other cities over recent years, the plans argue, it is important to stimulate growth now. There is furthermore a call for national responsibility, for example Copenhagen is defined as the country's "growth engine" (ibid., 1). In order to attract businesses, stimulate the creation of jobs and produce "green, healthy and creative growth" (Business and Growth Policy, 6), four principal strategies are proposed:

- more mobility
- more space for new commercial activities
- regional cooperation for competitiveness
- a green image to sell

Regarding mobility, the Planning Strategy (pp.22-23) welcomes the status of Copenhagen Airport as a regional hub and its traffic growth, to encourage the role of Copenhagen as an international hub. The Business and Growth Policy (p.21) sets a goal of 5% annual passenger growth, while preoccupation with competition from other airports is expressed. As a solution, the Policy proposes to increase the airport's catchment area through the improvement of regional infrastructures, mainly with new rail links. Furthermore, the Policy (p.21) aims at 3% annual growth, by public transport, of commuting from/to Sweden.

To promote commercial activities, 200.000sqm of new commercial floor space per year is planned for (Business and Growth Policy, 11; Municipal Plan, 54ff.). The Municipal Plan (p.48) avoids conceding new space for shopping centres to protect local businesses, but commercial activity is supposed to grow and is considered as the one activity guaranteeing lively urban streets. Growth in commercial space is seen as inherently positive, as it creates

new jobs. Sustainability concerns are only expressed in relation to its localisation, which is required to be close to train or metro stations, while the impacts of consumption itself are not mentioned.

The city's competitiveness is to be increased through regional cooperation in Greater Copenhagen (Municipal Plan, 65-75), in particular with Malmö, with the main goal of fostering economic growth, which, the Plan argues, can be assured as Greater Copenhagen has more population than the municipality alone. Larger and more varied investment opportunities could more easily attract international capital and businesses, jobs and growth.

Moreover, for Copenhagen, defined as a competitor on the global stage, improving quality of life and investing in 'green solutions' is not only seen as valuable in itself, but even more so as it increases competitiveness and stimulates growth: "Copenhagen is known worldwide as a green and ambitious city with ideas for future green solutions. (…) This supports the role of the region as a growth locomotive and its potential to attract new business activities." (Climate Plan, 11).

The strategies and policies in Copenhagen's planning documents focus on two main objectives, sustainability and economic growth, made apparently compatible with decoupling: "Copenhagen has an ambitious target to be carbon neutral by 2025 and at the same time show that it is possible to create growth and reduce carbon emissions" (Municipal Strategy 2014, 44).

5 – Structural limitations of Copenhagen's sustainability strategy

Decoupling is central to Copenhagen's strategy of enhancing growth while (or by) reducing carbon emissions. The Climate Plan (p.11) states that "[s]ince 1990, CO2 emissions have been reduced by more than 40% and (...) there has been a real volume growth of around 50%." This reduction has been mostly achieved through the wide-scale adoption of district heating (ibid.), i.e. a relatively easily obtained one-time efficiency improvement that cannot be repeated for further reductions (cf. Parrique et al. 2019). While this sounds like absolute decoupling, it regards only production-based emissions. Even if available emission data (section 3) does not give statistically conclusive answers, it shows a significant difference between production-based and consumption-based emissions, hinting at a process of externalisation. Together with the priority of growth set by Copenhagen's planning documents it seems more likely than not that these reductions in production-based emissions are or will be compensated by other emissions due to increasing consumption.

Externalisation

Copenhagen's strategy for a carbon neutral city is built on production-based emission figures. But in Copenhagen this means considering only between 20% and 40% of total per capita emissions (cf. Section 3). Not considering the difference between production- and concumption-based figures to inform its policies thus appears to be an important limitation of Copenhagen's strategy. A shortcoming potentially leading to misinformed policy choices not only because the entity of emissions differs, but also because the distribution of emissions over sectors differs between PBA and CBA. Typically in wealthy cities of the global north

like Copenhagen, a considerable part of production-based emissions are from energy production, while those from air travel and imported goods and services are excluded, an important component of consumption-based emissions (cfr. Section 3). CBA shows that consumable goods and services are responsible for about half of carbon emissions (Harris et al. 2020). But these are not considered by Copenhagen's planning documents. A strategy based on PBA is sensitive to the reduction of emissions of local power plants but will take little interest in people's consumption behaviour: indeed energy production is a central area of intervention in the Climate Plan, while new commercial spaces are seen as features to create jobs and make streets lively, obscuring that more consumption corresponds to greater ecological impact, occurring mostly outside the city.

A similar consideration can be made for air travel, also excluded from Copenhagen's emission accounting. The city proposes prominently a growth strategy for the airport, not mentioning that air travel is the most carbon intensive mode of transport[8].

Also emissions related to the construction phase of new buildings – 10-20% of a building's GHG emissions over the lifetime (Ramesh, Prakash, and Shukla 2010) – are not considered.

One could argue that global dynamics of externalisation are beyond the reach of municipal policies and that planning strategies elaborated by a municipality rightly focus on local solutions. But environmental challenges have a global dimension and consequently, the effects of planning for sustainability have to be evaluated on a global scale (Holgersen and Malm 2015; Angelo and Wachsmuth 2015). Consider Angelo and Wachsmuth's (2015) critique of "methodological cityism": if a city is inserted in a global system of exchange and is not analysable outside this system, then its sustainability policies must also be evaluated in this context. Furthermore, while in Copenhagen's planning documents sustainability policies

8 https://www.eea.europa.eu/data-and-maps/daviz/specific-co2-emissions-per-passenger-3#tab-chart_1 (Last access: July, 2019)

focus on local solutions, for other, apparently more important, policy areas like international competitiveness, strategies *do* reach beyond municipal boundaries. Finally, the dynamic of externalisation is related to local consumption behaviour and while planning does not determine behaviour alone it does influence it: now to stimulate growth, it could do so to promote sufficiency lifestyles (cf. Conclusions).

Focus on Efficiency

Central to every decoupling strategy is efficiency: producing more with less impact (cf. Section 2). In Copenhagen's planning documents improving efficiency, through technology and behavioural change, is the dominant strategy to achieve sustainability. To justify the requirement to locate new business space close to metro and train stations, it is argued that "[t]his could potentially reduce carbon emissions by 95000 tons during the entire period, compared to not locating the businesses near a station." (Municipal Plan, p.56). In reality this is not a reduction of emissions, but less growth in comparison to a less efficient scenario of sprawl and high car usage. Also more buildings themselves, even if more efficient, require increasing overall energy and resource consumption. This of course applies also to the planned growth of residential buildings.

Regarding mobility, the focus is on improving conditions for 'green' modes of transport, much less on making cars less attractive: to free space for walking and cycling is proposed only in one case after the construction of a new road tunnel. The Municipal Plan (p.17) states: "[w]hen we shift the mode of transport to cycling, walking and public transport it creates more space on the roads for those businesses and residents, for whom driving is required in their daily lives." This sounds very much like a rebound effect (cf. D'Alisa, Demaria, and Kallis 2014): some drive less, making driving more attractive for others. Likewise, within

Copenhagen car ownership continues to grow (Municipal Plan, 17). The plan proudly states that this has not led in recent years to an increase in traffic, but the production of a car makes for a substantial part of its ecological impact (outside of Copenhagen).

To compensate for the desired overall increases in mobility, housing and business, solutions must always be more efficient. Of course, if some shift from driving to cycling, this reduces impact. But this shift can only be done once. And if at the same time the overall volume of mobility grows, the total quantity of car usage is not necessarily reduced. Furthermore, economic savings can be used elsewhere, increasing impacts there, e.g. less driving but more shopping (indirect rebound effect - Parrique et al. 2019, 37). The climate plan itself points at this effect, celebrating the benefits of cheap district heating: "[p]art of the funds freed (...) is used in Copenhagen thereby generating local business and employment" (Climate Plan, 11), i.e. economic growth.

The priority of growth and the Green Fix

When in doubt, the plans give priority to economic growth over ecological sustainability. This is illustrated by the negotiability of parking space restrictions for commercial buildings in the Municipal Planning Strategy (p.32): "Business is demanding better road negotiability (…), better parking facilities (…). The City of Copenhagen therefore wants to explore whether there should be an adjustment of the parking regulations."

But Copenhagen's planning documents go further and give a constant impression that the primary goal of sustainability policies is not the compatibility of growth with sustainability, but rather the stimulation of growth itself. A strategy that has been defined 'green fix' (cf. Section 2). The Municipal Plan (p.68), in a paragraph entitled "Copenhagen's Green Brand Generates Growth and Jobs", argues that "Copenhagen is known for green solutions and

urban development, where green solutions go hand in hand with economic growth, job creation and improved quality of life." To further strengthen "Copenhagen's position as a green growth centre" an "export catalogue" presenting "Copenhagen solutions" has been elaborated, with the goal of creating "a basis for increased Danish exports of green urban solutions[9] and green jobs here in Denmark." Also in the Business and Growth Policy the idea of a green fix is present; environmental policies are regarded as key factors for attracting business and promoting growth[10]. Evidently, the green fix is strongly motivated by the international competition in which Copenhagen sees itself inserted, but also by its positive view of growth in itself. If carbon emissions (accounted by consumption) are mainly driven by income, as shown by research reviewed in section 3, the contradiction of this strategy with environmental goals is quite plain. Furthermore, it remains in a curious relationship with externalisation: does Copenhagen import (high impact) products from the same cities it sells its solutions for green growth to, guaranteeing the well-paid (and apparently low impact) jobs allowing to buy those very products? Possibly the places are not the same, but an investigation into their geography would be intriguing.

6 Conclusions

For Degrowth scholars, sustainable development is an oxymoron, as they consider the absolute decoupling of economic growth from environmental impact to be infeasible. I have tried to apply this criticism to the urban scale, studying the case of Copenhagen. Incomplete data on consumption-based emissions, lacking a coherent time series, do not allow the

9 e.g. to Singapore: https://www.opengovasia.com/opengov-speaks-to-soren-kvist-copenhagen-solutions-lab-city-of-copenhagen/ (Last access: april 2020)

10 The same is argued for liveability. You could speak of "liveability fix".

provision of a definite answer in quantitative terms, but with figures far higher than those offered by production-based accounting, it does unveil an important level of externalisation. Scenarios modelled by Harris et al. (2020) make seem future growth of consumption-based emissions likely, due to expected, economic growth, which indeed appears to be the central aim of Copenhagen's planning strategy.

In the introduction I have defined Copenhagen as a critical case. If Copenhagen results unsuccessful, this discredits strategy of sustainable urban development in general. While this study may not give mathematical proof, it shows clearly that the ecological limits of Copenhagen's strategy are due to its growth-orientation. The point is not that becoming climate neutral by 2025 is not an ambitious goal in itself – it certainly is. Nor to neglect the efforts made to achieve it. Efficient and retrofitted buildings close to public transport can be a good idea when combined with incentives to share homes. Promoting cycling and public transport has been effectively done, but the general strategy should aim at the reduction of mobility. The point is that as long as growth remains the central goal, efficiency will only be able to achieve relative decoupling, i.e. not a reduction but a slower growth of ecological impact. Thus, Copenhagen's strategy is based on a triple illusion: the overarching idea that unlimited growth is possible, based on the ignorance of externalised impacts and on the hope that efficiency gains will overcompensate the desired growth of the volume of economic throughput.

What would need to change in Copenhagen's sustainability strategy from a degrowth perspective?

A complete answer to this question is beyond the scope of this paper. Furthermore, one can doubt that a degrowth transformation could be implemented by urban planning, as it requires profound cultural and political changes (Cristiano 2020). Leaving this aside for a moment and assuming to be in a situation with the cultural and political conditions to envisage a degrowth orientation of Copenhagen's sustainability strategy, a few lessons can be learned from this study.

First, the goal of economic growth would have to be abandoned. Instead local quality of life on a basis of global environmental justice would become the central aim, alongside climate change mitigation. Then, an effort on data would be necessary, calculating consumption-based environmental and social impacts to complement production-based data. This should allow to identify policy fields on which to intervene, guided by the principle of sufficiency, leading to a reduction of total impacts. Particular attention would be given to impacts occurring beyond city limits, in the perspective of a "Solidary Degrowth City" (Brand 2020) which considers the city part of and responsible for a net of relations with its global hinterlands (cf. Brenner and Katsikis 2020). Relations to be transformed in order to limit externalisation and relations of unequal ecological exchange.

From existing data it is possible to speculate that three fields of intervention might be housing, transport and consumption. A policy aiming at the reduction of per capita living spaces should favour shared living over new constructions. Projects to increase the role of the airport should be stopped, and a policy to progressively reduce not only car usage but also possession, e.g. further reducing parking spaces, be implemented. To reduce general consumption and improve quality of life, instead of building new offices and shopping

facilities, places could be developed (maybe in former shopping malls and parking lots) which favour conviviality.

Obviously, such degrowth policies can hardly be implemented top-down. Instead they require citizen collaboration and behavioural change, Lamker and Schulze Dieckhoff (2019) provide arguments on how the planning process would need to change, becoming more inclusive, bottom-up and open to experiments.

Further research could deepen the present analysis building a coherent time series of consumption-based carbon emissions and relate it to other types of ecological impact. It could compare Copenhagen's geography of externalisation to that of the export of its 'green solutions' and it should continue to explore how the present and future research can help to build a strategy for a degrowth-oriented spatial politics and planning.

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Figures and Tables

< Figure 1: Copenhagen: CO2 emissions per capita;

Source: developed by the author from multiple sources (see key) >

< Table 1: Municipal Planning documents analysed >

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