

Non-growth in the housing sector for sustainability and its planning implications

Jin Xue

Aalborg University, Denmark

jin@plan.aau.dk

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Abstract

By thoroughly exploring the trends of the housing sector growth in Copenhagen (Denmark) and Hangzhou (China) metropolitan areas and its social, economic and environmental consequences, the paper argues for a non-growth and even degrowth in the housing sector in the global North and the wealthy cities in China. A simple thought experiment of a non-growing housing sector is made in order to identify what policies should be in place for a socially sustainable economic degrowth. A non-growing housing sector needs the facilitation of urban planning. The implications of this shift from economic growth to economic degrowth on planning in relation to values, substances, process and spatial arrangements are briefly discussed.

1. Introduction

Developing sustainable housing has been an important part of the endeavor to pursue environmentally sustainable development of the entire society. In the discourse on sustainable development, the dominant paradigm has been *decoupling* of economic growth from negative environmental impacts. In developing countries where the desirability of economic growth is usually taken for granted, decoupling has been emphasized as the key strategy for achieving environmental sustainability. In wealthy countries as well, maintaining economic growth through decoupling has been highlighted as a major goal on the political agenda, even though the affluence level is already very high. However, in recent years, the possibility of maintaining economic growth through decoupling has been questioned by critics arguing that decoupling alone is not sufficient to achieve environmental sustainability. Evidences so far have not shown convincing arguments that decoupling strategies will lead to an absolute decoupling between economic growth and its various environmental impacts (Azar et al., 2002; OECD, 2002; Tapio, 2005; Næss et al., 2011). Therefore, opponents of growth propose a reduction in the scale of the total economic output, i.e. degrowth to reduce the environmental impacts as much as is needed in order to stay within the biophysical limits of the planet.

Using the concrete examples from the field of housing and urban development, this paper argues that it is hard to combine continual growth in the housing stock and long-term environmental sustainability both in developed and developing countries. Non-growth in the housing sector appears to be needed to reach the requirements of an environmentally sustainable development. For the housing sector, decoupling means finding ways to accommodate the growth in the housing stock while reducing the negative environmental impacts resulted from this growth. The case studies are Copenhagen, the capital of Denmark, where living standard is among the highest in the world and Hangzhou, the capital of Zhejiang province in China, where living conditions have not yet reached the same level.

First, the environmental performances of the housing sector in Hangzhou and Copenhagen are compared through investigation of the trends of decoupling. Then, the limits to decoupling as a major strategy for sustainable housing development suggest the necessity of a non-growing housing stock. A simple thought experiment of a non-growing housing sector is made in order to identify what policies should be in place for a socially sustainable economic degrowth. This is followed by a discussion of the implications of economic degrowth on urban planning.

2. The environmental performances of housing sector growth in Copenhagen and Hangzhou metropolitan areas

Hangzhou is the capital and the economic, cultural, scientific and educational center of the Zhejiang Province. It is one of the central cities in the Yangtze River Delta and the transportation hub in southeastern China. The whole municipality covers an area of 3068 km². Since the 1990s, with the rise of Yangtze River Delta region as an emerging global city region, Hangzhou has experienced rapid globalization and growth. The economy of Hangzhou developed fast from 1978 to 2008 with an average annual GDP growth rate of more than 11%. As a consequence of the national urban housing reform in the 1980s and 1990s, the industry of real estate has become an important driver of economic growth and the share of real estate in total regional GDP has been increasing. Hangzhou can be characterized as a forerunner among Chinese cities in the development of the residential sector. The metropolitan area has had an unprecedented growth in the housing stock. Figure 1(a) shows how the GDP, residential floor area, residential energy consumption and urbanized area have developed since the 1990s in Hangzhou Metropolitan Area.

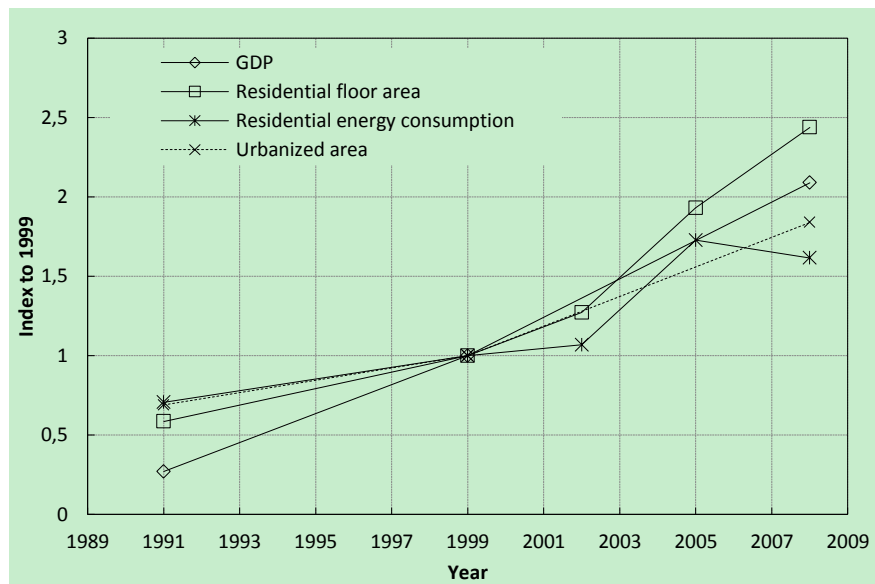
Copenhagen Metropolitan Area, the capital of Denmark, covers an area of 3132 km². From 1993 to 2006, the average annual economic growth in GDP was about 2%. Whereas the development of housing sector in Hangzhou did not take off until the 1990s, when the centrally planned public housing provision and allocation was reformed into a regime of commercialized housing in an open market economy, rapid growth in the housing sector in Copenhagen Metropolitan Area already started after the World War II

and peaked in the 1960s and 1970s. Since then, the construction of new dwellings has slowed down. Compared to the fast growth in Hangzhou Metropolitan Area, growth in the housing stock, population and urbanized area have been moderate in Copenhagen Metropolitan Area (Figure 1(b)).

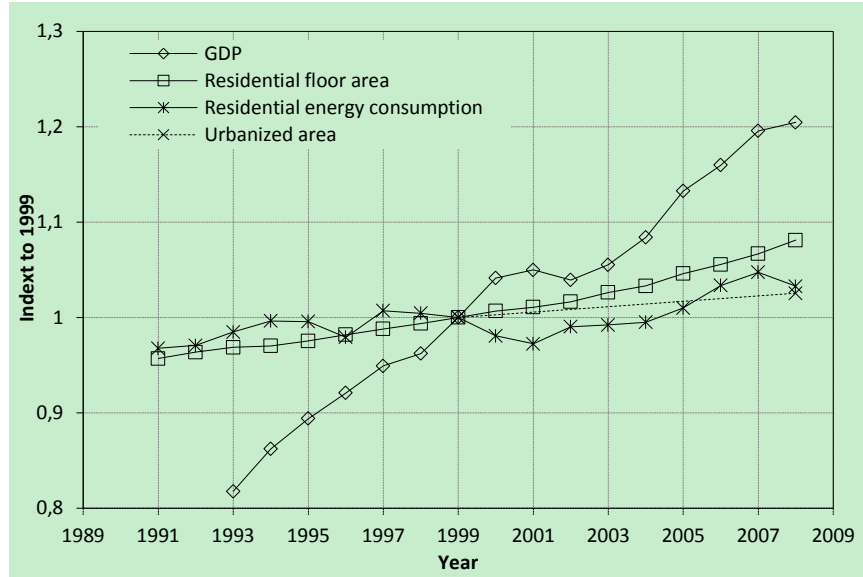
In absolute terms, in both city regions, GDP, housing stock, residential consumption and the size of urbanized land have increased over the period investigated. In Hangzhou Metropolitan Area, housing stock and residential energy consumption have grown at a pace higher than GDP growth. The growth in the number of urban residents has also been rapid, with 157% increase during the same period. Residential buildings in Hangzhou Metropolitan Area are relatively new. Among the total residential building stock in 2008, 59% of the residential floor area was built between 1999 and 2008. There has also been considerable growth in the size of urbanized land, with an increase of 165% over the period 1991-2008.

In Copenhagen Metropolitan Area, GDP has grown with a rate much higher than the housing stock and residential energy consumption. During the period 1991-2008, housing stock has grown by 13% and population by 7.8%. Over the period 1999-2008, the size of urban area has grown by 2.5%. In contrast to Hangzhou, the housing stock is old in Copenhagen Metropolitan Area. In 2009, less than 10% of the total residential floor area was built in the years between 1991 and 2008.

In both Hangzhou and Copenhagen, the size of urbanized land has increased at a lower rate than both housing stock and GDP.



(a) Hangzhou Metropolitan Area

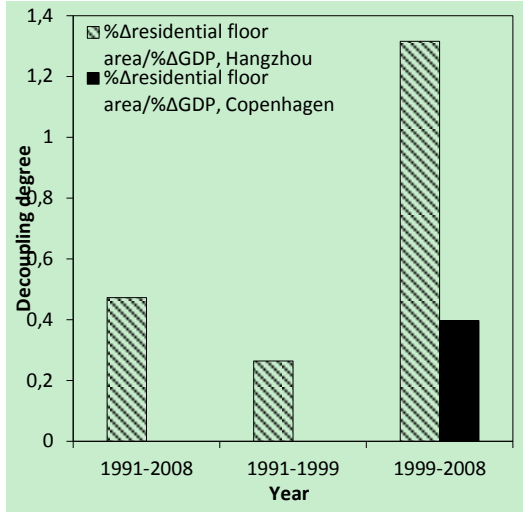


(b) Copenhagen Metropolitan Area

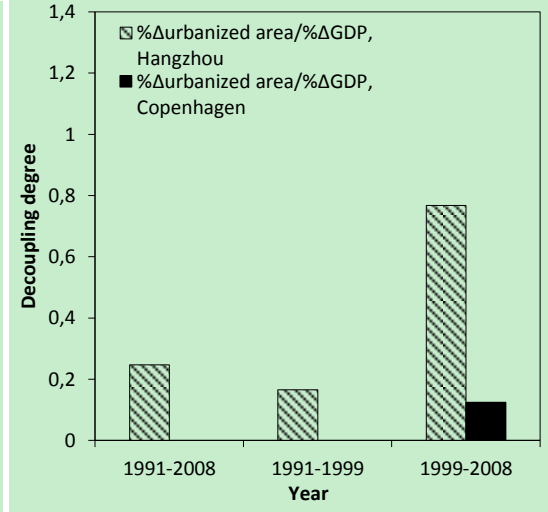
Figure 1: Development of GDP, residential floor area, residential electricity consumption and urbanized area in Hangzhou Metropolitan Area (a) and Copenhagen Metropolitan Area (b) over the period 1991-2008 (Source: based on data provided by Hangzhou Statistic Yearbook, various years; Wang, et al., 2009; Statistic Denmark, various years; Aalborg University's Spatial Data Library, 2009).

The environmental performances of the housing sector can be measured by decoupling degrees. According to Tapio (2005), on the premise of a growing GDP, if environmental impacts (EI) keep stable or are reduced ($\%EI / \%GDP \leq 0$), then strong decoupling occurs. If environmental impacts increase with a growth rate at least 20% lower than GDP growth rate ($0 < \%EI / \%GDP \leq 0.8$), weak decoupling takes place. Coupling occurs when the growth in the environmental impact lies within the interval from 20% lower than the economic growth rate to 20% above this rate ($0.8 < \%EI / \%GDP \leq 1.2$). If negative environmental impacts grow at a rate more than 20% above the economic growth rate ($\%EI / \%GDP > 1.2$), it is expansive negative decoupling, which is the least desirable situation.

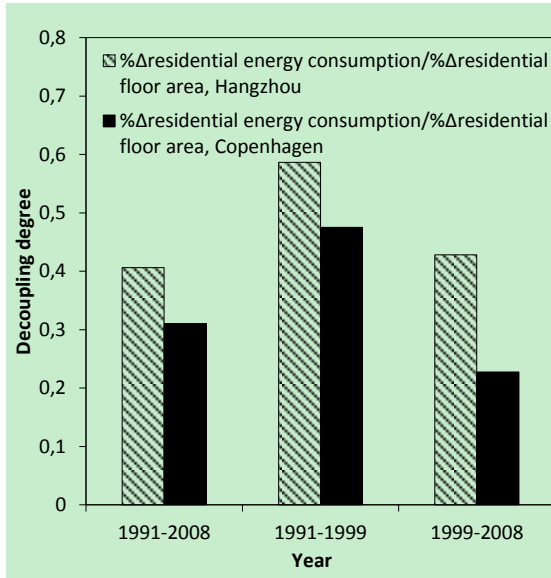
Measured by decoupling degrees, Figure 2 indicates the changes in the growth rates of residential floor area, undeveloped land consumption for urban expansion, and residential energy consumption relative to GDP growth in both city regions.



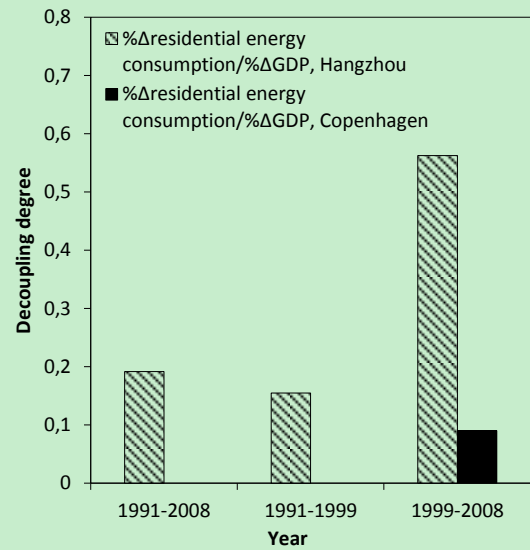
(a)



(b)



(c)



(d)

Figure 2: Decoupling rates between housing stock and GDP (a), size of urbanized area and GDP (b), residential energy consumption and housing stock (c), and residential energy consumption and GDP (d) in the metropolitan areas of Hangzhou and Copenhagen over the period 1991-2008.

Seen from Figure 2(a), in Hangzhou, the growth in the size of the housing stock has for the entire period 1991-2008 been weakly decoupled from economic growth. However, an important change has occurred during these years. In the first eight years (1991-1999), the residential building stock grew at a much lower rate than the economy, while during the period 1999-2008, the residential building stock increased considerably with a rate 30% higher than the economic growth. Hangzhou has thus moved from weak decoupling

between housing stock growth and economic growth between 1991 and 1999 to expansive negative decoupling between 1999 and 2008. The substantial increase in the housing stock in Hangzhou in the second period coincides with the period of housing reform, which emphasizes the perceived role of the housing sector from a drain to a driver of economic growth. The housing stock growth in Copenhagen has been slower than GDP growth over the period 1999-2008, representing weak decoupling between housing stock growth and economic growth. Housing construction in Copenhagen Metropolitan Area peaked in the 1980s and began to drop in the beginning of the 1990s and for the whole 1990s new construction of housing maintained a lower level, in spite of a growing population in the region. The average annual growth rate of housing stock was only 0.55% over this period. However, economic growth was relatively faster with an average annual growth rate of 3.51% from the period 1993-2000. This indicates a higher decoupling degree in the 1990s between housing stock growth and economic growth than that over the period 1999-2008. During the years after 2000, new construction of dwellings has steadily increased and peaked in 2006. In the light of a declined growth rate of GDP to 1.84% annually, the substantial increase in the housing construction was mainly resulting from high population growth. Even though the economic growth rate was still higher than that of the housing sector which was 1.1% annually during the period, the growth rate of the total housing stock was twice of that in the first period (1993-1999).

As shown in Figure 2(b), in both city regions, land consumption for urban development has been lower than the rate of economic growth over the investigated periods, in particular in Copenhagen Metropolitan Area. In Hangzhou, the growth rate of land consumption was 80% lower than the GDP growth rate in the period 1991-1999. Then it increased but was still lower than GDP growth rate in the period 1999-2008. Although the development in the two periods represents weak decoupling, the growth rate of land consumption was only 20% lower than GDP growth rate in the second period which, according to Tapio's definition, is barely within the range of weak decoupling. In Copenhagen Metropolitan Area, the decoupling degree between urbanized land growth and economic growth was 0.12 over the period 1999-2008, which means that the growth rate of the urbanized land was only 12% of GDP growth rate. The average annual growth rates of urbanized land and GDP were only 0.28% and 2.09%, respectively during this period. This tendency of decoupling also appeared in the previous period. Over the period 1993-2000, the average annual growth rate of GDP in Copenhagen Metropolitan Area was 3.5%, while according to EEA (2006), the annual growth rate of urbanized land was 0.8%. Therefore, relative decoupling between economic growth and growth in the urbanized land has already taken place in the 1990s, but the decoupling rate after 2000 is higher than that in the 1990s.

The higher decoupling degree between the urbanized land growth and GDP growth in Copenhagen Metropolitan Area does not indicate that the urban areas of Copenhagen are

denser than Hangzhou. In contrast, Hangzhou has a considerable higher population density than that of Copenhagen. Copenhagen Metropolitan Area had experienced a higher growth rate of urbanized area than population growth since the mid-1950s. For the entire period from mid-1950s to late 1990s, population growth was about one third of the built-up area growth in the metropolitan area (EEA, 2006). This low density urban development pattern has been reversed in the 2000s. The low population density in the urbanized area provides opportunities for densification. In recent decade, urban development in Copenhagen Metropolitan Area has to a high extent taken the form of inner-city densification as well as suburban development close to urban rail stations.

Correspondingly, geographic development of new residences in Copenhagen Metropolitan Area has experienced a shift from decentralization to concentration or from suburbanization to reurbanization. According to Andersen and Jørgensen (1995), between 1940 and 1980, about 240,000 dwellings were constructed and nearly 350,000 people left the two core municipalities (municipality of Copenhagen and Frederiksborg) for new dwellings in the suburbs, which constituted a major element of urban expansion into the formerly rural areas in this period. In the 1970s, new dwellings were built at a distance from the city center of Copenhagen of on average 23 km (Hartoft-Nielsen, 2002). Meanwhile, economic restructuring has made old industrial factories close down or relocate from inner city and harbor areas to the broader periphery of the region and left the inner city with fragmented brownfields. The suburbanization of housing and the economic restructuring have made the Copenhagen Metropolitan Area sprawled and sparse.

Compared to the period 1940s-1980s, residential development in the metropolitan area during the latest decade has shown a trend of concentration. New dwellings in the 1990s were built on average 20 km from the city center of Copenhagen (Hartoft-Nielsen, 2002). Some brownfield areas in the inner city were redeveloped into residential areas. Even though the majority of the new dwellings have still been located in the rest of the metropolitan area, Copenhagen and Frederiksberg have shown a tendency of increasing their share of the total number of newly completed dwellings. On average, this share increased from 19.6% in the 1980s, 22.9% in the 1990s to 33.4% in the 2000s. This illustrates the densification in the inner city in the recent two decades even though there is still a sprawling trend in the outside part of the metropolitan areas. Another trend which is favorable from an environmental perspective is that, to some extent, residential development has taken place close to urban rail stations or other major public transport nodes. This trend is more pronounced in the central municipalities than in the outer areas. Due to densification strategies in Copenhagen Metropolitan Area, a stabilization in population density occurred in the late 1990s and the turn of the millennium.

To some extent, the pattern of urban and residential development in Hangzhou Metropolitan Area has been opposite to that of Copenhagen Metropolitan Area. The

declined decoupling degree between the growth in the size of urbanized land and economic growth reflects the changes in the shift of spatial development pattern of the metropolitan area of Hangzhou from concentration and densification to decentralization and suburbanization. In the 1990s, urban development triggered by economic growth has to a high extent taken the form of renewal of existing urban areas, typically by replacing old built-up districts with new buildings at higher densities. As a result of land reform from free use of land to paid use in China, industries in the inner city moved out to the outskirts (Feng, 2002b). During this period, renovation of old urban districts was pointed out as the major residential development policy. Although new residential buildings were also constructed outside the inner city, clearance of old apartment buildings and construction of new ones at the same place was the major initiative on residential development. This is illustrated by the fact that the total floor area of clearance from 1986 to 1999 was 8.75 million square meter (Feng, 2002a), while the completed floor area over the same period was 17 million square meter (excluding Yuhang and Xiaoshan). According to Wang et al. (2009), the majority of expansion from 1991 to 1999 took place within the distance belts from 10 to 20 km from the city center of Hangzhou, with an increase of urbanized land of 145 km².

Along with the densification in the inner city, outward expansion also took place and gradually took the major role in urban development in the 2000s, which were characterized by a faster decline in the population density of Hangzhou. New built-up areas have mainly been constructed in the distance belts from 20 to 30 km from the city center. Urban expansion was relatively faster in this period than in the first one, with an increase of 396 km². The saturation of the inner city, where a considerable population densification has taken place (e.g. Shangcheng and Xiacheng, with a population density of 194 and 162 persons per hectare of built-up area in 1999), and the scarcity of land for further development, have led to the decentralization and suburbanization of dwellings. This development has been reinforced by the construction of transport infrastructure. Many recently developed residential districts have been located along 9 planned metro lines even though the majority of them have not yet been constructed. The decentralization of residential development in Hangzhou is likely to lead to increasing levels of motorized traffic between residences and workplaces and other city facilities (Næss, 2010). From a decoupling point of view, the evolution of such a city structure of Hangzhou is not efficient in reducing housing-related environmental impacts. Arguably, the increase of the growth rate of land consumption compared to GDP growth over 1999-2008 may be a signal of coupling in future.

Land use efficiency, in particular for residential areas, has been historically higher in Hangzhou Metropolitan Area than in Copenhagen Metropolitan Area. Due to a strong farmland protection policy, land available for urban development is quite limited in China. The typical type of residential buildings in Hangzhou has been middle-rise multi-family buildings of five to six stories, and the inhabitants have a tradition for dense living.

Since 2000 or so, most of the newly constructed residential buildings are high-rise buildings and the plot ratios are higher in the areas in proximity of the city center. But in recent years, a steadily increasing number of low-rise houses like row houses and single family houses have been constructed on the outskirts. Distinct from Hangzhou, a preference for owner-occupied single-family houses in Denmark can be dated back nearly to the mid-19th century. Especially since the mid-20th century, the detached single-family house has been a preferred and ideal housing type in Denmark (Vestergaard, 2006). In the Copenhagen Metropolitan Area, the share of single-family dwellings in the total housing stock has remained fairly constant at about 25% since 1980. In contrast, the share of apartments which are relatively environmentally friendly has declined by 4 percentage points. This has reduced the environmental sustainability of housing. However, seen in a shorter and more recent period, the increased urban density since 1999 is mirrored by the fact that the share of detached single-family houses in the completed new residences has declined in Copenhagen Metropolitan Area compared to the latter half of the 1990s.

One point worth noticing is that not all environmental impacts will tend to increase at the same rate as GDP in the absence of particular decoupling efforts, as assumed by Tapio. When comparing GDP and the size of urbanized land, environmental impacts (measured as urban land growth) from economic activities taking place in a three-dimensional space is reduced to a two-dimensional land surface. Spatial environmental impacts resulting from economic activities could also go upward to the sky or downward into the ground, as urban growth takes place in a three-dimensional way. Therefore, land consumption on the surface of the planet only reflects part of the spatial impact of economic growth. This incomplete match implies that the growth rate of urbanized land could normally not be expected to be as high as that of GDP. A lower growth rate in land consumption than in GDP therefore does not necessarily indicate a 'real' weak decoupling of urbanized land growth from economic growth. For those environmental impacts that have historically grown slower than the economy, caution is needed in order to make a legitimate assessment, especially when the decoupling indicators convey a positive message.

Figure 2(c) and (d) indicate that residential energy consumption has been weakly decoupled from housing stock growth as well as economic growth in both Copenhagen and Hangzhou. Seen in a longer period, Denmark has substantially reduced its total final residential energy consumption since the oil crisis in 1973. However, the decline in the residential energy consumption stopped in the beginning of 1980s and has since then almost been stabilized with small fluctuations. Hence, strong decoupling between housing stock growth and residential energy consumption was turned into weak decoupling in the recent two decades. This implies that the growth in household energy efficiency has declined, and the improvement of energy efficiency has been counteracted by growth in floor area and household machinery. Despite the stabilization of residential energy consumption since the 1980s, CO₂ emissions from the housing sector have been

substantially reduced since then. This is because of the integration of renewable energy in the residential energy supply and a shift to a more energy-effective system for coal-based energy production, where combined heat and power plants have utilized surplus heat from electricity production for space heating and hot water supply.

Given the fact of considerable growth in the residential floor area and domestic appliances, decoupling between residential energy consumption and housing stock growth in Hangzhou Metropolitan Area suggest a rapid improvement in thermal performance of residential buildings. Securing of more comfortable indoor environment is a more pronounced factor contributing to energy consumption in Hangzhou than in Copenhagen, because residents in Hangzhou have for a long time suffered from harsh indoor environment and have not been able to adjust their indoor climates until the recent decades. The installation of heating and cooling equipment occurred during a period without any consideration of thermal performances of residential buildings, yielding huge energy waste. On the other hand, low thermal performance at the outset provides a large scope to increase its energy efficiency. This explains the fast reduction in building energy intensity after the implementation of gradually sharpened building regulations. Nonetheless, building energy efficiency of Hangzhou is still lower than that of Copenhagen. Moreover, electricity use has increased its share of the total residential energy consumption in Hangzhou, with a large proportion of it going for space heating and cooling. In China, coal is the major energy source for electricity generation and the coal-fired power-plant efficiency is on average less than 40%. Thereby, it can be assessed that in Hangzhou CO₂ emissions from the residential sector have risen over the investigation period.

3. The necessity of non-growth in the housing sector

The investigated decoupling trends between different variables in the two city regions have to some extent revealed the ‘effectiveness’ of the decoupling policies pursued by Copenhagen and Hangzhou for sustainable housing development, which is more significant in Copenhagen. However, economic growth has, at best, only been *weakly decoupled* from housing stock growth, land consumption and residential energy consumption, which implies that the goal of sustainable housing development has not been fulfilled by the decoupling strategies.

Long-term growth in housing stock is incompatible with environmental sustainability. Present environmental impact of the housing consumption is already higher than what would be desirable from a sustainability point of view. The footprint per capita in Denmark is already 3.4ha higher than its biocapacity in 2007 and Hangzhou overshoot its biocapacity by 1.2ha in 2002 (WWWF, 2010; Zhang & Ye, 2004). So far, per capita ecological footprint in Hangzhou is only about one fourth of Denmark. An attainment of the Danish affluence level in Hangzhou would imply substantial biocapacity overshoot.

Relative decoupling (as seen in the relatively slower growth in the residential energy consumption in Copenhagen and the size of urbanized areas in both city regions than GDP) still implies increasing environmental impacts and is therefore not sufficient to obtain a long-term ecologically sustainable development. If negative environmental impacts from the housing sector continue increasing, an attainment of an overall goal of decoupling economic growth from environmental impacts would require extensively strong decoupling within other economic sectors, which is also difficult.

Since long term growth in the housing stock is incompatible with environmental sustainability, a non-growth or even degrowth in the housing stock is necessary from an environmental perspective. Let us make a simple thought experiment to identify what policies should be in place in a non-growth economy situation. To be environmentally sustainable, a non-growth housing sector should be defined in its physical sense, i.e. a non-growing housing stock which implies annual construction rate is equal to annual demolition rate (or lower if degrowth in the housing stock). Real estate developers in order to maximize profit and compete for market shares can do it by means of: improving aesthetic quality of buildings by architectural design, improving building construction technologies to save raw materials and labor (which will further benefit the environment), and increasing building energy performance to attract potential homeowners (households with stable purchasing power will care more about the expense of energy consumption in building operation). For environmental purpose, houses to be demolished should be the least environmentally friendly ones, like single-family homes in highly car-dependent suburban areas disconnected from the inner city, and dwellings with poor thermal performance. Suburban 'brownfields' where the old houses are thus dismantled can be used for nature regeneration. On the other hand, the replacement of those demolished dwellings should take place as densification with availability of public transport and other city facilities and take the form of concentrated types of dwellings (Næss, 2011).

In a non-growing housing stock, every increase in floor area per capita among some population groups must be balanced by reduced floor area per capita among some other groups. The poor are usually the losers in such a situation because a limit on the size of the housing stock will induce housing scarcity and push up housing prices. Home purchases funded by mortgage loans will become difficult because banks are cautious of granting credit in a degrowth context. First buyers and needy families would demand redistribution measures like subsidies or tax reduction to deal with this problem. On the other hand, tax can be levied on empty owner-occupied dwellings to reduce overconsumption of living space. Some present institutions can be made use of. For instance, social housing, traditionally an important part of social welfare in Denmark, can function as a redistributive measure to relieve the potential distributional conflicts. In the same vein, the long tradition of rent control in the rental market need to continue because the number of households who cannot afford a dwelling will otherwise increase in a non-

growing economy. In addition, economic incentives can be employed to encourage cohousing and reusing empty dwellings (Lietaert, 2010).

With a non-growing housing stock, population growth will lead to decline in per capita floor area. Although population growth is not a prominent phenomenon in affluent countries at the national level – actually many of these countries have a shrinking size of population - for some city regions, like the case of Copenhagen Metropolitan Area, there has been immigration of population in the recent two decades. This has led to a lower level of per capita residential floor area and a relative ‘shortage’ of housing in Copenhagen Metropolitan Area compared to the rest of the country, even though the absolute figure is already quite high. To solve this problem, strategic planning may be required to balance regional development and location of workplaces.

4. Urban planning implications

Within the growth paradigm, cities, especially big ones, like the cases of Copenhagen and Hangzhou, have played an important role in promoting competitiveness and creating economic growth against the background of globalization. They form the growth centers at regional, national and international levels. A proposed degrowth paradigm would require the big cities to convert their conventional role to facilitating the achievement of planned economic decline in a socially sustainable way. This applies to big cities in both developed and developing countries. A departure from the growth paradigm to degrowth in the big cities requires reframing planning rationality and spatial logics. In the other way round, planning can function as one of the pathways to reach the goal of economic degrowth. This paper tentatively touches upon planning issues pertinent to degrowth in big cities and will be organized around four questions.

More or less planning?

It is hard for market mechanisms to secure economic degrowth when left on their own. In contrast to the current trend of neo-liberalization which is basically hostile to public planning, a degrowth paradigm requires proper regulatory intervention from planning. Instead of serving the purpose of market, planning should in some cases counter with and supplant market mechanisms in terms of converting the growth-oriented role of planning at the strategic level and containing the amount of land allocated for industries, houses, highway, airport, etc. at the spatial level. In this case, China’s long tradition for central political power may give it certain advantages in relation to growth control and degrowth. These advantages of political power are weakened, though, when power is decentralized to local authorities or even privatized as is the case in some of the developed provinces.

What are the values of planning?

Degrowth is not a mere quantitative decline in GDP as in symmetry to economic growth, but also involves re-ordering of values and ethical assumptions. A degrowth paradigm

calls for multi-values, among which environmental concerns and distributive justice are emphasized. It may also depart from an anthropocentric thinking and calls for obligations for non-human nature. Under this overarching paradigmatic shift, planning cannot be value-neutral but need to highlight the social and environmental aspects of city development. The distributive dimension of planning is more prominent for social justice in cities in a degrowth paradigm because the potential for devastating conflicts over distribution of resources (e.g. housing) is much higher when growth is contained. The interests of the marginalized and vulnerable population should be fully represented by urban planners, who would to some extent need to work as advocates. Urban planning may also need to incorporate and underscore an ecological rationality in line with the so-called 'deep ecology' championed by Arne Næss (1993). This requires planning to show fundamental concern and respect to the inherent values of non-human life and to preserve the richness and diversity of life forms. It also means abandoning the dominant economic rationality as a determinant of decision-making in the planning process (such as cost-benefit analysis in transport planning) which tends to value things according to its instrumental use for human in a monetary form.

What are the substances and process of planning?

The degrowth paradigm needs comprehensive planning capable of coordinating multiple development processes at the regional and city levels. At the strategic level, planning may need to emphasize balanced regional development. This, however, implies different development strategies for the North and South. For cities in Western countries, the increasingly prominent role of planning in attracting capital and industries under the domination of economic rationality should be shifted to containing growth and promoting social development. For developing countries, such as China, degrowth in big cities may give some breathing space to the development of small cities. Thus, degrowth in big cities should accompany decentralization and relocation of economic growth to those small and medium cities in impoverished regions where growth is still necessary for a better living. This requires a coordinated and synergetic regional planning which aims at weakening the status of big cities and providing development opportunities for other regions. Planning strategies should aim to upgrade peripheral cities and rural regions to stimulate growth in a socially sustainable manner. Note that planning efforts should also be made to decouple the environmental impacts from such growth as much as possible. Proper planning strategies should be in place to obtain high eco-efficiency in the process of urban growth of the small and medium-sized cities.

At the city level, a 'selective degrowth' as one of the goals of urban planning could include degrowth in the size of the population (notably big cities in developing countries), in urban sprawl, in high-speed transport infrastructure, in consumption of cars, in the per capita consumption of dwellings and other material items, in export and import, etc. However, the selective degrowth should arguably accompany selective improvement of

social services and welfare for the deprived within the city, including affordable housing, medical care, education opportunities and mass transit.

Planning for economic degrowth may run a higher risk of being authoritarian as it to a larger extent confronts market mechanisms and may receive more public resistance than in a growth context. The planning process thus needs more public participation and communication to avoid top-down decision-making and to gain public support by providing more scope for local and democratic discussion.

What are the spatial implications for cities with economic degrowth?

The spatial pattern of cities is highly influenced by the vision of economic degrowth, which is often associated with localized economy that is small and highly self-sufficient under social control. This vision is in a way kindred to shrinking cities and slow cities. In terms of land use, it would favor compact cities with less urban sprawl, less high-speed transport infrastructure, more pedestrian-friendly neighborhoods, concentrated types of dwellings, mixed land use. At the regional level, scattered settlement development should be avoided. Instead, cities should be surrounded by large and continued green areas in order to protect the ecological functions of these areas and provide recreational functions for urban citizens.

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