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TITLE: FUTURE VISIONS: a disruptive model to address the issue of urban sprawl and the unsustainable economic expansion in the Era of Megacities.

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0. Abstract

By 2050, we will have to produce 60% more food to feed the 9.5 billion people who will exist on the planet.

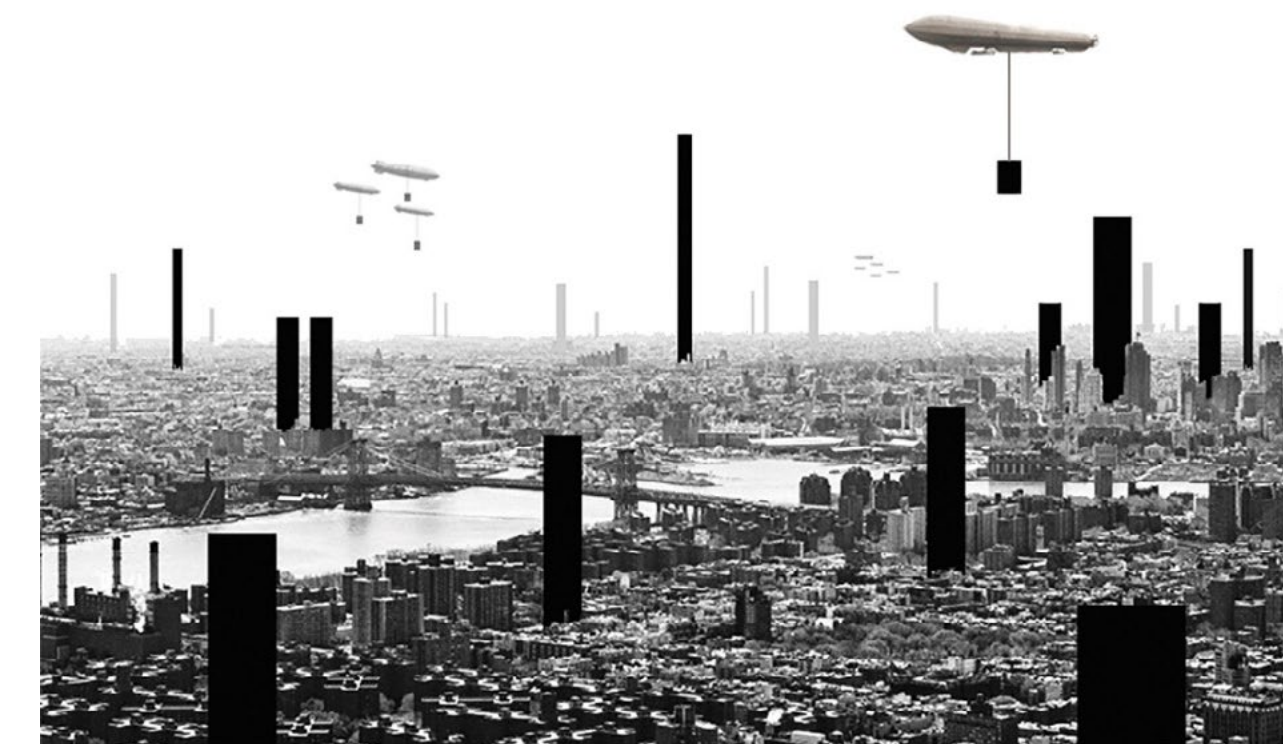
We will have to produce better, but the transition to large-scale sustainable production is blocked by the existence of intensive farming, which undermines all others.

We'll have to produce differently, but cities currently follow a model of economic expansion that doesn't fit with a different method of production.

Meanwhile, our cities are expanding at an extremely fast rate, destroying Nature and compromising the possibility of triggering a change such that it will be possible to live with it within the shortest possible time.

This paper addresses the unsustainable relation between the urban construct development and the global production system. The economic expansion model on which the development of our cities is based is in fact generating a series of problems which will affect several aspects of our society in a relatively short period of time. If it is true that we are already seeing its effects, it is factual that in a short time these effects will be decidedly more marked. From the economic point of view to the more general perception of the urban environment, we are going to face various issues which will have to be addressed as soon as possible, to configure a new model of development involving both the way we produce and the way we consume. As Architecture provides the place in which we consume, it is extremely important to push forward the global dialog related to sustainable urban planning and the visualization of the future of our cities. If it is true that any type of urban settlement will be affected by climate change, global market related consequences and the need to produce and distribute wealth by using a different method, this paper focuses on the more urgent problem of Megacities, and Shanghai in particular. Global intensive productive system and global market are connected to the economic expansion of the city by distributing labour force and capital. These two elements push the expansion of cities by enlarging their horizon to continue the absorption of labour force and capital, rather than constructing a different model to avoid sprawl as a means of development. By consequence, several

aspects related to the urban environment get affected as sprawl and non-sustainable development impact on the whole urban area. My interest is focused on the relation between these factors and how to use them to visualize a different model of development. These include, in particular, the density of population, the balance of job-housing ratio and the structure of the "knots" that compose Megacities – the central business districts (CDB). These factors are extremely important as they cover a vast area of analysis including the city as an urban construct and what surrounds it, that is, the natural and rural environment. Furthermore, they represent indicators that can have different interpretations starting from the architectural point of view to the more social, political or economic one. Our cities are the direct product of economic expansion and the global production process. Therefore, rethinking the city means acting on these systems that are no longer sustainable for our planet. It is not possible to imagine cities that do not expand. But we can change the way they expand and the rate at which they expand. To slow down this phenomenon, a sustainable development of all the parts that make up the city is necessary: both its horizon and its centre, simultaneously. This report and the project thesis aim to deal with megacity centres, visualizing a radical and disruptive urban context compared to those we are normally used to.



"Dense City". Personal drawing.

1. Introduction

This thesis is a visualization project that takes into consideration the reality of Shanghai, a Chinese megacity that serves as an example to be able to open a dialogue with respect to the complex themes just mentioned. Consequently to the rapid expansion of Shanghai due to the recent opening of China to the global market, it is a perfect example of how the large urban realities of the future will have to behave in order to reduce the effects that humanity will produce on the planet in the coming years.

The city expansion model follows two processes: the urban one and the urbanization one. The first is the process that aims to distribute and produce more and more wealth on the territory through the absorption of the labor force and capital, using the second - i.e. the urbanization process - which modifies the morphology of the territory to connect it to the city.

The problem of overproduction and consumerism are inextricably linked to the effects of pollution and climate change. From the methods of food production, to the distribution of future millions of climatic migrants, to the fight against global warming up to the safeguarding of our cities, to obtain a radical change in future prospects, it is necessary to displace a series of equally radical transformations on the territory. But the pace with which the largest cities in the world complicate and often compromise the livability of the places that compose them is extremely fast. For this reason, my thesis starts from the study of specific factors related to the urban territory, and then dwells on a possible rereading of the urban centers of the cities and a disruptive modification of their parts to mitigate the negative effects of the previously listed issues.

For the drafting of the text I studied and followed various theses provided by scientists, experts and technicians who have investigated various urban phenomena following the advent of Globalization. The interpretation keys used are mainly urban, economic, climatic and social. Following the study of the sources, I formed a personal idea of how to act on the urban fabric of the great cities of the world. Obviously, this view is experimental and empirical, even if it is built on the basis of confirmed data. It affects in an extremely radical way pre-existing environments

inhabited in reality by hundreds of thousands of people using an approach of reconstruction of the areas adjacent to the hubs of economic power, in this case a financial and technological district. This approach can be summarized as follows: defragment the city by acting on its CBDs and diversify the intended uses to make it more accessible. The surplus of space and social inclusion paves the way for the introduction of food production within the urban fabric, to complete a process of transition to a sustainable production method, creating a more inclusive and socially just model. In other words, enhancing the participation of the urban environment in the global production process and dismantling the concept of the city as a place of consumption only.

In general, the idea of defragmenting cities and redistributing housing units to control urban density will be applied in Pudong New Area District, Shanghai, especially in the iconic Lujiazui sub-district. In it, the variation of geometry and density will allow the opening of green and widely connected spaces to be able to distribute new activities and job opportunities. The act of choosing this famous district derives not only from the need to narrate a different development model by taking advantage of the strong emotional component that a disruptive visualization can have on readers, but above all from the pragmatic need



to reread - and then rewrite - the surroundings of the so-called CBD, which have given the economic boost to the cities that today are called super-metropolises and which have inexorably become a symbol of economic expansion aimed only at creating profit, and not well-being for the community.

In any case, the virtuosity of this thesis derives from the freedom of action that a visualization of the future allows and that a real architectural project requires to reduce for a series of issues related not to Architecture, but to politics and the economy. In fact, it is precisely in this mental passage that I believe that the force capable of pushing the dialogue on the future of our cities a few steps further forward should be sought. To implement this operation, however, a certain amount of mental flexibility is required, typical of pioneers who for the first time decide not to follow the written and unwritten rules inherited from the history of our countries.

“But first of all we have to remove a current opinion that is superstitious: namely the notion that the form and content of the city must primarily be functional to its technology and its “expanding economy”. This assumption overturns the real order of things. Perhaps the primary function of the city today is to subordinate technology to human purposes, reducing speed, energy and massification to values that are humanly assimilable and measurable.”

Lewis Mumford, “The Urban Prospect”, 1968.

2. Us and the Planet

Since ancient times, the body of the city - albeit closed and protected - has always been linked to the abundance of what remained outside: the gifts of Nature, including food and climate, which we have “tamed” to obtain a livelihood from it, and the ways of commerce, whose profit, exchanges and cultural contaminations were used to set in motion the machine of progress. Today, in the era of globalization, the models of cities we live in seem to have lost the harmony with which they were once founded. The largest cities in the world are today exposed to both the local social and political theater and the global one, from which they draw most of the impetus to look at their future. On the other hand, thanks to progress,



“Sunset over New York” (1932)

telecommunications and the global market, this harmony must necessarily have changed at a certain point in History. Translating it into a new way of seeing the city must become our task. We are a race that keeps growing, keeps changing, and keeps consuming. But we do it differently, more intensively even if with more awareness of the future even though it may not seem like it. Starting a discourse on the functioning of big cities, especially if with a certain critical spirit, turns out to be very difficult. Then when you want to discuss the problem of the structure that the big cities have taken on in order to be able to persist over time and survive the global market, it becomes even more complex. For this reason I decided to start from a series of general data, looking at the whole world. In particular, having an idea of the large numbers that can tell the story of our civilization becomes of fundamental importance.

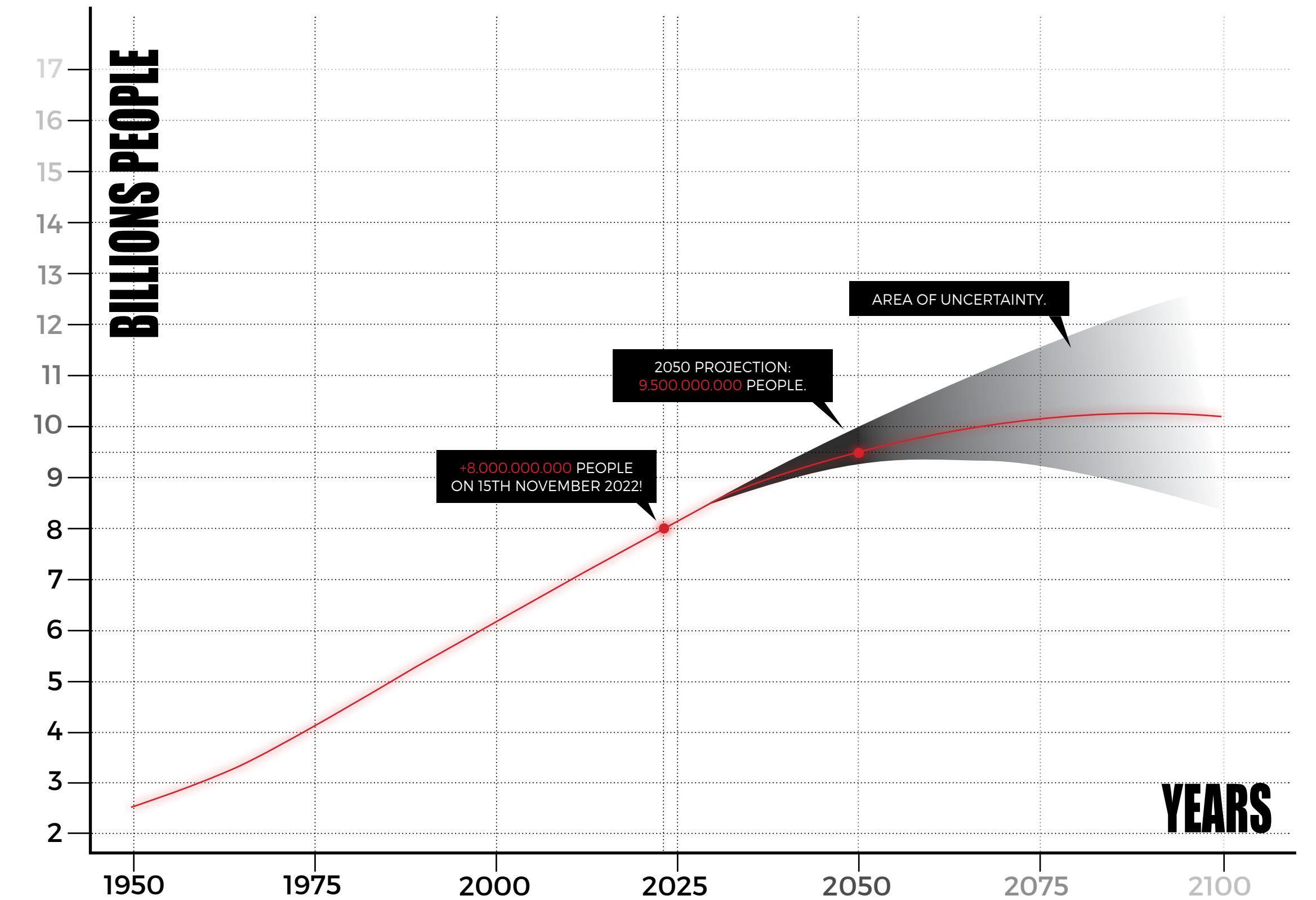
2.1. Between the City and the Rural landscape

On November 15, 2022, the world population reached 8,000,000,000¹.

This historical date, which occurred a few days before I concluded this text, represents a great achievement from the point of view of our race. The news bounced around for a few hours on television programs and on social media channels, in some cases it moved the conscience of some people, positively and

negatively: many started writing about the possibility of seeing a rosy future for our society, others have predicted the decline of our society at least as we know it. Clearly, the truth lies somewhere in between: it's about figuring out how to achieve the former while avoiding the latter. It is not a question of catastrophism, but of a simple application of the logic linked to the expansion of a race from the point of view of Nature.

In fact, it has always been like this and it has been for all the races that have followed one another throughout history, both for those that have dominated the world and for those that have seen their own extinction. For this reason, the achievement of a goal such as that of eight billion people living on Earth at the same time should be a cause for joy, yet it is not. The reasons are two: the first one is simply linked to the spirit that global society maintains towards it, preferring to reason at the level of nationality rather than by global index. We are interested in knowing much more how much Italians are in the world, or how much Indians are compared to Chinese, and this is obviously correct in a perspective in which we feel to belong more to a sub-category, such as our nation of membership. The second motivation, on the other hand, derives from the current pressure that the issue of climate change is putting on the world community, and especially on my generation, which is increasingly



1. United Nations, 2022.

entering the center of participation with respect to the dialogue on possible solutions that in the future we will have to take to reduce our impact on the planet.

One of the most influential phenomena that has marked our millennium is the famous movement of people from the countryside to the city, together with the demographic growth in many areas of the planet. To be exact, this flow stood at 3% in 1800, 13% in 1900 and 50% in the 2000s. Today, standing at 56%, we know that within a few years, around 2030, the world population it should reach something like 8.6 billion individuals, of whom at least five are city dwellers ("Journal of International Affairs" Vol. 65, No. 2, "The Future of the City" - SPRING/SUMMER 2012, pp. 157). In fact, it was only in 2009 that the urban population surpassed the rural one, despite the exponential growth of this figure. This phenomenon is not only linked to the number of the population, but also to the functioning of the cities, the distribution of services, the supply of food and energy and above all the construction of new districts to expand the cities themselves - or found them from scratch. This reality has been produced by the inexorable advance of Globalization, whose markets have caused millions of inhabitants from all over the world to adapt to new life prospects and opt for a different future. Obviously, this is not a homogeneous phenomenon across

the planet: in Europe, the number of individuals of working age is decreasing, against an increase in the average age ("The impact of demographic change in Europe", European Commission, 2021). But we have another fact that tells us something very important: exactly since last year, the year 2021, people living in rural areas have started to decrease². This projection predicts no other trend than the negative one. If it is true that the first figure – i.e. the ratio between the number of people living in urban or rural areas – is of considerable importance, I argue that the second is more interesting: because it tells us about something more specific and is linked not just to a quantity – as if it were some sort of cold unit count – but to a trend. Somehow, it is more easily connected to a different idea of urban reality. More specifically, the statistic on those who live outside urban contexts is a datum that speaks to us of a certain type of future, the idea of which begins to be enriched by a certain quality and a series of characteristics. In this trend, I believe, the strength with which to push the dialogue on the cities of the future must be found, taking into consideration not only the needs of today's citizens, but also what will be the cultural identities that - for the most part - will shape the places of society urban.

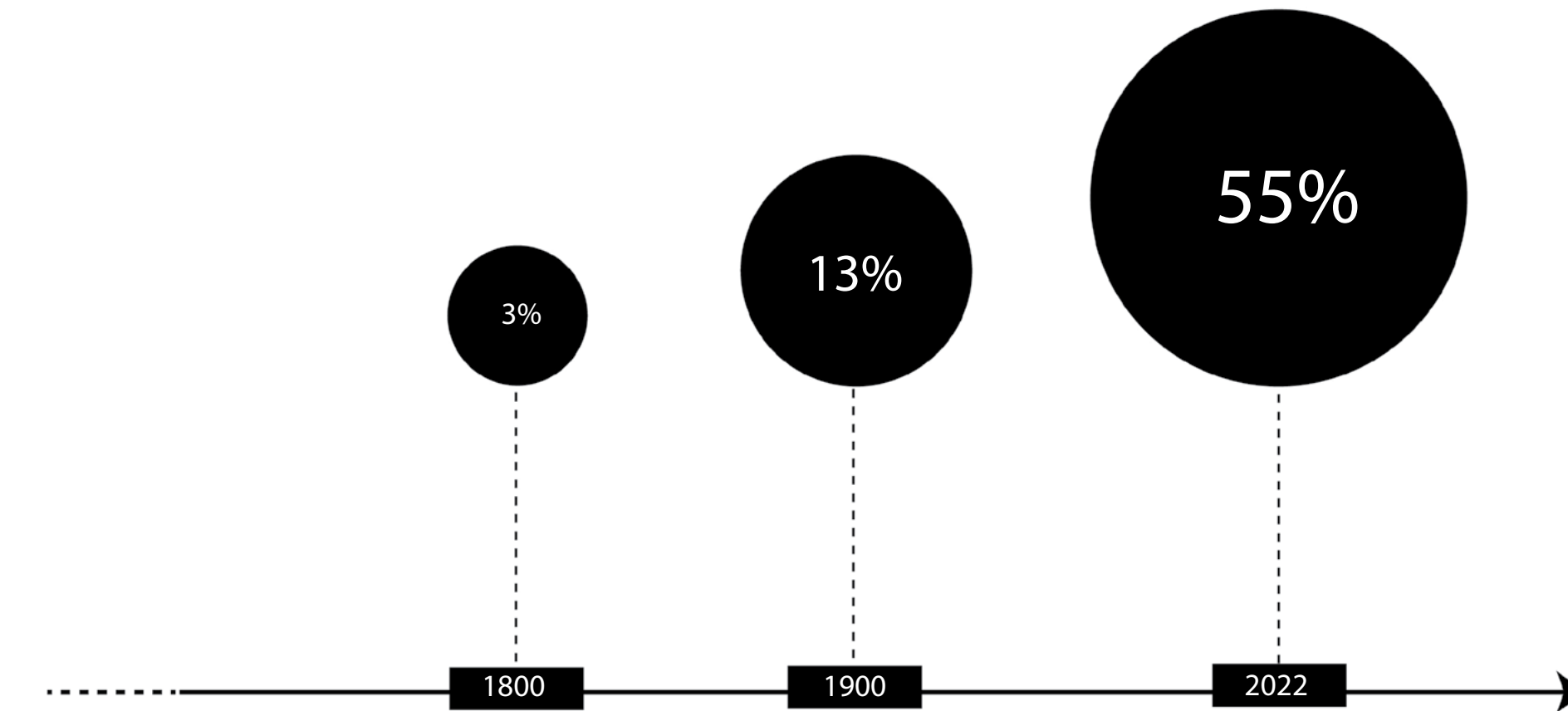
Number of people, life prospects, land, housing and job markets, access to services and transport, price

of living. All these elements have effects on local and territorial governance, setting up models of control and protection that require large amounts of public spending. They have an impact on society and the urban area, and obviously on the ecosystem in general. Ultimately, whether we are in a Megacity of a Superpower, in a small village in Europe or in a rural reality of a developing country, it is clear that the types of construction we are used to inhabiting will inevitably change, because we will all be invested from the need to change the system, whether we are part of it or feel outside it. And, with it, our habits as citizens.

But what are the solutions we are talking about nowadays?

Right now, the dialogue about the possible differences we could make to our urban constructs is extremely full-bodied. More and more discussions are fueled by the concept of "slow city", of intelligent inversion, of "20 minute city" and of any other theory that takes on the burden of redefining the forms of our inhabited centers in the name of psycho- greater physical, combined with the protection of the environment and the sustainability of our means of production. Interesting case studies are the (relatively) new peripheral districts of large cities, aimed at the reception of new urban dwellers or new decentralized workers, of which the

From rural to urban population index.



2. United Nations Population Division, Population Reference Bureau.

East provides many examples. These are the New Towns: dense, fast, hyper-connected. But which, although often better than the pre-existing areas to which they are integrated - from an organizational and spatial point of view - have hardly solved in the past the problem of creating and distributing jobs for their citizens or the cost of carrying out the work itself, the real engine of the New Towns themselves ("New Town Developments in Hong Kong", PETER HILLS and ANTHONY G.O. YEH, Built Environment 1978 - Vol. 9, No. 3/4, New Towns Revisited 1983, pp. 266-277). Therefore, whether it is due to the need to develop pre-existing cities in a different way, impact less on the environment or having to create entire self-sufficient districts, one of the greatest challenges of our century remains that of thinking about how to bring our urban environment back on a human scale and respecting Nature. It is a question of codifying the urban and territorial factors, using a holistic and inclusive interpretation, since implementing a plan that aims at optimizing the life of only a few means implementing a plan that aims at optimizing life only for a period of temporary time. They are the tools that help us consider these challenges as real opportunities to redefine the concept of "living together". In fact, the desire to redefine the built environment today more than ever implies an economic and political reform, which can be implemented by Architecture solely as the "body"

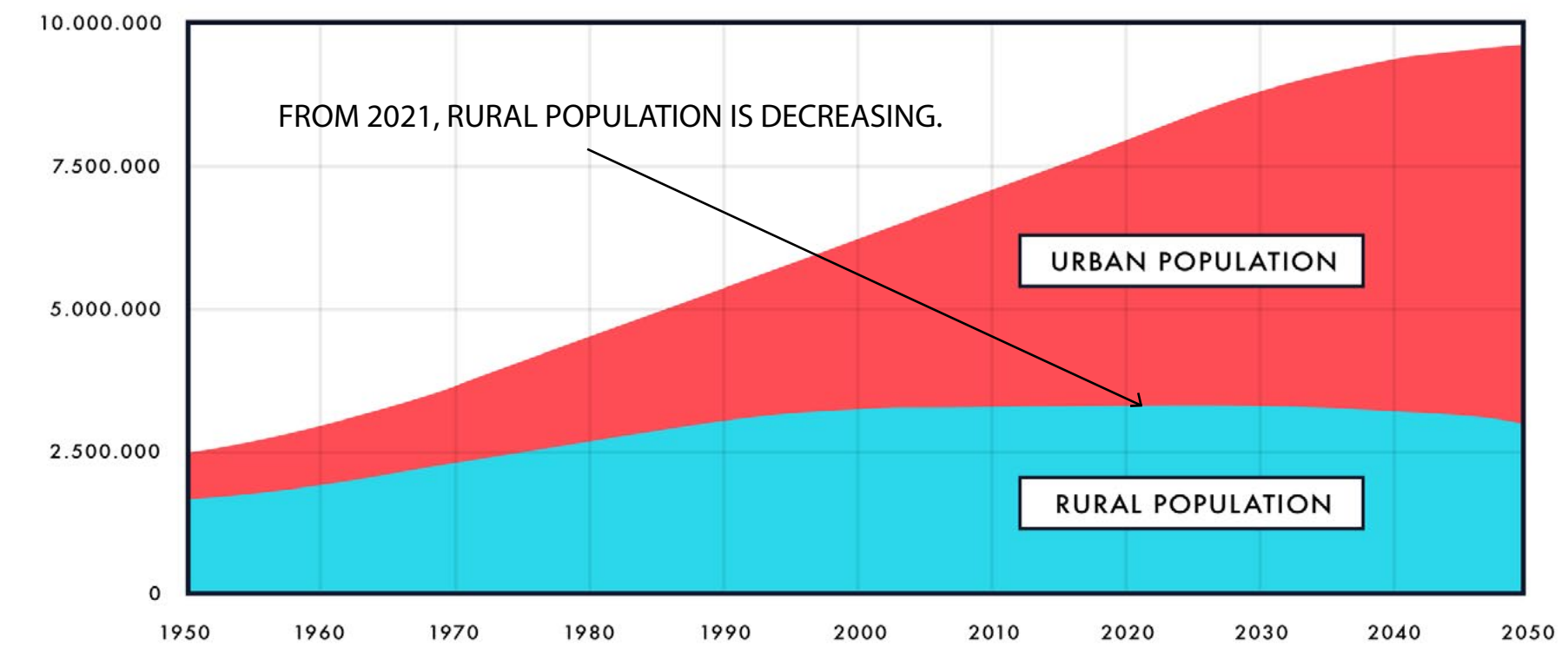
of this same model of change. It is in assigning the previously mentioned priorities, i.e. if and how to build and if and how to have less impact, that we must build a new method to meet the aesthetic and technical needs deriving from the manifestation of Architecture.

2.2. Expanding Cities

To understand the expansion mechanism of a city in 2022, we must necessarily look at the complete situation, starting from a wider zoom: the global economy. What makes the way in which a city expands differently today compared to past eras is that what for now we can generically call "external influence" is becoming more and more predominant

over "internal" motivations. If in more ancient times the first settlements or the most advanced cities expanded, it was above all thanks to the need to create more space due to the normal demographic growth of the civilization of reference. This required that cities adapt to new methods to provide for the construction of houses for increasingly growing populations, or to adapt to new methods of farming or finding food, or even thanks to external stimuli derived from trade. In this millennial situation that has accompanied our race from the beginning of civilization to the invention of the locomotive, the growth of a city was always and in any case obviously linked to the economic one, which took place thanks to progress and thanks to the local ability to evolve be able to compete with adjacent civilizations. Sociologist Lewis Mumford explains this process - and in particular the American one - by telling of the "three migrations" that have shaped the United States of America in the last five hundred years. In the pages of his book "The Urban Prospect", he recounts the phases that shaped America in the last five hundreds years. In the pages of his book "The Urban Prospect", he recounts the phases that shaped America. Paraphrasing the master, if the first American phase, i.e. that of stable settlements, had produced an environment characterized by industrial and agricultural activities capable of making the best use of local natural resources, the consequent

Urban versus Rural Population Growth 1950 – 2050



Source: United Nations Population Division, Population Reference Bureau.

“America of migrations” ended up compromising the initial atmosphere of well-being and sophistication achieved. The three migrations Mumford talks about are a mixture of enterprising discovery of the territory and birth of strategic cities, and finally the unconditional unification of women, men, things and money around financial centres. Mumford poses a question as simple as it is disarming: why have we chosen to live in cities that are psychologically and physically destructive, under the banner of productive action, subject to the God of Money and compromising our well-being?

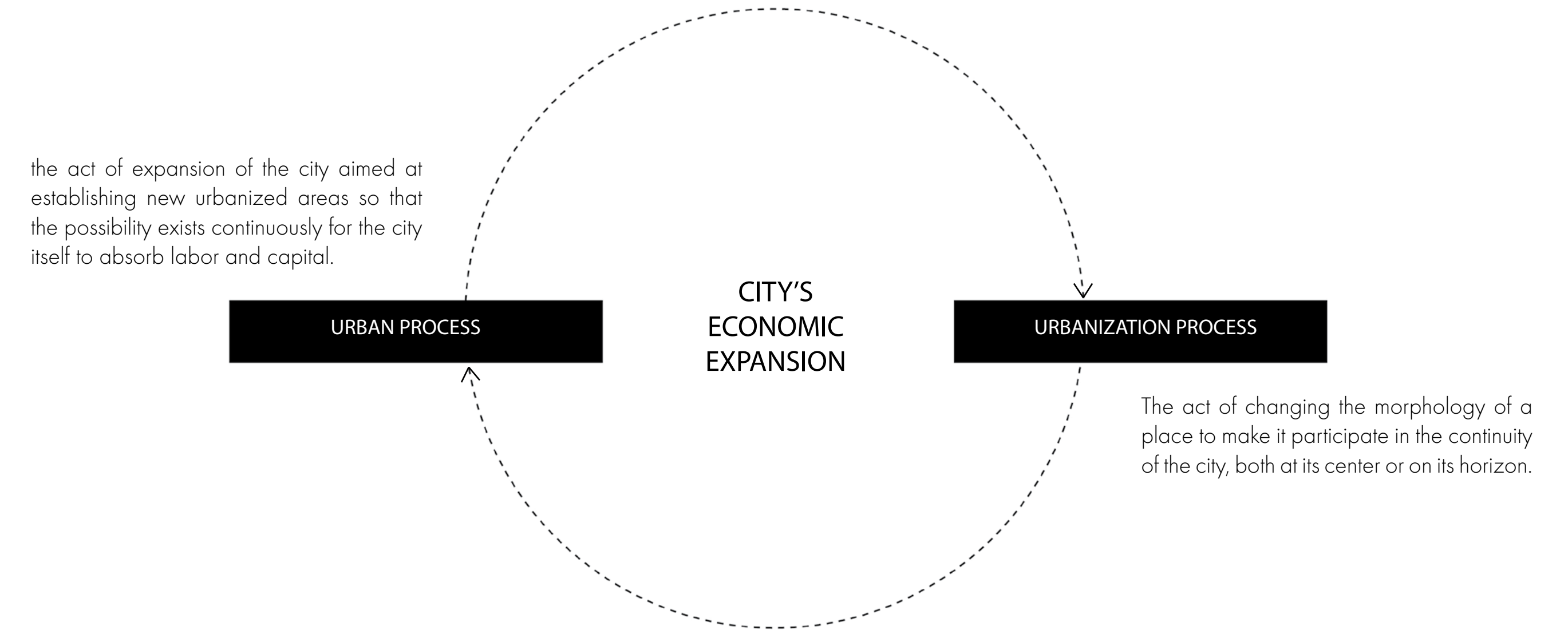
In some way, therefore, the difference between how a city expands today compared to how it did before lies in a new relationship between “space and time” of the city itself, ever faster thanks to the infrastructures that run within an immense sprawl to prolong its economic power. In our era, the city is vigorously fed by flows of money, resources and people who - especially in the case of megacities - come from the global network, and not just from the local situation.

2.3. Megacities

A Megacity is a metropolitan area with a total population in excess of 10 million people³. The term was originally used to refer to the urban agglomerations of the early 20th century, such as London, New York City, and Tokyo. Today, the term is used to describe the world’s largest cities, including Mumbai, Delhi, Shanghai, and Mexico City. Megacities are characterized by their high population densities, large land areas, and complex infrastructure systems. They are often home to a significant proportion of the national population and generate a large share of the country’s GDP. Megacities are also typically centers of economic activity, with a concentration of businesses, financial institutions, and other organizations. The economic expansion of megacities has been a major driver of global economic growth over the

past few decades. The rise of Megacities has been accompanied by the growth of the global middle class and the rise of consumerism. Megacities have also been key drivers of innovation and creativity, as they provide a large pool of talent and ideas. The economic expansion of Megacities has come with some challenges, however. The high population densities and large land areas of megacities can put strain on infrastructure and public services.

If we were to define a criterion for applying or not sustainable development strategies, it would be absolutely necessary to use that of the gravity of the urban situation. From this point of view it is inevitable to look at the Megacities, i.e. those megalopolises which by definition have, as mentioned before, more than 10 million inhabitants according to the United Nations Department of Economic and Social Affairs in 2018 (some rankings attest to +5/8 million), taking into consideration their metropolitan area and not their political borders. It is evident that the multiple problems deriving from exponential urbanization, be they energy, spatial, infrastructural, accessibility, public welfare and so on, add up most to these cities. After all, it is logical to think that with greater urban complexity, the need for sustainable solutions and the difficulty of applying strategies intensify at the same time. The geometry of these giants is absolutely variegated, uneven, and for



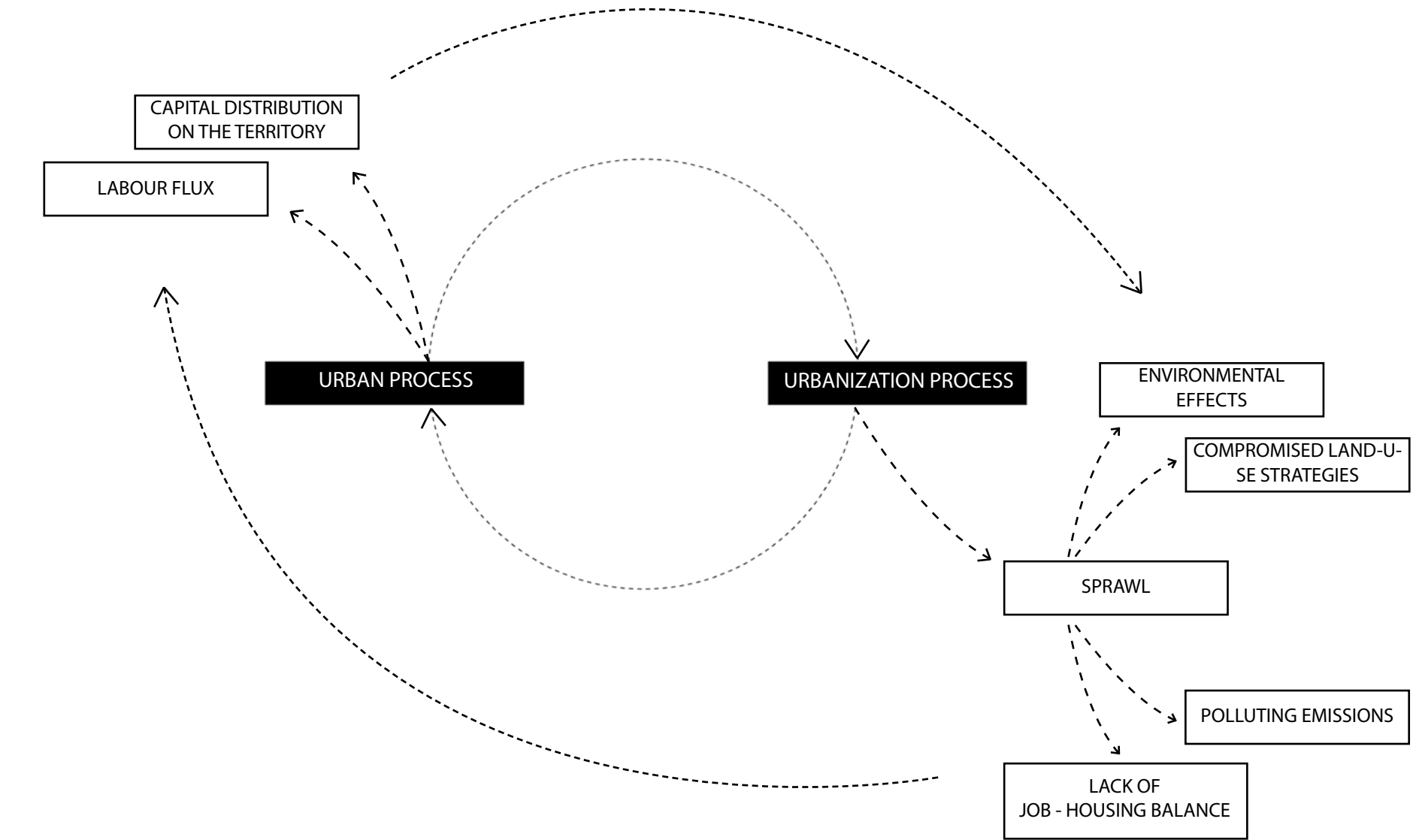
3. United Nations Department of Economic and Social Affairs.

the most part it has several “city centres” although only one is considered the “official” one by the citizens. However, the pattern of their infrastructure tends to tell the opposite, establishing different groups of districts with their own center (central business districts, or CBD), on which they depend economically and functionally. This continuous fusion of agglomerations also involves cultural contaminations that are impossible to disentangle later (“Megacities: Setting the Scene”, Daniel Safarik, Shawn Ursini and Antony Wood - CTBUH Journal - No. 4, Special 2016 Conference Themed Issue: Megacities 2016, pp. 30-39).

Pearl River Delta in China represents the largest agglomeration of human beings in history, with a population of about sixty-five million people, an area of 56,000 square kilometers - or comparable to the whole of Denmark - and a GDP per capita that would be twelfth to world if it were a nation (and 22nd by population), i.e. superior to Australia. In this specific case, the fact that it is a special administration with a series of legislative differences and a sort of pseudo-national border demonstrates how such powerful economic entities can somehow precede and influence the political aspect, and not vice versa. The third Megacity would be that of Tokyo⁴ (albeit with some administrative differences related to the status of the region as it is connected to different prefectures),

demonstrating that they are not totally ungovernable: on the contrary, Tokyo represents a case absolutely positive politics and high integration. Furthermore, the comparison of urban figures between different Megacities demonstrates that there are substantial differences: Mumbai, the eleventh Megacity by population has nearly forty buildings taller than 200 meters; Dhaka, thirteenth, none. These construct-level differences are specific to the terrain, the natural obstacles, the geometry of the city over the years, but also related to political, cultural, economic and technological issues. For this reason, unambiguously defining these urban agglomerations is extremely difficult. On the other hand, we have a certainty regarding their future development, linked to the issue of demographic growth mentioned above: if ten years ago out of 3.5 billion people living in cities, 2.6 billion of them were in developing countries (73%), in 2050 they will be 7.3 and 5.2 billion respectively (83%)⁵. Therefore, the growth rate of developing countries stands at 15 times that of developed countries⁶. In fact, the urban density of the 45 Megacities analyzed in the study stands at 963 people per square kilometre. This datum, if specified for different zones, contrasts with the growth rate of the extension of the urban area, which is generally higher than that of population growth. For example, the Shanghai Municipality doubled the extent of its urbanized area from 2000

to 2010 but also lowered its density from 8700 to 6900 people per square kilometer, despite preferring a vertical development strategy. By contrast, China generally increased its population by 130 million people over the same period, while leaving density unchanged at about 5,300 per square kilometer by building in areas where the population rate was declining (World Bank, 2015). Clearly, these data are influenced both by territorial issues, by cultural issues, and by citizens’ habits. The United States of America, for example, with a general average density of 110 people and one of about 560 in the “Megacity” of New York-Philadelphia, records a shift of generations - especially the baby-boomers - outside the contexts highly urbanized. Despite this, younger generations prefer an urban lifestyle, creating an expectation of +100 million people (+40%) in urban areas by 2050 – making the US the only developed country that can foresee a massive future increase in the built environment. Obviously, everything has to be contextualized according to the specific orography and geography of the reference area, which in the case of the United States has made it possible to create self-centric sprawl even in semi-rural areas, redefining the CBD market in highly urbanized areas. Although I am skeptical of the very definition of “developing country” and remaining critical of many of the models pursued by the superpowers, it is



4. CTBUH, 2016.

5. United Nations, Urbanization Prospect 2018.

6. Angel, 2012.

inevitable to think that the future of the world resides in the economic places of the megacities, i.e. the true centers of power and of the vastest and most complex aggregation of human beings, providing a further need to understand how sustainable strategies can be used for the defense of the territory and citizens.

Sustainable development means active and intelligent planning, looking to the future and focused on the "shape" of the inclusive city. Without the introduction of this ideology within the architectural panorama, especially that of developing countries, what are now serious threats from a social, environmental and economic point of view will become serious and indelible wounds on the skin of citizens, bringing entire generations to their knees. But what role does the shape of cities play?

It is about proximity between the actors of the urban context, whether they are the citizens who live there or the architectural figures that compose it. Generally, the densest areas of the planet have the fewest tall buildings, promoting slums and slums. On the other hand, most of the strategies of governments to resolve the issue is to opt for the opposite strategy: the repetition of a building model that can be described as the "tower in the park", tall and popular, low cost, and inserted in a pattern of wide streets as in Le Corbusier's vision. This model has traveled through history and time, from

Europe in the 1920s but really applied only after the Second World War, passing through America in the 1950s with its superhighways heading towards infinity, up to today's Asia. Despite the path, this model is criticized for not solving the social alienation and cultural destruction created by, among others, also its architectural opposite, the "slum". It seems evident that it is not, in fact, the specific architectural typology that is the discriminating element between a city that works and one that does not. Instead, it is the relationship and harmony between these typologies and their urban, economic and social context that represent the true and only reason for the success of a metropolis. Finally, thinking that the study of Megacities is not important for any other type of city, even the smallest ones, is not only ill-advised, looking at the trend that leads to the growth of the built environment, but potentially dangerous. The effect these cities have on the rest of the world, although they are not yet home to most people, is enormous: this is because they are home to most of the economic power.

The factors used to study the behavior of cities and judge their livability are hundreds. Especially with regard to climate change, some of them are used as real "theoretical pillars" to be able to investigate the work of the past or the operations of the future in the architectural and engineering fields. With

respect to these disciplines, understanding how their implementation impacts on the internal and external environment of cities is extremely important. Nowadays, especially at the media level, some of these factors are often used to narrate and connect the multiple problems that afflict our age. From global warming to the melting of ice, from the multiple shortages of food and water that are recorded throughout the world to the difficulty of many cities to provide adequate living standards. These are just some of the topics that increasingly appear in the media.

But why are increasingly large cities turning out to be a problem for themselves and for the ecosystem?



DELHI - AERIAL VIEW

DUBAI - AERIAL VIEW

MEXICO CITY - AERIAL VIEW

3.

INCREASINGLY BIGGER CITIES:

The side-effect of the Global Market-oriented Economy.

According to the concept of market-oriented economy, the expansion of the city takes place through two distinguishable but closely connected processes. In particular, “the urban process” is an act of expansion of the city aimed at establishing new urbanized areas so that the possibility exists continuously for the city itself to absorb labor and capital. On the other hand,

the “urbanization process” is the act of modifying the morphology of a place to make it part of the continuity of the city, be it at its center or on its horizon. From an objective point of view, these two processes would not be harmful in themselves. The problem lies in their method of application and in the main reason why they are put into practice: to increase profit without improving people’s lives and impact on the planet. Since this mechanism needs to obtain the maximum yield at the lowest possible price, it is clear that the uncontrolled expansion of cities takes place above all in those areas where it is more convenient to build, i.e. in those areas where it is more convenient to “buy” work and displace poor social classes. Through the modality and speed with which these two phenomena manifest themselves, the problem of sprawl is getting bigger every day, compromising both the innermost areas and the outermost areas of the big cities of our time. But that’s not all: other climatic, economic and obviously social phenomena depend on these phenomena. Understanding them within the narrative of our era means keeping in mind all kinds of consequences deriving from the hyperproduction and expansion of cities within a complete and adequate framework. Today, 4.4 billion people live in the city. In 2030, there will be about 600,000,000 more. In 2050, with a forecast of almost ten billion living individuals on Earth, they will reach 70%⁷. It is clear that today’s challenge is to understand how to ensure that this phenomenon

can produce well-being by setting a better standard of living in a sustainable perspective, above all bearing in mind that already today around 80% of the world’s Gross Domestic Product (GDP) is produced in urban contexts (World Bank). Despite this, however, we are far from securing access to this kind of future.

Paraphrasing Lewis Mumford again, if it is true that the real economic power resides in the cities, why are the majority of them unable to ensure a decent level of habitability regardless of the social extraction of their inhabitants?

The speed at which cities are currently growing seems to go in the opposite direction to what we could define as sustainable development and set up in such a way as to promise an adequate level of accessibility and equity. For all this to work, it is not just a question of building, but of “connecting” quite quickly everything that the new part of a city aims to introduce to improve the life prospects of its inhabitants, including affordable housing, base, infrastructure and above all work. To date, all this turns out to be quite unlikely: in the next 8 years alone, the world’s urban area will grow by another 1,200,000 km², making the increase factor in land consumption exceed by at least 50% compared to the real population growth⁸. This is what is called sprawl, and it is the last thing we need to be able to set up a growth model on a human scale and sensitive

WE WILL HAVE TO PRODUCE MORE. WE WILL HAVE TO PRODUCE BETTER. WE WILL HAVE TO PRODUCE DIFFERENTLY.



7 - 8. The World Bank, 2022.

to what Nature is asking us to do and above all to what it is asking us to do. do not. To get an idea of what the expansion of cities entails, just think that they represent two thirds of world energy consumption and produce at least 70% of greenhouse gas emissions. Furthermore, just under 2,000,000,000 people (almost one in four) live in an high-risk flood zone⁹. Urban expansion therefore implies that we talk about what is “inside” and what is “outside” of a city: in fact, urbanization is a process that puts two entities in contrast, namely the growth of the population urban area and the transformation of the urban area, whether it is already part of the metropolitan fabric or whether it is still linked to the rural environment. But this physical expansion, as has already been said, does not perfectly follow the urban population growth rate. The conversion of soil into urban land affects biodiversity, climate (both locally and globally) and people’s lives, as well as the way they are actually forced to live in the urban construct. “Expansive urban growth is strongly linked to higher per capita urban greenhouse gas emissions, habitat fragmentation and biodiversity loss, inefficient use of natural resources, and loss of agricultural lands.” (Natures, 2022). This concept can be summarized with the idea of Urban Scaling, which refers to the fact that the major characteristics of a city, such as the production of emissions or its urban extension, are related to the

population through a scalar relationship. This is due to the fact that, generally, an increase in the urban area corresponds to an increase in national income, and the latter is in turn correlated with population growth. This mechanism, expressed here in an extremely reductive way, is at the basis of what the market-oriented economy represents in a globalized world.

3.1. INCREASINGLY POPULOUS CITIES: a Density issue.

The reason why the increase in the population of a city can be a problem to be solved through a rewriting of the traditional models of expansion, therefore, is that the greater the size of the problem corresponds to the greater complexity of the solution. The explosive growth of urban populations poses enormous risks from many points of view, including social, environmental and economic. Especially as regards the so-called developing countries, the most urgent of the problems is that of infrastructure and opportunities in the area, both of which are already lacking today. To address these problems, there are many initiatives at a global level. The eleventh point of the United Nations’ Sustainable Development Goals requires, together with the various global goals to be achieved by 2030, for example, to build “inclusive, safe, resilient and sustainable cities”. Since the world’s urban population will grow well beyond 2030, it is obvious that the effects of climate change will be increasingly risky for the integrity, sustainability and resilience of our urban areas well beyond this date. Furthermore, the majority of urban growth Without this broadened and holistic vision it will be impossible to tackle every problem with adequate strength, starting from the question of the spatial distribution of people in urban areas, an element extremely connected to various phenomena, such as climate-change-induced flooding, heat waves, malaria epidemics,

**WE WILL HAVE TO
PRODUCE
MORE.
WE WILL HAVE TO
PRODUCE
BETTER.
WE WILL HAVE
TO PRODUCE
DIFFERENTLY.**



9. FAO's data.

food security, biodiversity, and freshwater availability.

Returning to the relationship between the expansion of the city and the increase in the urban population, it is also important to specify that, even if it is the nations with a medium-high level of wealth that record a greater increase in the urban area, it is the poorer nations that have the highest increase in urban population. Furthermore, it is precisely in these countries where the fastest reduction of green areas deriving from urban expansion is recorded. Generally, a negative meaning is associated with an increase in population. Same thing works for population density. People tend to prefer areas where population density is minimal, despite the majority of local policies and global regulatory agencies insisting on sustainability and the benefits that higher density can provide. Indeed, it is not true that a high concentration of people corresponds to a reduction in the livability levels of a place. On the contrary, urban agglomerations with a certain level of density can positively influence the individual impact of each inhabitant on the environment, improve the mobility of the area, enhance and enrich the cultural dimension of a place and so on. In fact, density is a combination of physical structures and the actual resident population (Whitehead, 2008). In 2011, Turok et al. instead they give a definition of density linked to the potential that

it may have in the territory: it is a tool that can allow us to access wider ends, such as connectivity, social vivacity and convenience. There are many potential benefits to increasing the density of population in urban areas. One benefit is that it can lead to more efficient use of resources, since more people can be housed in a smaller area. This can help to reduce the overall environmental impact of the city, since there would be less need for transportation and other infrastructure, acting positively on emissions and traffic, especially private traffic. This situation would also favor the possibility of undertaking a “transit-oriented system” (TOD) model, i.e. an urban concept in which public and pedestrian traffic is optimized to shorten travel times, acting precisely on the density of people inside the well-defined areas. This concept would also make it possible to reduce energy use and urban air pollution. Additionally, denser population can lead to increased social and economic interactions, which can boost the overall vibrancy of the city. Finally, it can also help to create a sense of community and belonging among residents.

Despite this, due to the rapid expansion of large cities, gentrification and sprawl, this horizon seems far from becoming reality. Rode et al., in 2014, asserts that the global urban population will double in the next 35 years, while the extension of the urban area will

take less than twenty, if maintaining the current pace¹⁰.

3.2. INCREASINGLY WARM CITIES: an Urbanization issue.

One of the most significant indices of urban realities (connected both to architectural elements and to the use made of them) is represented by the Urban Heat Island (UHI). The UHI, of which there is a vast literature,



HOUSTON COUNTY BY M. STROZIER



LOS ANGELES



TOKIO

10. “Accessible Cities: from Urban Density to Multidimensional Accessibility” by James Waters

is substantially the portion of the urban context affected by an increase in the average temperature, due to the climatic, energy, natural, geometric and use characteristics of a place. This phenomenon, present in most cities (with differences depending on the geographical location, the time of year and the extension of the urban area), is connected to many aspects of the functioning of urban centres. From the point of view of health up to that of energy processes, the UHI has an impact on the life and health of people and on the cost of functioning - not only energy - of the city system. A study carried out in Jakarta in Indonesia found, for example, that depending on land use (LU), the UHI changes in size and intensity. It has been estimated that with a 25% increase in urban area, the UHI will grow by 5% (about 43 square km). The report also suggests that adding 58%, 95% and 440% of vegetation would result in decreases in UHI of 255, 289, 466 square kilometers, respectively ("The Integrated Wrf/Urban Modeling System And Its Application To Monitoring Urban Heat Island In Jakarta, Indonesia", Laras Tursilowati, Josaphat Tetuko Sri Sumantyo, Hiroaki Kuze and Erna S. Adiningsih, Vol. 6, No. 1 - January to June 2012, pp. 1-9). These numbers demonstrate how the applications of techniques limited to the territory in particular are necessary for the better functioning of the cities of the future. Furthermore, depending on the case study, there

are variations and exceptions to be measured in terms of which long-term planning should be implemented.

The amount of factors determining these and many other urban phenomena is vast and the proportion between them is often not directly linear (note the amount of vegetation needed to decrease UHI in Jakarta). Some of these strategies can be divided into stock compartments. For example, the control and increase of biomass and the care, development, distribution and increase of vegetation, but also the increase of the albedo of surfaces, the control of the aspect ratio of urban canyons and the thermal performance of buildings (materials, porosity, proportions and so on), sustainable mobility, climate control, reduction of energy waste, zoning and both capillary and large-scale planning systems ("Developing Climate Change Adaptation Strategies: A Risk Assessment and Planning Tool for Urban Heat Islands in Montreal", Gregory R.A. Richardson, José Otero, Julia Lebedeva and Chee F. Chan, Vol. 18, No. 1, Supplement: Canadian Planning and Policy - Aménagement et politique au Canada, 2009, pp. 74-93).

In general, warming trends in cities are influenced by both large scale climate processes and local scale urbanization. Currently, more than 2,000 large cities

worldwide have a mean surface warming trend in their center that is 30% greater than in their adjacent rural area. The probability that this phenomenon will increase is extremely high due to climate change and the increase in the global urban population. It is estimated, however, that in China and India, this phenomenon is largely attributable to urban expansion, and not to climate change. For example, in China, the urbanization-induced warming accounts for 20% to 50%¹¹ of the overall warming in area that have experienced fast urbanization. Currently, 1.7 billion people live in the 520 most populous megacities in the world (more than 1,000,000 inhabitants), where there is a surface warming trend 47% higher than the trend of the rural background. Within eight years, there will be 2.4 billion people living in cities of over one million¹². This means that their exposure to a higher temperature and in any case artificially produced, i.e. not necessary for the human body, will be inevitable. Furthermore, since there is a direct connection between the extension of the UHI and the extension of the city, we can assume that this phenomenon is destined to worsen over time.

RESOURCE EXHAUSTION.

ECOSYSTEM CRISIS.

CLIMATE BREAKDOWN.



10 - 11. "Surface warming in global cities is substantially more rapid than in rural background areas" by Zihan Liu, Wenfeng Zhan, Benjamin Bechtel, James Voogt, Jiameng Lai, Tirthankar Chakraborty, Zhi-Hua Wang, Manchun Li, Fan Huang & Xuhui Lee

3.3. INCREASINGLY DESTRUCTIVE CITIES: The price of our Food production system.

The expansion of the cities corresponds to a conversion of the adjacent lands, putting the ecosystem in serious danger. This process is not directly proportional: the expansion of the urban

area by a certain amount corresponds to a greater measure of space, energy and natural resources, not to mention the economic price of the operation. For this reason, in some way, we can say that the global market-oriented economy is indirectly connected to the destruction of the environment as it enhances the process of uncontrolled expansion of cities. Starting from the basic concept that urban expansion derives from the conversion of “free land”, this means that a portion of it belongs to the amount of land that is still cultivable. As previously mentioned, the year 2050 represents a sort of tipping point as the future amount of people living on earth, just under ten billion individuals, will require a global food production capacity equal to 60% more (FAO).

The numbers relating to the current reality of the intensive system on which the production of food in the world is based make this goal far-fetched. It is precisely in the intensity of the production system that the main cause of the destruction of the ecosystem must be sought, and not simply its long-term unsustainability.

Currently, 2.5 billion people live in a “water stressed area”¹², i.e. an area in which there is difficulty accessing water for a certain period of time. Generally, these areas are affected by population growth and economic growth that require greater

use of water. Currently, 70% of fresh water that can be used throughout the planet is used by agriculture, 23% by industry. A quantitative datum to give an idea of the quantity of water necessary to sustain the food production process: between 1996 and 2005, agriculture consumed 8,300,000,000 cubic meters a year, more than 90% of the overall fresh water available. It is easy to understand how urgent it is to act before our only livelihood system collapses due to the scarcity of resources on which it is based. In fact, the structure of the global food production system is based on the degradation of natural resources and falls on the poorest countries of the world. For this reason, with current production methods and rhythms, it is unthinkable to imagine producing the quantity of food that the near future will begin to require within a few years. This situation began to be decisively compromised following the end of the Second World War, which marked the beginning of an era in the technical and economic fields, setting a new model of progress and obviously ushering in the Era of Globalization. The characteristics of this historical period have therefore allowed for an increase in the population, massive urbanization and a change in the traditional diet, including less and less native foods and foods derived from an increasingly intensive production system. The problem of food production is linked to that of architecture and urban planning when the intensity and

12. GrowingBlue, 2015.

13. Hoekstra et al., 2012.

RESOURCE EXHAUSTION.

ECOSYSTEM CRISIS.

CLIMATE BREAKDOWN.

78% OF GLOBAL OCEANS AND FRESHWATER **POLLUTION** IS CAUSED BY FERTILISER AND PESTICIDE USE.

50% OF WORLD'S **ABITABLE LAND** IS ALREADY CONVERTED TO AGRICULTURAL USE.

70% OF GLOBAL WATER WITHDRAWALS ARE MADE FOR AGRICULTURAL USE. INSTEAD, **3.2 BLN PEOPLE** LIVE IN AREAS WITH WATER SCARCITY.

86% OF THE **28.000 SPECIES** IN DANGER OF EXTINCTION ARE AFFECTED BY AGRICULTURE FACTORS, RESULTING IN BIODIVERSITY LOSS.

21% OF **REDUCTION** SINCE 1960 IN TERMS OF **AGRICULTURAL PRODUCTIVITY**.

28% GREENHOUSE GAS EMISSIONS ARE CAUSED BY **FOOD INDUSTRY** (LAND CLEARANCE, TRANSPORTATION, ECC).

speed of land use conversion irreversibly deteriorate the delicate balance of the ecosystem. After all, in a reality where agriculture occupies about half of the planet's habitable surface, it becomes clear that the phenomenon of the expansion of cities turns out to be a problem. Furthermore, Agriculture currently uses 69% of the world's abstractable freshwater, while the entire food system is responsible for approximately 30% of greenhouse gas emissions (FAO).

To measure the current state of the impact that the global production system has on the biosphere, there are the so-called "9 Planetary Boundaries", i.e. nine safety limits beyond which one must not go to ensure the quality of life as we know it. Of these nine, four have already been overcome: biospheric integrity, the biogeochemical cycles of nitrogen and phosphorus, and climate change. For this reason, today we can talk about at least three scenarios that are literally taking shape before our eyes: first of all, the resource exhaustion. Among all the resources currently at risk, it must be mentioned that 78% of the pollution of the oceans and fresh water comes from the fertilizers used for food production. Additionally, half of the habitable land on the planet is currently used for agriculture. The second scenario is that of the ecosystem crisis: let's compare the fact that the 70% of water withdrawals are made for agricultural use, while 3.2 billion

people live in areas with water scarcity. Additionally, 86% of the 28,000 endangered species are found in this state due to biodiversity loss from agriculture. Finally, the climate breakdown: as already mentioned, 28% of greenhouse emissions are caused by the food industry, while since 1960 we registered a 21% reduction in terms of agricultural productivity¹⁴.

4. WHY CHINA

The main reason that prompted me to consider the example of China is that it represents a formidable case study regarding the rapid transformation in the urban environment in the Globalization Era. The reality of Chinese cities demonstrates what incredible possibilities are potentially feasible through a powerful economic system capable of channeling the stimuli derived from the global market.

Furthermore, the multiple contradictions and diversities that make up the architectural, spatial and social mosaic of this nation are of absolute interest for the study of what can and must be done in the future to improve life inside and outside the urban environment.

14. Data InFARM.



GUANGZHOU



SAO PAULO BY R. PAIVA



HONG KONG

5. CHINA'S EXPANSION: Progress and change of spatial scale.

Starting from the concept of “urban process” and “urbanization process”, they represent the two processes that shape our cities, fueled by the global economic model. China represents a prime example in terms of expansion due to the speed of urbanization that distinguishes it from other superpowers. The Chinese economy has grown by 10% every year since 1974 until 2004, generating

an ever-increasing demand for land to be urbanized and concern for the integrity of rural areas, being that two-thirds of China's total land is not particularly suitable for this type of use. This general concern is justified by the need to find areas for food production, especially for a rapidly growing population.

After China's opening up to the global market, the expansion process of Chinese cities has demonstrated broad power and extremely high speed of adaptation. In 1984, China had 8842 square kilometers of built-up area, spread across 295 cities. Twenty years later, the built-up area amounted to 23,943 square kilometers spread over 287 cities, while the amount of arable land per capita decreased from 0.15 to 0.1 hectares.

From 2000 to 2015, the urban population growth of China was the largest in the world. The urban expansion from 2001 to 2018 was also the largest, accounting for 47.5% of the total urban expansion in the world (9% for USA, 3.6% for India)¹⁵. Due to the rapid economic growth in this period, China invested many resources into infrastructure construction for advancing the urban living environment. With the advent of the housing market in urban areas and that of arable land, together with the privatization of land, the number of owner-investors increasingly opted for different, and above all larger, housing solutions.

Furthermore, the reduced enforcement of restricted mobility laws has allowed many people to move around urban areas, aided by the growing right to use land for commerce, tourism or entertainment. These were the natural responses to an economic system that was changing very quickly and a growing and increasingly strong market, which began to shape Chinese urban areas at least as much as the law and urban plans could do. This mixture of commercial and institutional forces has modified the Chinese territory and produced cities of enormous dimensions inhabited by millions of citizens, including those from abroad, attracted by the strength of the state's economy.

As already mentioned, studies on urban density in relation to productivity, however, show that it is not true that a greater number of people within the city corresponds to greater productivity. There is a vast literature on the subject: Ciccone, 2002; Ewing, 1994; Glaeser and Kahn, 2004. The reality of the facts demonstrates in fact that the global economic model develops cities of different dimensions, and that depending on the extent of the communication routes, of the transport of goods and people, and with respect to many other factors, it is more instead, it is congruent to change the density of people – and not their quantity – to maximize productivity. China, which in 2001 now had 43,600 square kilometers

**DEMOGRAPHIC
EXPLOSION.
RAPID
URBANIZATION.
UNCONTROLLED
SPRAWL.
SOCIAL AND
INCOME
INEQUALITY.**



15. An assessment of urbanization sustainability in China between 1990 and 2015 using land use efficiency indicators, NPJ - Sustainability, 2021.

16. “Dramatic uneven urbanization of large cities throughout the world in recent decades”, Nature, 2020.

of built-up area, has however reduced its population density allowing rapid sprawl of its cities. If the annual urban expansion coefficient stands at about 7%, the population increase remains stationary at about 4%¹⁷.

These data demonstrate that sprawl supports an absolutely unsustainable economic expansion mechanism for a nation like China, with more and more inhabitants but less and less land.

Also from the point of view of emissions and pollution, China records the same trend confirmed for other areas of the planet. In many developing countries, as already mentioned, urbanization is often related to higher emissions resulting from increased levels of energy consumption and needs. However, beyond a certain level of per capita income, as people move into more densely populated urban spaces, their environmental footprint decreases. Urban density, therefore, tends to reduce the intensity of energy consumption of transport, infrastructure and housing (World Bank Commodity Markets Outlook).

6. DENSITY VS ACCESSIBILITY

Addressing the issue of population density to achieve the best possible situation in terms of optimization of the urban environment is a winning concept that, on the other hand, is not possible to apply in the same way in every urban context, regardless of its characteristics. This is because not only most of the scientific evidence is extrapolated predominantly from the “North” of the planet in general, but also because the more “South” areas of the World, i.e. in developing countries,

experience a very rapid evolution of the context urban and with it that of society as a whole. The density factor, therefore, is not a one-sided tool applicable to every reality. Just think of the large number of people isolated in the slums, where there is a high density of people but also a substantial impossibility to provide adequate services and jobs. In these cases, the use of the concept of density alone is not enough because the spatial and social characteristics of these areas are linked to an “informal” and often illegal situation, as well as insensitive to any type of rationality derived from a systematic and gifted urban planning of techno-managerial and market tools which, in more “stable” areas of the planet, would work due to the presence of a pre-existing social order (Watson, 2009). Density therefore represents a numerical factor that varies according to the variables connected to the specific context, and for this reason it is possible to find a better concept to refer to the general improvement strategy of a place, broader and conceptually more applicable. Density, being substantially a relationship of quantity, can therefore be the basis for the construction of a concept which is instead capable of referring to the objective qualities of a place. For this reason, we want to focus on something that can be based on population density, but that has the conceptual strength to refer to other factors as well, such as the amount of work, housing, price controls,

**DEMOGRAPHIC
EXPLOSION.
RAPID
URBANIZATION.
UNCONTROLLED
SPRAWL.
SOCIAL AND
INCOME
INEQUALITY.**

+4% CHINESE ANNUAL
DEMOGRAPHIC GROWTH RATE

+7% CHINESE ANNUAL
URBANIZATION RATE

47.5% OF THE URBAN EXPANSION IN
THE WORLD BETWEEN 2001
AND 2018 WAS IN CHINESE CITIES.

+7% CHINESE ANNUAL
URBANIZATION RATE

17. “Density effect and optimum density of the urban population in China” by Hongjian Su, Houkai Wei and Jian Zhao, Urban Studies Vol. 54, No. 7 (MAY 2017), pp. 1760-1777 (18 pages).

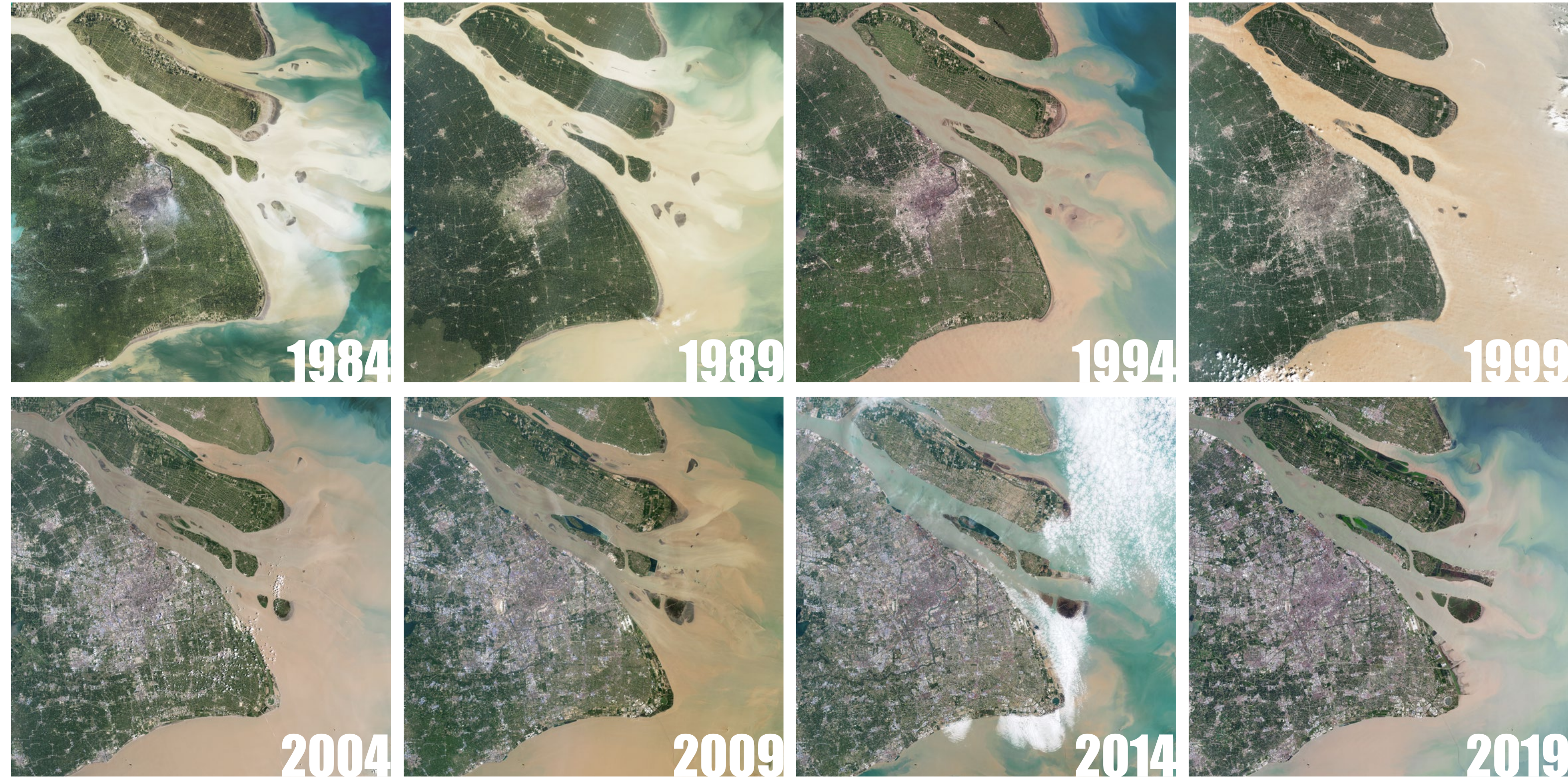
mixed land-use, access to services and education, and so on. **We call this concept “Accessibility”.**

There are various levels of accessibility as the factors now in play have increased, being however able to act in a more capillary way and more sensitive to the specific context than the density index alone can do. It is clear that there is a strong correlation between density and accessibility, as the former makes it possible to optimize the proximity of people and services and to control the frequency of public transport. Furthermore, density and mixed-use development are concepts that can be integrated with each other, being able to exponentially optimize the efficiency of a place. Density, after all, can lead to problems related to, for example, access to housing, creating too high a market demand and driving up house prices. In this sense, the concept of accessibility acts in such a way as to confront all these issues directly and trying to limit the risks that a high density can provide. We connect accessibility to a list of elements that would not be possible to structure solely thanks to density. First of all, the concept of accessibility can be translated through legislation, as it refers to the ability of individuals to access not only physical places, but also services and jobs, thus being able to quantify the general “well-being” of a place. Secondly, accessibility takes into consideration the nature of a static place,

and not a dynamic one, based on the possibility of access to transport in places where there are different types of population, such as the native population and the “floating” one. Furthermore, accessibility refers to sustainable models which, in order to be such, must also refer to the social dimension of the construct, and not only to its quantitative characteristics. Ultimately, if the density represents an important indicator for the optimization of the natural and artificial resources of an urban context, the concept of accessibility allows to structure a complete and sensitive planning to the specific aspects of a place, implementing control and improvement strategies of life to protect the weakest and most marginalized classes, victims of the uncontrolled urban expansion deriving from the global market.

6.1. SHANGHAI

Since the implementation of the hukou system in the 1950s, the city of Shanghai has experienced a significant expansion in both population and size. The hukou system, which is a form of household registration, has allowed the Chinese government to better control the movement of people within the country and has resulted in a more centralized population. As a result of the hukou system, the population of Shanghai has become more concentrated and the city has experienced a significant population growth. Between 1950 and 1980, the population of Shanghai more than tripled from 3 million to 9 million. This population growth is largely due to the influx of migrants from other parts of China who were attracted to the city by the promise of employment and better living conditions. The hukou system has also resulted in a more urbanized population, as people are less likely



to move to rural areas where they would have to give up their hukou. The expansion of the city of Shanghai has had a number of implications for the city's infrastructure and social fabric. The rapid population growth has put a strain on the city's resources and has resulted in a number of problems such as overcrowding, traffic congestion, and air pollution.

Between the 1990s and 2000s, if one had had to think of the concept of metropolis, New York, London and Tokyo would have first come to mind. Many scholars wondered if and how Shanghai could have become at the same level as the others, when China still had 70% of the population located in rural areas. But it was also known that China's future was inextricably linked to the prosperity of some of its cities, including Shanghai. The government's efforts to make it a regional technological and financial hub have undoubtedly achieved their goal. As already mentioned, the question of economic expansion creates a mechanism of continuous attraction between wealth and people, then defining their location in space and influencing the layout of cities. The city of Shanghai, today one of the most powerful economic poles in the world, saw the birth and growth of its market between the 80s and 90s. There were three main reasons for concern that gripped the city: first of all, a general demographic growth accompanied by

a gradual reduction of housing units. Secondly, the enactment of a policy linked to land use, in order to be able to extract money from pre-existing areas, has allowed the financing of new areas, but also a rise in house prices. The construction of residential areas - as a consequence of the expansion mechanism and made possible by funding - represents the third reason: opting for the creation of residential areas to populate the areas bordering the city is a quick and effective way to absorb the surplus workforce and capital, generated by the Chinese market. In this cyclical system, however, a series of side effects are found, such as sprawl, the need to connect these areas to urban centers and the distortion of space with respect to the relationship between density and quantity of land. After all, it was precisely around the 1990s that it found itself having to face another problem, namely that of the over-accumulation of capital due to the FER (China's fixed exchange rate) and the continuous growth of an economy mainly centered on a workforce intensive and massive export. The most effective solution was to stimulate the real estate market, acting on the buildable parts of the city and appealing to private investors who could meet the demand for housing units by the upper and middle classes in a short time. In parallel, the government has worked to meet the needs of the less well-off by providing popular areas and social housing. This dual strategy

has made it possible to keep many of the boundless Chinese cities together, creating various areas which, however, like most cities in the world, have not taken into account the need to vary the intended uses in each specific territory, but only support the connection between home and work in the humblest areas. Like London and New York, Shanghai has also taken on the appearance of a substantially dispersive city that self-organizes its structure through an urban fabric with multiple "centres". A monocentric model does not work in cities of such a large scale. After all, this phenomenon of transition from a mono-centric city to one with multiple "nodes" has also occurred in Guangzhou, Shenzhen and Hong Kong. These cities serve as an example to be able to decipher a new structure that can channel the traditional solutions we have to meet the needs of citizens and put into practice the new measures to contain the effects that Humanity produces on the Planet.

From a purely geometric point of view, a network of several "core" business districts appears to be the "natural" response that an expanding city puts into practice with respect to the need to distribute wealth and the workforce, always according to the traditional expansion model economic, policy and regulation of the global market. With careful planning of the scattered "cores" it would be possible

**POPULATION
DENSITY.
UNSUSTAINABLE
DEVELOPMENT.
JOB-HOUSING
IMBALANCE.
SPATIAL AND
TRANSPORTATION
INEQUALITY.**



18. The history of urbanization and data about FER provided in this chapter come from "Aspects of Urbanization in China: Shanghai, Hong Kong, Guangzhou", (Edited by Gregory Bracken) in the chapter "Urbanization and Housing: Socio-Spatial Conflicts over Urban Space in Contemporary Shanghai", Non Arkaraprasertkul, pp. 139-164 (28 pages).

to alleviate several problems related to big cities, such as pollution, traffic jams, long waits and lack of public space typically created by the “CBD + SPRAWL” model. But in a holistic view these are only some of the possible improvements that would occur.

Thanks to long-term planning, unlocking these high-income areas and opening them to a denser and more diversified reality would make it possible to increase the social offer and extend it across the territory, through multiple projects. In this offer, the intended uses would range from those related to business to recreational, residential, commercial and educational. From the organization of economically inclusive functions to the distribution of parks and green areas, up to the implementation of real plants for the production of food, integrating the part of housing still paralyzed by the housing market in the CBD and the distance between -work. To limit the need to intensively urbanize the surrounding areas of the cities and perpetrate an unsustainable economic expansion, the first step is therefore to plan a redistribution of the population density in the internal areas of the urban environment and allow such a development of the Cores for which they can equip the surrounding citizens with all the necessary functions. The goal is to assist the expansion towards the urban horizon and put into practice a dual strategy in which an urban transition

mechanism can be set in motion even in city centres, in order to avoid unjustified sprawl and a conversion of rural areas valuable to the livelihood of the nation.

6.2. PUDONG NEW AREA DISTRICT

History of its formation.

The district of Pudong, Pudong New Area district, is located in the east of Shanghai, on the east edge of the Yangtze River Delta. The name Pudong refers to the east area of the Huangpu River. The district started its evolution after the Huangpu River became

the most important channel of Shanghai. Its political establishment started exactly on May 3, 1990, when the Pudong Development Office and the Shanghai Pudong Development Planning Research and Design Institute were founded. In fact, the history of the area starts almost one thousand years ago, but it is in 1958 that Pudong becomes a formal county. Two years later, Pudong County was abolished and divided into Huangpu, Nanshi and Yangpu districts.

The Pudong New Area returns on January 1, 1993, with an extension of almost 570 square kilometers²⁰.

6.3. PUDONG:

Between the Monocentric and the Polycentric model

POPULATION DENSITY. UNSUSTAINABLE DEVELOPMENT. JOB-HOUSING IMBALANCE. SPATIAL AND TRANSPORTATION INEQUALITY.

77.700 IS THE PEAK OF POPULATION DENSITY IN SHANGHAI IN 2021.
PEOPLE/
KM²

1.6% ANNUAL EXTANTION BETWEEN 1990 AND 2000 WAS 6%. + 120.000 HECTARS OF BUILT UP AREA ADDED BETWEEN 2000 AND 2015.
URBAN EXTENT
GROWTH RATE

8.8 KM CAUSED BY THE RELOCATION TOWARDS SUBURBAN AREAS, BOOSTING SEGREGATION OF THE POOR CLASS.
COMMUTING
DISTANCE

40 MINS THE EVERY DAY LIFE EXPERIENCE METER TO MEASURE THE EFFECTS OF DECENTRALIZATION OF JOB OPPORTUNITIES. INCREASING SPATIAL MISMATCH BETWEEN EMPLOYMENT AND RESIDENCY AREAS.
COMMUTING
TIME

19. “Lujiazui, Pudong, Shanghai, Peoples Republic of China: a global business precinct 1990”, NorthernArchitecture.

The spatial model of a city, depending on the position, distance, composition and connection of its districts and the infrastructures that connect them, generates an influence on the social theater and on the market of land and houses. To understand the spatial distribution mechanism of a city, one can refer to the monocentric and polycentric models. The fathers of the modern concept of urban land-use are Alonso (1964), Mills (1967) and Muth (1969), who were the first to decipher the monocentric model as a sum of connected elements, including transport, land-use and density issues. The mechanism that links these elements is substantially of an economic nature, as it aims to compare commuting costs, housing prices and the amount of housing consumption.

In general, the monocentric model produces three consequences*:

1. House prices decrease with increasing distance from the CBD.
2. Housing consumption increases as distance from the CBD increases.
3. Density and capital-to-land ratio decrease with the distance from CBD.

Obviously, this model starts from some basic theoretical assertions which make it unrealistic when compared

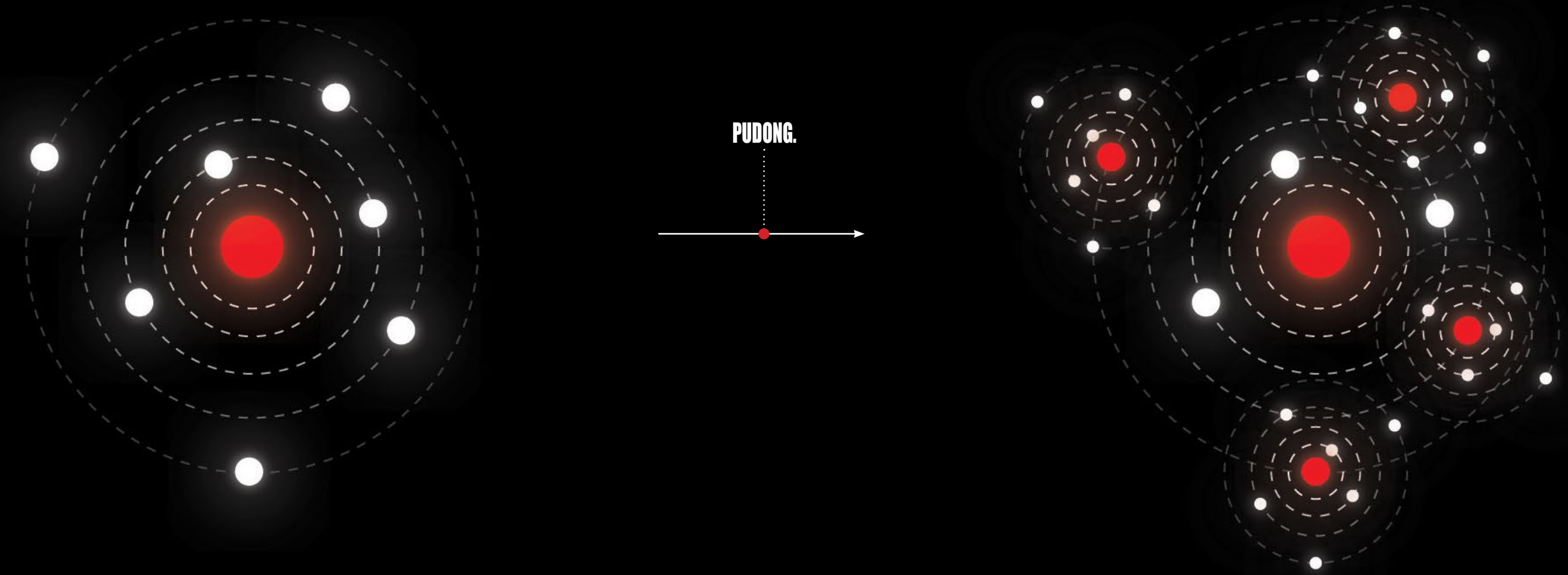
with specific reality.

The polycentric model, on the other hand, belongs to a vision more in line with current reality, as the largest cities in the world have evolved and continue to evolve, producing a multitude of different centres, or CBDs, within their own metropolitan area. This too is obviously a product of globalisation. However, it is a natural response that a large city offers to its territory when it needs a mixed structure to respond to the needs of citizens and the market. Furthermore, many studies promote the idea that with a certain planning, the polycentric model is in any case more sustainable and applicable to a future vision of our cities. This is because, on the one hand, the presence of a predominant center promotes a concentration such that the cost of labor and land would discourage the formation of future agglomerations, creating sprawl and on the other hand because the polycentric model represents a "scalar" model, applicable to any type of grouping of human activities and for this reason it contrasts with the centre-periphery structure, now obsolete in the case of Megacities.

But the most interesting detail is the fact that cities, being complex and stratified identities, often show that they belong to both the monocentric and polycentric models in a certain time or space.

Somehow, a sort of overlap is obtained depending on the urban analysis which can be limited to a certain extension or with respect to certain elements.

The traditional Central Business Districts (CBD) that characterize the great cities of the world, in any case, pose enormous risks to the functioning of the city. Expansion, infrastructural hyper-connection and demographic increase make the cities sequences of CBDs connected to each other through the dispersion of the adjacent areas and which remain nestled between the centres. Districts of different densities with a majority of different use functions - and not enough mixed within them - compromise an adequate functioning of the city. The attraction that the financial districts apply to their surrounding (and often not too surrounding) areas weighs down the transport routes and makes the urban context unlivable due to the movement of people who are forced, for economic reasons and due to the poor job-balance housing, to move to reach the workplace. This phenomenon, experienced by many of us in everyday life and certainly not with the gravity typical of many other areas of the planet, is however much larger and more complex. What is experienced by each of us as the city routine is actually the functioning of a huge system that uses our work to support itself, and which to do so needs to evolve into something



that is less and less people-friendly requiring even more work. This unsustainable vicious circle must be stopped in order to turn our course towards a more sustainable method of expansion before our global production system becomes too weak to sustain us. That of Pudong, in Shanghai, represents an interesting case as its structure is similar to the monocentric one, due to the spatial characteristics derived from a massive component of jobs in the area. Despite this, Shanghai is a city endowed with a polycentric spatial structure: on the one hand, it is made up of a large number of neighborhoods characterized by a strong home-work alternation, distributed around nine financial and technological centers which leave a dispersion of homes. That of Shanghai is therefore an urban pattern with some exceptions within it – like magnetic nuclei that attract elements and repel others, within a non-homogeneous network – producing a considerable urban complexity which requires the use of different keys of reading for your understanding. As it has been said before, to put into practice an efficient spatial strategy for a sustainable development it is necessary to focus the effort on the control of the population density, the accessibility, the creation of different architectural typologies and the variation of the dimensions of the various constructs that compose the districts. Pudong is an example that embodies all these themes. In Pudong, urban planning should have

as its first task that of increasing accessibility to work and the housing market by increasing population density, accessibility and varying the typical uses of the district. The increase in density would also help to emphasize the concept of Transit Oriented Development (TOD) to improve the connectivity of the various districts and make it effective even in those with a lower standard of living. In general, we can summarize this economic-spatial transition in three points: first of all, balancing the relationship between work and housing, trying to create a homogeneous but diversified mosaic and limiting the dispersion of people (Pudong has the highest price variation for travel). Secondly, improve and upgrade public transport to demolish the invisible barriers that delimit high-income areas and isolate them from lower-income areas. Indeed, Pudong represents the district with the highest access time to the city center. Finally, the creation of more public space by acting on the geometry of the buildings, in such a way as to create a strongly civic and widespread place in the territory, allowing the birth of cultural projects and the implementation of green areas or food production. These three fundamental steps are the key to ensuring sustainable, equitable and accessible development of our cities. Their application in the territory requires radical changes to the urban construct, following a price which, given the circumstances related to the global climate crisis, is to be seen as an investment rather than a cost.

6.4. PUDONG'S EXCEPTION: Job-housing balance, Inequity, Efficiency.

The imbalance between jobs and housing has become a critical urban problem worldwide, particularly in large metropolises, resulting in longer commuting distances and durations, increased income inequality, traffic congestion, air pollution and travel distance to the high. As for our case study, Shanghai has attracted millions of people of low-income migrants,



called “floating population”, generally concentrated in the marginal areas of Shanghai (Li, 2010). Rapid urban expansion and residential segregation have contributed to the imbalance between jobs and housing in Shanghai, while the average commute distance has increased from 4.3 kilometers in 1986 to 6.8 kilometers in 2004. reached 8.8 kilometers and the average journey time is about 40 minutes²¹. This is a result of relocation to suburban areas, leading to poor accessibility to work and long commute times. On the other hand, house prices are exceptionally high in Shanghai which also causes longer commute times for the poor and middle classes. As the urban area continues to increase, the spatial mismatch between occupation and residence tends to increase. Therefore, the work-housing imbalance has become a major obstacle to building a more sustainable Shanghai. The effects of the urban structure on the work-housing imbalance range between monocentric and polycentric cities. In some monocentric cities, the suburbanization of the population and workplaces reduces the distance and travel time because people would change their residence and workplace due to the worsening of congestion and to reduce travel time and distances. On the other hand, the theoretical model of polycentric cities implies a balance between work and housing because people choose residences close to work centres. Variables related to urban

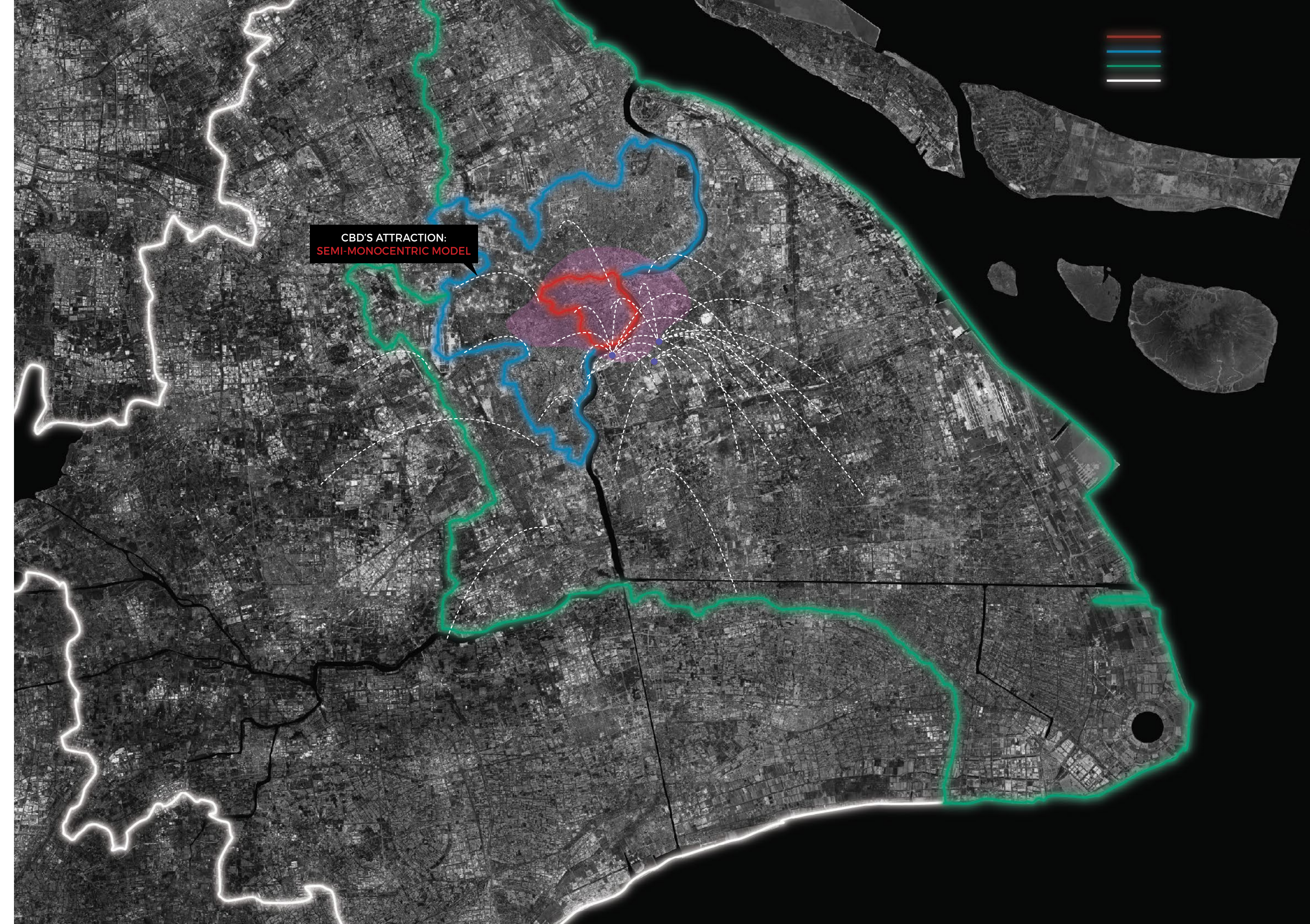
structure include house prices and population density. The monocentric urban structure and the polycentric urban structure are two common urban structures, and the urban structure of Shanghai, as we have said, is transforming from monocentric to polycentric.

Historically, the northwestern part of Pudong New District was the first modern financial center of Shanghai; Lujiazui is located in the northern part of the Pudong district, while we have already talked about the southern part of Nanhui. To contribute to the growth and development of Pudong, in 2009 the Nanhui district and the Pudong district were combined into a single identity. As the blending happened quite recently, there is still a significant difference between South Pudong and North Pudong in regards to housing, prices and population growth.

The reason that prompted me to choose the Pudong district as the intervention area, and in particular the Lujiazui sub-district, is that they represent a contradictory situation, derived from an adequate density, a high concentration of jobs and a historical continuity rooted in the territory. On the other hand, however, they also have a stressful effect on the neighboring parts due to the very large dispersion of the floating population in their surroundings who need to work in the area but cannot

afford to live there. Indeed, housing projects in Pudong District command extremely high prices despite also having good accessibility to public transportation (Li et al., 2019). For this reason, the Pudong district can be used as a valid example in which jobs can be created against a considerable economic effort, which in any case would be worth a solid investment for the creation of a more sustainable future community.

Despite this, the factor of discontinuity between this area and the adjacent ones is extremely high and although there is a good connection in terms of transport, the gentrification and segregation of less well-off people in the peripheral areas creates social, economic and functional problems. This is because both employment opportunities and urban services are highly concentrated in the central urban area of Shanghai. Since house prices in the expanded urban area are so much lower, many people choose to reside there rather than near their work area. But as high-skill job opportunities are found in the urban center and low-skill jobs have instead been decentralized to the urban fringes, the highly concentrated population in the expanded urban area leads to an imbalance between work and housing. In addition, due to the continuous expansion of Shanghai, there is an increase in the area where house prices tend to soar. This trend must be stopped in order not to distort the center of



21. "Understanding jobs-housing imbalance in urban China: a case study of Shanghai" by Weiye Xiao, Han Li and Yehua Dennis Wei (Journal of Transport and Land Use, 2021, Vol. 14, No. 1 (2021), pp. 389-415)

Shanghai and further compromise the adjacent areas. A first natural response to this type of phenomenon would be to provide development projects for the areas belonging to the city skyline. As mentioned above, however, the idea of operating only in peripheral areas means promoting a strategy that is only temporary and does not solve the climatic and social issues within the city.

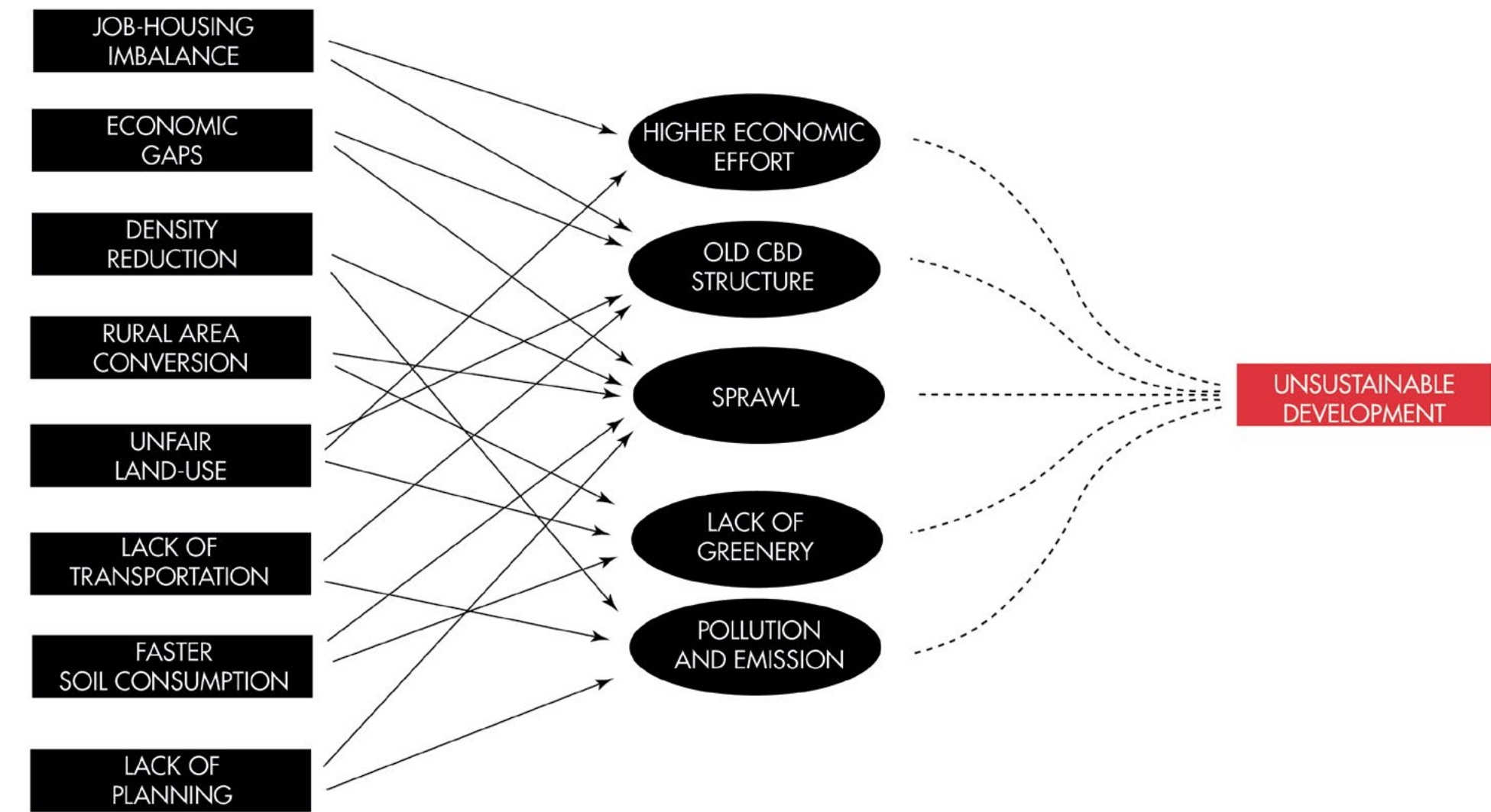
6.5. JOB-HOUSING BALANCE: Between Compact City and Low Density City.

As far as sustainable development is concerned, it is not possible to think of putting a different model into practice without talking about housing. In general, the debate on how this architectural sector should adapt to a different vision of the future has only begun to emerge in the last 20 years, probably due to the fact that this issue is linked to a sphere that we could even call private, or in any case in direct connection with people's lives. Furthermore, the dialogue on sustainable development models in the past has mostly been based on economic and social issues rather than on issues related to the environment, which is an even more urgent reason why thinking of being able to change such an important aspect of life of people. This is a context linked both to the European and Asian reality. In fact, understanding how to distribute and shape the homes of tomorrow is one of the key elements in building a more sustainable city. This derives from the fact that housing is one of the most imposing elements to weigh on the global market and, from a purely architectural and urban point of view, it represents the place from which people move to meet their social needs and towards which they lead to meet their personal needs.

It is precisely by starting from housing that one can arrive at the two most popular concepts of the ideal city since the 2000s: that of the compact city and

that of the low-density city. These models generally represent two opposites that put housing, and above all people's lives, at the top of the priority list. The best definition of the first model is that of a city that manages to make optimal use of its infrastructures through compact, mixed-use and dense settlement structures enabling effective use of public transport. The second, on the other hand, suggests an extremely large and distributed city model, characterized by a low density of people living in a series of small towns connected to each other and with wide access to natural areas. Both models are concerned with visualizing a system in which the primary priority remains that linked to the ability of people to live adequately in a large urban construct. In fact, they try to solve the problem of city expansion, pollution, and climate change using two different interpretations. The first, as already widely discussed, aims to optimize urban space by controlling the density of people and the balance between housing solutions and workplaces. The second instead seeks to break up the city into smaller urban areas and to connect them to each other through green spaces and public infrastructures. Therefore, also the second model actually tries to control the density of people and group them according to a structure similar to that already used in some megacities of the world, namely a CBD pattern. It therefore seems that the optimal solution would be to develop a system

WE CAN'T PREVENT CITIES FROM EXPANDING.



halfway between the two proposals as neither one nor the other fully resolves the issues we are considering.

So why are we talking about high and low density models? And how do they relate to the issue of mixed-use development?

Over the past 25 years, China’s economic production had grown 2.33 times as much as the built-up areas in urban areas from 1990 to 2015²². Meanwhile, the built-up areas experienced a more intense expansion than population growth did. In fact, cities had been becoming less compact in living density and performed much better in production density. These trends are the direct consequences of the application of governmental policies. To solve the agricultural land shortage, the Chinese government implemented three general land use plans (1986–2000, 1996–2010 and 2006-2020), which focused on the control of arable land and building land. In fact, these policies have alleviated the rampant sprawl of building land in urban areas, but not in a way that optimally improves the situation. Furthermore, the efficiency of urban land use obviously varies from region to region, even between urban cores and periphery. Due to regional disparities, formulating coordinated land use planning between districts may be more urgent in the context of disproportionate spatial expansion which day by

day undermines the achievement of sustainability objectives causing damage to the environment.

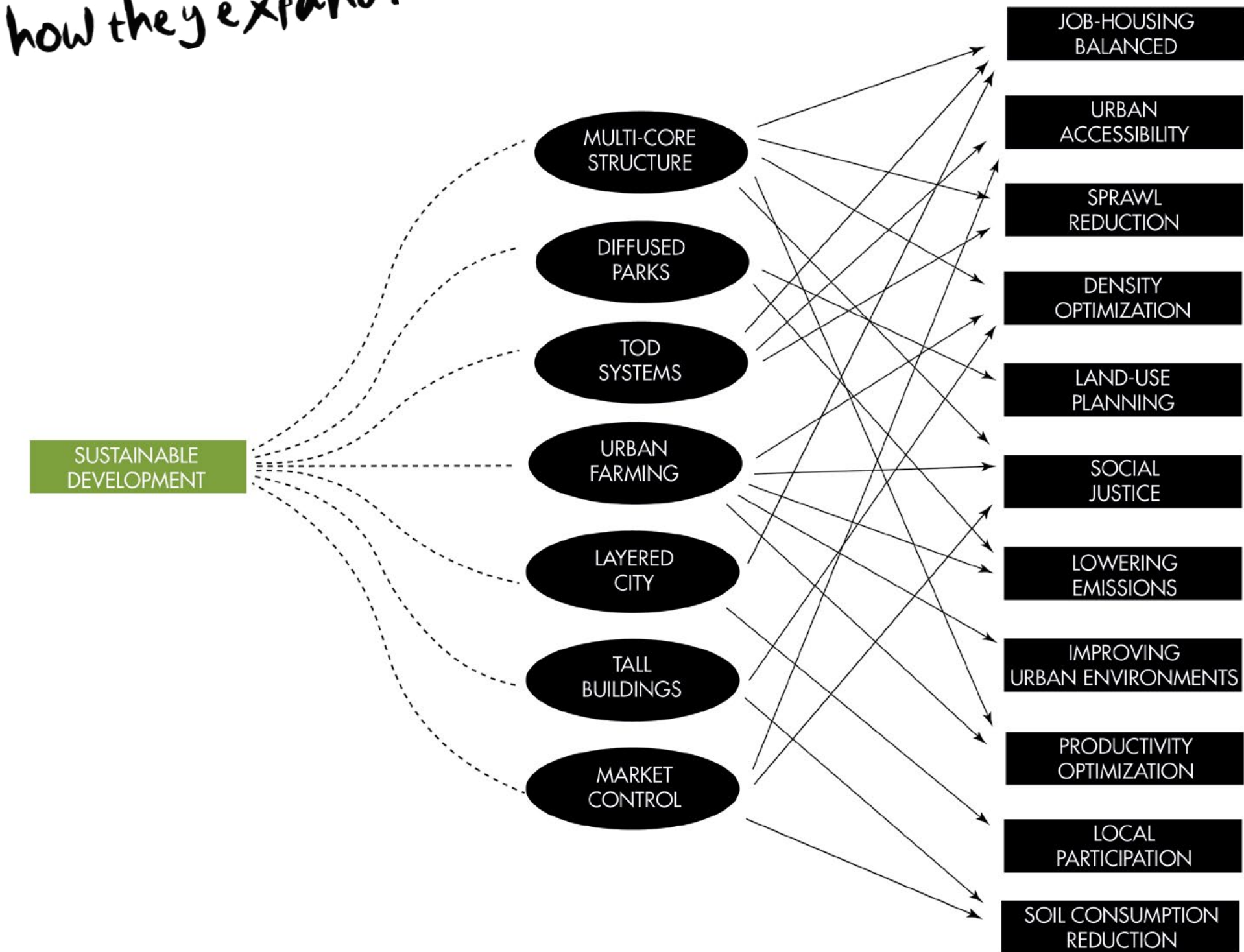
The compact city model would need, in any case, to have constant access to Nature, which is undermined by the conversion of rural areas into urban areas. Furthermore, the model of economic expansion of the city appears to be unstoppable in any case, and imagining acting only on that front would only represent a temporary solution. The second model, on the other hand, offers an apparently adequate idea of structure but does not solve the problem of the density of people. Secondly, the expansion rate of the world’s big cities and Shanghai in particular is too high to think that a series of small, low-density cities can meet the current needs. Therefore, it seems logical to think that an intermediate solution represents the most suitable way forward: act on the density of pre-existing urban districts and on the job-housing balance factor, verticalizing where possible and optimizing accessibility, and introducing the possibility of defragmenting the urban context inserting natural areas used simultaneously for the production of food and the presence of green spaces.

Finally, the goal of modeling a hybrid city in its parts, more connected but slower in relation to its possible clusters on a human scale, does not mean reducing

development and production. Instead, it means creating an environment in which the production and exchange of goods or work takes place with respect for Nature. As regards the consumption of these products, on the other hand, it would be carried out within an urban context capable of absorbing the wealth produced without making the weight of development fall on the less affluent and disconnected areas of the city. It is therefore essential to start from the writing of a policy capable of creating constructive competition within the global market thus avoiding the abandonment and useless destruction of entire geographical areas afflicted by a possible crisis. In fact, and at the national level, this operation must be carried out in such a way that economic competition can remain an instrument of control as well as a simple production of wealth. As already widely said, sprawl follows the movement of money and for this reason a constructive economic competition would avoid a dispersion of urban development and a consequent deterioration of one’s own areas according to market trends. Although it is not in the specific interest of architects, this purely economic and legislative component represents the basis on which to build sustainable planning. It would be put into practice thanks to the structuring of an economic system based on the cooperation of regions or areas that can produce what is needed for the sustenance of people living in their circumstances

WE CAN'T PREVENT CITIES FROM EXPANDING.

But we can control how they expand.



22. "An assessment of urbanization sustainability in China between 1990 and 2015 using land use efficiency indicators" by Huiping Jiang, Zhongchang Sun, Huadong Guo, Qihao Weng, Wenjie Du, Qiang Xing & Guoyin Cai (npj - Urban Sustainability)

and beyond. Consequently, it would be much easier to be able to control the relationship between the housing market and the labor market, being able to act precisely on the job-housing balance. Precisely in this context, the definition of priorities following a national policy linked to housing would lead to the real possibility of taking care of the social aspects of people's and inhabitants' lives and the sustainable maintenance of the pre-existing urban context.

In general, we know that project control develops on different levels relating to the various spheres of the reference society, whether they are political, cultural or strictly architectural. From the point of view of the construction of the architectural object to that of territorial governance, the influence that renovations, buildings, urban projects and regulatory plans demonstrate to have is extremely broad and can be analyzed through many different indicators. In the Era of Globalization, these effects are multiplied by the economic, political and cultural stimulus derived from the contamination of local environments and exposure to global ones. Unfortunately, the efficiency of the systems we use derives in turn from the uncontrolled intensification of the exploitation of resources and the natural world, having set up the development model such that it is always and only economic profit that most defines governance strategies mentioned at the beginning.

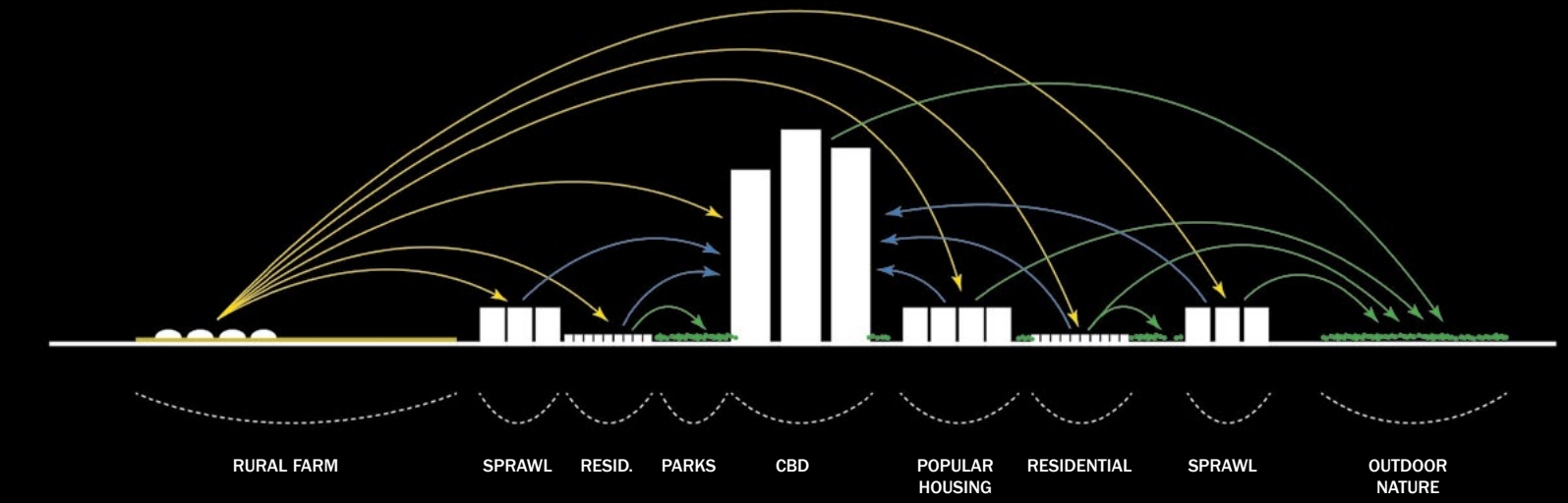
Strategies of homogenization and defragmentation that aim to desectoralise the city could have extremely positive implications: the contamination of the central economic districts (CBD) with enhanced means of public transport, green areas and different uses can become real elements of "opening" of less accessible and more relevant contexts, eventually ending up controlling the phenomenon of sprawl, as well as stimulating the market (Stokols et al. 2003, Li et al. 2005, Schrijnen 2000).

Would different models be possible? What if we were inspired by a slower, more sustainable and accessible idea of architecture to visualize our cities?

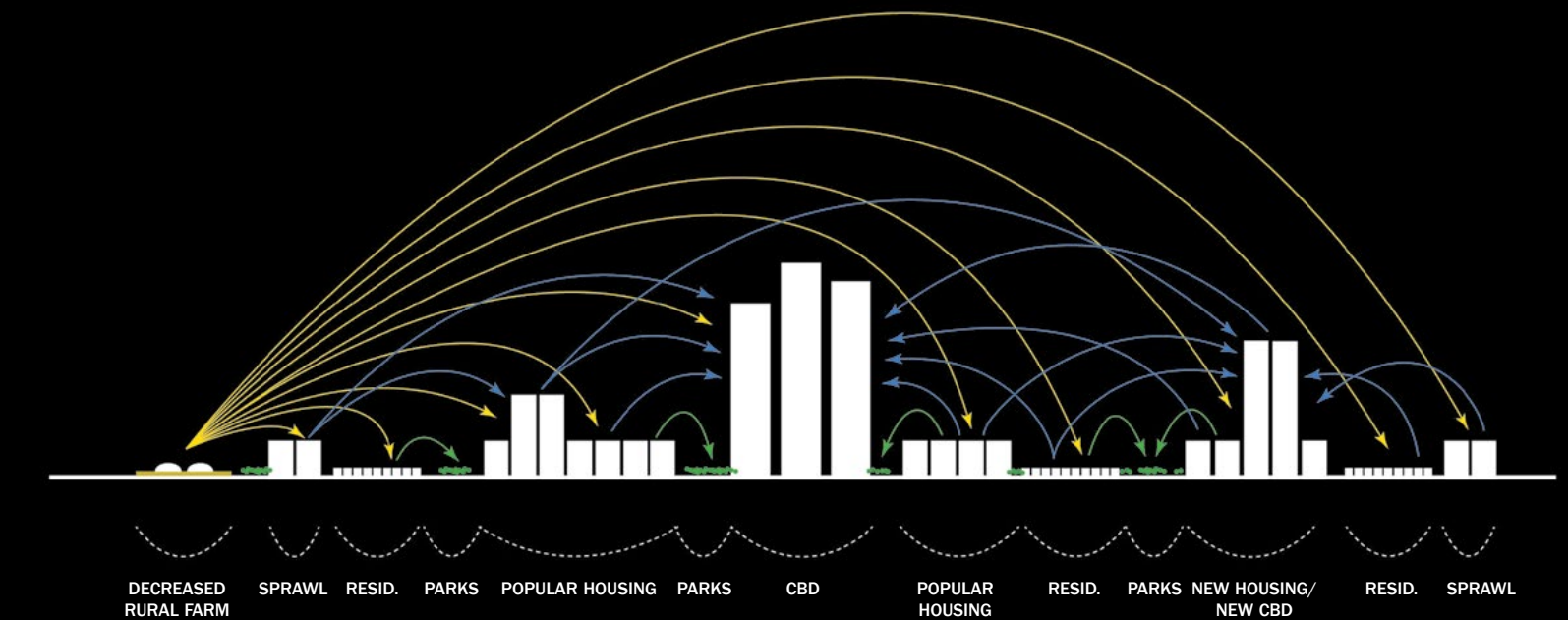
7. LITERATURE REVIEW

This thesis aims to propose a conceptual scheme to visualize a disruptive proposal for the CBD area of Lujiazui sub-district in Pudong, Shanghai. To do this, a general framework was proposed as a theoretical basis and on which the model of the thesis could be built. The general theory on which this work is based is that the connection between the uncontrolled expansion of the world's large cities and the global economic model on which the power of our society is based is contrary to the principles of sustainability, well-being, equality and efficiency. In the current system, our cities expand following the model provided by the global production system, which gives cities the power to expand following two processes: urban and urbanization. The synergy of these two processes represents a balance devoted to continuous spatial and economic growth. In particular, they are involved in the formation of new urban areas in order to promote the distribution of capital and workforce, in such a way as to ensure the continuity of the system itself. These two processes are obviously supported by the global production system, which provides the necessary sustenance by implementing an intensive use of natural resources. Due to the urgency linked to its state, this thesis argued the global food production system, which produces the most massive damage to the ecosystem. The problem of uncontrolled urban expansion, in addition to putting pressure on the

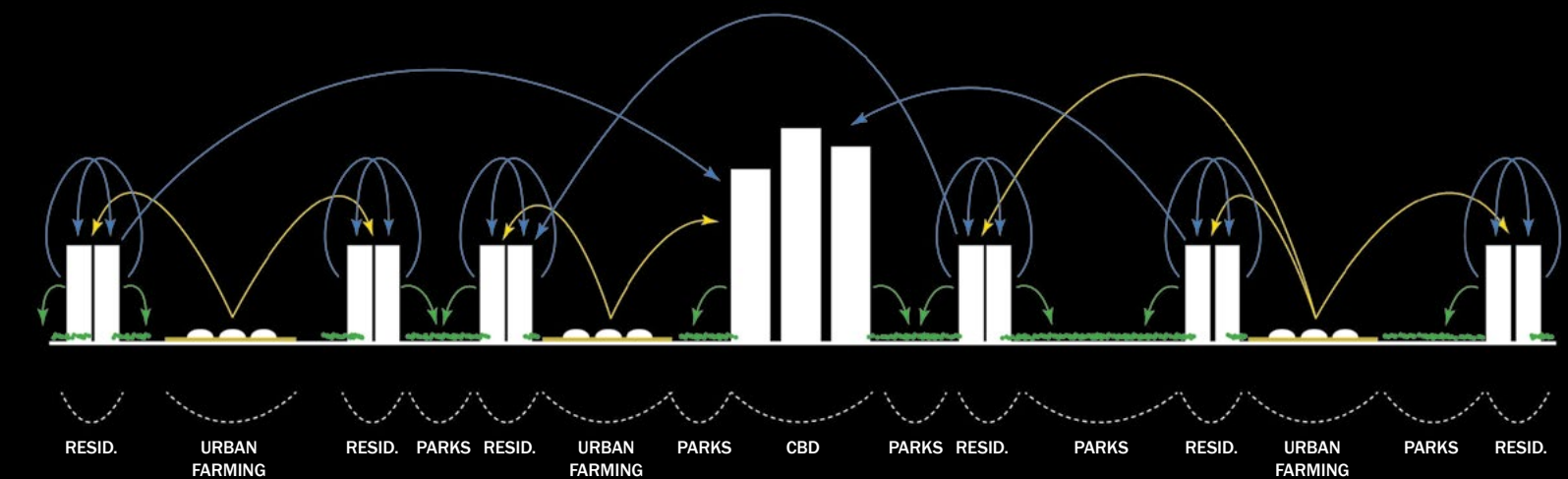
CURRENT CITY MODEL



CURRENT EXPANSION MODEL



PROPOSED MODEL VISION



internal areas of the city, compromises the peripheral areas, which are absorbed by the cities by converting the free and - in part - arable land. This mechanic constantly reduces the amount of arable land and at the same time increases the demand for resources, and in particular food, to sustain oneself. Due to the increasingly reduced amount of resources, the system responds with an increasingly massive intensification to optimize the efficiency of its means.

This paper has reviewed diverse data from many studies by the world's leading regulatory agencies, researchers and experts. In particular, the data related to the climatic situation and the impact that our system has on the ecosystem come from: FAO, Metabolic, InFARM, World Bank, Nature, WWF, United Nations, European Commission, Population Stats, Census, GeoNames, PNAS, OECD, Brookings Institution. Other manuscripts and research, especially those focused on analyzing the urban environment and the impacts of urban sprawl, have been viewed at JSTOR.org, and are included in the bibliography. All the data collected were in agreement with each other and were reported following the narrative necessary to link the global situation to the one of China.

Data about Job-Housing balance, on which this thesis is based, were collected from "Understanding

jobs-housing imbalance in urban China" (Weiye Xiao, Han Li and Yehua Dennis Wei), "Privatization of the Urban Land Market in Shanghai" (Ling Hin Li), "Transferring land-use rights with transportation infrastructure extensions: Evidence on spatiotemporal price formation in Shanghai" (Zheng Chang, Jin Murakami), "Accessibility, urban form, and property value: A study of Pudong, Shanghai" (ChengHe Guan, Richard B. Peiser), "Accessible Cities: from Urban Density to Multidimensional Accessibility" (James Waters).

These papers were used to compare data regarding the issue of Job-Housing balance in Shanghai and the general concept about the formation of an accessible environment. In particular, Weiye Xiao, Han Li and Yehua Dennis Wei in "Understanding jobs-housing imbalance in urban China" address the relation between Job-Housing balance and population density in Shanghai, confirming that the city presents a complex urban pattern full of contradictions. Moreover, Pudong district, despite its relatively recent structure and the areas that compose it present different trends, promotes a situation in which the job-housing balance factor is quite adequate, suggesting that the most serious problem is found in the more peripheral areas, despite the model presented by the authors may have application limitations due to the possible inconsistency between the distribution of capital and

the extent of the study area. To construct the general concept of my thesis, I took into consideration the fact that although Pudong, and above all its northern part, has a good level of job-housing balance, the district produces enormous "indirect" problems in the surrounding areas: first of all, the house prices and the lack of an adequate level of mixed-use development do not make the area accessible. This situation has repercussions on people who live in peripheral areas and who are forced to travel long distances to get to the workplace. For this reason, my thesis aims to propose a conceptual schematic model in which the urban environment adjacent to the Lujiazui CBD can be "opened" through the introduction of a new area that aims to increase the level of mixed-use development and to optimize the level of accessibility of the area, by adding different classes of work combined with proximity to new housing. Finally, the construction of a production park can promote the factors just mentioned by also acting on the ever-increasing need for areas for the production of food.



Photo: Century Avenue and the residential area of Lujiazui

8. A DISRUPTIVE MODEL FOR LUJIAZUI Pudong New Area, Shanghai

The choice to use Lujiazui Finance and Trade Zone, a sub-district of the Pudong New Area District, as already mentioned, is not accidental.

Prior to the construction of the Pudong of today, the area was partly an agricultural area and partly a

shipbuilding zone. It was in 1990 that the People's Republic of China government announced the plan to convert the area. The goal was to make Shanghai a global financial and commercial center by creating a huge circle of prestigious and ultra-modern buildings, open spaces and a powerful transport infrastructure. The master plan of Pudong can be divided into four special development zones: the Lujiazui Finance and Trade Zone, the Jinqiao Export-Processing Zone, the Waigaoqiao Free Trade Zone and the Zhangjiang High-Tech Park.

Lujiazui holds the record for the largest construction site in the world. It was conceived as a single urban tool to form the identity of the surrounding area, influence that of the whole of Pudong and strengthen the financial sector. In less than twenty years, 12,000,000 square meters of office space have been built and about one hundred and sixty banking institutions have settled in the area. To date, Lujiazui is the most iconic place in China. Several designs were done for Lujiazui by, among others, Dominique Perrault, Fuksas, Richard Rogers and Toyo Ito. The main purpose of the competition was to absorb the latest Western ideas on the form that the new urban context and its buildings could have, since these ideas were new in China, to then translate them with the appropriate Chinese interpretation key to be

able to pursue the ideals economic and social issues that should have occurred in the area. Today, twenty years later, we can witness one of the most impressive rewriting projects of the territory and its culture that history has seen. Lujiazui is in fact the symbol of a China that has been able to open up to the global model and to compete as a leader in its expansion.

Some aspects of this new CBD, however, must be emphasized with respect to what has been extensively discussed in this thesis. We have already said how the sectoral specialization of some areas of a city is not easy to develop from a perspective in which we want to improve its functioning. In fact, the project was soon criticized also by the citizens and visitors themselves, who found it extremely boring due to the absence of other activities and the monotonous implementation of the architecture according to a single aesthetic objective. This hyper-specialization contrasts with more sustainable development models and makes it difficult to apply the concept of mixed-use development, as has already been widely argued.

Another element of considerable importance is the scale of the project, which contrasts with the ability to provide comfortable movement solutions on a



human scale. Before the project was concluded in 1993, several attempts had been made to vary the concept and bring it back to a human scale. However, construction continued and this was not possible. Another aspect that was a reason for collision with mobility was the pre-existing structure in which the new project was inserted. Century Avenue is in fact the huge thoroughfare that serves as the axis of the entire CBD. It is in fact a European import, being built following the model of the Champs-Élysées in Paris. Its mammoth translation in the context of Lujiazui, with a width of one hundred meters and the absence of an architectural facade that would define its visual limits, has distorted its architectural efficiency. Secondly, the fact that it cuts through an expanse of blocks produces interruptions and road crossings that do not best interpenetrate with the main axis, creating problems for the pedestrians themselves.

Therefore, Lujiazui can be criticized on two levels: the lack of an identifiable space within the limits of its own body and the fact that public spaces and streets are difficult to live in, due to the lack of human activities and the strong inclination to road transport.

In 2007, another competition for the expansion of the Lujiazui Financial District took place. The great architect **Vittorio Gregotti won the competition** with

a masterplan of around 850,000 m² which proposed mirrors of water, vegetation and many towers ordered by a precise and regular grid of streets, using some parallel avenues to reduce the project to the human scale.

8.1. THEORETICAL FRAME

To procure this work and provide a visualization for the center of Shanghai I have chosen some previously mentioned aspects to create a theoretical context within which to act with absolute freedom. They are the concept of job-housing balance, the question of density and accessibility, and the production of food within the urban context. In particular, comparing the

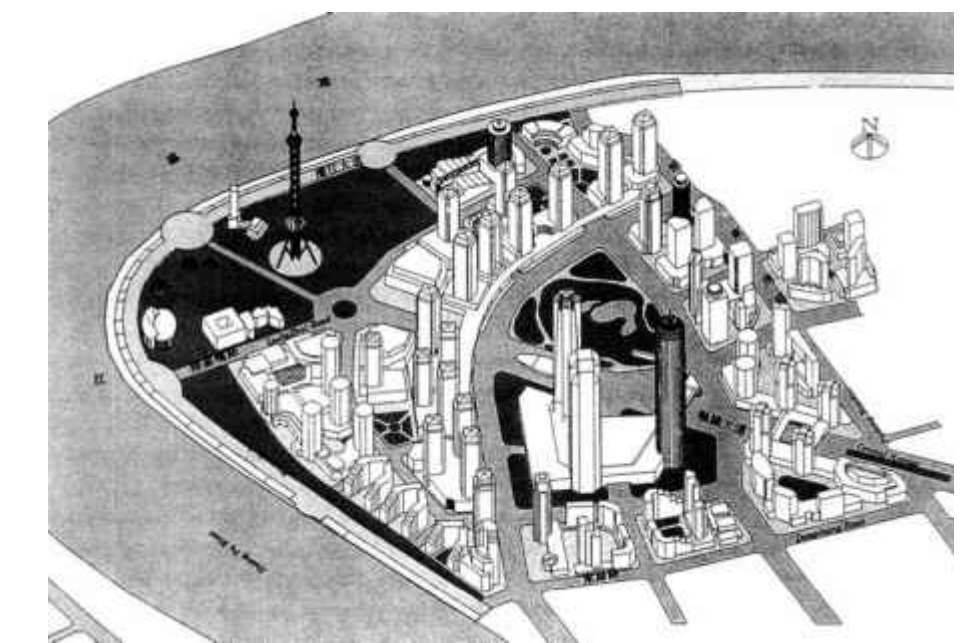
job-housing balance with the issue of density allows us to think about the theme of verticalisation and the possibility of making an opening in the dense but vast context of the Lujiazui CBD. The question of accessibility is instead linked to mixed-use development, integrating housing and commercial use together with the public park. The latter is presented as a hybrid identity in which the experience of the park merges with its ability to produce food for the local community. The decision to focus attention only on a few factors derives from the need to structure a simplification of reality allowing for two consequences. The first consequence is the same possibility of making a personal work by participating in the vast dialogue relating to the design of cities and architectures devoted to improving people's lives and the urban environment. Especially with a view to providing a master's thesis within a university context, it would have been impossible, after all, to include all the previously mentioned aspects within this work. The second consequence that it was necessary to formulate instead lies in the need to simplify the issues addressed in order to make clear the ultimate goal of this same work: what has been compared, in fact, works at a theoretical level, such that the factors taken into consideration are directly comparable, free from real variables and from any type of specific problem of the territory, be it economic, political or social.



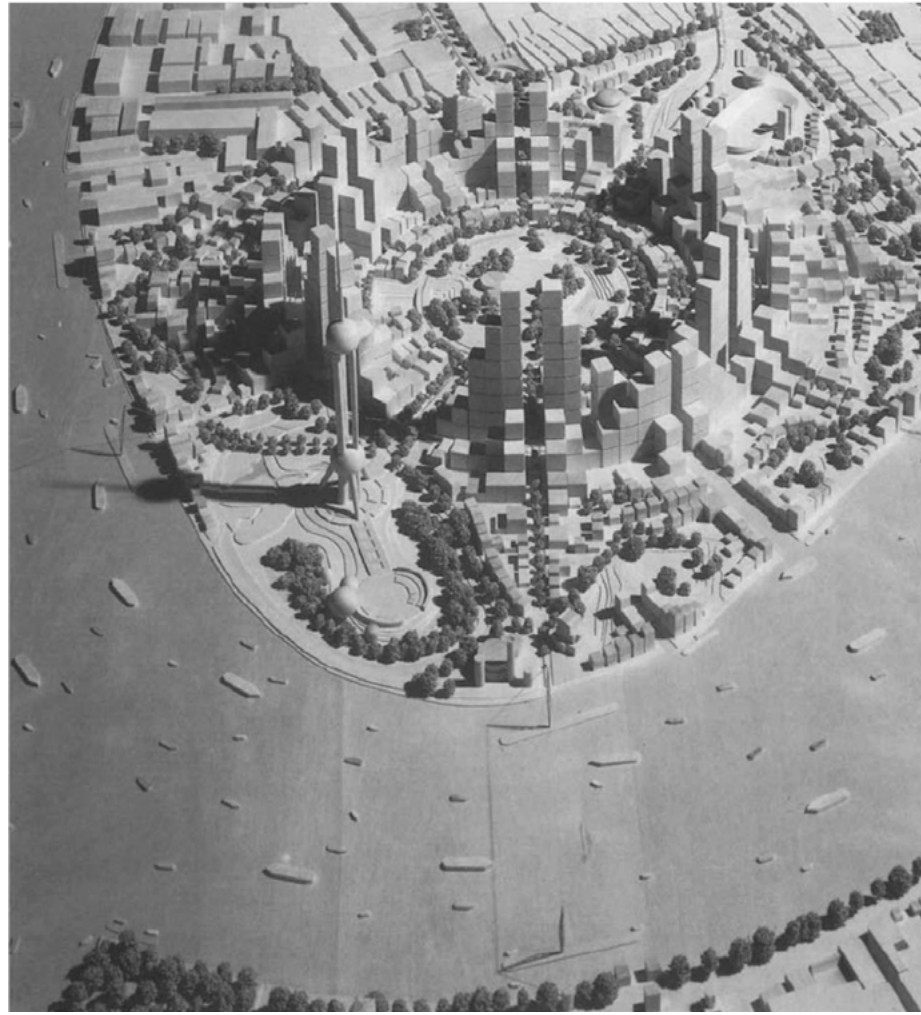
Ancient drawing of Lujiazui.



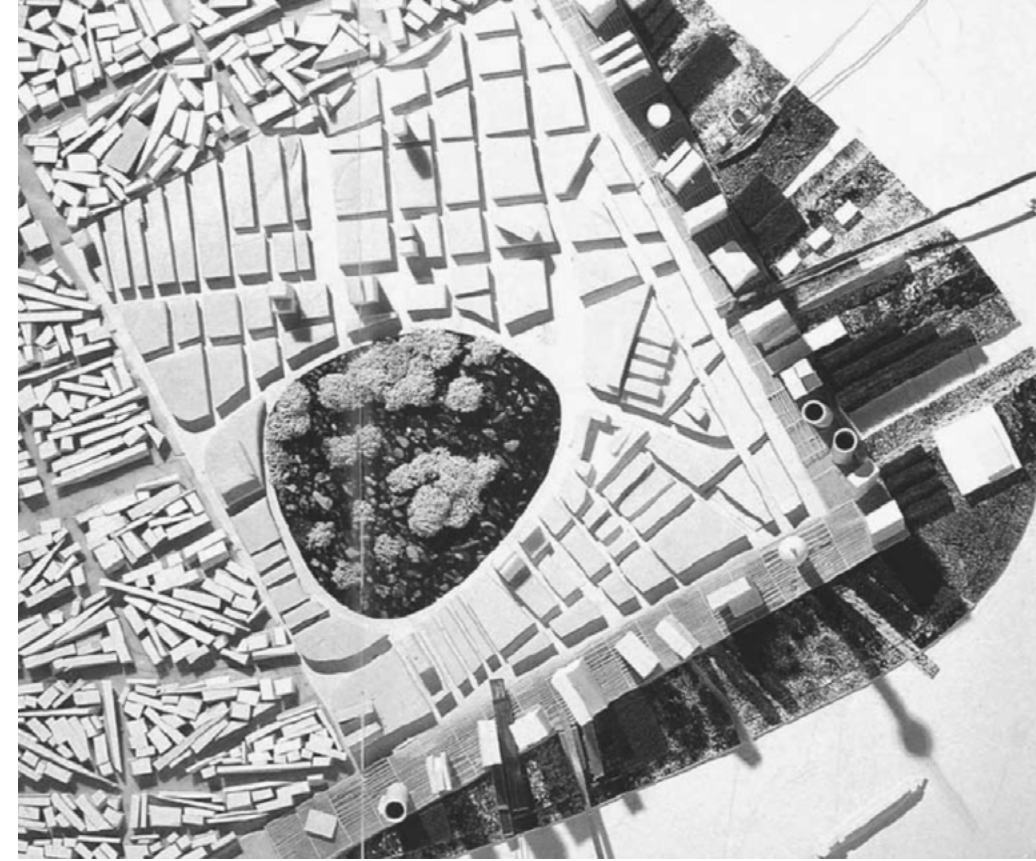
Pudong area in 1980.



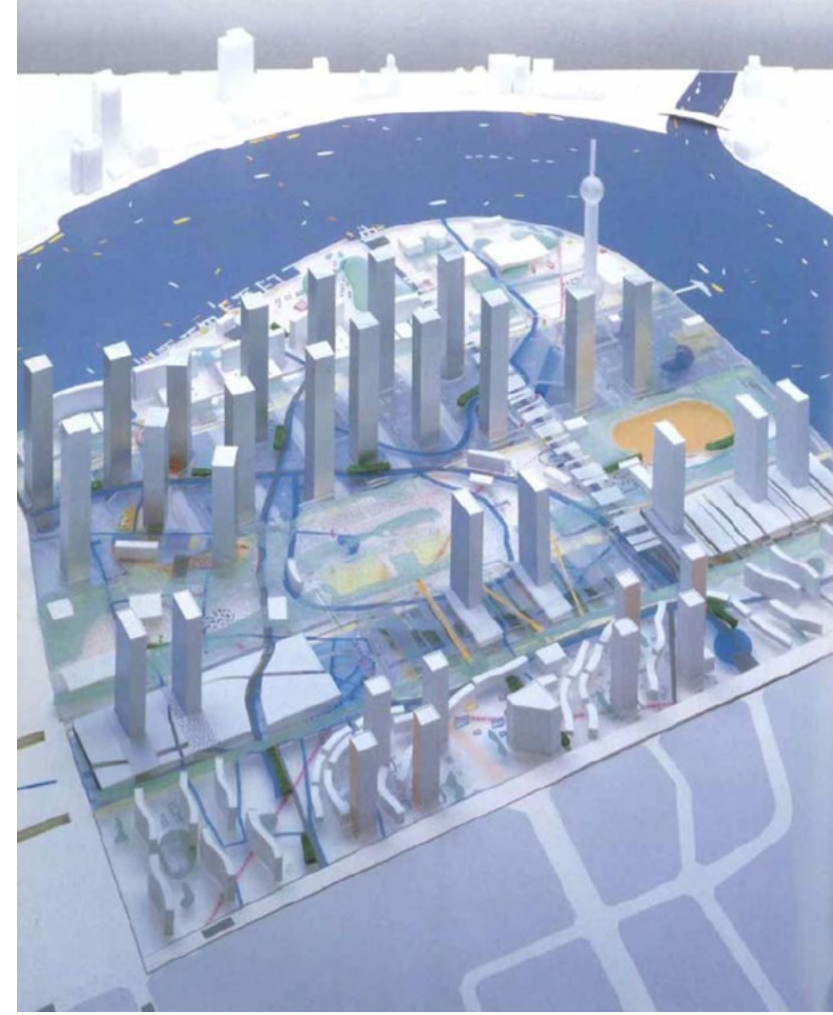
Lujiazui Master plan proposal by Shanghai Urban Planning and Design Institute.



Richard Rogers proposal for Lujiazui Masterplan competition.



Dominique Perrault proposal for Lujiazui Masterplan competition.



Toyo Ito proposal for Lujiazui Masterplan competition.



Vittorio Gregotti proposal for the extension of the CBD of Lujiazui, 2007.



FUTURE VISIONS - CHRONICLES FROM SHANGHAI 2050

Building this research is a personal path to speculate on an alternative to the usual architectural processes. An approach without prejudice to avoid resolving a project in traditional terms, but to discover one through an open development of explorations.



PRODUCTIVE PARK FLOATING WALKWAY

8.2.

INTRODUCTION

As already reported in the previous dissertation, Pudong represents a very large area with different realities within its administrative boundaries. Given its recent transformation, which occurred with the annexation of other districts, together with its peculiar history of rapid revitalization, its characteristics vary greatly within its extension. Especially regarding the Lujiazui sub-district area, we have already extrapolated the issues of scarcity of land-use development, poor house price situation, low level of affordability and difficult job-housing coefficient balance, which varies depending on the specific sub-district of Pudong. Precisely starting from this last element, which turns out to be substantially negative in the northern area of Pudong due to the inaccessibility deriving from the housing system, despite the lower population density,

it becomes easy to imagine how other planning methods can positively influence the whole construct. Obviously, the macro-theme of accessibility is influenced simultaneously by all the other factors mentioned above. The state of the general situation, in fact, starts from the hyper-specialization of the sub-districts and from the concentration of public transport routes in the central area. These elements cause house prices to skyrocket in the central areas, putting in place a very marked gentrification process. This situation, of which Lujiazui represents a clear example, also presents the lack of an adequate diversification of functions on the territory, making many spaces essentially neutral and not able to both align with an holistic and sustainable future vision and providing adequate services for the floating and local population.





METRO

The first design element put in place to start forming the thesis hypothesis was the definition of the plot.

The model proposed in this thesis retraces the boundaries of the 2007 competition for the extension of the CBD, won by Vittorio Gregotti. The affected area, substantially residential, it's located close to the center of Lujiazui and Century Avenue. The chosen plot appears to have a size of about 1.3 x 1 km, slightly modifying the boundaries required by the competition. The area is mostly occupied by much lower-rise buildings than the buildings in the Lujiazui CBD, mostly residences. The context is in fact part of the downtown of the financial district, in which huge skyscrapers are inserted substantially isolated in an area in progressive change.

The first objective to be achieved in this phase, therefore, appears to be to understand how to incorporate a powerful construct capable of redefining the balance between the central area of the CBD, extremely austere and vertical but without spatial continuity, and the residential one, which is more compact, low, calm, and organized according to a boring grid that is not in harmony with the entire urban system.

The choice to "break" the project plot comes out from the intrinsic issue of the enormous principal axis

of Lujiazui, which is Century Avenue. As mentioned before, the road was provided to the area by means of an action of "urban transfer" from Paris, trying to model the concept of the Champs-Élysées into Pudong, to provide a massive fast connection between the iconic center of Lujiazui and the rest of the major district. The road, 100 meters wide, unfortunately doesn't provide any quality to the perception of the space, as it doesn't exist as a corpus that moves around together with facades that people can experience, but more as an urban void that cuts the area. To provide a solution to the lack of an architectural tool aimed at "framing" the space, the choice was to provide the actual definition of the plot, divided in two parts which sides can now communicate, without distorting the actual function of Century Avenue.

The plot stands at the intersection between an essential node of the public transport system and the center of the CBD. This aspect is extremely important to make the area more accessible by providing a strong connection with these two identities. The model proposes a dual strategy to achieve this connection: first, to avoid any disconnection of the preexisting structure of the metro system the plot will respect the "invisible" boundaries of Century Avenue. Secondly, the model will be applied as a consistent sequence of amenities that will follow the main direction of

Century Avenue, "filtering" the space occupied by the road and creating a new connection with the new "internal" space.





Photo: the residential area existing in the project plot.



8.3. VISION: Against a place for consumption only.

To start the formation of the massing model and operate the variations to achieve the final configuration, the study focuses on the footprint of preexisting buildings. The area occupied by the preexisting buildings is about 215.000 mq, out of a total area of 750.000 mq circa. Unfortunately, no data regarding actual GFA were found. To align the boundaries of the first massing model to the preexisting roads crossing Century Avenue, the footprint achieves 260.000 mq. Once the ultimate massing is formed, the building footprint area achieves less than 180.000 mq. This simple calculation was provided to give an idea of the

actual scale of the project. Moreover, it was to set a reference area to understand the actual consequence of applying the design actions related to the formation of the model.

Through the sequence of schematic diagrams it is possible to understand the design strategy:

To provide a first action aiming at fixing the issues of Lujiazui listed above, the massing is cut in four pieces that follow the movement of Century Avenue along the space, till the beginning of the Lujiazui Central Green space, which is the central park of the sub-district. Different heights are set to distinguish the four elements now crossing space. In particular, the bodies facing Century Avenue become tall enough to host housing and commercial towers, as they need to “frame” the urban void represented by Century Avenue itself. Bodies facing the internal voids left by the “building subtraction” are lower as they are intended to get in contact with the new productive area and are not related to the massive dimension of the axis of Lujiazui. In particular, two boundaries were set, in order to respect the limits asked from the contest for the design of the CBD of Lujiazui. First, the building’s podium height of about 25 meters. Secondly, minimum building height of about 400 meters. These boundaries were set by the contest as guidelines to provide comparable models for the intervention.

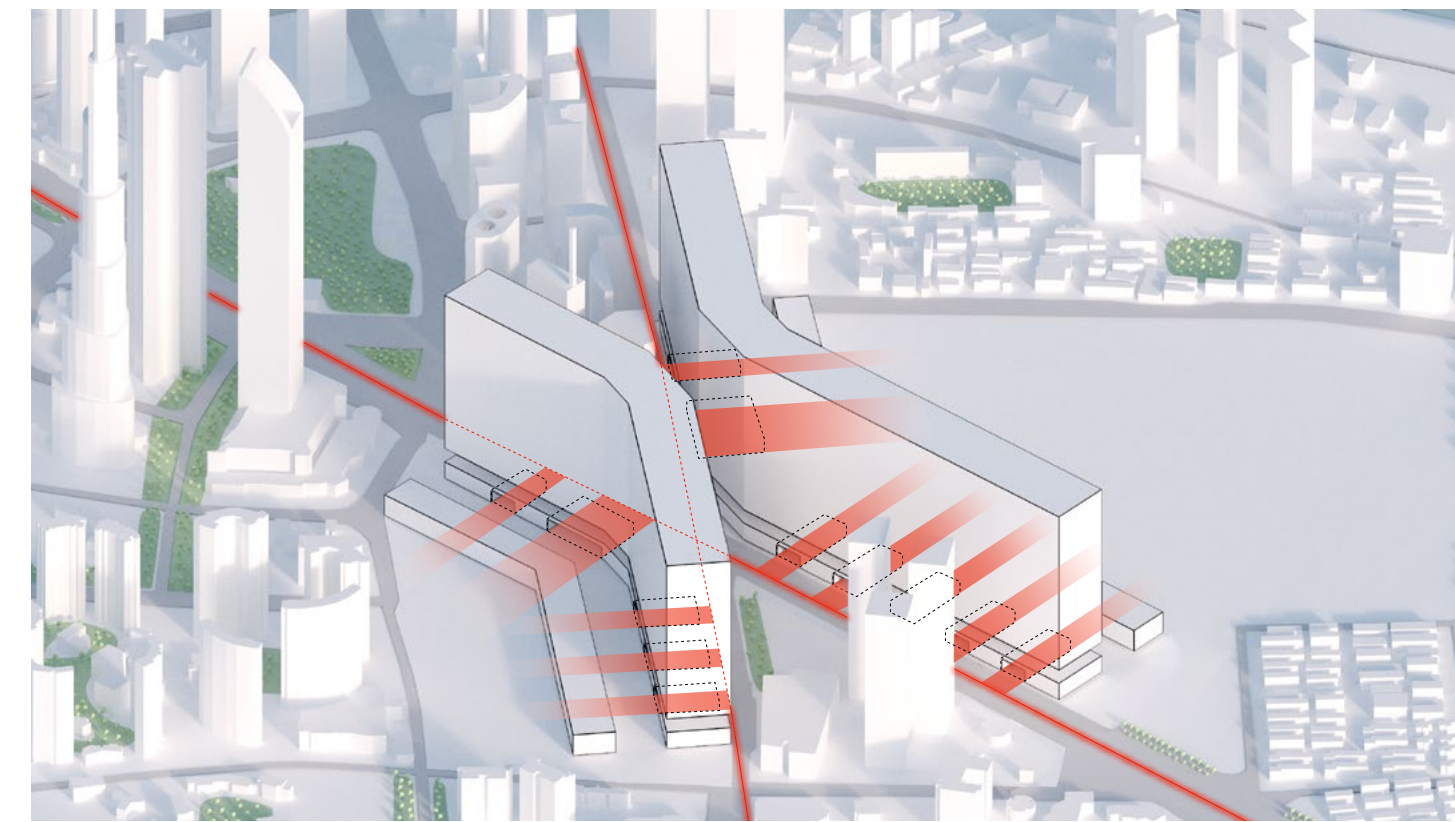
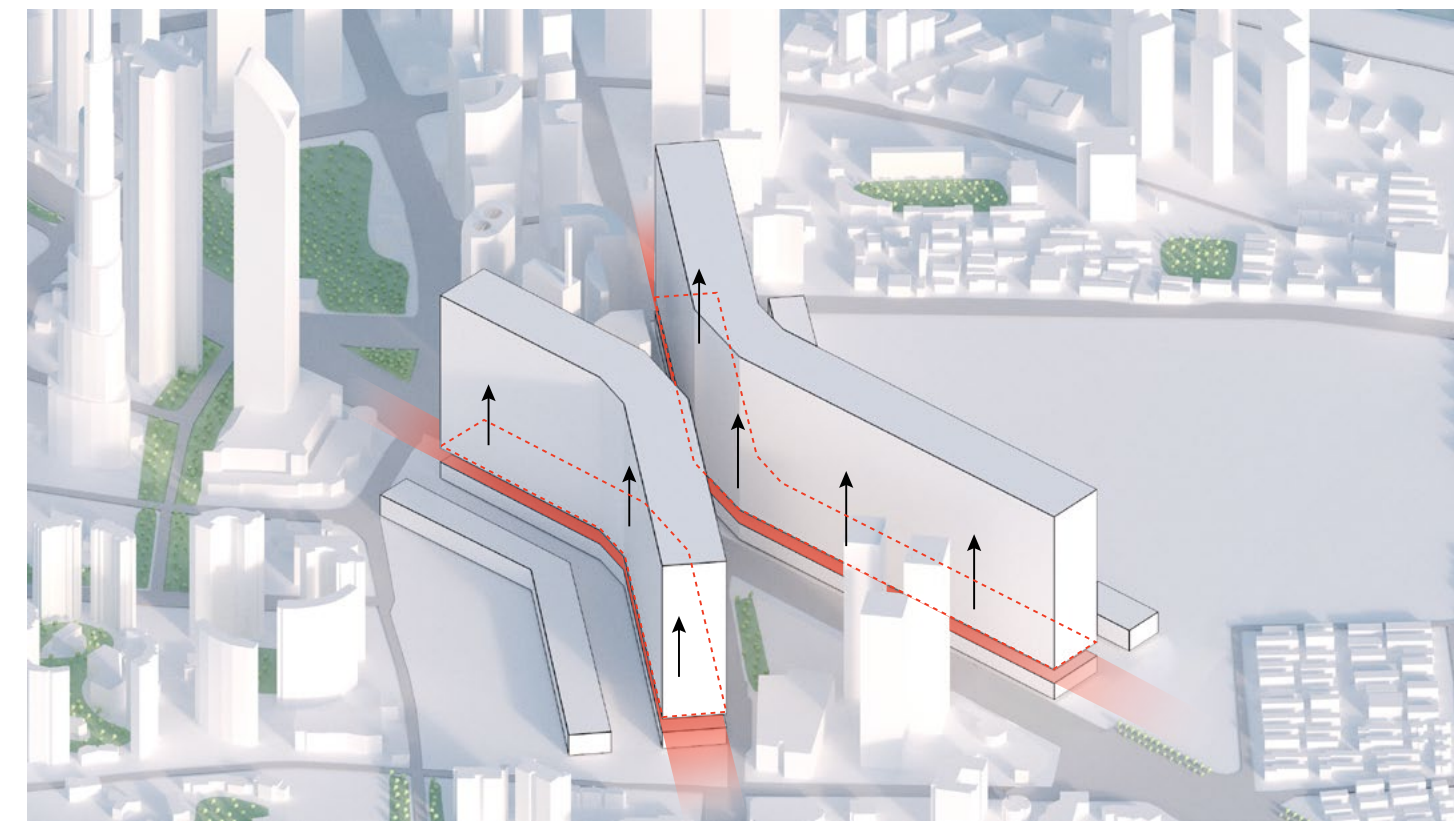
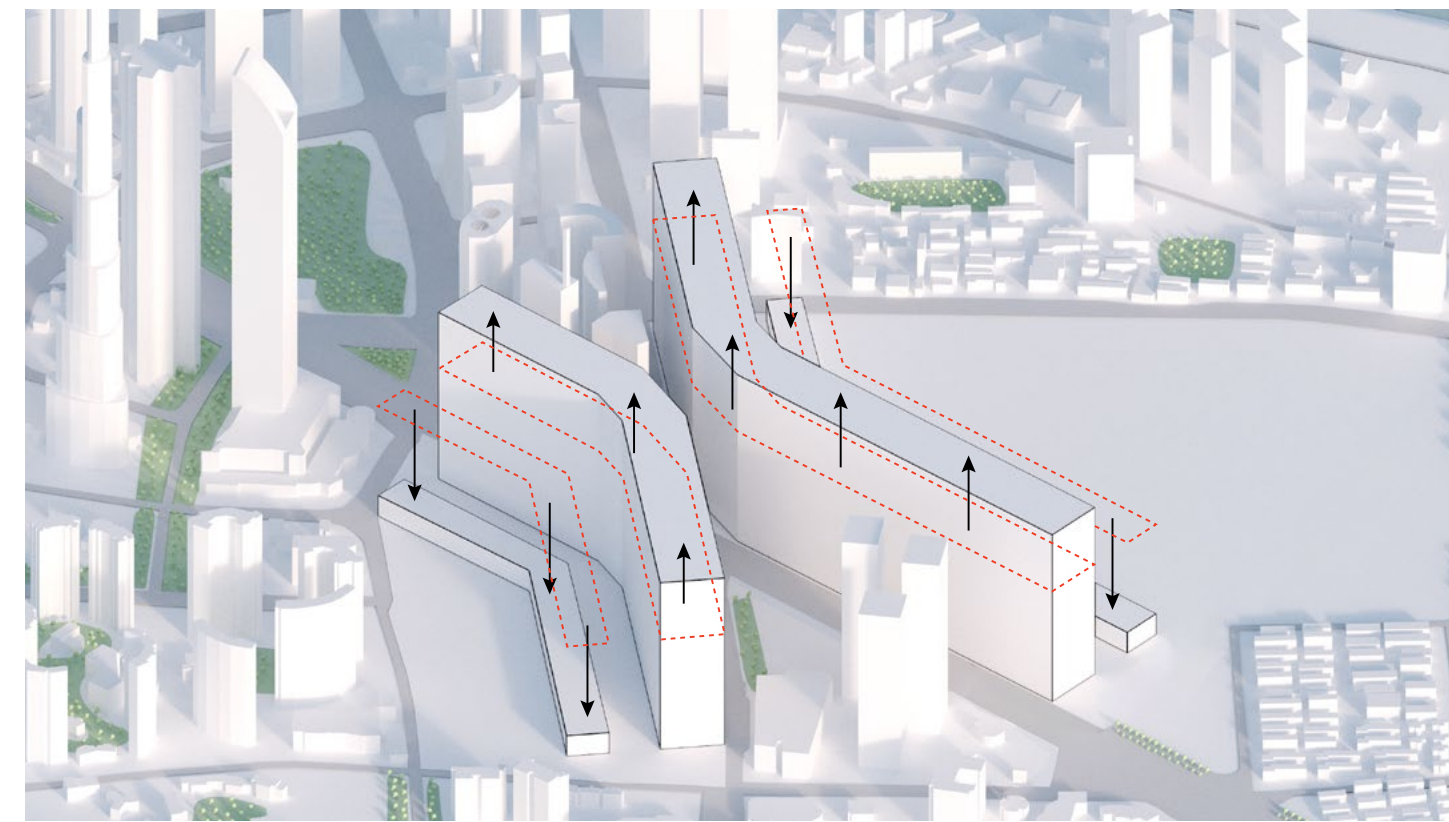
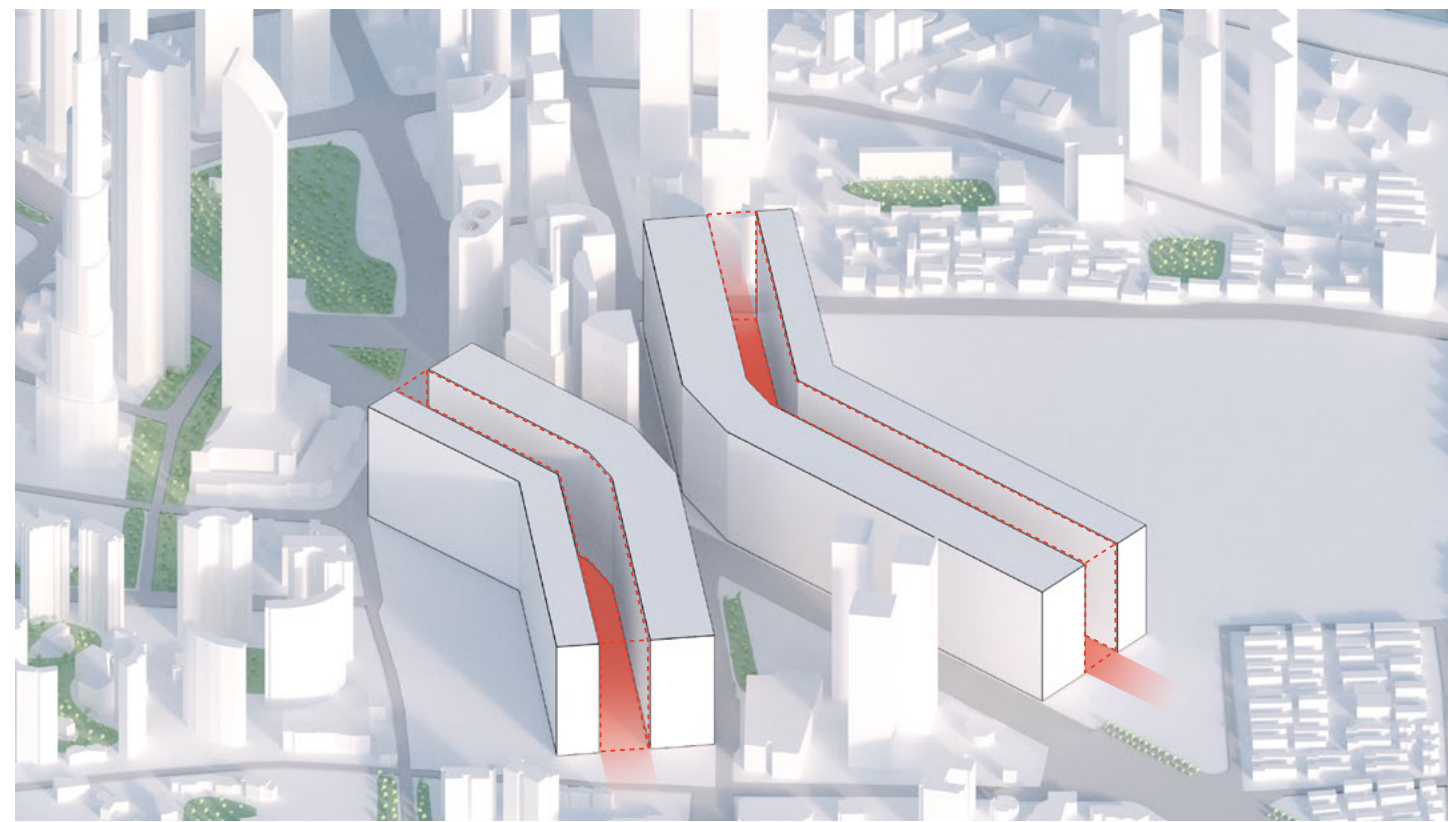
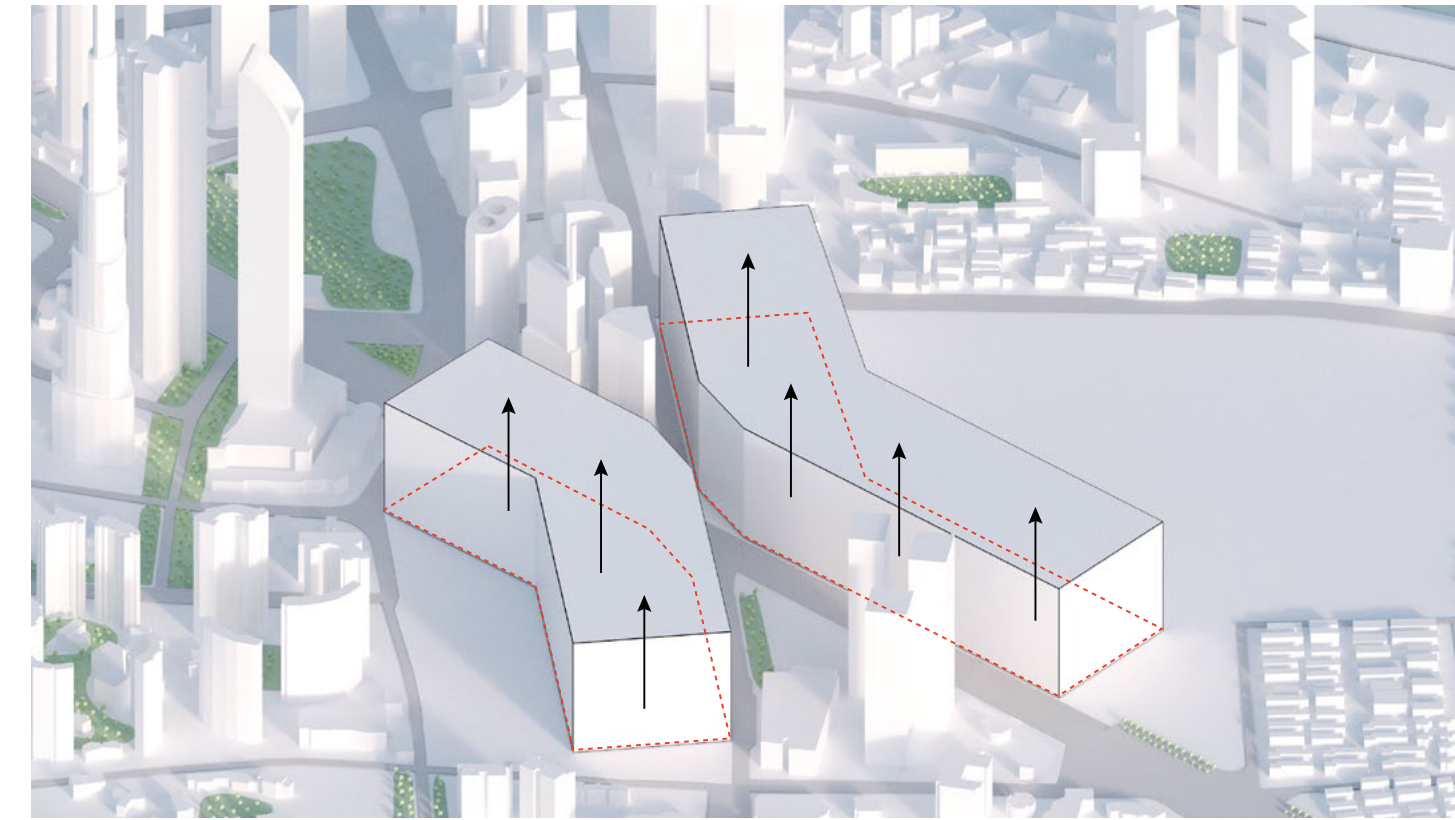
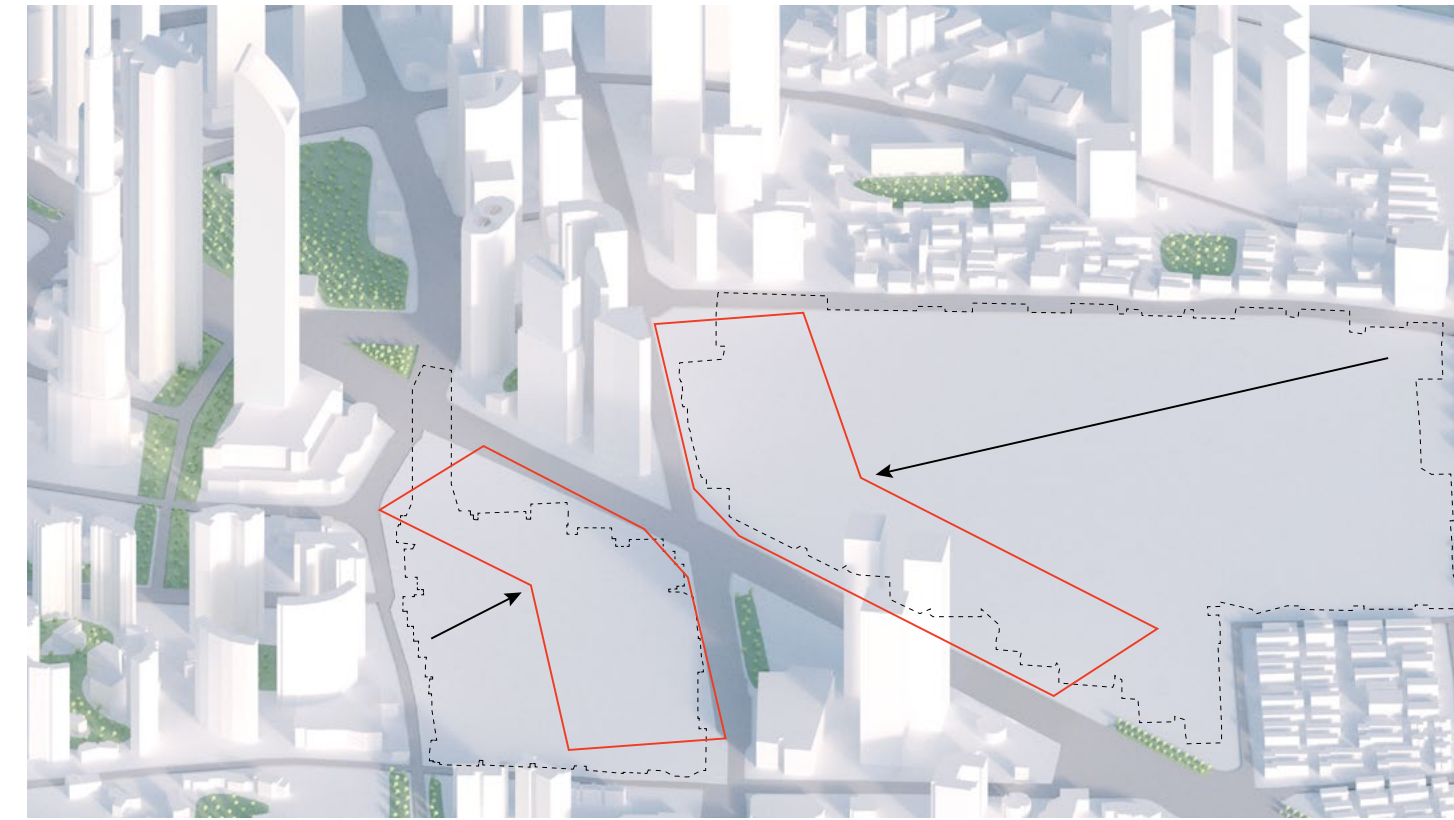
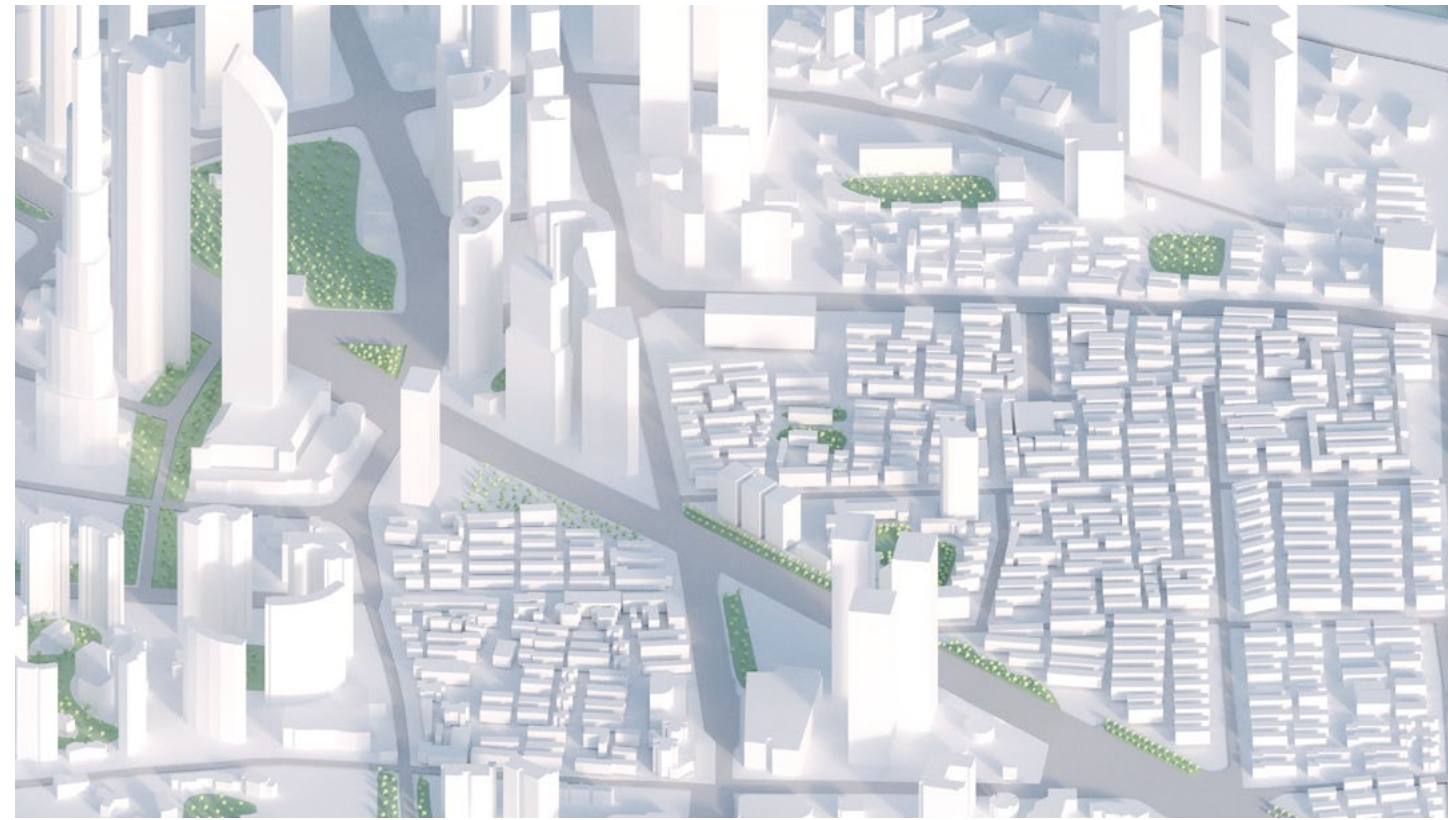
After defining towers for housing, organizing them as a sequence of tall buildings connected to each other by public amenities, surfaces are carved to provide additional horizontal passages. These passages connect housing and commercial buildings, creating several paths to be experienced both walking or by bicycle.

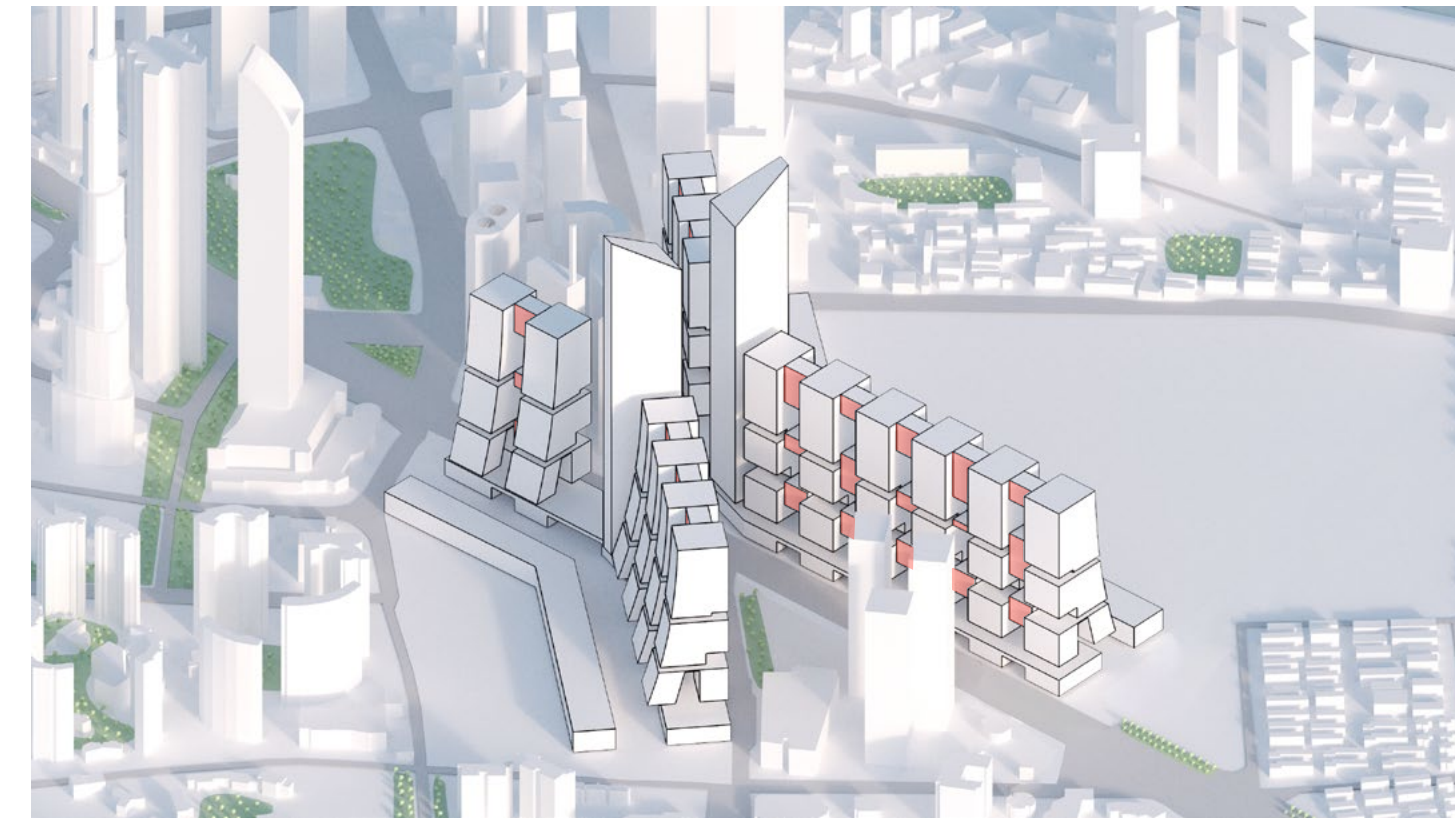
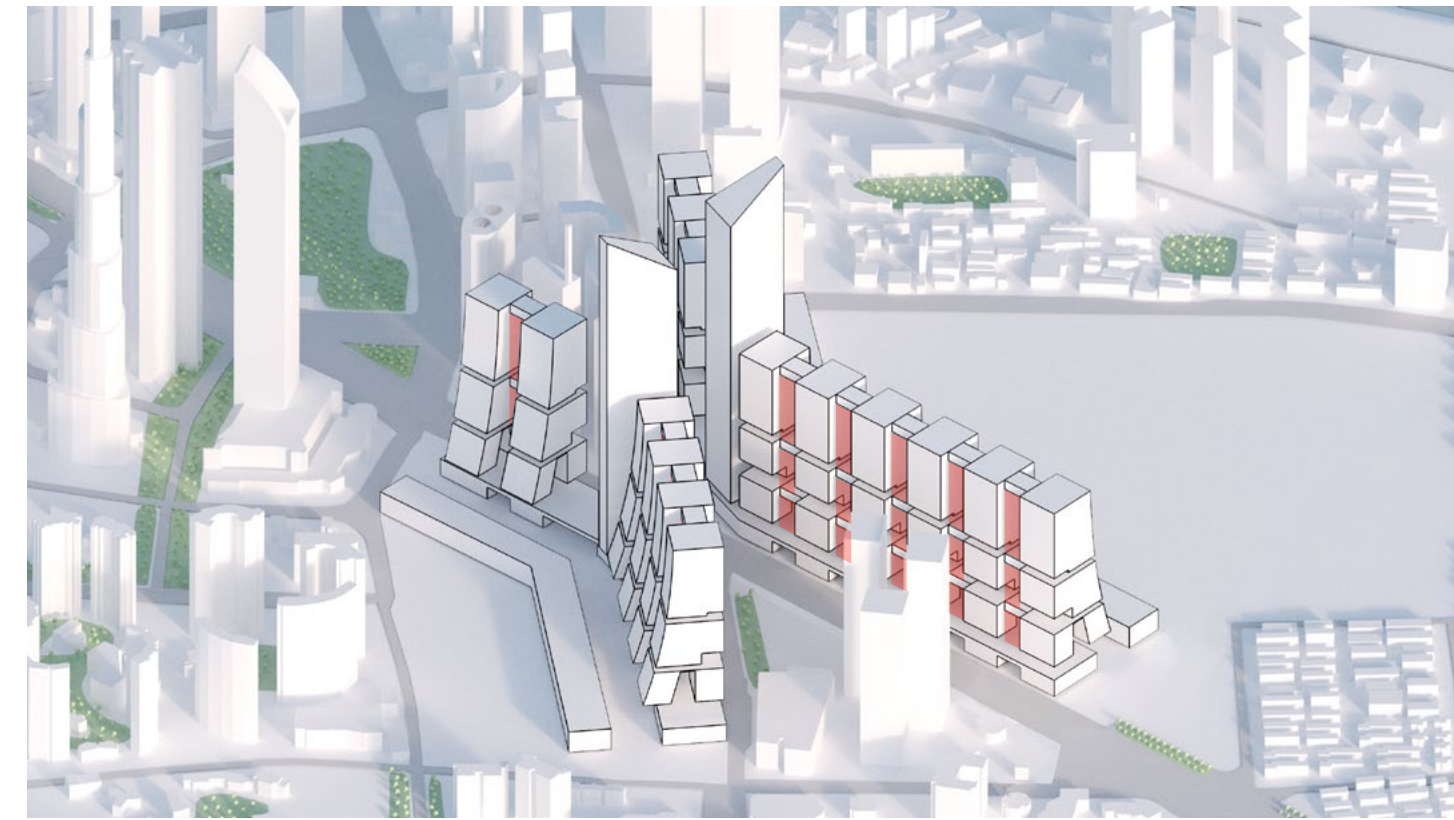
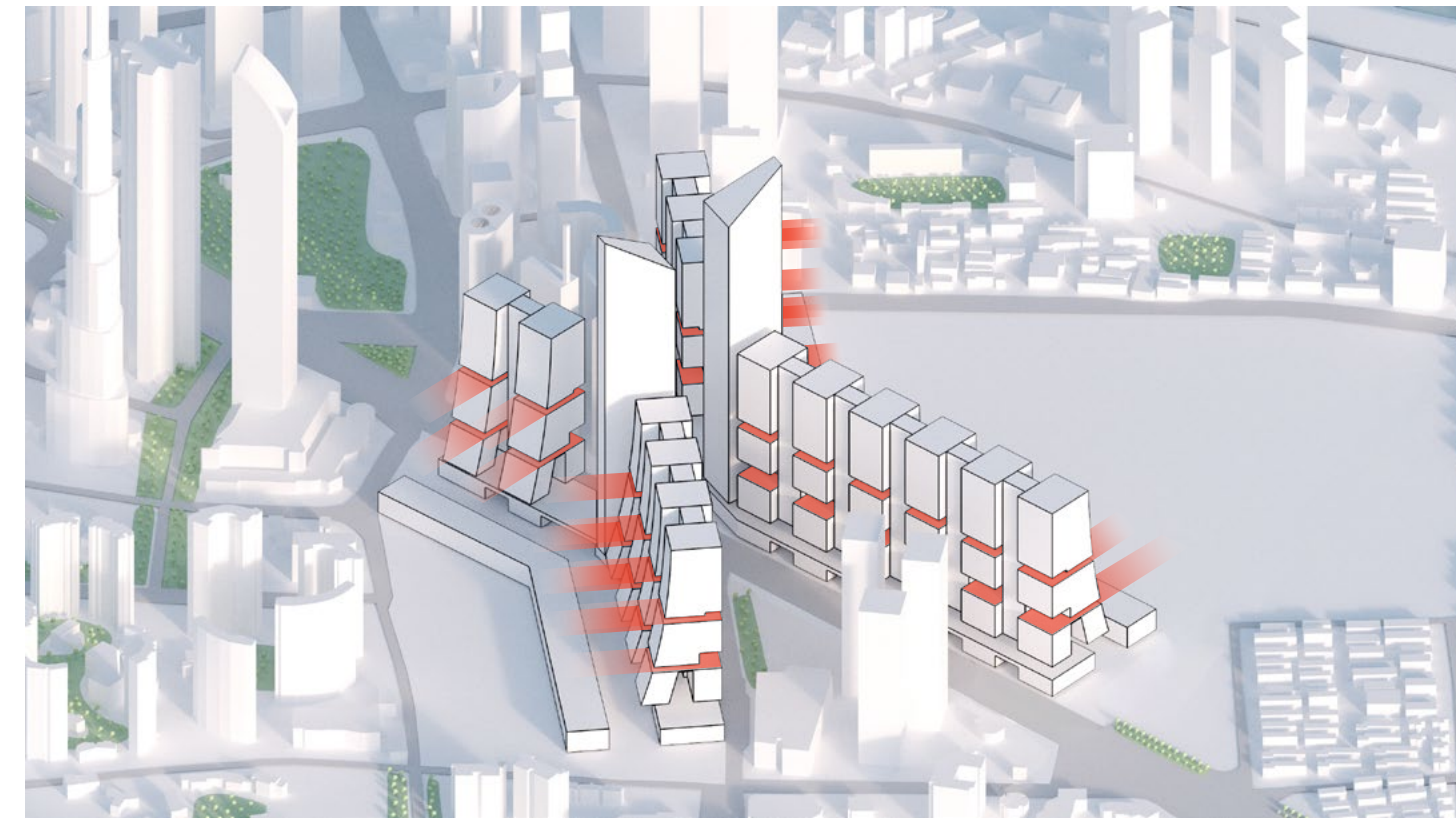
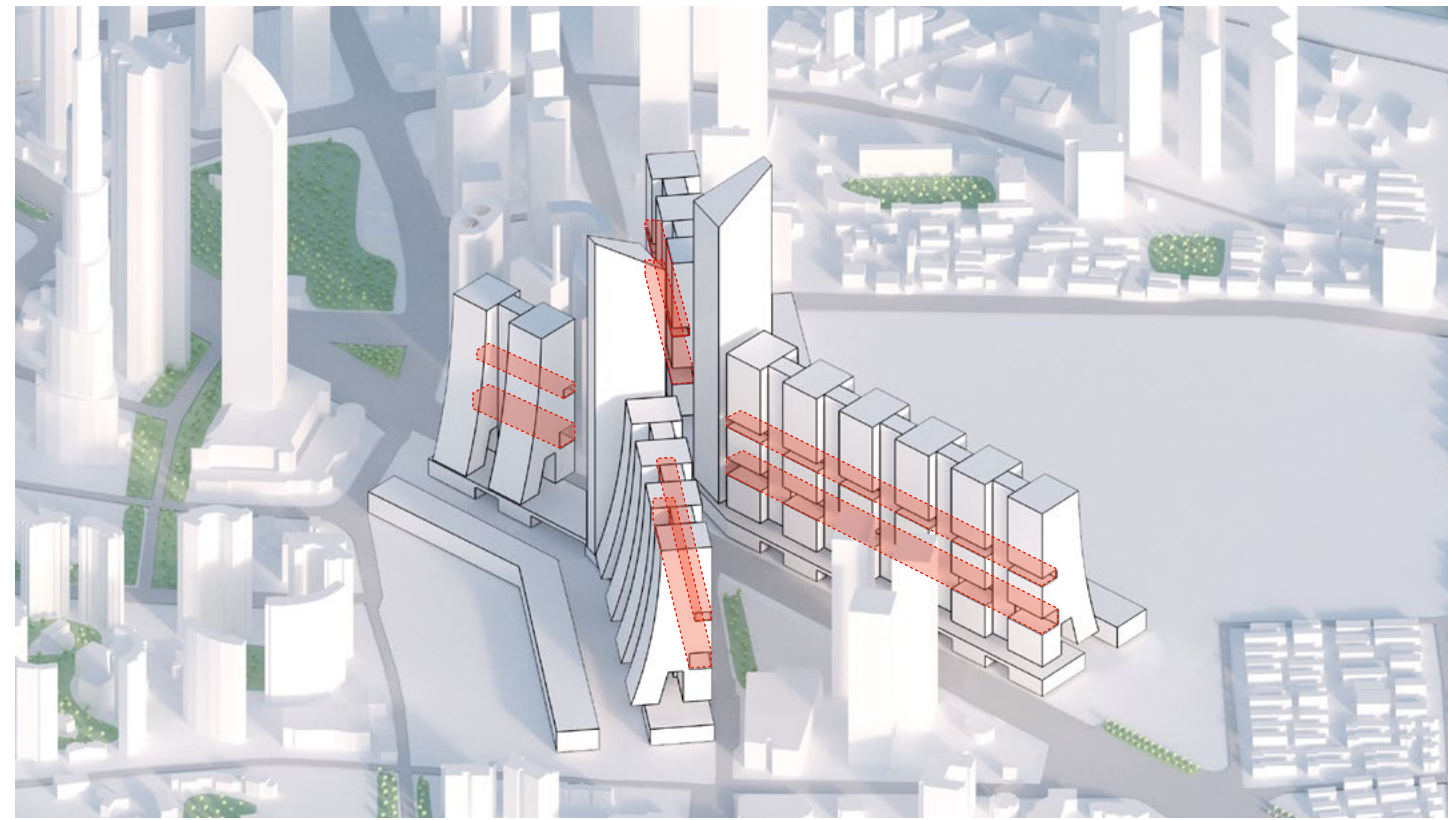
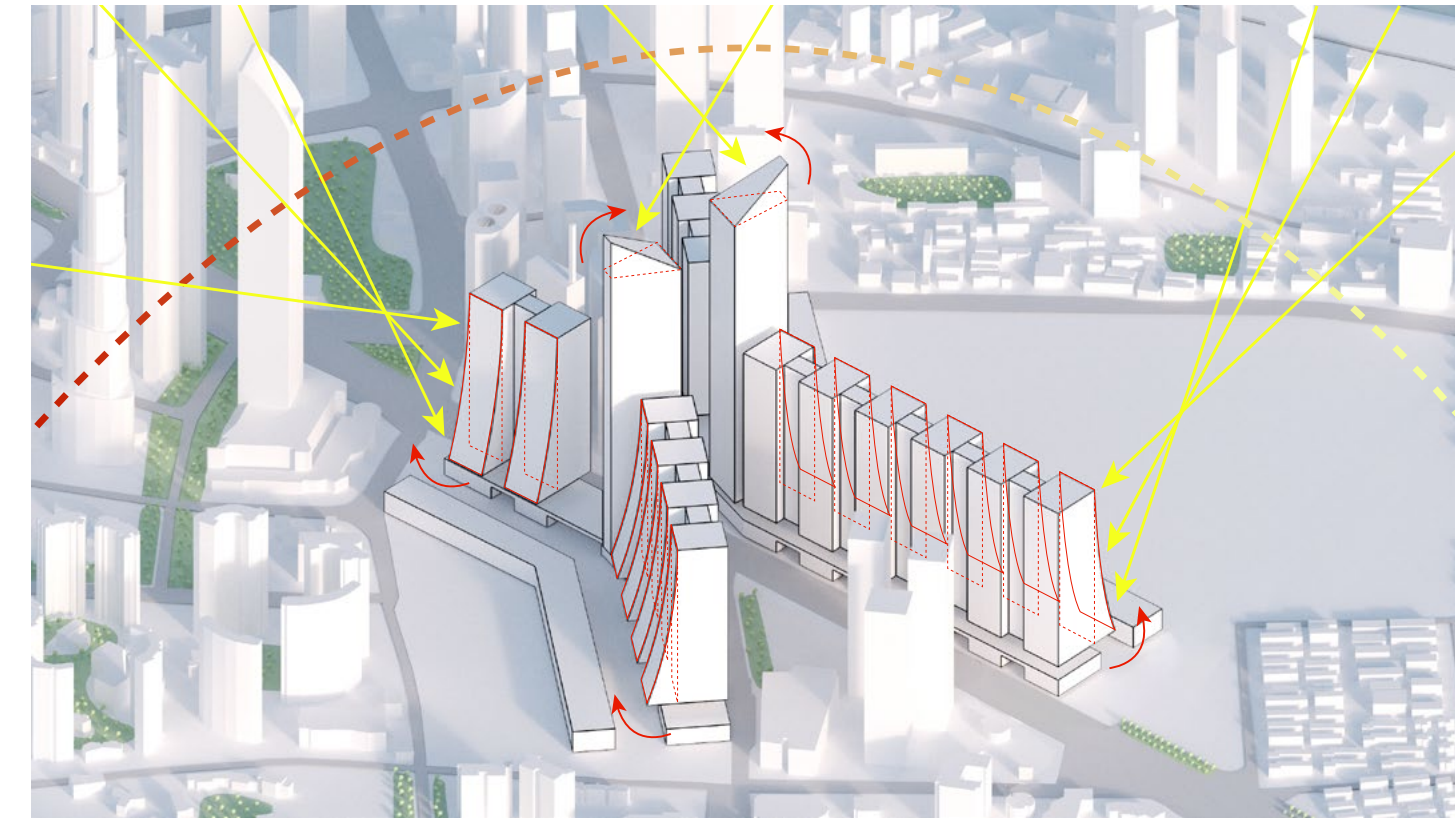
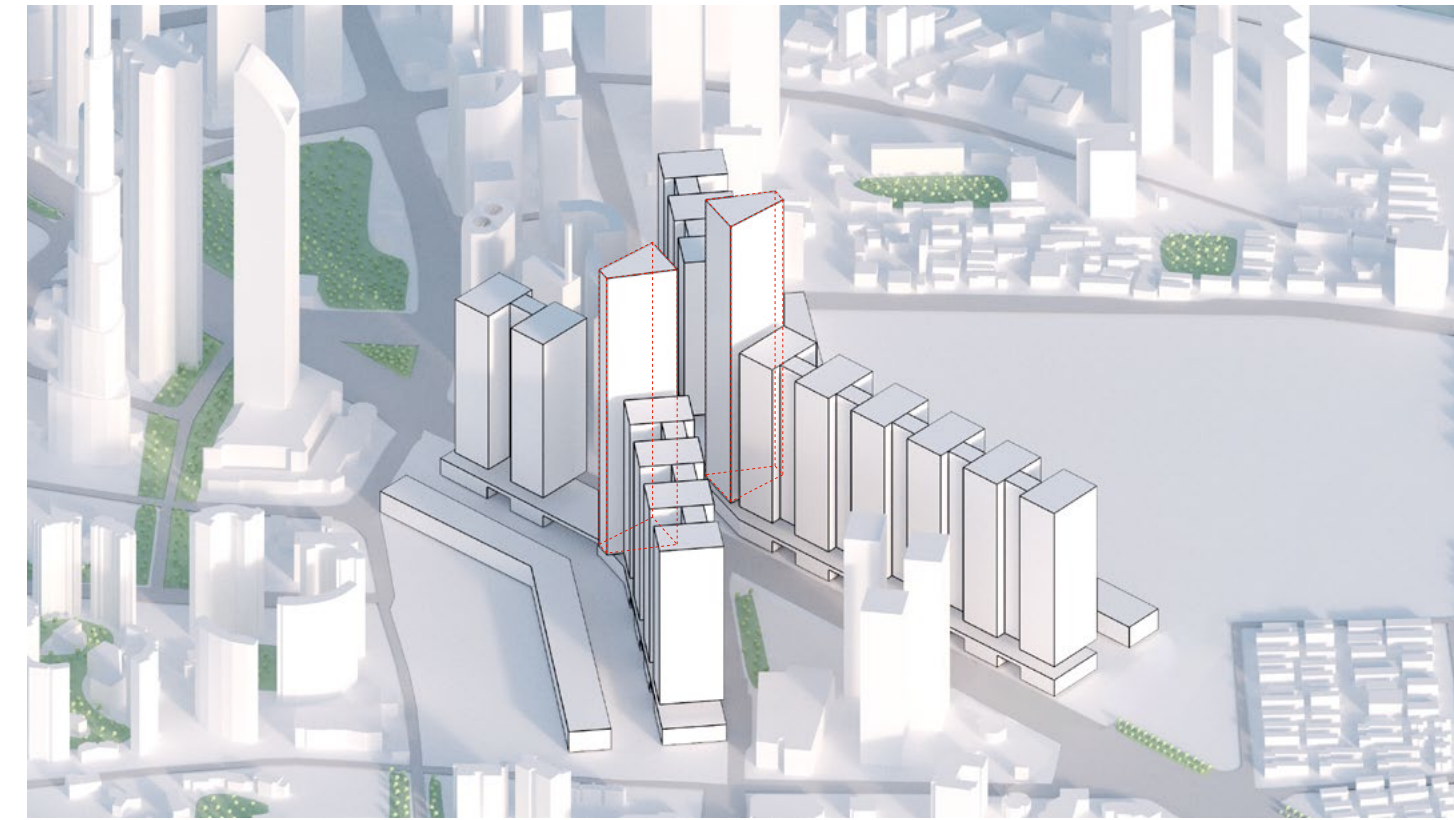
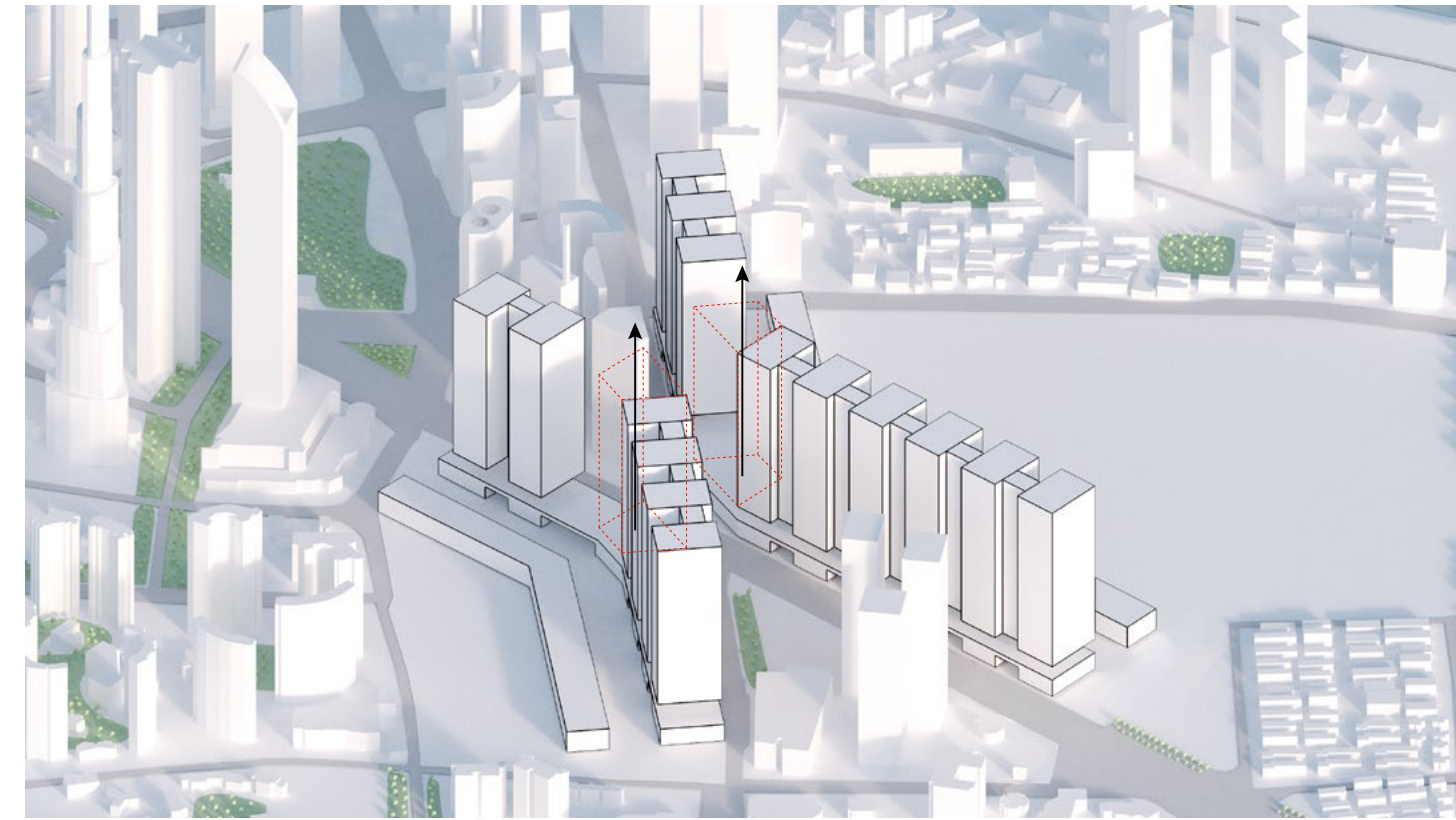
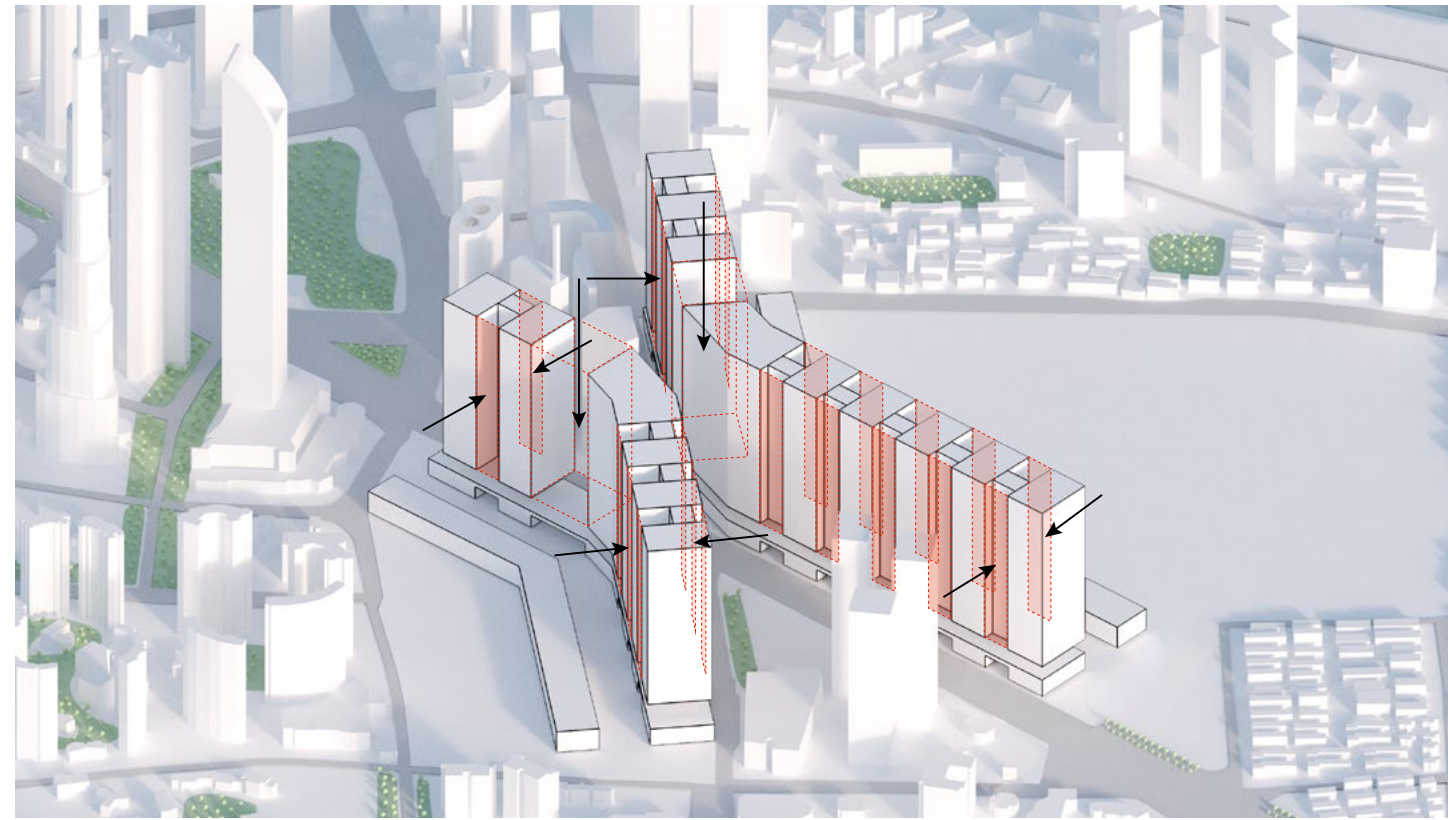
In particular, towers stand on the podium leaving a generous space to organize a complete opened-covered floor able to host additional public functions. In the meantime, the internal promenade between the two stripes of buildings connect housing and commercial buildings with the park.

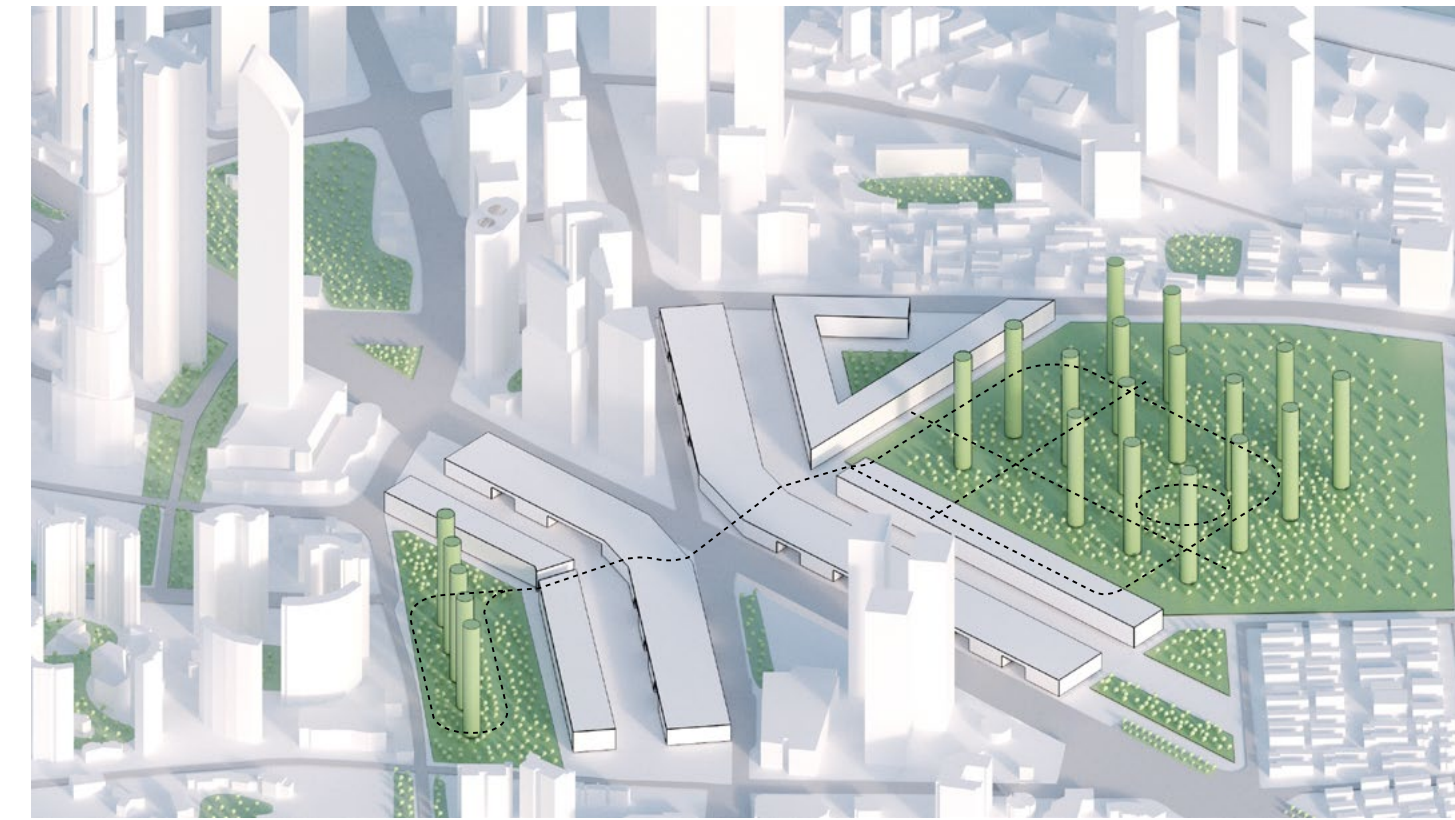
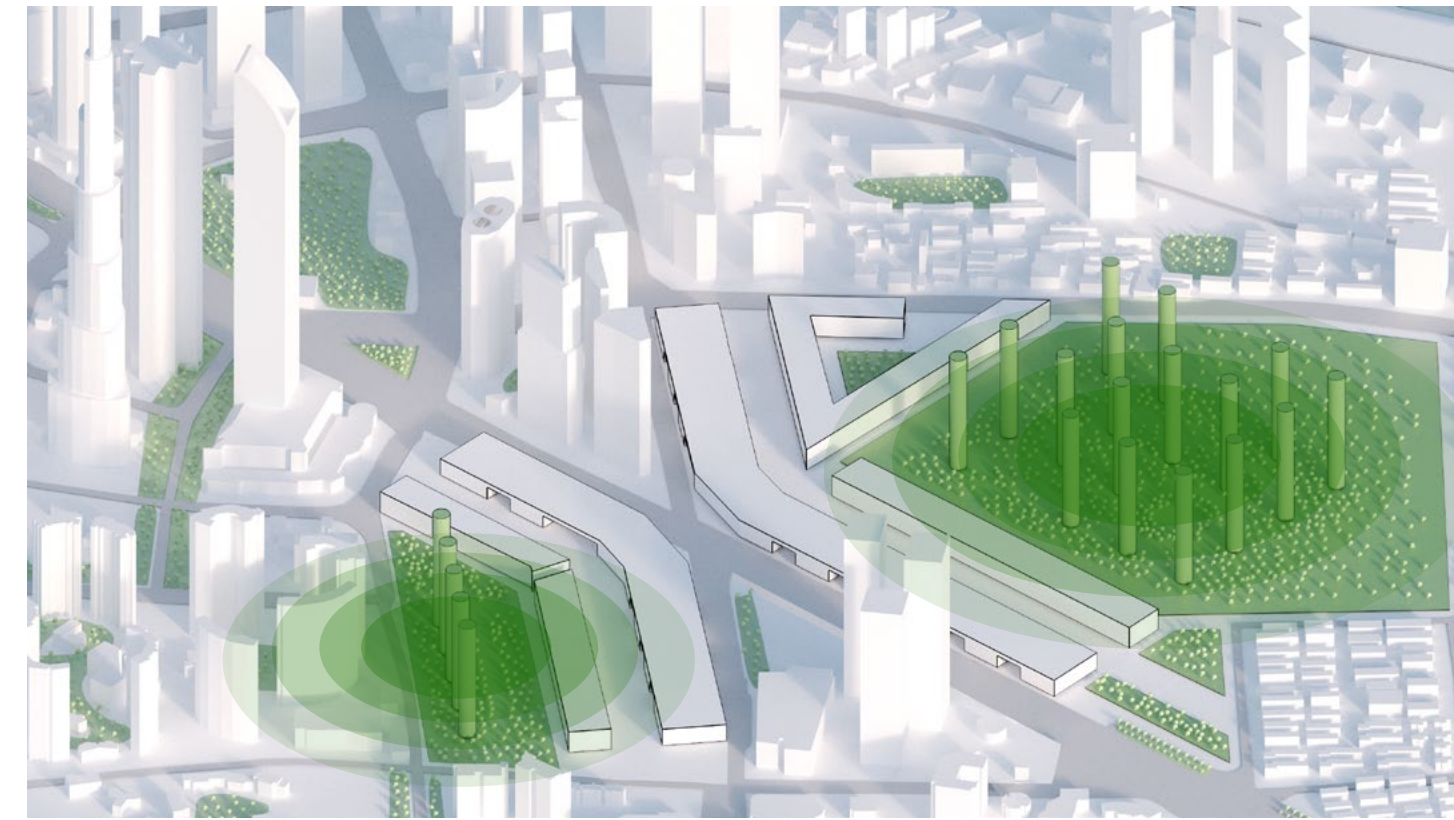
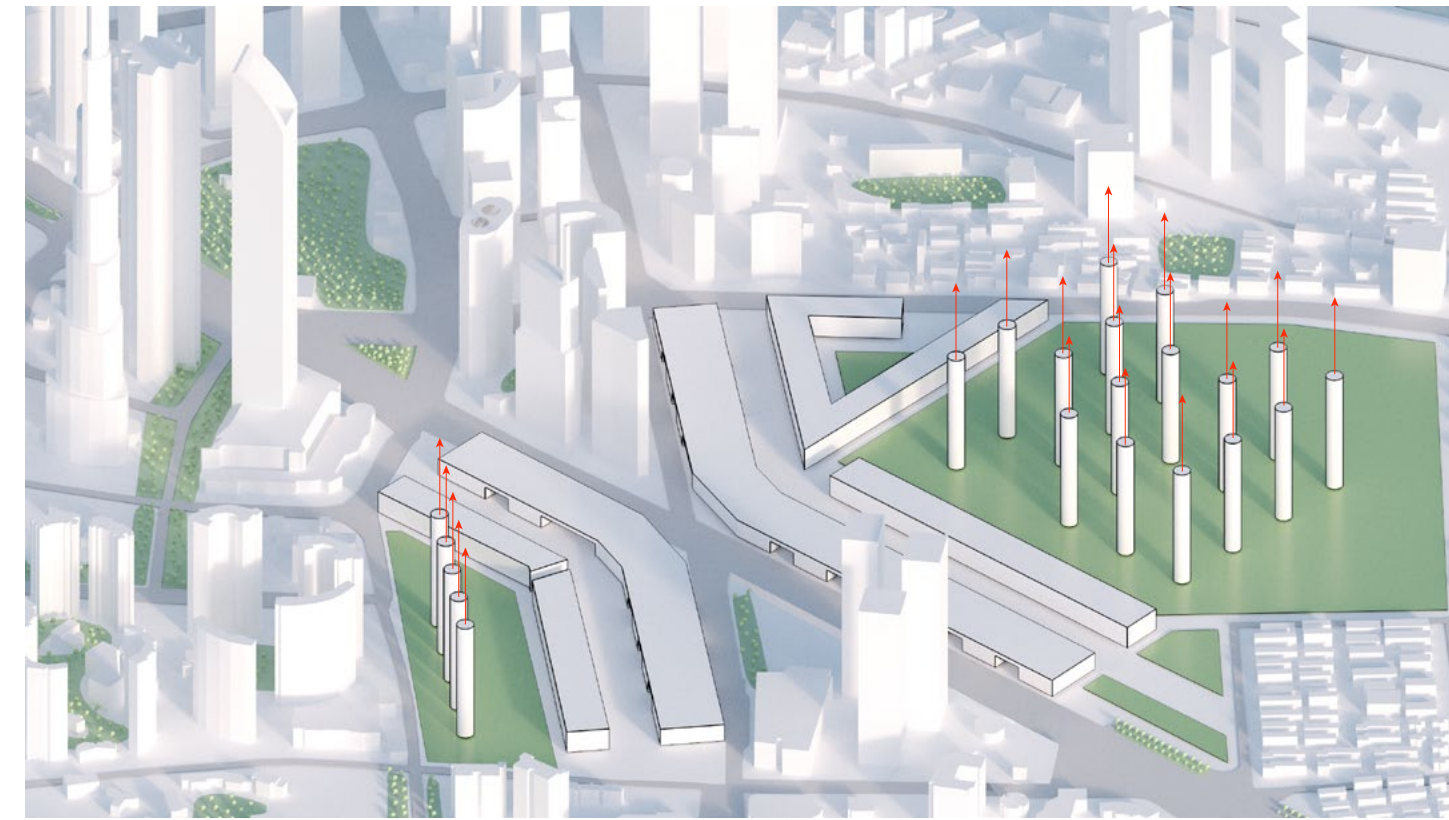
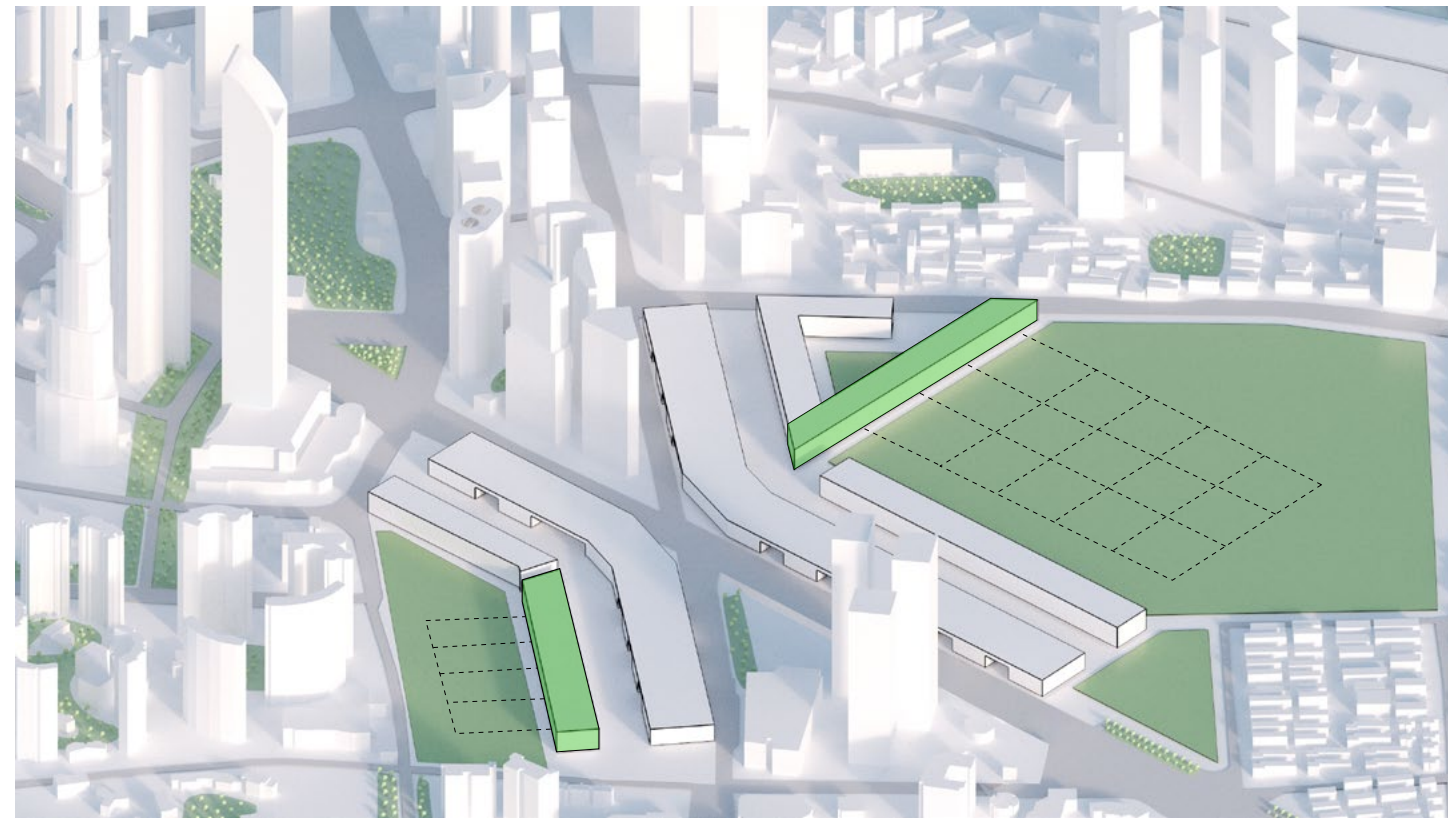
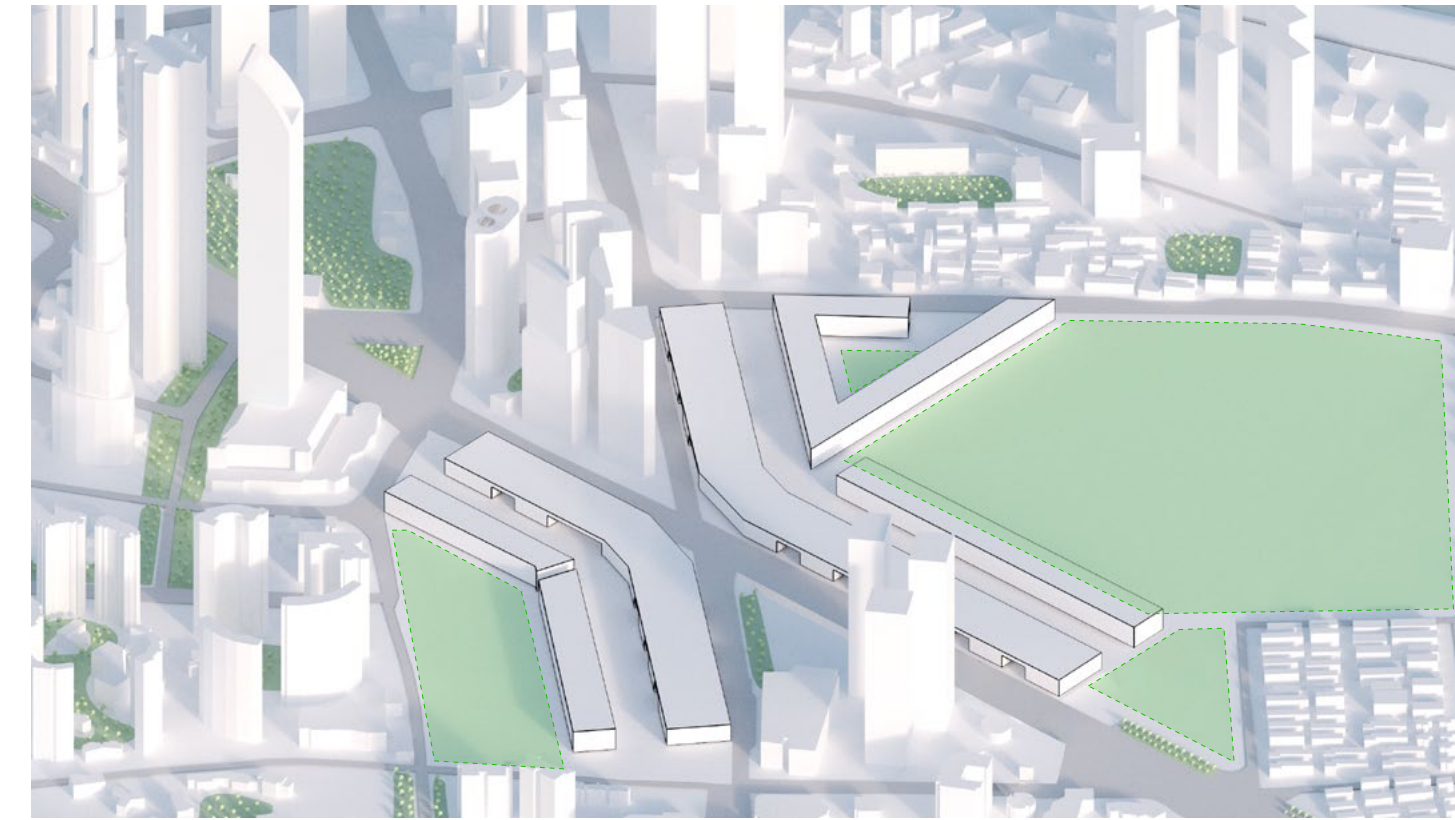
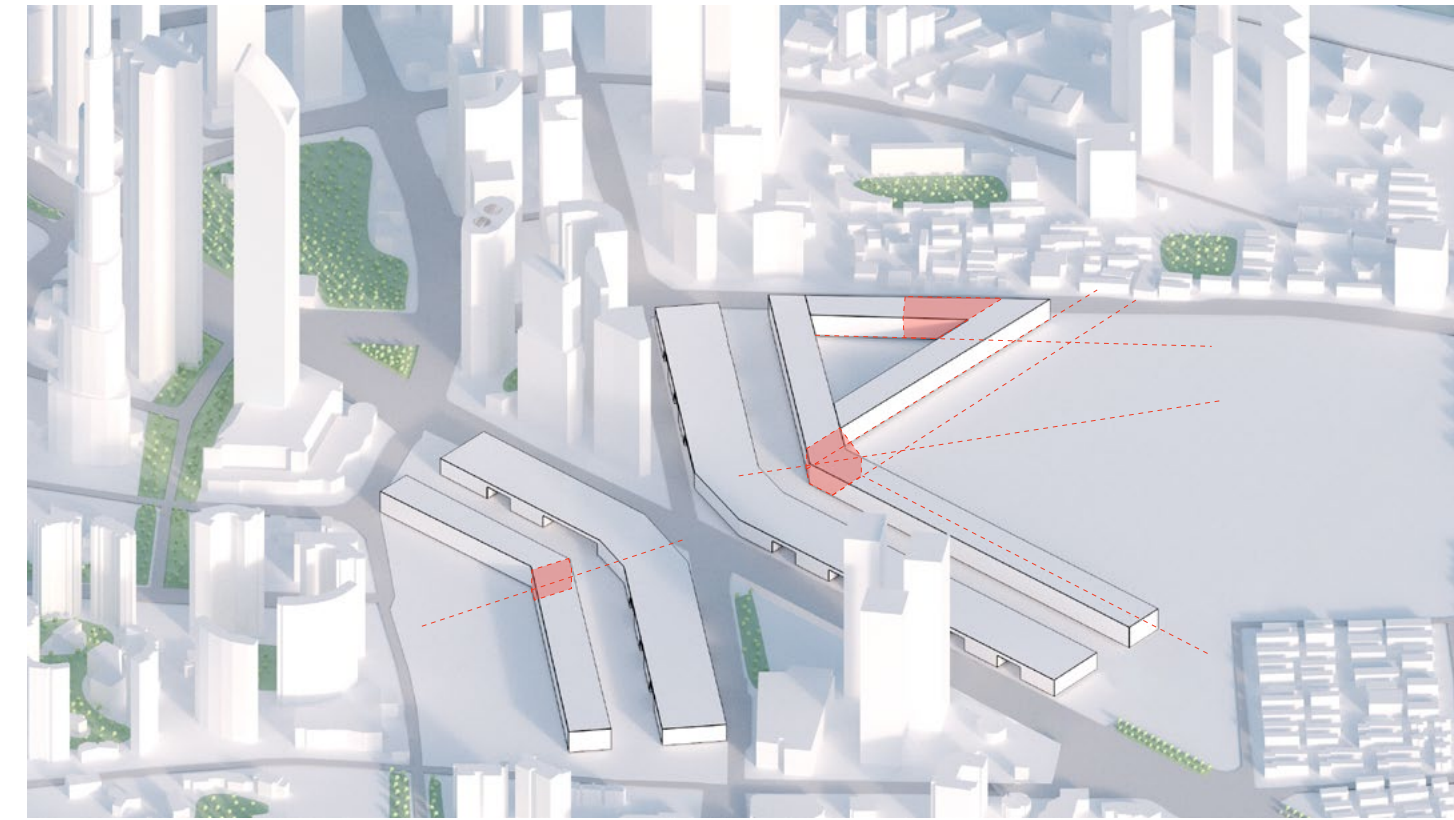
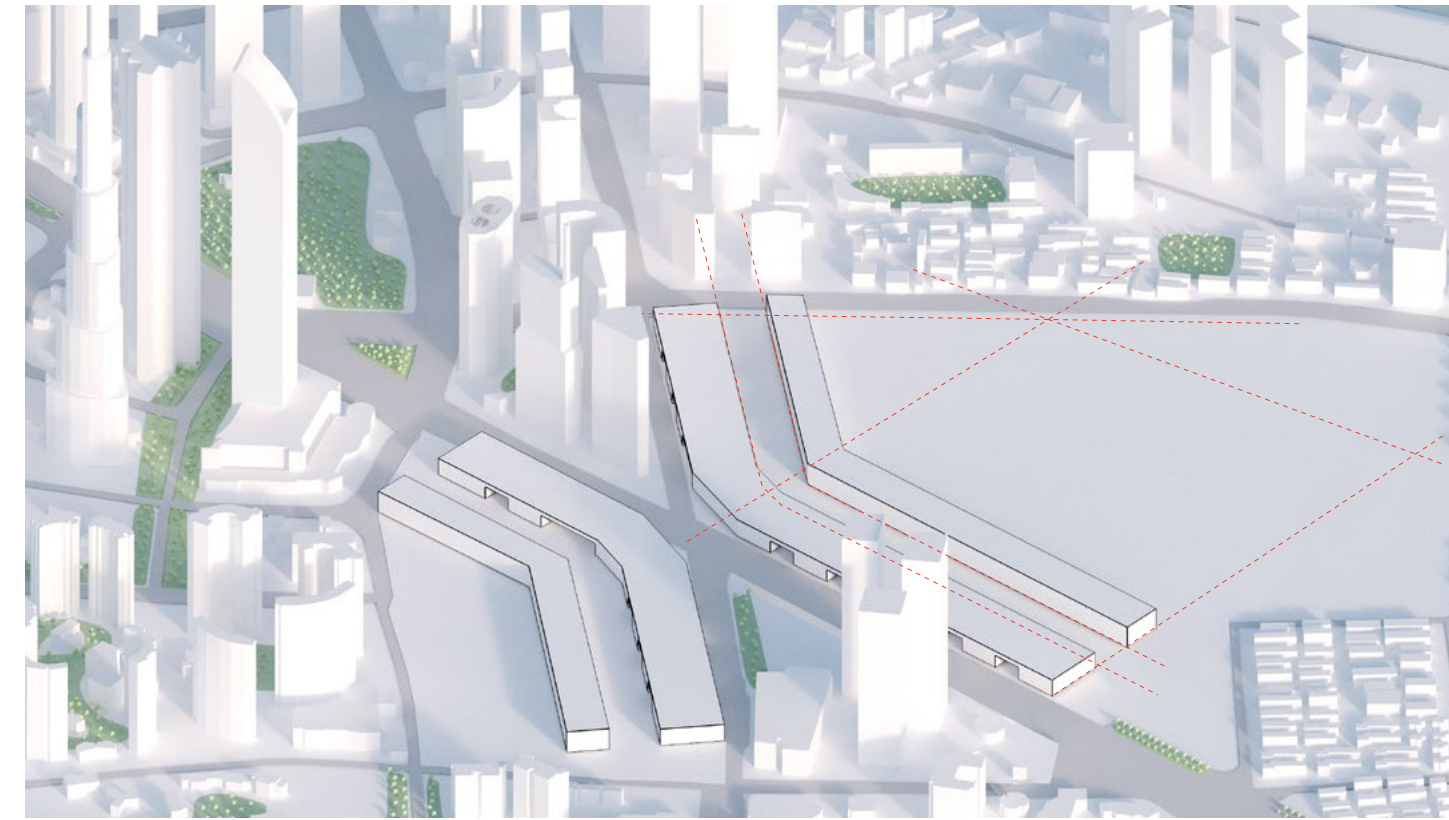
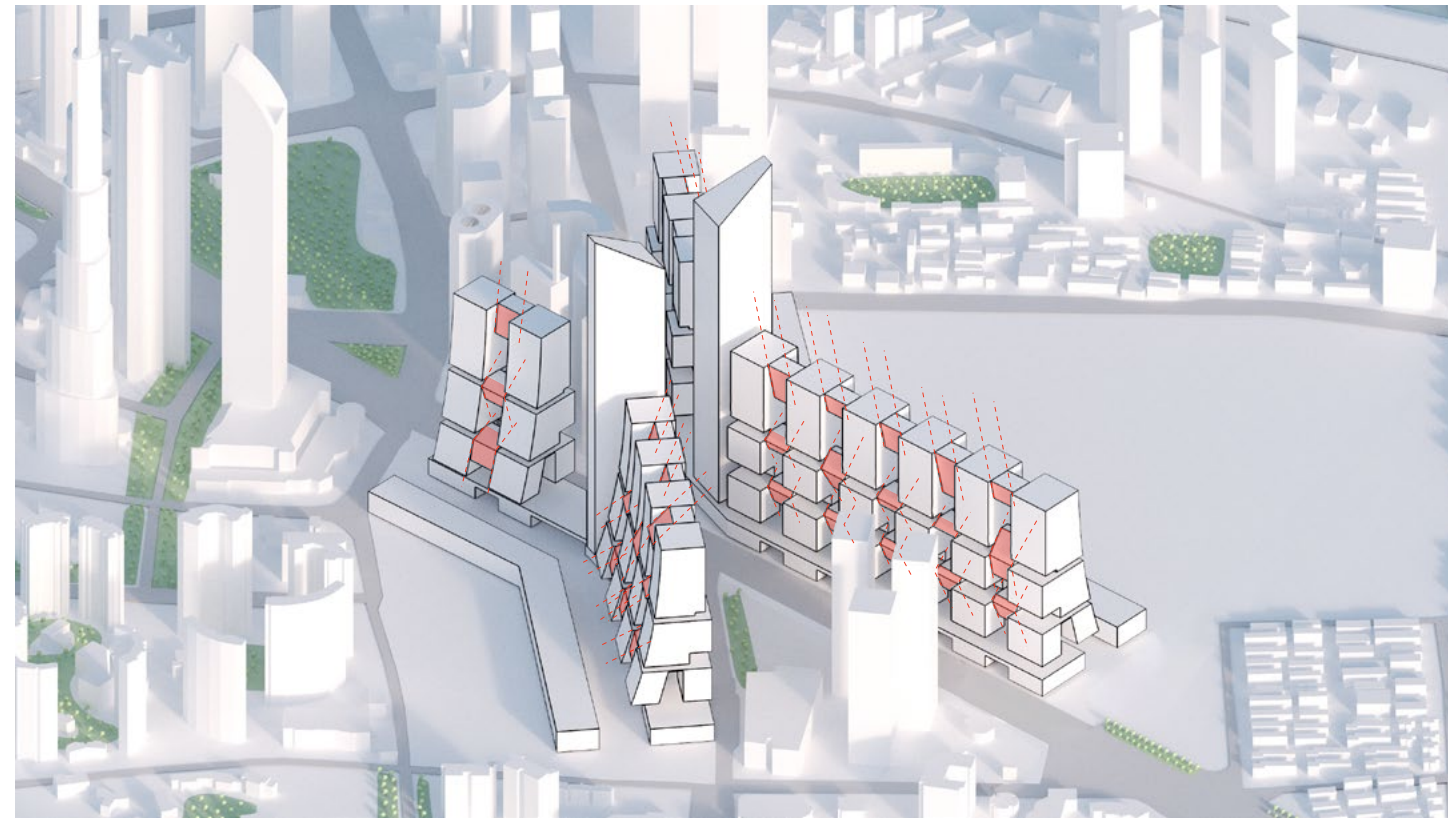
The park represent a concept for a green space able to produce food, to be distributed and consumed by people living in the surroundings. A factory and a market adjacent to the park will process and store the food.

In the point at which distances between the two main parts of the project get close, a bridge will cross Century Avenue to keep the continuity of the elevated public floor. Moreover, it will connect the two office skyscrapers which stand on top of two squares that are designed to be the “principal entrances” to the project: their location align them both to the center of the CBD and to the gates of the two parks, to put in strict relation outer urban space and internal park.











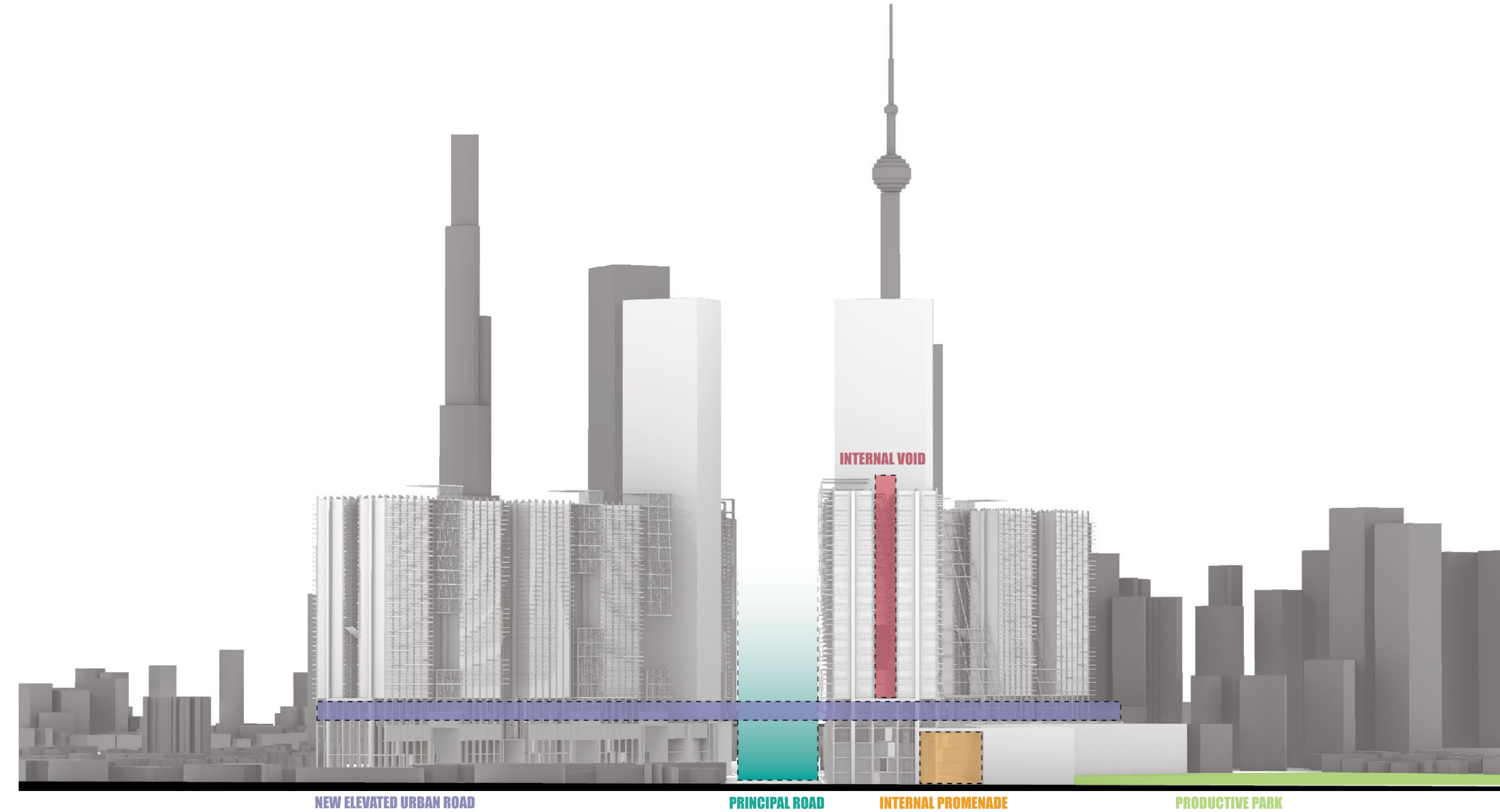
In order to retrace the passages discussed in the theoretical dissertation, my aim was to put in practice an exercise of visualization to enrich the object of this thesis, which is the relation between economic expansion and the issues of Megacities. Addressing this relation requires different “theoretical levels”, as the factors that influence the urban environment are hundreds. As architecture provides the geometric space in which we move and experience the world, finding new ways to configure the urban environment is fundamental to move forward on the path to sustainability. As designers, the theoretical level we belong to can be called “geometrical” as we take care of the spatial context to ensure a better life condition. By controlling volume and proximity of the actors of the city, we can optimize the urban environment, aligning with a more holistic and sustainable strategy. The reason why the model proposed with this thesis seems entering the space as a “tool”, rather than a part of the city, comes out from the fact that defining a massive redesign of an iconic central area of one of the biggest cities in the world represents an “exploration” strategy able to provide non-traditional alternatives. As the general statement of the model is to address the issue of the city as the place typically related to the last part of the productive system - the phase of consumption - it provides a different way to organize housing, commercial and production

spaces together in a unique area of intervention. To “stress” the geometrical issues related from the proximity between these actors, the model provides a vertical and an horizontal strategy at the same time. This multi-dimensional behaviour is fundamental to explore every type of co-existency between the actors. In particular, no data related the amount of stable population living in the plot were found. The amount of population to which we can compare the new density provided by the model is the total population of Lujiazui (112.000 people in 2010), with an average population density spacing between 6000 and 16000 people per square kilometer²⁶. The configuration of the model, by providing verticalized housing, can allocate 23.300 people circa per 0.15 km² (computed at the podio and not at the actual footprint, lowering the ratio). But it’s definitely not a matter of quantity of people: the real issues related to the preexisting context are mainly qualitative. For example, even though the are of Lujiazui is enormous, the quality of the space still can’t be perceived as a whole nor amenities and functions satisfy the local and floating population. Starting from this concept, the model wants to configure a space that can represent a pivotal point in the enormous area of Lujiazui, adding quality by acting as a new central park able to connect free-time experience and production to optimize the potential of the city of Shanghai.

The proximity of these two figures is fundamental: while the groundfloor of the park mixes people and workers, productive towers can be experienced by moving around at the higher level, thanks to the “floating aqueduct” that connects the entire plot. Rather than being just an elevated passage with no functions, this floating road merges the two podiums and extend the accessibility to the parks. The contrasting development of the park, which involves the traditional natural surface and a concept for a productive tower, is replicable in the housing and commercial area as well: in planimetry, the sequence of amenities and housing towers appear to be the same as in a traditional city, in which is the groundfloor to merge functions. In fact, this model promotes a principal groundfloor at +24mt to detach the new “civic space” from the level of Century Avenue. The stripes of public amenities hosted by the podiums can be accessed from any side and organize the sequence of gates to access the internal promenade as well.

The strategy to operate a sequence of public spaces that follow the preexisting shape of Century Avenue helps to not compromise a tremendously negative situation; moreover, moving every amenity on the internal sides of the plot, facing C. Avenue, makes easier to optimize the physical accessibility to the whole program.

26. “Understanding jobs-housing imbalance in urban China: A case study of Shanghai” by Weiye Xiao, Han Li and Yehua Dennis Wei (Journal of Transport and Land Use, 2021, Vol. 14, No. 1 (2021), pp. 389-415)



The sequence of public spaces, together with the amenities in between towers, represent a valid construct to be compared with the issue of mixed-development and the amount of offers the territory can potentially provide. This scheme promotes two different positive situations: the first one is related to the actual location of jobs and the variety of amenities compared with the actual distance with housing, which in this model is never more than 900 meters, or 11 minutes walking. This aspect is extremely important to build a community rather than a building. The lack of an actual architectural atmosphere in Lujiazui due to the enormous urban void that is perceived from the human scale can be resolved only by improving the cultural and social offer of the territory, together with an actual planning of the single areas that compose the CBD. Chinese cities in general are becoming bigger, and the trend is faster than the actual population growth²⁷. Because of this issue, every problem related to the urban context, such as pollution, commutes, lack of mixed-use development, social inequality and so on, represent a massive weight that the system has to support. In fact, an expanding city that doesn't work at its centers affects its horizon as it is the area in which the majority of the people that suffer the most urban related issues live. To reconcile the CBD of Lujiazui with its surroundings, this project aims at providing a redefinition of the project

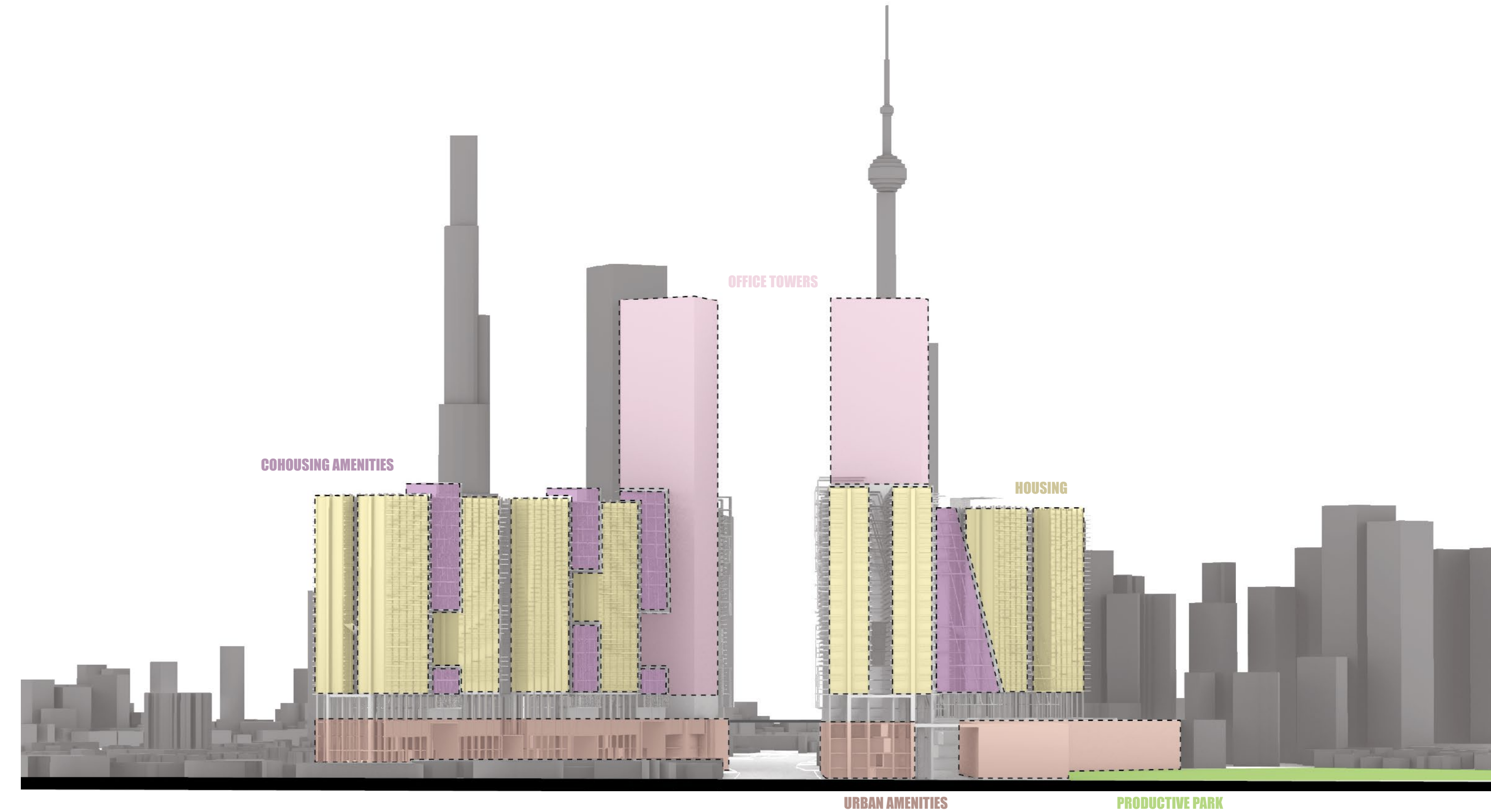
plot by changing its architectural nature. Going from a residential model to a tall building model with an high mixed-use level and an adequate job-housing balance can be a solid key to access a different way to live the entire area. Moreover, the insertion of medium-low level jobs (related to the majority of the job offers of Lujiazui) can mitigate the pressure that a too high market price puts in around the CBD, preventing it to be accessible to a wider range of people. This last element is fundamental to put in practice a revitalization of the actual community of inhabitants and floating population.

Regarding the actual situation of the sub-district, we can confirm a tremendous issue related to private traffic²⁸, which saturates the whole area. Moreover, the area is served by 1 rail station and almost 50²⁹ bus lines, which can't anyway satisfy the demand of travels as an high level of traffic occurs both entering and going out from the central area of Lujiazui. Finally, as mentioned before, the massive flow of people (residents, tourists, white collars, floating population and so on) experience the space as a "passage" rather than an "arrival space"³⁰. This issue is related to the perception of space and to the level of mixed-use development, together with the distribution of attractions and public functions. Lujiazui, again, is recognized as a landmark because of the iconic

tall buildings but can't be experienced as a "whole space", with its own identity.

To respond to this negative aspects, it is clear the need of a more stable zone in which several amenities can support the features of a complex that reacts to the CBD not by isolating itself, but by establishing itself in the area as a new point of attraction.

The system, anyway, is not a closed one. The high level of accessibility from Century Avenue and the presence of public amenities both at the groundfloor and at the higher levels together with the floating promenade, create a dynamic environment in which an high amount of people can live.



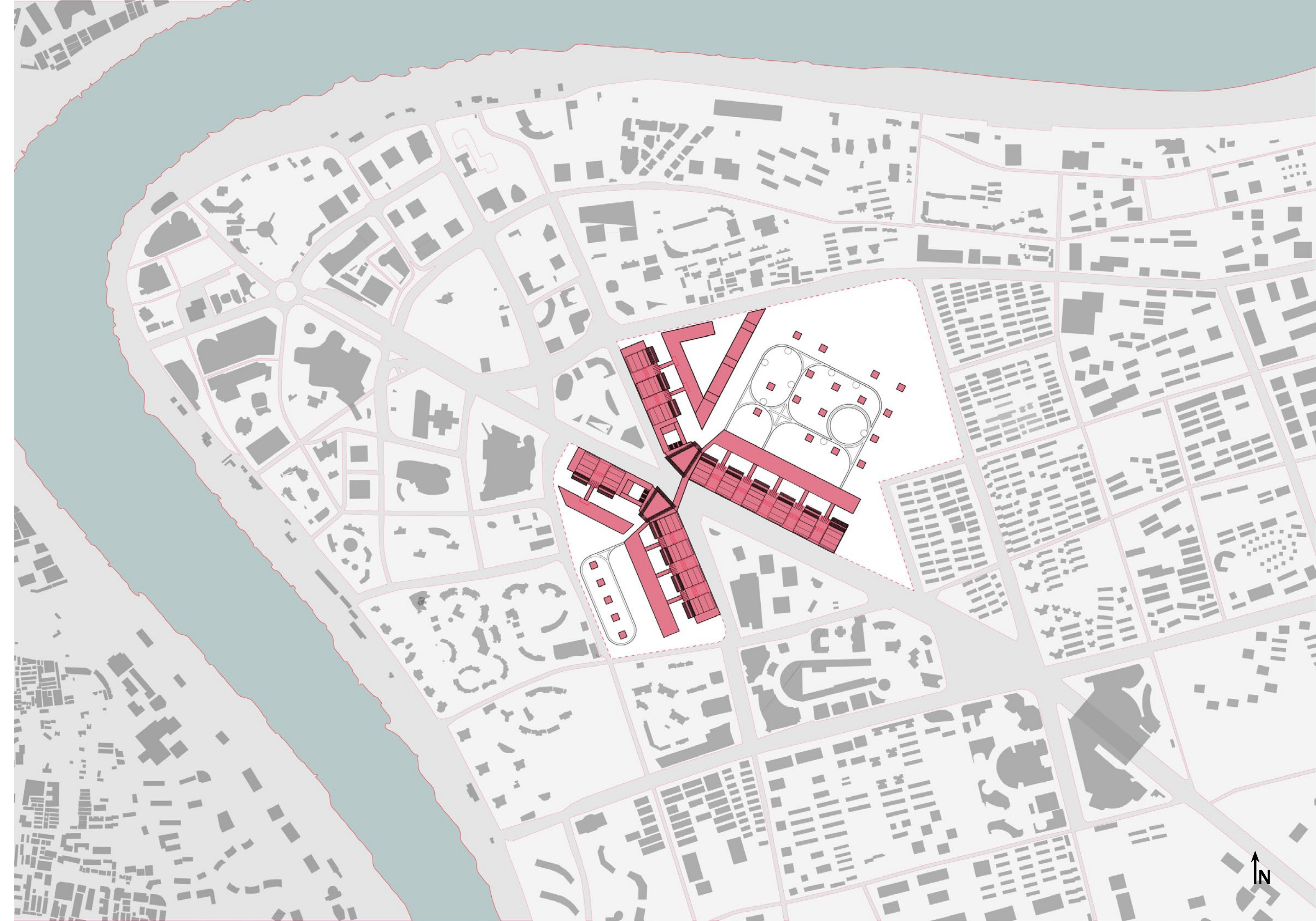
27. "Denser cities could help China reconcile economic and climate goals" (MARTIN RAISER KATHERINE STAPLETON YOONHEE KIM) (DECEMBER 20, 2021)

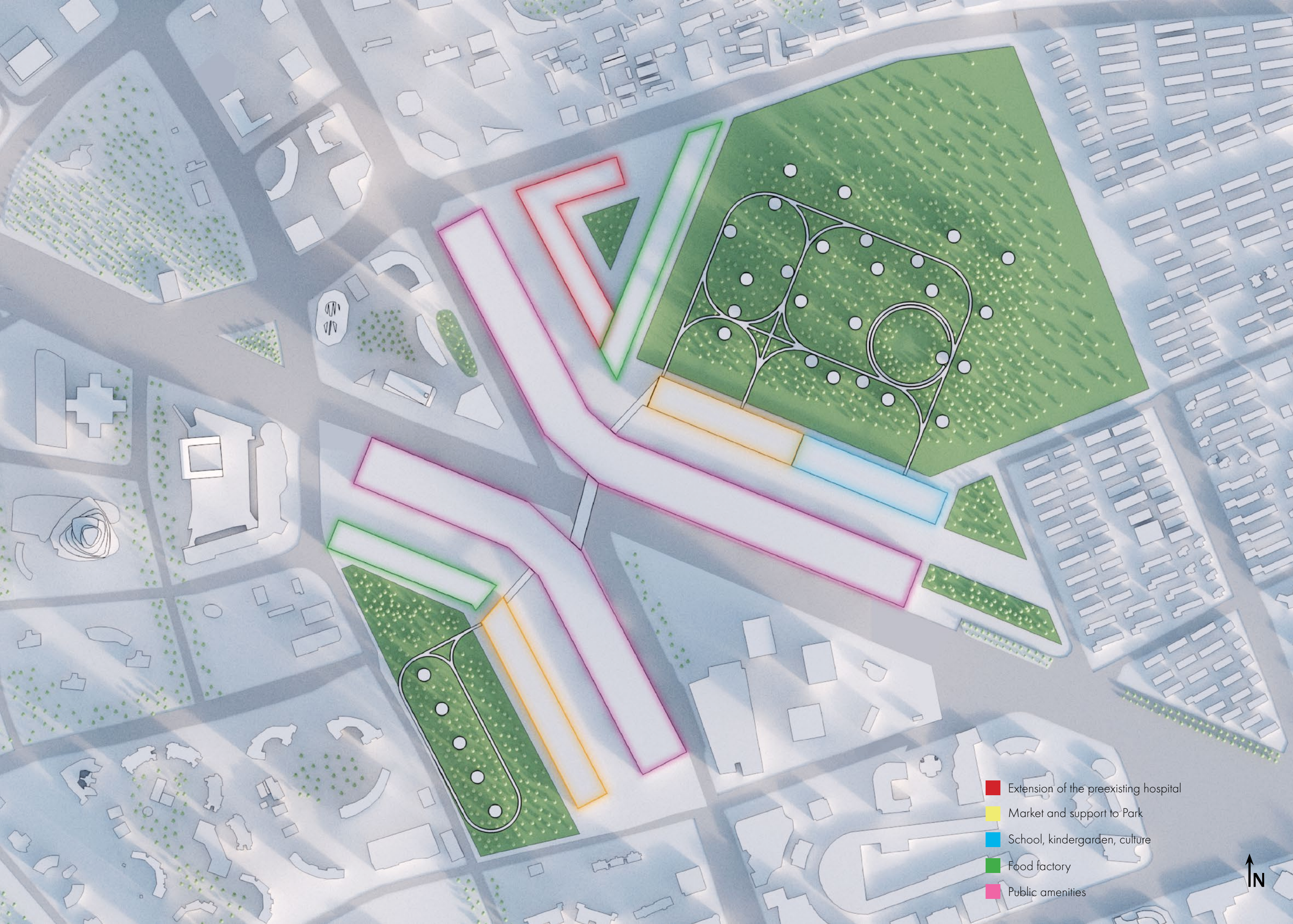
28-29-30. "Study on the Management of the Public Space of Lujiazui" by Kangjuan LV and Bingjie FAN, (Cambridge Journal of China Studies)

Finally, this prototype tries to extrapolate the specific situation in which human and natural needs obtain the same strength in determining the shape of the city: the production park and the complex of buildings work in synergy, equaling each other in manifesting themselves within the project area, providing the necessary sustenance to the people who live near them. In this model a multidimensional park has been theorized in which the production of food is entrusted to towers to maximize the space of the park. The perspective of opting for a series of towers that arise from the park and feed it in turn was chosen inspired indirectly by the master plan provided by the master Vittorio Gregotti who, for the competition for the expansion of the Lujiazui CBD in 2007, he saw towers organizing space within a grid of streets and connections at different heights. Although I have based this visualization on different themes and principles, and despite my need to narrate a problem through an alternative model, rather than narrating an idea with an architectural project, I tried to translate in architectural visualization what a synergy between spaces and people can mean in the future. Imagining this type of integration is one of the keys to the sustainable future of cities. Especially from the point of view of the use of green, agricultural or natural spaces in general, the construction of a social or economic value around it is essential to be able to stitch together different elements

within the mosaic of the city. The experimentation of a different development model (especially a radical one) can arise from the complete redefinition of an already fully tested system. This could be the case of parks, urban crops (vertical or otherwise), city greenhouses and all those places suitable for the production of food. After all, the theme of accessibility does not only manifest itself on a spatial level, above all with a view to visualizing a city that can incorporate production processes within it. For this step it is essential to make use of the concept of "distributive justice" ("Searching for a new model of food and farming", from "Sustainable Food Systems: The Role of the City" by Robert Biel, pp. 4-10). In this vast theme we find multiple elements, such as the question of sustainable production, importation, the market, the distribution of food and obviously the immense waste of which our society is stained every day. In fact, at the global level, the problem of nutrition affecting various countries is not fueled only by the deficiency of the production system, but also by the degree of accessibility to food itself (Amartya Sen, 1982). This projection also occurs within the reduced context of many cities. In any case, as Robert Biel explains, if the success of food production in the world's superpower systems is currently high, it is thanks to the use of production methods that are not sustainable in the future, due to the fact that they pollute and erode Earth's resources.

Now, this discourse seems to be very general and almost detached from the actual themes belonging to Architecture, however imagining future cities with greater capacity to respond to the needs of citizens also means imagining cities as the final - but active - part of a more sustainable supply chain. Robert Biel, in any case, starts from two premises to justify the need to set the discourse at a decidedly vast level. The first is that it is not possible to talk about the problems of access to food without talking about the whole production process in its global entirety. The second is that, precisely in this discussion operation, we are required to do so due to the fact that the will to improve the production process is possible today only thanks to the enormous quantity of food that (only currently) we are able to produce. At the level of the city, and of the visualization work that follows, this approach to the discussion at a global level from which the importance of the theme of food derives is substantially manifested in the attempt to design infrastructures capable of putting the city districts in contact with the places of production. This integration, already underway in a punctual manner in some cities of the planet, demonstrates that a logic of community and sustainable production can evoke very positive socio-cultural situations. On the other hand, since they are not supported systems like traditional supply chains are, they cannot yet make up for the quantity



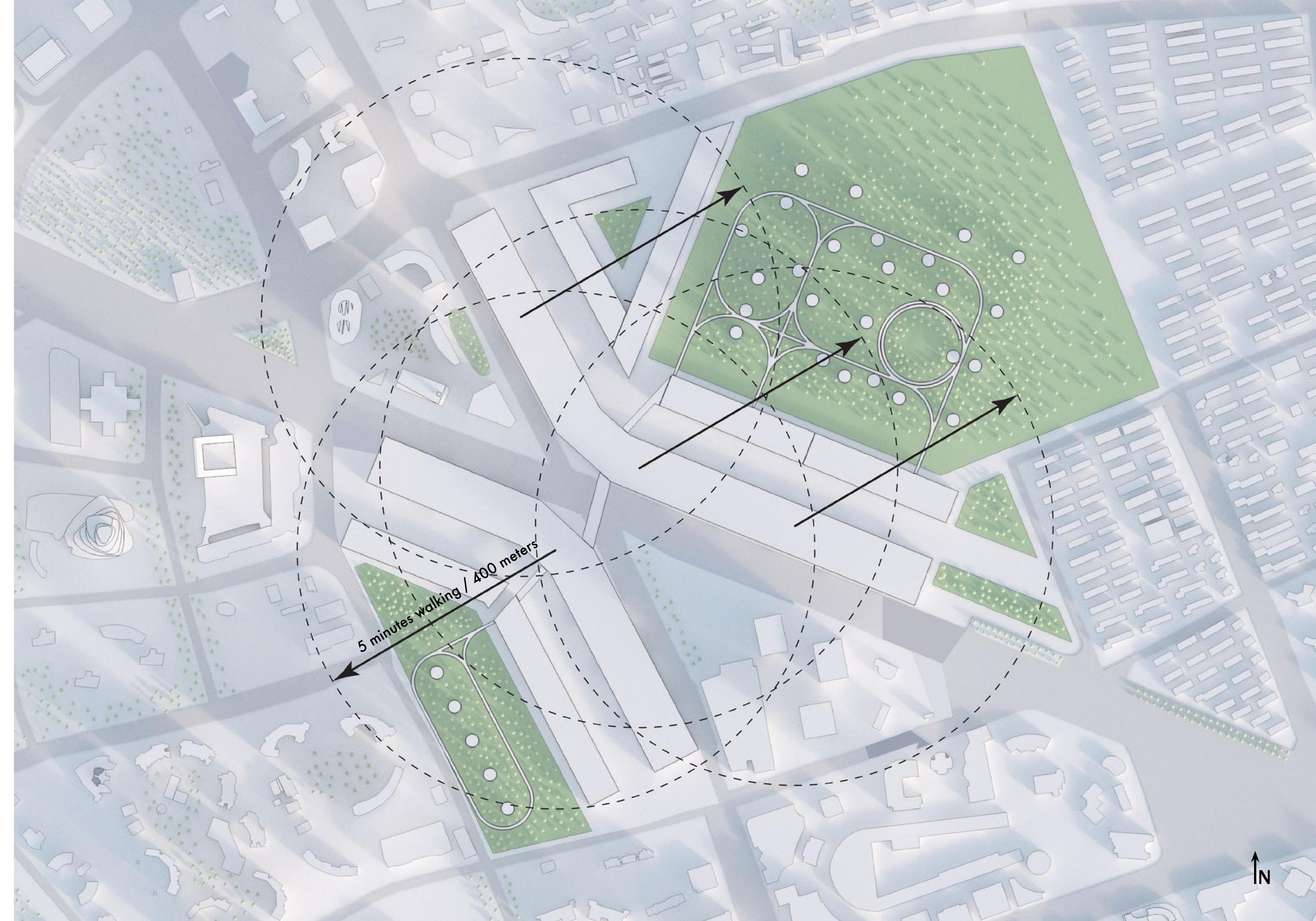


that would be needed if calculated in their urban surroundings. In fact, it is a problem of "metabolism" of the city, whose energies are fed and burned following a "closed" system, which does not allow substantial integrations. This is a problem that is part of agriculture: Biel himself argues that there are a number of problems, including the need to continue to feed people during a possible "transition" of traditional supply chains into sustainable supply chains or the fact that The use of pesticides makes it impossible for supply chains that use them and supply chains that do not coexist ("Searching for a new model of food and farming" from "Sustainable Food Systems: The Role of the City" by Robert Biel). For obvious technical reasons, but also of common perception, the production of food within cities through infrastructure spread across the territory is not an easy concept to incorporate into the list of characteristics of the City of the Future. Only recently, after all, "urban agriculture" is finding space to establish itself (thanks to the importance that the search for more sustainable lifestyles has assumed today). The same question applies to traditional agriculture: it is the logic with which the system is understood that irreparably limits the transition process, together with political and economic directives. After all, it is normal to imagine that an agricultural field is an activity relegated to staying away from inhabited centres, marginalized with respect to the consumer

society, just as happens for heavy industry ("Food/ Activating Urban Agriculture", EMMA SHEPPARD-SIMMS, "Landscape Architecture Australia", No. 122 - MAY 2009, pp. 64-65). The application of urban agriculture could reduce transportation costs and improve different parts of the city, connections between citizens and the development of buildings around it. Again, some elasticity of thinking is required to avoid imagining the traditional agricultural field directly embedded within the urban construct. The effort of such an operation should lead us to imagine agricultural fields as "parks" of recreation and production at the same time, in which citizens can become active players, and around which the city of buildings does not remain a mere backdrop. The concept of a park itself is changing: it is the lever for which visiting a park has gone from being negative (seeking air or sunlight, attunement with nature) to positive. Started as a place to escape the city, it has now become an element of connecting districts, sustainable development, improving well-being conditions, and a gathering place to propel projects.

Theorizing its productive aspect, or as a means of connecting productive and more civic areas, could be a valuable key to the planning rules of the future. In any case, the definition of a Sustainable Park, even if deprived of a productive component, evokes four

problems that it sets out to solve: the infrastructure problem (integration of transportation routes, canals, or stormwater drainage), the reclamation problem, the health problem, and the social welfare problem ("Defining the Sustainable Park: A Fifth Model for Urban Parks" by Galen Cranz and Michael Boland, "Landscape Journal," Vol. 23, No. 2, 2004, pp. 102-120). In order to obviate the multiple situations listed, attention must be focused on the way of "making the park": it must become site-specific, participatory, and endowed with an artistic vein in order to counter the previous standardization and to be able to provoke new cultural situations. This virtuous approach to the park introduces the possibility of it manifesting itself everywhere, regardless of the size of the place and around any urban element. In fact, the theme of the widespread, accessible, open park is defined. This phase has begun to manifest itself, but it is not yet finished to date. Globalization and progress allow us to feel less of a need to escape the city and take refuge in a park, especially accipiente to the last generation described. But I argue it is also because of the social conditions that have come about thanks to capitalism and consumerism, which influence our opinion about our own needs as human beings. And this is why, in a way that is contradictory to our habit, we now feel much more strongly the need for a new city rather than a new park, an idea in which these



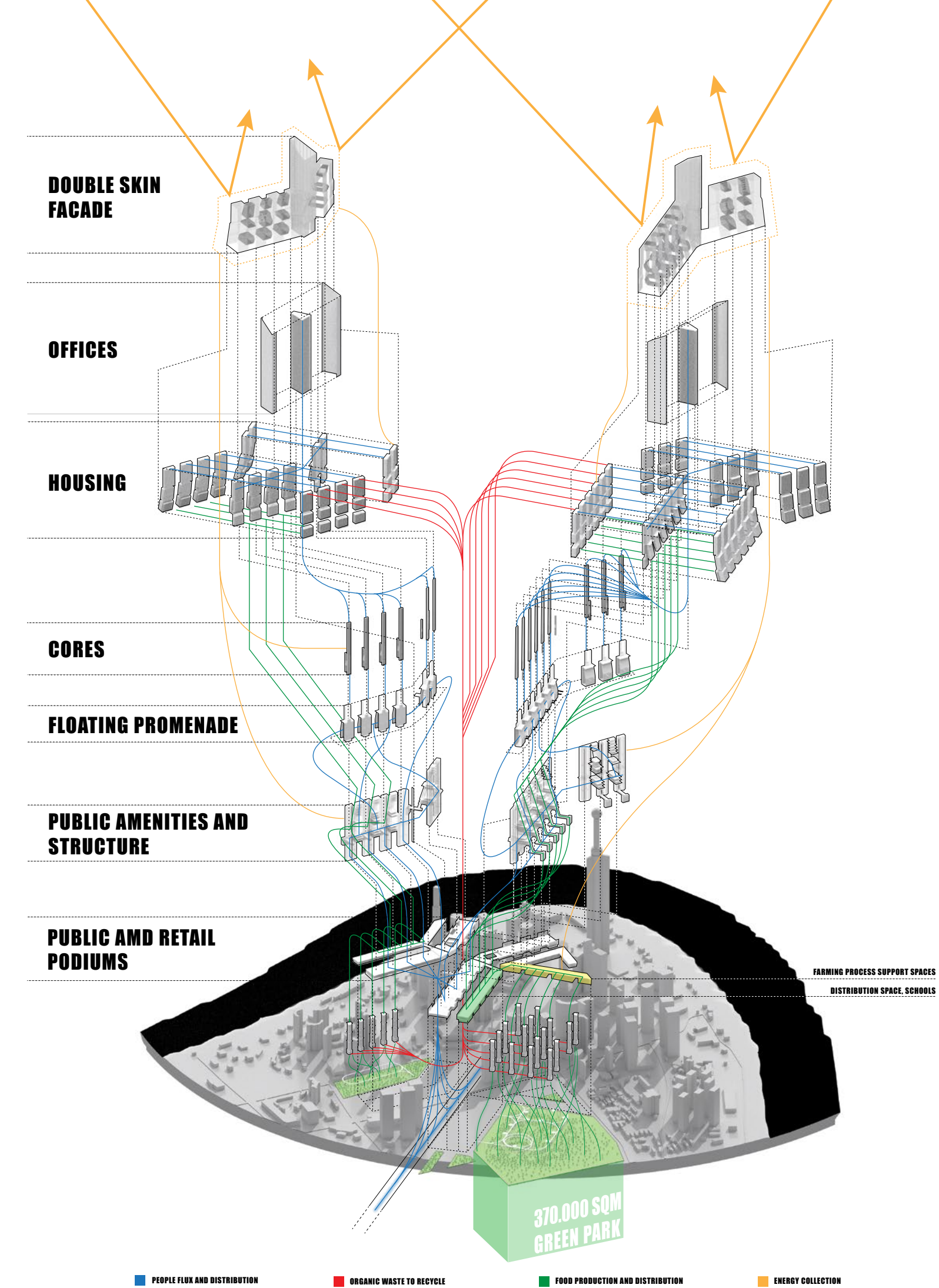
merge and interact, feeding off each other, without contrasts or lines of demarcation. In "Defining the Sustainable Park: A Fifth Model for Urban Parks," a typology of park is theorized that follows the following principles: self-sufficiency (with respect to energy, consumption, garbage, pesticides, plant growth, water drainage, and so on), integration with the city, and aesthetic virtuosity (derived from the need to merge urban construct and natural park). Starting from this model of park concept development, which I agree with, I find it necessary, however, to understand how those areas of the city where its extension could become more than present, even decisive, could be structured.

The productive efficiency of a production system within the urban context can be difficult to calculate. In a moment of uncertainty, in which the In fact, two systems that on a large scale become extremely complex, must now merge to find their synergy. In this view, the architectural parts of the new city must obviously be read within a theoretical context that deals with investigating some possibilities whose strength derives mainly from their principles of sustainability, equity, accessibility and development. The economic and engineering feasibility aspects are obviously the first problem that an urban construction should face. Obviously, in this thesis the questions relating to

feasibility will not be addressed either at a structural or at an economic level. In this model, the expressive freedom of the architecture that I propose for my thesis derives from the urgency of developing new methods of urban expansion and food production. Consequently, the main aspect that turns out to be of interest to me becomes that of making a dissertation on a logical and social level. In terms of energy and costs, this system can be, for example, very expensive. However, this problem should be seen as a further incentive to investigate issues related to the sustainability of urban construction, and not as a reason not to act in time. The OECD-FAO "Agricultural Outlook"³¹ report testifies to the increase in demand for food at least in the next decade, specifying that in the recent past the greatest influence had been caused by the incredible growth of China. Due to the slightest slowdown in terms of growth that is recorded today, the demand for food will grow more slowly, but it will not stop due to the increase in world population. Furthermore, with the deterioration of climatic and environmental conditions, it will be increasingly difficult to produce food that respects the minimum values of sustainability and equity. Most of the demand for food in the future will come from China, India and Africa. Vegetables, Meat, Fish, Cereals and much more are going to be requested significantly more depending on economical and socio-environmental changes that

will affect especially the developing countries³¹ all over the world. In any case, all the major control agencies in the world agree on the steps that must be taken to achieve a better level of sustainability of our economic and productive system. The starting point is represented by the policies: supporting integrated development at local and international level, innovating agriculture, encouraging and supporting different and more sustainable means of production, operating a large-scale mobilization that includes economic, political, and related instruments to education and research, implement demand prediction and risk management policies, and much more. It is also clear that, due to the fact that most of the food eaten in the world derives from its trade and not from its direct cultivation at a local level, it is increasingly important to operate strategies and policies that work on an international scale (FAO). It is necessary to understand what are the real changes that will occur in the future in order to have the necessary time to transform them into new opportunities for growth and collaboration between countries. The fact that the production chain itself is decentralized and fragmented, after all, introduces several features that would have been impossible to imagine less than a hundred years ago. The production phases are often shared by several countries due to specific economic policies and labor costs, and for this reason the greatest risk is represented by the

31. Socio-economical changes are massively influencing our ability to predict future food demand. OECD-FAO's report argues that economical improvement can lead to social and income inequality. Data are provided in this thesis by reporting the actual reality of the production system's effort without arguing the specific economical situation in China.



weakest components of the production chain and of the global trade pyramid.

Every year, urban sprawl “eats up” arable land which is increasingly becoming a luxury that few countries can afford. It is estimated that between 1.8% and 2.4% of cultivated land will be lost by 2030, following a far from homogeneous distribution. In fact, only 20% of this loss will occur outside Asia and Africa. Furthermore, the soils are not all the same: they can show different levels of productivity. It is estimated that the lands that will be lost produced up to 4% of global food in the 2000s and that this expansion will occur at the expense of lands that are almost twice as productive as the world average (“Future urban land expansion and implications for global croplands” by Christopher Bren d’Amour, Femke Reitsma, Giovanni Baiocchi, Stephan Barthel, Burak Güneralp, Karl-Heinz Erb, Helmut Haberl, Felix Creutzig and Karen C. Seto – Duke University – 2016 - PNAS).

A consistent example is provided by Singapore, which is a densely populated city with 5 million people distributed on 700 square km and having only 250 acres of cropland available to feed its inhabitants, resulting in the need to import almost the 90% of the food from other nations³² (Permaculture Research Institute, 2014). Also in Singapore, the Agri-Food and Veterinary Authority (AVA) has implemented a

technology to build high-yield vertical farms that can produce commercially salable food on a large scale. It is a production system that can produce about a ton of food within a few days and is up to ten times more efficient than a traditional farm. The technology of this farm is based on the use of a small amount of water and energy to produce vertical vegetables, using a low environmental impact hydraulic system, occupying only 6 square meters and requiring a few dollars of electricity to operate. Examples of great importance can also be found in the same area of Pudong: it is precisely in this district that the Laogang landfill is located, which covers about 6.5 km² of land and is responsible for at least 70% of the waste management of the whole city. In the last twenty years the government has made possible a modernization such that today at least eighty per 100 of the organic material is composted. also focusing on waste and the quantity of non-recyclable waste is essential to favor a process of sustainable transformation of cities in the correct way. For example, since 2008 the landfill has been able to produce electricity that will serve at least 100,000 families (“Shanghai Urban Farming: Green ring generates half of city’s food”, WWF, 2012). Although the food production system is not comma enough and this is essentially true in every nation on the planet, China has employed large resources since 1950 to be able to ensure food for its

inhabitants: most of the vegetables, for example, are grown within a radius of 10 km from the place where it is then sold. Up until the 1980s, food in Shanghai was also supplied in portions suited to the growing demand. The so-called green ring around Shanghai made it possible to produce almost all the milk, eggs, chicken, fish and at least half of pork in the 1990s. In those years, the hectares available for production were around 300,000. where at least 800,000 people worked. Since the 2000s, the government has been implementing a policy focused on controlling agricultural land expansion, which has been able to slightly mitigate the effects of the nation’s economic and urban expansion despite paving the way for an efficient and sustainable production system is still long. Today, Shanghai manages to produce about 55% of its vegetables. Taking a step back and looking at the global situation as a whole, it is estimated that the total amount of food produced by urban agriculture is between 5 and 10% of the total (Clinton et al. 2018), and that the food produced in generally in urban and semi-urban areas is between 15 and 20%, being able to potentially feed about 30% of the global urban population (Kriewald et al. 2019). A large-scale use of urban agriculture would lead to a series of improvements: first of all, an urban production means that the system is strengthened and becomes more resilient as the length of the supply chain is reduced

32. Singapore’s example is reported to frame the potential of urban vertical farming. In this thesis, scale of the intervention and amount of food required are not comparable with the specific situation of Singapore. On the other hand, general examples are worth to be analysed to provide an overview of the urban vertical farming technology.

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SECTION

by closely connecting the city, its inhabitants, the agricultural businesses and vendors. Added to this is the accessibility to food especially as regards the supply of fresh food. From an ecological point of view, a specific and local urban agriculture system would help to support biodiversity and regulate carbon emissions, being able also in the future to positively influence the risk rate to which the current global production system is exposed as the improving production conditions in turn improves the environmental conditions of our planet. As far as direct emissions are concerned, it is difficult to quantify whether an urban production is competitive with respect to traditional production as the data relating to emissions are very diversified and conflicting. Precisely for this reason, urban agriculture today is substantially correlated to two issues: the fact of having access to more genuine food and the shortening of food transport to reduce pollution at least as regards the phase in which the food was already produced and needs to be distributed. In a holistic view, however, these are just two elements of a long list of potential changes to our production system that could lead us one day to develop not only new methods of sustenance but also new methods for experiencing space inside and outside the city. In terms of production it is estimated that many types of vegetables and fruits of the earth perform better within an urban agriculture context. In particular, the yield

of urban farming with regard to primary vegetables, roots and tubers, up to primary fibers, can be from to 40 times higher than the yield of conventional agriculture. Even fruit and vegetables show that they can perform better within an urban production system while only primary sugar crops remain those that yield more if grown in a traditional context³³ ("How Much Food Can We Grow in Urban Areas? Food Production and Crop Yields of Urban Agriculture: A Meta-Analysis" by Florian Thomas Payen, Daniel L. Evans, Natalia Falagán, Charlotte A. Hardman, Sofia Kourmpetli, Lingxuan Liu, Rachel Marshall, Bethan R. Mead, Jessica A. C. Davies, AGU, 2022).

Devising a planning that aims to maximize the space necessary to evoke a close synergy between the urban system and the natural one effectively means optimizing the space in which these two entities collide, intertwine, and then merge under the name of a new type of urban life. It is not just a matter of pragmatic sustenance or feasibility linked to the efficiency of the new construct, but rather the exploration of a new routine based on more sustainable principles, to which the city responds with the modeling of a different urban environment equipped with new keys of translation of the cultural, social and political elements dedicated to the definition of the civic space.

33. Differences between horizontal and vertical urban farming can be still appreciated: these different production rate is related to several urban factors and depend on the actual typology of cultivation, climate and specific technology is used.

Especially from the perspective of a radical transformation of the city area, in which artificial construct and Nature coexist and feed off each other, it is crucial to understand what the relationship - qualitative and quantitative - of the two compared entities is. Creating a diffuse and integrated green environment means blurring its edges, making it suitable for any graft and activity, even changing our habits to preserve its identity and functioning, or to provoke new sociocultural possibilities. Finally, an opening up of the city in its most difficult parts and under the pressure of the uncontrolled expansion mechanism could become a new way of defining the city. To use models that aim to make our urban construct spread in a more homogeneous, socially right, accessible, harmonious and sustainable way means, now more than ever, to relate appropriately to the very first global problem in Human History.



CENTURY AVENUE - CIVIC ENTRANCE

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CONNECTION BRIDGE



INTERNAL PROMENADE

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PRODUCTIVE PARK

Thank you.

9.

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