June 2021

Capstone Final Report

Spécificités françaises de l'aménagement urbain durable ? : Étude comparative à l'échelle du quartier (France, Europe, Colombie, Corée du Sud et États-Unis)

Specificities of sustainable urban development? A comparative neighborhood study (France, Europe, Colombia, South Korea, and the United States)

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ÉCOLE URBAINE

**FRANCE
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Table of Contents

Preface: About the Capstone Research Project

The Governing the Large Metropolis (GLM) capstone project at the Sciences Po Urban School provides the opportunity for masters students to work with a client to develop a professional analytical skill set. Students are charged with the task of interpreting an urban-related problem or question that is important to the client through an analytical framework. Students then use this analysis paired with their professional expertise on the topic to inform local governance initiatives that are relevant to the organization's mission and work. This capstone project was commissioned by France Ville Durable, an intersectoral agency that promotes the growth and development of holistically sustainable cities in France and around the world. The final deliverable of the project is this original report, which consists of a critical comparison of various urban sustainability projects in select countries around the world.

The capstone student research team agreed to work with France Ville Durable on behalf of the Sciences Po Urban School to produce this comprehensive report, including a bibliography and relevant charts and graphics that assess the question of if and how a "French" method of sustainable urban governance can be identified. The duration of the capstone project was five months from mid-January to mid-June 2021.

In addition to producing the final report, a presentation was made at a conference organized by France Ville Durable in Dunkerque on May 19, 2021, entitled "Villes durables en actions." This presentation consisted of an overview of the research conducted to-date, including a brief introduction to the five global sustainability projects of interest and a preliminary evaluation of their strengths and weaknesses relative to one another. One of the aims of this presentation was to propose to France Ville Durable and its members the analytical direction the capstone research team hoped to take in producing this final report.

Thus, the session also included a brief response and feedback component by urban experts Gérard Wolf and Brigitte Bariol, who serve as ambassador and director of France Ville Durable, respectively. The feedback following the presentation—as well as feedback provided by the staff of the Sciences Po Urban School and France Ville Durable throughout the project—has all been incorporated into this final report.

Presentation of Capstone Research Team

Joel ANSAH is from Accra, Ghana. He studied sociology at the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana. Prior to joining the GLM masters program at Sciences Po, he co-founded the YoutHub science clinic in Ghana.

Jazmyn BLACKBURN is from New York City, United States. Prior to joining the GLM masters program at Sciences Po, she graduated from Princeton University with a BA in Sociology. She currently works as an elementary school social studies teacher and wishes to pursue a career in urban planning towards better social inclusion in cities.

Giulio NEGRI, born and raised in Milan, Italy, graduated from the Università Cattolica del Sacro Cuore in 2020. Fluent in English and Italian, he worked as a translator prior to joining the GLM masters program at Sciences Po.

Maïwen PAIN is from La Rochelle, France and studied engineering at L'École spéciale de travaux publics in Paris prior to pursuing her masters in the GLM program at Sciences Po. She has worked for multiple construction agencies managing infrastructure projects and hopes to transition into urban policy in her career.

Delia WALKER-JONES is from Reno, Nevada in the United States. After graduating with a BA in Geography, she worked in Denver at the Colorado Department of Transportation and received a US Student Fulbright English Teaching Award to work in Dushanbe, Tajikistan prior to joining Sciences Po's GLM program.

Introduction

This capstone project is a comparative analysis between five cities across four continents: Europe, Asia, South America, and North America. The purpose of this report is to identify and juxtapose the unique attributes of contemporary, local sustainable development initiatives deployed in these cities. **Our goal is to determine whether—and to what extent—a quintessential "French" method for sustainable urban development can be identified.**

The final report is organized into three sections. In the first section, Theoretical Framework and Methods, we present the analytical approach we took for our research. This section includes an overview of our understanding of the concept of "sustainability" based on a variety of literary and political authorities on the matter, including our own client, France Ville Durable. We consider what it means for this abstract notion of sustainability to be realized on a geographic level by investigating the notion of an "éco-quartier" and its characteristics as a sustainable neighborhood—and, more specifically, as a *French* sustainable neighborhood.

In the second section of the report, Results, we consider how this French conception of an éco-quartier may be replicated elsewhere in the world. We first identified an éco-quartier "equivalent" in four other nations in four continents. Then, we evaluated each one using our analytical framework for sustainability as developed in the previous section. Here, however, we also articulate our hesitations in conducting such a comparative analysis, knowing that sustainability projects and the cities and the countries in which they are situated distinguish themselves in many different ways. Some of these factors are measurable and fit well into our analytical framework while others are immensurate by nature. This section of the report thus tests the robustness of our analytical framework while also illuminating its unavoidable conceptual limitations.

The third and final Discussion section offers a discussion that compiles the analytical framework of the first section and the results of the second section to begin to answer the central question of whether and to what extent a quintessential "French" method for sustainable urban planning exists. We attempt to answer this larger central question by first addressing some more basic guiding questions:

➔ What are the greatest strengths and weaknesses in sustainable development globally? What are the greatest strengths and weaknesses regionally?

➔ Which features of sustainable development complement one another and which detract from one another? Are there trade-offs to sustainable growth?

➔ What are the implications of these findings for sustainable development policies in France and elsewhere?

Whether the answers to these guiding questions begin to address the larger central question is the very debate that we propose in this final section. Out of this debate emerges a great number of directions for further research that extend beyond the scope of this abbreviated inquiry.

I. Theoretical Framework and Methods

Overview of Sustainability

1. Global definition of sustainability and its three dimensions

The topic of sustainable development has increasingly gained traction in the public policy sector in the last decades. Since the concept was introduced in the latter part of the 1980s, many countries, national and international corporations, as well as many global organizations, such as the United Nations, have advocated for the incorporation of sustainable development principles in the governance of nations and cities. The underlying idea of sustainable development, as first conveyed in the Brundtland Report of 1987, is to meet present-day needs without hindering the chances of future generations to meet their own needs. In other words, sustainable development can be seen as a set of deliberate efforts to meet current needs while also preserving adequate resources for the future.

Globally, sustainable development is said to simultaneously and holistically address three related areas of life: ecological, economic, and social.

➔ The **ecological** dimension of sustainability refers to the maintenance of natural resources and the environment. This dimension pertains to the protection of natural systems even when pursuing economic growth and social justice.

➔ The **economic** dimension of sustainability encompasses all elements and practices that stimulate and support long term growth of the economy without harming the environmental or social dimensions of society. Economic sustainability thus denotes the ability for a country to engage in systems of production that satisfy current consumption needs without compromising future demands. To achieve economic sustainability, nations must engage economic systems that are built with the objective of conserving environmental resources.

➔ The **social** dimension of sustainable development relates to the wellbeing of people. In simple terms, social sustainability focuses on systems of social organization to alleviate poverty. This dimension takes into consideration equity, empowerment, participation, and cultural identity, among other factors. For a country to achieve social sustainability, there must be a positive nexus between the improvement of social conditions of people and the preservation of the environment.

The United Nations has proposed seventeen goals related to sustainable development. These broad goals provide a framework for all United Nations member states to take on their own sustainability initiatives. However, each country's approach differs substantially.

2. France Ville Durable's four pillars of sustainability

Sustainable development is interpreted differently by different countries and agencies to suit their local contexts. For France Ville Durable, sustainable cities must ensure that

their policies, projects, and programs exhibit four main sustainability pillars in addition to being socially, environmentally, and economically sustainable. These four pillars are Sobriety, Resilience, Inclusion, and Creativity.

→ The **Sobriety** pillar pertains to cities working and developing in ways that are within the physical limitations of the planet. This pillar consists of several actions, including reduction in energy consumption, reduction in green gas emissions, efficient use of energy and the use of renewable energy, among others. This pillar also advocates for the participation and the education of citizens to change their consumer behavior.

→ The **Resilience** pillar relates to how adaptive and responsive a city is in the wake of major environmental or economic shocks, such as natural disasters or recessions. When a city is resilient, it is conscious of its vulnerabilities and works to mitigate the effects of these vulnerabilities.

→ The **Inclusion** pillar advocates for the creation of a city for all. This means that efforts must be directed towards the fight against spatial and social segregation. An inclusive city protects and improves the conditions of the most vulnerable and can meet a diversity of needs.

→ The **Creativity** pillar focuses on locally-specific innovations that contribute to cultural, social, and economic progress in the city.

Although these four pillars proposed by France Ville Durable differ from the three global dimensions of sustainability, when merged, these two frameworks provide concrete and specific indices of what it means to govern a sustainable city. We have dubbed this analytical framework the "Holistic Sustainability Analysis" framework.

HOLISTIC SUSTAINABILITY ANALYSIS FRAMEWORK

	Sobriety	Resilience	Inclusion	Creativity
Ecological	Climate mitigation, conservation of natural resources	Climate adaptation	A diverse array of flora and fauna	Ecological Innovation, Circular economy
Economic	Low carbon economy	Impact on city's economy and attractiveness	Impact on local population (housing, wages, etc.), quality of employment	Private sector participation, local stakeholders, social solidarity economy
Social	Education of citizens	Social cohesion, solidarity	Local governance and citizen participation	Cultural events, art

Marrying the four pillars and the three dimensions of sustainability provides a clearer, more precise understanding of how a sustainable city appears as situated in a global context. This holistic lens for critically considering what sustainability means and how it is perceived at both a local and global level has provided a basis for selecting the various sustainability projects analyzed for this report.

Bridging Sustainability Definitions and the Éco-quartier

1. What is an éco-quartier? How does an éco-quartier fit into the framework of sustainability?

The French "éco-quartier" can be defined as a small geographic region of the city approximating the size of a neighborhood that has demonstrably embraced the global dimensions of sustainability as well as the four pillars of sustainability according to France Ville Durable's accounts. The "éco-quartier" label was introduced in 2012 with the aim of encouraging "the implementation, by local authorities, of exemplary sustainable development operations."

In summary, an éco-quartier is a neighborhood that has taken on a major politically, economically, and environmentally impactful project to drastically improve its social, physical, and/or economic infrastructure towards a more sustainable urban future. According to the French Ministry of Ecological Transition, the classification is based on a charter of 20 commitments. To date, about 500 neighborhoods have begun the éco-quartier certification process, as seen in Figure A.
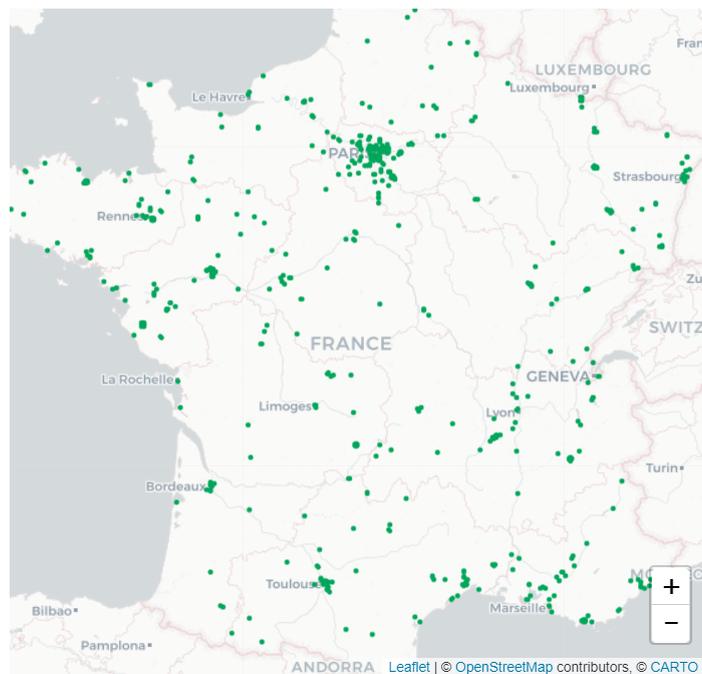

Figure A: Map of registered eco-quartiers in France.

Once a neighborhood has met these criteria, it is eligible for certification as an éco-quartier. However, for our purposes, the éco-quartier label on its own does not suffice. In order to make a more holistic comparison between sustainable neighborhoods, we have broadened the éco-quartier definition to put more weight on its sustainable attributes according to the criteria suggested by the global definition of sustainability that we have adopted in addition to France Ville Durable's four pillars of sustainability.

In this way, we do not seek to investigate and evaluate the éco-quartier as a governance structure based on its status as a label. Rather, we have sought to be more

critical and holistic in our consideration of what constitutes a sustainable neighborhood according to a number of dimensions—all of which superpass any single label. This approach to the notion of the éco-quartier permitted us to generalize the definition from its very specific French context to some much more broad-ranging applications, which made the global comparison we were charged with even possible.

2. The éco-quartier as the basis of analysis

Each of the four international sustainability projects selected for this report are thus based on three broad criteria that stem from the our interpretation of the éco-quartier concept and its pertinence to a holistic approach to urban sustainability:

➔ <u>FIRST CRITERION:</u> It is a project that is sustainable according to the corroborative notion of sustainability that we have proposed between characteristics of the so-called global definition and the four pillars of France Ville Durable's definition, as represented by the Holistic Sustainability Analysis table.

➔ <u>SECOND CRITERION:</u> It is a project that is comparable to the French éco-quartier in terms of the aforementioned characteristics of an éco-quartier. This feature was determined by a set of indicators that will be detailed in the next section of the report.

➔ The <u>THIRD CRITERION</u> for selection, which has not yet been discussed in detail, is based on how representative the project is of sustainability efforts in the city, country, and continent in which it is situated. Whereas the first and second criteria have already been assigned a conceptual framework with which to evaluate them, this third criterion has not been afforded the same attention. The acknowledgement of this criterion as evaluated in a highly subjective manner relative to its counterparts will be addressed later in this section.

We also acknowledge that of the six continents we could have used for our study, we have excluded the continents of Africa and Australia. With this, we excluded a potentially dynamic angle for our analysis which takes into consideration how developing countries and emergent cities fit the analytical framework we have created. We were restricted to a selection of four continents by the time constraints of our research, and the selection of the four continents was largely predetermined by France Ville Durable based on the professional networks of its members. We also wish to assert that by including South America, we do not intend to imply that this region of the world is wholly representative of the entire global south or sufficient in addressing the unique perspective of the developing world on urban renewal.

Project Selection Through Holistic Indicators

1. What are indicators and what are they used for?

To determine which of the projects would be most useful for the analysis—particularly concerning the important question of comparativeness—we formulated a series of

questions serving as indicators that could be evaluated on a qualitative and quantitative scale to determine the feasibility of any given sustainability project for our comparison. Producing such objective criteria for evaluating the feasibility of the projects was intentional for facilitating the analysis in the most clear, concrete, and scientific manner possible. They provide a framework for rigorous and consistent analysis of each project.

This Criteria Comparison table enabled us to visualize our projects simultaneously and contrast their fulfillment of each criterion. Questions 1-3 relate to our third, more subjective criterion while questions 4-12 align closely with our first and second criteria.

TABLE B: CRITERIA COMPARISON TABLE

Criteria	**Project Name** - *Location*
1. Is the project completed or ongoing?	Completed/partly completed/ongoing
2. Do we have available contacts?	Yes/No
3. Available data?	Yes/No
Does the project…	
4. …address climate change mitigation? (CO_2 emissions reduction…)	Yes/No
5. …address climate change adaptation? (earthquake, flooding, heat wave…)	Yes/No
6. …improve the city's economic attractiveness? (commercial activity, tourism…)	Yes/No
7. …aim at enhancing social cohesion? (creating a sense of community, encouraging solidarity, role of associations…)	Yes/No
8. …promote innovative ecologic solutions? (technology, smart city but also nature-based solutions, deep ecology, indigenous knowledge…)	Yes/No
9. …include innovations in terms of economic/financial/business models? (Private Sector Participation, Public-Private Partnerships, circular economy…)	Yes/No
10. …promote creative social initiatives for the local community? (innovative social events, dedicated spaces, cultural animation…)	Yes/No
11. …aim at enhancing economic inclusion of the	Yes/No

local population? (fighting against homelessness, poverty, unemployment...)	
12. ...promote a participatory approach in its design and governance? (citizen participation...)	Yes/No
Overall Ranking	**1st Choice/2nd Choice/3rd Choice**

2. Presentation of the indicators

The indicators are based on the three criteria we have incorporated for our selection. These indicators, again, can be summarized as follows: (1) holistic definition of sustainability based on the global sustainability definition along with France Ville Durable's four pillars of Sobriety, Resilience, Inclusion, and Creativity; (2) the comparability of the project to the ideology of the éco-quartier and its geographic manifestation; (3) the representativeness of the project to its city, country, and continent.

TABLE C: PROJECT SELECTION INDICATORS

Does the project meet Sobriety? Identify the strategy used to cope with the needs of the population while adapting and optimizing existing resources and constraints in three main ways:
➔ **First**, what are the available resources and characteristics of each project? The notions of scale, population, and initial building constraints must be considered as the basis of the thinking.
➔ **Second**, in what ways has the project changed the neighbourhood? This can be observed in terms of functional mix, density, care of biodiversity and environmental impact.
➔ **Third,** sobriety is about which long-term results and objectives are expected for the neighbourhood. What are the solutions adopted to optimize resources and diversification, optimize existing buildings and improve renewable energy use?

Does the project meet Resilience? What are the strategies designed to overcome stresses and shocks? The challenge of this approach is to develop a project which allows evolution and flexibility over time. Two main aspects could be assessed to determine and compare the efficiency of a resilient strategy.
➔ **First**, to what extent was the project designed to ensure a safe living environment for all? How does it implement urban services such ase water, electricity or trash collection? Encouraging active modes of transport, public transport and alternative travel options is also part of this first assessment.
➔ **Second,** what is the project's ability to evolve and adapt? What is the upgradability of the neighbourhood? Is it about estimating the capacity of continuous improvement of services and governance, and assessing the evaluation systems implemented to support performance initiative, improvements made, and adaptation at all stages of the project?

Does the project meet Inclusion?
A goal of inclusiveness for a neighbourhood works to both avoid segmentation within the population and allow the citizen to participate in an efficient local governance. Two areas of consideration are suggested.

➔ **First**, is the neighbourhood designed to improve coexistence and solidarity? Measuring tools would be the diversity of the residents' profession and income level, as well as the diversity of jobs offered, but also the implementation of social housing and the concern of disability access. Innovative social and community practices may be included in this part, such as social solidarity economy.

➔ **Second,** inclusion at the government level questions if a participatory process of piloting and extended governance is implemented. It refers to the institutions involved and their decisions and power as well as the conditions created for citizen mobilization.

Does the project meet Creativity?
Innovation and creativity are assets to reimagining sustainability and navigating all the challenges that come with it. From the design process to implementation and follow-up, does the project represent a new way to think about the city? There are four main areas to be discussed.

➔ **First**, private companies can be a source of innovation in sustainable cities. Public-Private partnerships or private sector participation involve new ways of thinking, new possibilities and new financing. The influence of private investment can vary according to the project. Are there any innovative partnerships, like contracts supporting a circular economy?

➔ **Second,** new technologies are also a feature of innovative projects, in particular through the utilization of publicly-sourced data. What kinds of data are being used by the project coordinators? What data is collected about the residents and their habits, and how is that information shared or used?

➔ **Third**, creativity can be found also in the built environment. Do the buildings include any unique or innovative features, from their design to their function and building material? Does the built environment incorporate the local natural and cultural heritage of the area?

➔ **Fourth**, and finally, as the study ambition is to define some characteristics of the future sustainable city, each project should be analysed in a broader context. What are the success or failure of the model of each project, in terms of economic attractiveness, projected growth, or even user and external perception? This would mean assessing the contribution to the local citywide context.

Project Selection Process and Results

1. Selection of French project

With the indicators specified and well defined, we set out to select a French

éco-quartier upon which to base our analysis. A series of meetings with France Ville Durable and its stakeholders were dedicated to discussing its selection. Ultimately, the éco-quartier of Boulogne-Billancourt, just outside of central Paris, was selected by Bruno Bessis, chief manager of urban sustainability, of the four we presented as shown below. As with all of the projects selected for the comparison, this selection was based on our series of indicators which, in turn, are based on the three aforementioned criteria, including a holistic sustainability definition, the defining characteristics of an éco-quartier, and the representativeness of the project to the city, country, and continent in which it is located.

Below is a descriptive outline of the French éco-quartiers we selected, summarizing their unique attributes and qualities.

➔ **La Prairie au Duc** - *Nantes, France:* Surrounded by the Loire river opposite the city centre of Nantes, the 337-hectare island consisted of large residential suburbs, together with businesses and abandoned industrial land. An urban renewal project launched in 1999 proposed the creation of a mixed-use city, working with already existing infrastructure, developing environmentally-friendly modes of transport, strengthening the presence of nature in the neighborhood, and working to preserve natural resources.

➔ **La Courrouze -** *Rennes, France:* The La Courrouze district is inventing new urban territory in an area characterised by its industrial and military past. Started in the 2000s, its development will continue until 2028 with 10,000 inhabitants and 4,500 jobs. The new district will host new housing, offices and shops as well as public facilities such as schools and the metro. All this will be seamlessly integrated into a large urban park: green spaces will account for a third of the total area.

➔ **Parc Marianne District** - *Montpellier, France:* The Parc Marianne project commenced in 2007 and spans some 30 hectares of land. It was built with the following sustainability principles: social and functional mix, a tramway, cycling and pedestrian paths, quality public spaces, control of energy consumption ensured by low energy consumption buildings and collective district heating networks, integration into the city, public and commercial facilities, and adaptations to local climatic and cultural characteristics.

➔ **Boulogne-Billancourt** – *Boulogne-Billancourt, France:* The Boulogne Billancourt éco-quartier project started in 2004. This project will eventually have more than 15,000 inhabitants and 12,000 employees. The project site spans an area of 74 hectares and is one of the largest éco-quartiers in France. The main sustainability focus of the project is therefore on four fronts, including diversity, innovative water management, high requirements for energy efficient buildings, and heating and cooling networks that favor renewable energies. In addition, more than half of the land size of the project will be reserved for public spaces or walks, with a strong presence of gardens and plantations.

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2. Selection of international projects

Employing the same criteria that were used to evaluate the French éco-quartier, we then selected sustainability projects across the four continents of interest. These projects were not selected by a representative of France Ville Durable. Rather, the team

made an effort to consolidate as many potential projects as possible into a single document, evaluate them one by one, and then select the projects that were deemed the most comparable for approval by the France Ville Durable staff. We began by brainstorming a list of prominent sustainability projects around the world based on their distinctive qualities as sustainable initiatives.

In narrowing the selection, we deliberated more over the third criterion, the representativeness of these projects to the cities, countries, and continents to which they belong. Given the innovative nature of such projects and their global visibility, it is easy to be seduced by the aesthetics of the project. We avoided making such potentially misleading assumptions about an appealing project simultaneously being a culturally relevant project by lending a critical eye to the culture of sustainability in the regions of interest. We conversed over which elements of which projects appeared wholesome and representative of the stakeholders in charge of them, and which were potentially more superficial. While this assessment was more qualitative and subjective, we felt that we adequately addressed the question of representativeness in an equitable and holistic fashion merely by taking such a question into account.

Therefore, the projects that are listed below were carefully selected based on their distinctive qualities as well as their representativeness of the countries and continents to which they belong. Most importantly, they were selected based on their comparability to the French standard "éco-quartier" as defined by the client in terms of both their size and function. Following the very same analytical structure with which we presented and compared the French éco-quartiers, we presented the proposed projects for this report, organized by continental region.

EUROPE

The following projects were selected from amongst many European candidates with the intention of best contrasting the French éco-quartier model. Our top choices were in Sweden after considering the holistic nature of the projects and their comparable size. We selected the Hammarby Sjöstad project in Stockholm as our top choice because it fulfills all relevant criteria, especially considering its goals for inclusion. However, the Bo01 project and Royal Seaport, as our second choices, were also highly ranked in our selection.

➔ **Bo01** – *Malmo, Sweden:* The Bo01 district in Malmo began with the creation of a charter setting out the major objectives to be achieved. These objectives include 25% reduction in CO_2 emissions by 2005, 60% of the energy consumption (excluding transport) from renewable energy sources, and maintenance of biodiversity.

➔ **Hammarby Sjöstad** – *Stockholm, Sweden:* The Hammarby Sjöstad project is located in a former industrial area. The neighbourhood was developed in a participative way through a publically available questionnaire. The main goals are social mix, energy self-regeneration, and strong waste management as well as the reduction of water consumption, the development of car-sharing and public transport, functional mix and finally the creation of biological corridors to preserve nature and educate the populations. The project is considered an example across Sweden and the world for designing criteria to respect sustainable conceptions of neighbourhoods.

➔ **BezBed** – *London, England:* Built in a brownfield and completed in 2002, this site was an opportunity for creativity in the construction to save, create and recycle energy and water. The project was developed according to the following objectives: sustainable energy, water management (reduce water consumption by 33%), waste management, housing improvement (reduce the demand for 90% heating, use construction materials from a radius of less than 60 km for half of them), green transport plan, develop the biodiversity of natural areas, functional mixity, and social mix.

➔ **Eko-Viikki** – *Helsinki, Finlandia:* The project, completed in 2004, is Finland's largest sustainable building development. It has been implemented on an important site, on the edge of the city and close to a nature reserve, near the Viikki Science Park and the Helsinki University Biocentre. The neighbourhood aims to face five major challenges identified - the reduction of pollution, the use of natural resources, health, biodiversity and food.

➔ **Stockholm Royal Seaport** - *Stockholm, Sweden:* The project is the largest urban regeneration project in Sweden. It is an ongoing project that aims to deliver 12,000 homes and 35,000 workplaces. The project was inspired by the Hammarby Sjostad eco-neighborhood. This area used to be an industrial site and, due to its proximity to the center of the city, has been converted into an urban district that interacts with port operations.

ASIA

These projects were selected from within a variety of options in South Korea. We were flexible in our ranking of the Asian projects and had some challenges in selecting the top project. While the Songdo International Business District is a strong representative of a smart city project, it is also quite large in scale and perhaps not comparable to an éco-quartier. The other two projects represent perhaps more closely the French conception of éco-quartier. Ultimately, we selected our top choice, the New Town Regeneration project, because of its innovative approaches to inclusion and its holistic affect.

➔ **Songdo International Business District** - *Songdo, South Korea*: Songdo's International Business District (IBD) is a pedestrian city with 40% green space historically built on a plot of reclaimed land and now consists of 180 hectares of LEED-certified infrastructure.. The most recent project is the 68-story Northeast Asia Trade Tower (NEATT).

➔ **The New Town Regeneration Project** – *Seoul, South Korea*: The New Town Regeneration Project is intended to expedite the resettlement of low-income residents of the Gangbuk region of Seoul. The project was designed to maintain the equality of basic living service facilities and educational conditions across the regions of Gangbuk and Gangnam and alleviate the financial gap between these autonomous regions. The entire project is aligned with multiple political initiatives aimed at housing redevelopment.

➔ **Sandokdoro Renaissance Project** - *Busan, South Korea*: True to its name, this project is an attempt at a holistic renaissance of an entire urban ecosystem in response to rapid population decline in recent decades. The project was recently completed in 2020 and the objectives include space regeneration, living regeneration, and culture regeneration. In addition to being a sustainability project, it can also be considered a beautification project.

SOUTH AMERICA

These projects in Colombia were selected from a longer list of projects in South America, including several from Medellin. It is important to note that many projects were focused on transportation and therefore difficult to frame in the French context of the éco-quartier. However, our initial top choice, the San Antonio neighborhood in Cali, Colombia, is an explicit example of the éco-quartier: The stakeholders include different French entities such as Agence Française de Développement (AFD) and the French ministry.

➔ **Progresa Fenicia** - *Bogotá, Colombia:* This project is somewhat unique in that it was launched by a local university, Universidad de los Andes, in the interest of diversifying land use in the region and combat gentrification. The project makes for an attractive candidate because it presents several pillars serving as indicators which overlap with the four pillars defined by the client as being most pertinent to the French definition of sustainability.

➔ **Quinto Centenario** - *Bogotá, Colombia:* As the city's first resilient cycle highway, this ongoing project consists of a redevelopment of urban infrastructure to accommodate more clean transportation. A primary objective of the project is to create 25-km cycling highways that connect low-, middle-, and high-income neighborhoods to reduce social stratification and foster inclusion.

➔ **San Antonio** – *Cali, Colombia:* San Antonio is the first officially designated éco-quartier of South America. Granted up to the second step of the French éco-quartier label, the project is designed both by the local administration and the community, and particularly accompanied by French organizations. The action plan follows four axes to improve the neighbourhood: *San Antonio Caminable*, *San Antonio Verde y Azul*, *San Antonio Armonioso*, and *San Antonio Patrimonio caleño*.

NORTH AMERICA

Selecting projects in North America that could be considered equivalent to the French éco-quartier proved challenging given the context of land use laws that often prioritize private real estate developers over city planners in the US. Therefore, we selected as our top choice a project in Portland, Oregon that closely mimics the éco-quartier structure in its public and private participation. However, the Wharf development in Washington, is also a compelling case in its status as a private development.

➔ **The Wharf** - *Washington D.C., United States:* The Wharf is a commercial and residential waterfront community. It is designed as a densely populated mixed-use neighborhood with fourteen acres of green space. This is an ongoing project implemented in two phases to achieve LEED certification for the majority of buildings in the region. The project highlights its efforts towards sustainability, including a cistern system, green roofs, and durable buildings.

➔ **Lloyd EcoDistrict** - *Portland, OR, United States:* The Lloyd EcoDistrict is a "living laboratory" for the most sustainable neighborhood in North America. A mixed-use area in downtown Portland, the project was initiated by the City of Portland and implemented by groups of local stakeholders. It includes a number of community-led initiatives, like street art and gardening, and larger-scale energy

goals, like district-level utility tracking.

While we endeavored to maintain a rigorous and transparent selection process, undoubtedly there were aspects of bias in our final selection. Moreover, due to limitations on the availability of information and time constraints, as well as the consideration of meaningful feedback from our clients at France Ville Durable, we did not always adhere perfectly to our process and several projects were changed or modified despite our initial rankings.

In Europe, for example, contacts were found for both the Hammarby Sjöstad and the Royal Seaport projects. After contacting a representative from the French embassy in Stockholm, Hammarby Sjöstad was selected as the representative project, because the innovation center of the Royal Seaport project was closed. Project selection in Korea proved challenging as well, due in no small part to availability of contacts and time constraints. Our research focused primarily on the New Town Regeneration Project. In Colombia, after proposing the San Antonio project in Cali and following discussions with France Ville Durable representatives, we elected to focus our research on Progresa Fenicia. In the North American case, we ultimately focused on the Lloyd EcoDistrict, with supporting research from similar organizations in Pittsburgh, Pennsylvania.

TABLE D: FINAL PROJECT SELECTION CRITERIA COMPARISON TABLE

Project	**Lloyd EcoDistrict** - *Portland, Oregon, United States*	**Progresa Fenicia** - *Bogotá, Colombia.*	**Jangwi New Town Regeneration Project** - *Seoul, South Korea.*	**Hammarby Sjöstad** - *Stockholm, Sweden*	**Boulogne Billancourt** - *Boulogne-Billancourt, France*
Region	North America	South America	Asia	Europe	France
Is the project comparable to the French éco-quartier in its size?	Yes	Yes	Yes	Yes	Partly complete; partly ongoing
Is the project completed or ongoing?	Mostly completed, some aspects ongoing	Ongoing	Completed	Completed	Completed
Do we have available contacts?	No	No	No	No	Yes, limited
Available data?	Yes, limited	No	Yes	Yes	Yes
Does the project...					
...address climate change mitigation? (CO_2 emissions reduction...)	Yes	No	To some extent	Yes	Yes

...address climate change adaptation? (earthquake, flooding, heat wave...)	To some extent	No	No, not explicitly	No, not explicitly	Yes
...improve the city's economic attractiveness? (commercial activity, tourism...)	Yes	Yes	Yes	Yes	Yes
...aim at enhancing social cohesion? (creating a sense of community, encouraging solidarity, role of associations...)	Yes	Yes	Yes	Yes	Yes
...promote innovative ecologic solutions? (technology, smart city but also nature-based solutions, deep ecology, indigenous knowledge...)	To some extent	No	Yes, more focused on nature-based solutions than technology	Yes	Yes
...include innovations in terms of economic/financial/business models? (Private Sector Participation, Public-Private Partnerships, circular economy...)	Yes	No	Unclear, but the local government takes the lead and controls a greater part of the project if not all	Yes	Yes
...promote creative social initiatives for the local community? (innovative social events, dedicated spaces, cultural animation...)	Yes	Yes	Yes	Yes	Yes
...aim at enhancing economic inclusion of the local population? (fighting against homelessness, poverty, unemployment...)	Unclear	Yes	Yes, to some extent	Yes	Yes
...promote a participatory approach in its design and governance? (citizen participation...)	Yes	Yes	No	Yes	Unclear

Figure B: Map of selected sustainability projects.

Data Collection and Methodological Limitations

1. Primary sources

Primary sources of data collection relied on interviews. Finding contacts for these interviews was generally facilitated by members of France Ville Durable and the Sciences Po Urban School. Some contacts were also made through associates of the team members who were familiar with the research. The individuals who participated in the interviews were a range of experts, including government officials and project managers. To bolster the information gleaned from these contacts—many of whom were directly involved with the project—interviews were also conducted with ancillary actors who were indirectly involved in the project because they were either residents in the district of interest or worked for a company or agency that was indirectly involved in the project. All interviews were conducted over the Zoom virtual meeting platform with video and audio features activated.

Additionally, one site visit was conducted at Boulogne-Billancourt. This site visit was organized by France Ville Durable and led by Bruno Bessis. Information gleaned from the visit was centered primarily around the Project Pavilion, where technicians on site offered thorough accounts on the history of the project. In particular, their narrative surrounded the development of the Trapèze District and the Ile Seguin District. The technicians also expounded on how the éco-quartier operates and how it is managed, as well as future timelines and plans designed for the project. Examining the architectural model of the éco-quartier in the Project Pavilion was also helpful in gaining a deeper understanding of how the éco-quartier operates.

2. Secondary sources.

Secondary sources of data were also employed to complement the data obtained from the interviews and site visit to the Project Pavilion. For the French project, a key secondary data source was the official website of the Boulogne-Billancourt éco-quartier. This website provided key information such as the history and chronology of events leading to the development of the project, key figures and timelines of the project, and some of the photos that are included in this report. Information gathering for the four other projects also took place on the web, similarly by visiting the official websites and research publications of the projects where available.

3. Methodological limitations in data collection.

The outbreak of the Covid-19 pandemic in March 2020 has changed the habits of everyone, including researchers. In the past months, travel has become greatly restricted and in-person social interactions have been limited. It has been a difficult time for everyone and the consequences of the global pandemic are still being felt. We, too, had to adapt to the global context and this greatly affected the outcome of the comparative study. Naturally, the information of each project was influenced and biased by the stakeholders that were interviewed. And it was not possible to directly verify their claims given the time restrictions of the project and the travel restrictions brought on by the pandemic. We have conducted our analysis under the assumption that the information that was given to us is accurate and valid, but we did not have the capacity to confirm first hand.

4. Conceptual limitations in data analysis.

When conducting research on an urban development project within a city, one must keep in mind the specificities and uniqueness of each context. Each of the selected projects are tailored, bearing in mind this geopolitical context and all it ecompasses. While the Holistic Sustainability Analysis framework we developed would theoretically seem to be very useful for comparison, applying these requirements to each project in practice proved more difficult.

In trying to fit specific aspects of the projects into the framework we have created, we acknowledge that our analytical scope is somewhat restricted. Our framework cannot reasonably encapsulate all of the projects' varied, abstract components. This realization has led us to reflect deeply on the importance of the context of each project and debate the pertinence of a seemingly holistic model for characterizing such specialized, localized projects. In this way, the results of our research are a reflection of our decision to conduct our analysis as holistically as possible with our analytical framework and indicators serving as a *supportive* toolkit as opposed to relying entirely upon them to evaluate the projects.

II. Results

Organization of Results

This section consists of an overview of the projects selected for each region, divided into five components. The components consist of (1) the historical **context** in which the project was first proposed, outlining the political backdrop that incentivized its development; (2) the **project goals**, which pertain to vision of the project and what it sought to achieve; (3) the **project features** or the geographical, economic, and political characteristics that define it; (4) the **stakeholders** and their strategies for financing the project; and (5) an **analysis** of the outcomes of the project.

The analysis component is further subdivided into (i) a summary of the project's strengths, (ii) its weaknesses, and how that project emanates the values of sustainability for the city, country, and continent in which it is situated. In this way, we begin to detail (iii) a specific approach that is unique to each project and region. The analysis is based on the Holistic Sustainability Analysis framework, which has been reproduced for each product. Each cell is populated with specific or general attributes of the project that meet the criteria of the framework.

The cells were then color-coordinated according to whether we consider the feature to be a strength or a weakness of the project considering our three sustainable project criteria based on the éco-quartier as well as our indicators for sustainable development. Strengths of the project are denoted by green cells while weaknesses are denoted in red. White cells are neutral and can be considered neither strengths nor weaknesses. Cells that have no text are inconclusive due to lack of data. The color coding is based on both the visionary project goals and the real project features, considering at all times the historical context in which the project was realized.

Boulogne-Billancourt - Paris, France

1. Context

The 74-hectare Boulogne-Billancourt éco-quartier was developed on the former industrial land of the automobile company Renault. After Renault ceased operations on the site in 1992, the land became vacant and needed development. In 1997, a mixed union brought together several actors to deliberate on the development of the vacant land. Key actors involved in these deliberations included the municipalities of Boulogne-Billancourt, Meudon, Issy-les-Moulineaux, Vanves, Saint-Cloud, Sèvres, and the automobile company Renault.

The plan for the development of the land was adopted by the Boulogne-Billancourt municipality in 2002 which subsequently led to the creation of the Concerted Development Zone (ZAC) on 74 hectares, including the Pont de Sevres District. To start the development of the land, the SAEM (Société Anonyme d'Economie Mixte) Val de Seine Aménagement was created in 2004 and started the development of the land. Between the years 2006 and 2008, the first buildings began to appear in the Trapèze District, while agreements for the renewal of the Pont de Sèvres District were reached in 2008 with the support of the National Agency for Urban Renovation (ANRU).

Figure C: Factory building of Renault on the Ile de Seguin.

Figure D: First buildings began appearing in the Trapèze District in 2008

The Western side of the Trapèze District was finally completed in the year 2013 and was seen to have all the important features that an éco-quartier should have. This led to the Trapèze district being awarded the National Éco-quartier label in 2013.

2. Project goals

The Boulogne-Billancourt éco-quartier is one of the premiere éco-quartiers in France.

The development of this éco-quartier embodies the desire to attain sustainability and thus the éco-quartier was built to be a mixed-use community, having a mix of residential and commercial buildings, public facilities, office spaces, as well as the large green parks and planted courtyards. The éco-quartier was also built to revive the economy of the community and particularly attract cultural and digital firms.

The éco-quartier at Boulogne-Billancourt is built over three different districts: Trapèze, Ile Seguin, and Pont de Sèvres Districts. The largest of the three districts is Trapèze, which covers an area of about 37.5 hectares, and is built on the city-park model. Trapèze was built to have, in the long term, more than 15,000 inhabitants and 12,000 employees. Currently, Trapèze has about 11,000 inhabitants, 10,000 employees, about 60 local shops and around 40 companies.
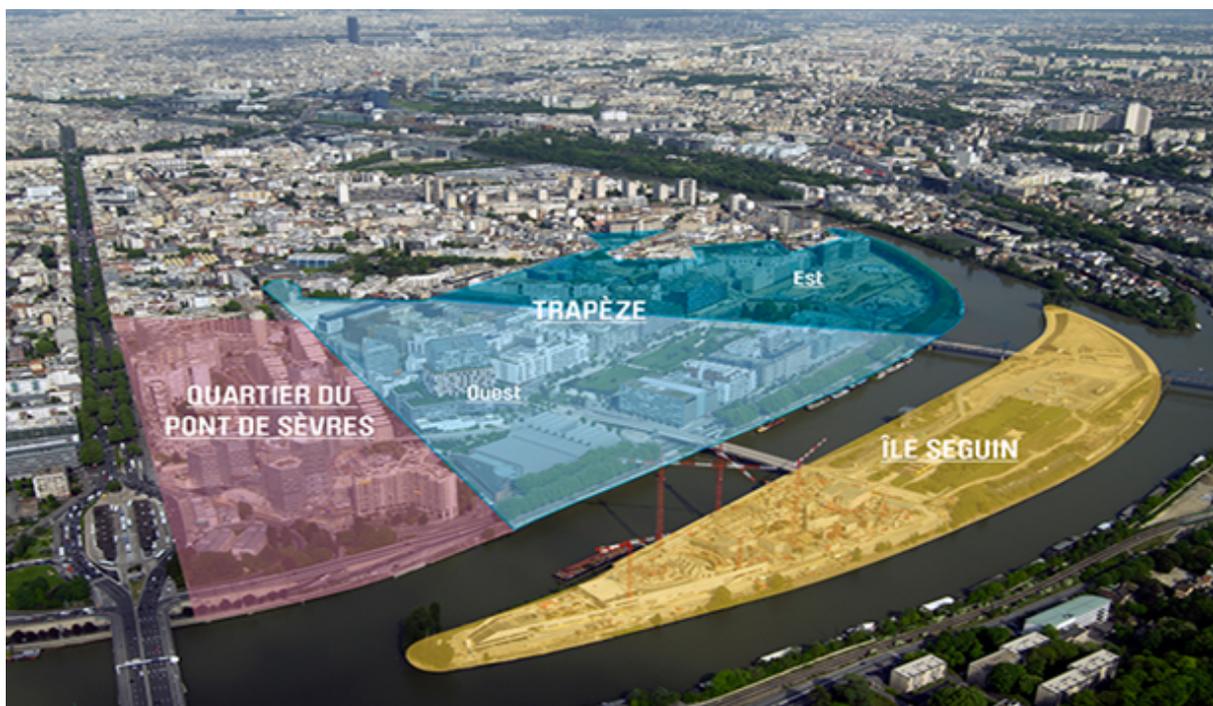
Figure E: Digital map projection of Boulogne-Billancourt districts

Trapèze was designed to have a mixed-use functionality and as such has dedicated 364,680 m² to housing, offices and office activities covering 230,068 m². Public facilities, activities, and shops cover 76,810 m². Trapèze is designed such that 50% of its land areas is marked as public space, of which 50% is reserved for nature. The Trapèze district has a 7-hectare park, Billancourt Park, which serves to maintain the biodiversity of the neighborhood.

Aside from the Billancourt Park serving as a green space and maintaining the biodiversity of the neighborhood, it also serves as a water basin, where rainwater is collected to prevent the neighbourhood from flooding. Through Billancourt Park, Boulogne-Billancourt is now home to some new plant and animal species that were originally not found in the neighborhood. Trapèze also puts much emphasis on mixed housing with 65% of the housing being free and 35% being social housing.

The Ile Seguin district of the eco-quartier covers about 11.5 hectares and is built with an orientation towards culture, art, new media and leisure activities. This district is not only being designed as the digital and cultural hub of the éco-quartier but is also being targeted as an international hub for innovation, culture and creativity. With the Ile Seguin being built to be attractive to digital and creative arts firms, there are an estimated 8,000 jobs to be created upon its completion.

The Pont de Sèvres district covers about 17.9 hectares and unlike the first two districts, which were built completely from scratch, the Pont de Sèvres district was an already existing neighbourhood that only required renewal. The Pont de Sèvres district was given a major renovation through a state of the art urban upgrading program in a bid to improve the living conditions of the inhabitants and ensure that the district met the standards set by the Trapeze and the Ile Seguin districts.

Figure F: Photograph of Boulogne-Billancourt

3. Project features

An interesting feature of this éco-quartier is its quality landscape that is built on a city-park model and ensures the availability of places to walk and relax as well as a strong presence of greenery. The macro-lots have interior gardens that contribute to the greenery in the neighbourhood. Similarly, most of the buildings also have green roofing. Billancourt Park, for instance, which is located at the heart of the Trapèze district, provides a place for outdoor leisure activities. It is also instrumental in the neighbourhood's water management system. Thanks to the permeability of the soil, the garden can be used to store, collect, and filter rainwater, which prevents flooding of the neighbourhood.

In order to further the goal of sustainability, and specifically sobriety, the buildings in the éco-quartier are built to conform to High Environmental Quality Standards. The SPL Val de Seine Amenagement to this effect sets high standards that developers must follow when building houses. Generally, the SPL Val de Seine Aménagement sets an energy consumption coefficient for all buildings that is 20% lower than the reference level, in order to obtain the THPE label (Very High Energy Performance). Thus, buildings in this eco-quartier conform to a level of thermal performance that is higher than the national regulatory requirement.
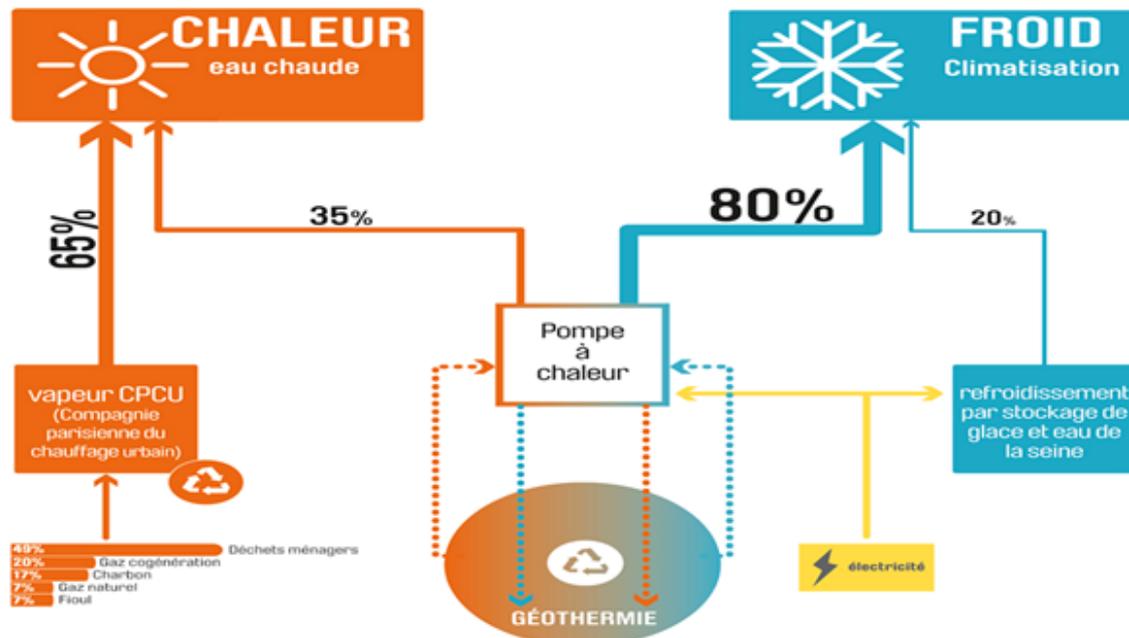
Figure G: Diagram of the heating and cooling network of the ZAC Seguin - Rives de Seine- *Boulogne Billancourt*

The SPL Val de Seine Amenagement ensures that all buildings on the V and Y blocks of the Trapeze district comply with the BBC (Low Carbon Consumption Building) standards. This efficient energy consumption standard is 4 times lower than the national standard.

4. Stakeholders

The éco-quartier has multiple stakeholders, key among which include the municipality of Boulogne-Billancourt. Although the municipality is not the traditional developer of the land, it defines the construction program, public spaces and local equipment, in addition it also provides standards and principles of architectural and environmental quality of real estate operations. The municipality also secures public land and develops public space and facilities through the SPL Val de Seine Aménagement. The

public spaces in the éco-quartier after their development are managed by the The Grand Paris Seine Ouest Public Territorial Establishment.

The main developers of the éco-quartier are the SPL Val de Seine Aménagement. The SPL Val de Seine Aménagement was created in 2015 when the SEAM Val de Seine was transformed into a Local Public Company (SPL). As developers, their operations cover the Ile Seguin and Trapèze sectors districts and they also partner with the National Agency for Urban Renovation (ANRU) for the urban renewal of the Pont de Sèvres district. The SPL Val de Seine Aménagement primarily develops public spaces such as roads and parks; local equipment such as nurseries and schools; and also coordinates the activities of all other stakeholders working on the development of the éco-quartier.

5. Analysis

→ **Summary of Strengths:**

Ecological/Sobriety. In a bid to mitigate and adapt to climate change, the éco-quartier dedicates 50% of its public space for green spaces such as planted courtyards and parks. A typical example of this is the 7 hectares Billancourt Park which contributes to increased biodiversity and ultimately climate change mitigation and adaptation. The éco-quartier also ensures climate change adaptation through innovative cooling and heating, and an emphasis on geothermal energy. Furthermore, the developers in the éco-quartier endeavor all buildings meet the BBC certification standards which means that all buildings in the éco-quartier are energy efficient.

Ecological/Creativity. The éco-quartier relies on the innovative use of renewable energy. The neighbourhood uses waste recycled from the incineration center for heating and the stored ice cooled thanks to the Seine. Through the creative and innovative means adopted by the éco-quartier to address the ecological and biodiversity issues of the neighbourhood, about 23 new bird species and 22 fish species have been seen to have settled in the neighborhood.

Economic/Inclusion. In its bid to be inclusive, the project ensures that the allocation of housing in the neighbourhood is two-thirds free housing and one-third social housing. To ensure economic inclusion, the economy is being revitalized through a growing number of companies and local shops.

→ **Summary of Weaknesses:**

Ecological/Resilience. The éco-quartier ensures that the neighbourhood is resilient and able to withstand adverse weather and natural disasters. A key

example of this is its flood risk reduction through the Billancourt park's ability to collect and store rainwater. Due to the Park's ability to collect and hold rainwater, it prevents the neighbourhood from flooding. Similarly, each plot has a water absorption system on the roofs. However, this is not the focus nor the highlight of the project.

➔ **The "French approach":**
The French idea of sustainability, reflected through the éco-quartier project in Boulogne-Billancourt shows an equal emphasis in the three global dimensions of sustainability as well as the sustainability pillars of France Ville Durable. This gives an indication that the French model through the éco-quartier has a holistic view of sustainability although this does not necessarily translate into the project excelling in all the sustainability dimensions and pillars.

Key: ▢ = Strength ▢ = Weakness ▢ = Neutral

	Sobriety	Resilience	Inclusion	Creativity
Ecological	50% of public space reserved for greenery. Innovative cooling and heating. BBC certification to be respected by buildings.	Flood risk reduction systems.	Renewal of neighboring community; Pont de Sèvres district.	Reliance on renewable energy. New species have settled in the neighborhood through biodiversity efforts.
Economic	Aimed at attracting digital and creative industries that rely on less carbon.	Revamping the local economy. Trapèze offers 120,000 m² of office spaces, attracting 60 local shops and over 40 companies and head offices.	2/3 free housing and 1/3 social housing. Economy being revitalized through growing number of companies and local shops.	Private sector involvement as private companies develop the buildings albeit complying with public housing requirements.
Social	Establishing the Project Pavilion to educate citizens on sustainability and the **éco-quartier** project.	Billancourt Park has a large space for social activities and gathering and thus fosters solidarity among citizens.	In 2008, meetings with residents - volunteers who accompanied promoters.	The Ile Seguin is oriented towards the fields of contemporary cultural and artistic expressions, new media and leisure activities.

Hammarby Sjöstad - Stockholm, Sweden

1. Context

Hammarby Sjöstad is a district of 200 hectares, of which 160 hectares are land and 40 hectares are water. This neighborhood is located in the southern part of the city of Stockholm, about 4 km from the city center, and overlooks the shore of Lake Hammarby Sjö, meaning it is also referred to as "Hammarby Lake city". The district stands on a former port and industrial area, which has been renovated and converted into a residential, commercial and tertiary service area. Upon its completion in 2017, it is now home to 26,000 inhabitants and 10,000 jobs. The area was purchased in the 1920s by the municipality of Stockholm in order to be used as a manufacturing area, in fact large-scale manufacturing industries were established there.
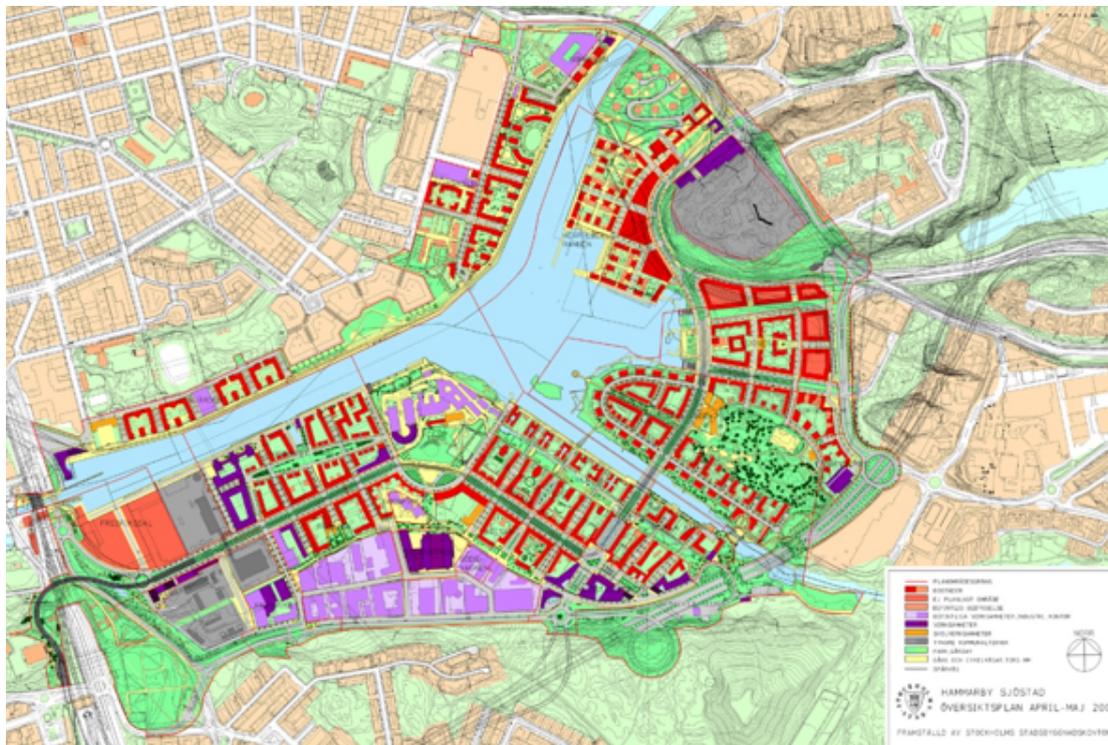
Figure H: Hammarby Sjostad Plan, 2004.

Only in the last decade of the 20th century a new master plan was launched, converting the area into a recovery and residential expansion zone necessary to deal with the considerable increase in the city's population as a result of the rising birth rate and immigration. In particular, following the candidature of the city of Stockholm for the 2004 Olympic Games, the Olympic village was designated in Hammarby Sjöstad and would have to provide for a sustainable management of resources. Figure H illustrates the Olympic project for 2004.

Although the bid was unsuccessful, the program to build a large neighborhood according to the principles of sustainable development with respect for the

environment continued. The principle behind the project was to develop a neighbourhood that would have halved the environmental impact of a typical 1990s residential building in Sweden. Sweden's peculiar administrative structure, shown in Figure I, allowed the Stockholm municipality to develop such an ambitious project, and the whole investment reached the impressive amount of 3 billion euros.
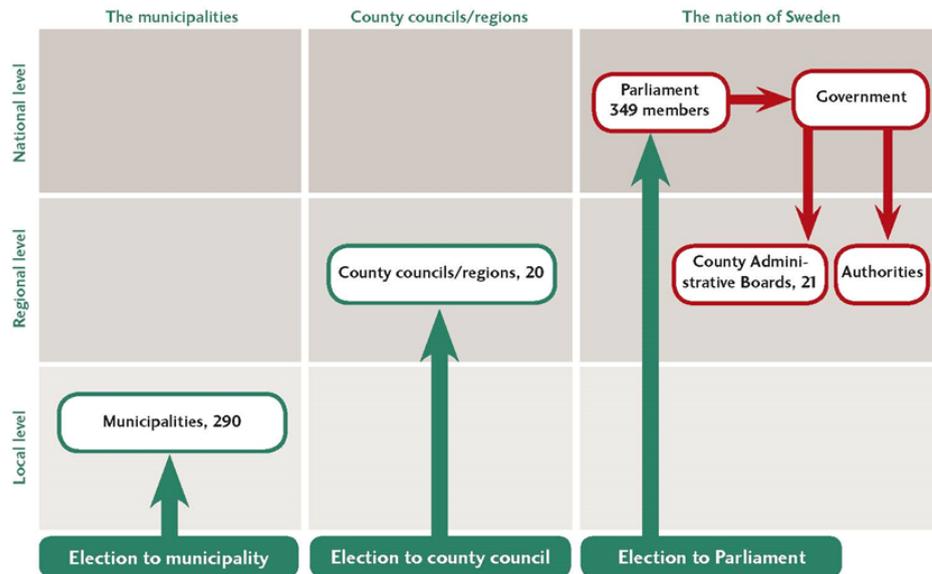

Figure I: Swedish administrative structure.

2. Project goals

Water and green areas were two of the key elements of the project, influencing some of the design choices involving buildings and open space. To maximize the overlooking of the buildings on the water of the lake Hammarby Sjö, in the distributional study of the area, a design plan was formed mostly by open court blocks that allow the continuity of the urban space and the green system. Additionally, the privately owned green areas were connected to public green areas, and to the bicycle and pedestrian paths.

In order to pursue the ambitious goals of sustainability of urban intervention and the cancellation of environmental impacts, a special ecological closed-loop model known as the "Hammarby model" was created. The model considers the settlement as a form of ecosystem in which the various components of waste are reinserted in a virtuous cycle that ensures that nothing or almost nothing is lost, making sure that most waste components are reused for the sustenance of the neighborhood.
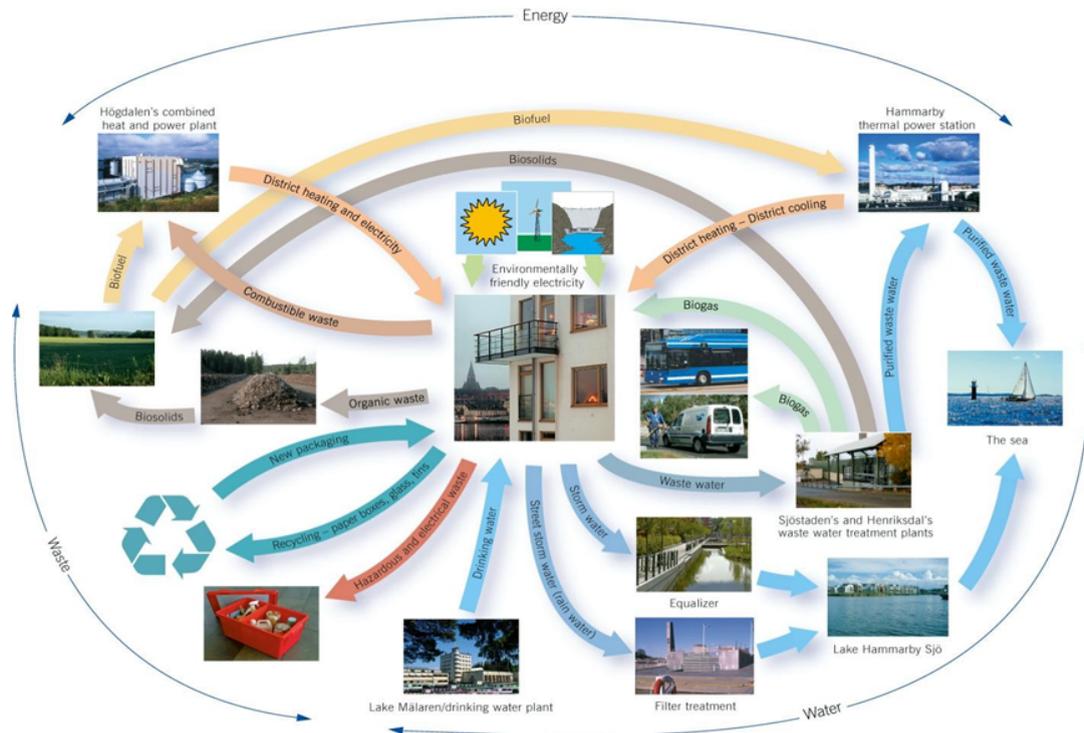
Figure J: Hammarby Model.

The model is structured around three pillars: water, waste and energy. We present them here sequentially. Water leaving the buildings is sent to a special treatment plant, from which three components are extracted: biogas, organic compounds, and clean heated water. Biogas can be reused in kitchens and for local transportation vehicles, orga. Organic components can be used for soil fertilization and for the production of biofuel to be sent to the power plant for the production of thermal and electrical energy. Finally, clean heated water is then fed back into the cycle of district heating plants.
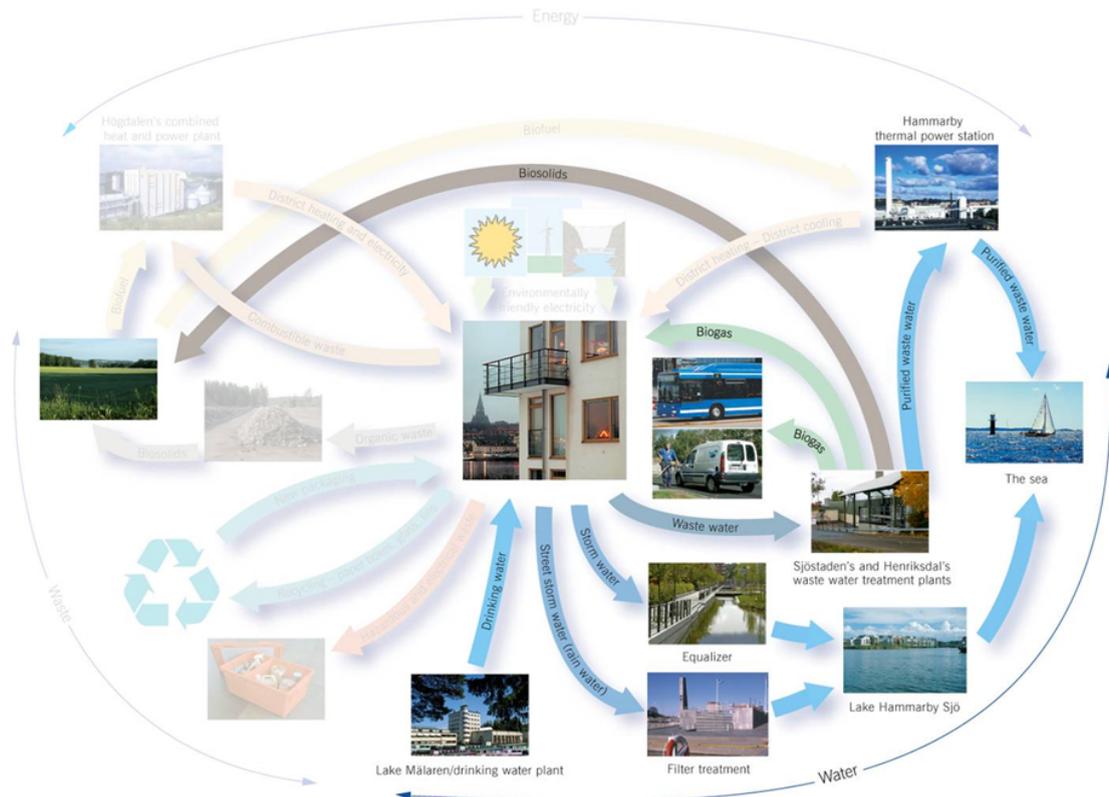
Figure K: Hammarby model: water cycle.

Second, the Hammarby model includes the waste cycle. Specifically, municipal solid waste collection is organized at the area, block, and building level depending on the type of waste. This is undoubtedly a specificity of the district since a network of underground pneumatic piping (stationary vacuum system) connects the courtyards of the buildings to the recycling center within the district. The differentiation of the waste at the origin allows the reusable part of it to be immediately sent to recycling plants (glass, metal, paper). The incinerator receives the combustible and non-recyclable portion of the waste and produces thermal and electrical energy. Organic waste is then composted to be used as biological fertilizer for crops. From these, part of the biofuel is produced, which feeds the thermal power plant for district heating.

Figure L: Stationary vacuum system in Hammarby.

The Hammarby model also engages the energy cycle. Most of the electricity is produced by the solar panels on the roofs of the houses and the hydroelectric power plant. The homes achieve average energy needs of 72kWh/m2a, of which 47% is derived from household waste. In fact, the non-recyclable waste that is taken to the incinerator provides domestic heating. The remaining 50% comes from the combustion of bio-oil and water energy produced from wastewater. In addition, the kitchens in the neighborhood are 50% biogas-fueled. Hammarby thus uses a closed-loop recycling system in which the inhabitants contribute half of the energy system by producing waste, while the rest is obtained from renewable energy.
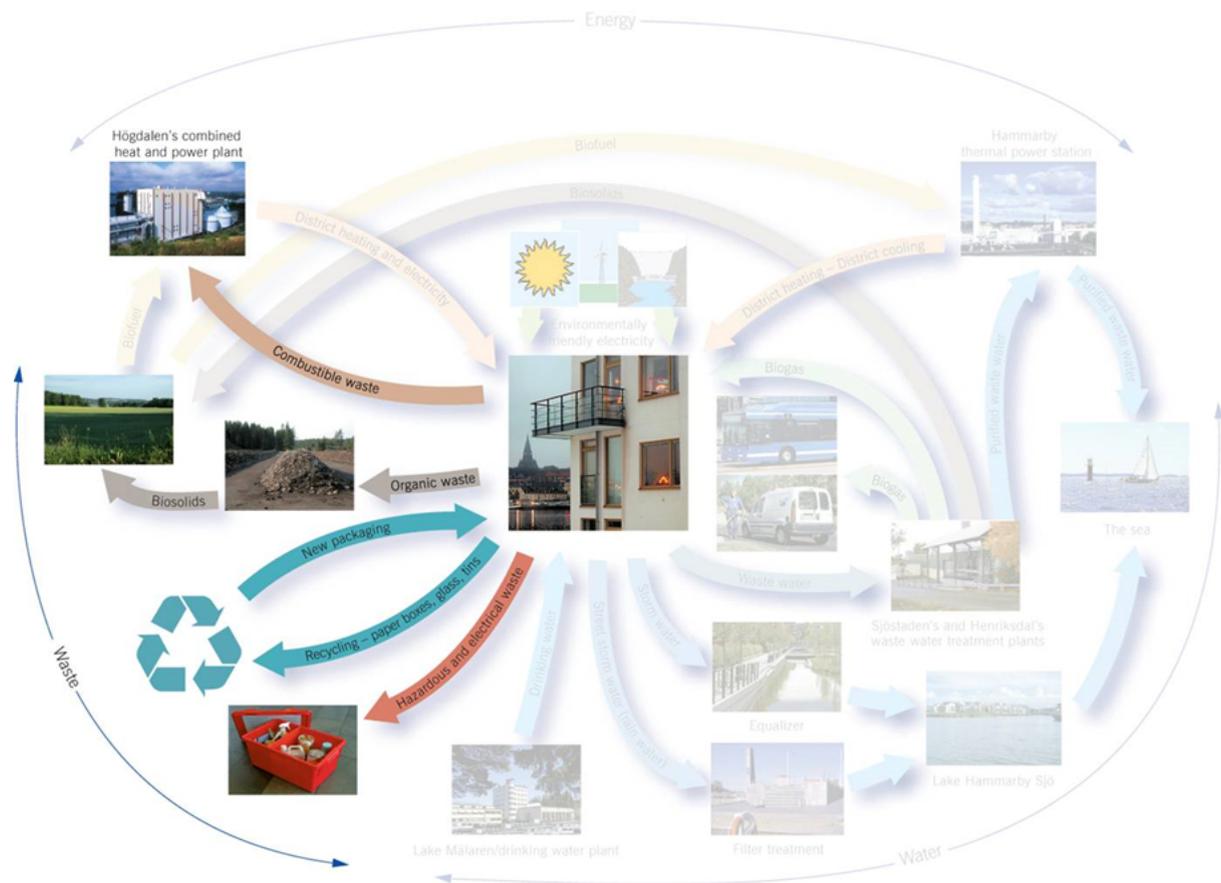

Figure M: Hammarby Model: Waste cycle.

3. Project features

The district is structured as a city surrounded by greenery in which buildings are harmonized with the lake, located at the north of the district, and the woods in the southern hinterland. Several strategies have been adopted to keep intact the biological continuity: firstly the riparian wetlands were introduced as a habitat for native flora and fauna are recovered and preserved; the areas contaminated by industrial activities have been subjected to remediation; and finally, the lake water has been purified with natural systems.

In addition, a network of green corridors and channels for rainwater harvesting that crosses public and private spaces of the district was introduced, connecting the wooded areas to the lake environment. The use of nitrogen fertilizers for the maintenance of green areas has been strongly limited while the use of compost from household waste has been developed to a greater extent. In addition, the buildings have been constructed with low environmental impact materials such as glass, wood, steel, stone and eco-certified and non-toxic products. The use of heavy metals and oils on roofs and facades has been banned to avoid contamination of rainwater.

Internal mobility is almost entirely pedestrian or bicycle friendly. A large boulevard (Hammarby Allee), located in a barycentric position with respect to the residences, serves the entire neighborhood. On this boulevard runs the public transport lines of buses and streetcars. Within the neighborhood, the use of private cars is strongly discouraged. Most of the cross streets on which the residential courtyards face end in cul-de-sacs to avoid vehicular crossing flow.

Figure N: Mobility in Hammarby.

4. Stakeholders

The principle of subsidiarity is directly applied in the Swedish administrative structure. Everything to do with daily life is undertaken by the municipalities, who work closely with communities and retain 20% of all taxes paid by citizens. This makes the municipalities very stable financially, so much so that each municipality has its own bank. Furthermore, municipalities are the only actors in urban planning. Secondly, there are two main areas of responsibility for the regions: healthcare and public transport. We have seen how the Hammarby district has been connected and implemented within the public transport network. This was the only instance where

interference between the different administrative levels occurred and might have had negative repercussions on the development of the project.

Finally, the size of the intervention made necessary the activation of an innovative management system in which the municipality of Stockholm has reserved the role of coordination, effectively involving public and private entities and citizens. In other words, the public sector has imposed the standards to be achieved, while the private sector has provided the expertise to get there.

5. Analysis.

➔ **Summary of Strengths:**
Ecological/Sobriety: The focus in the Swedish model is to reduce its carbon footprint. Its aim is to lower the total environmental impact by half compared to the other residential areas built at the end of the 1990s in Sweden. Hammarby is a benchmark as it launched technical solutions with a huge ecological impact.

Ecological/Creativity: The innovative solutions developed as part of the Hammarby model have been discussed precedently.

Economic/Creativity: The project ensures that there is private sector participation. The private sector develops the buildings, albeit after complying with public requirements. The project is separated into "macro lots", and for each one the private sector proposes a design that is accepted by the regulators.

➔ **Summary of Weaknesses:**
Economic/Sobriety: The financial investment put into Hammarby is not comparable with any other project analyzed. As shown before, the Swedish administrative structure enables financial independence for the city. This makes the Hammarby model very difficult to replicate in other contexts.

➔ **The "Swedish approach:"** Hammarby today is considered to be the best environmental solution in Sweden as it includes a complex and coordinated ecological model, where each service participates in the functioning of the other, thus achieving an exemplary ecological efficiency. But it is obvious that this is only possible because of the considerable investment that is allocated to the project. Without such resources, similar results cannot be expected.

	= Strength		= Weakness		= Neutral

	Sobriety	Resilience	Inclusion	Creativity
Ecological	Reduced CO2 emissions of 30/40% compared to the Swedish standards of 1990.	Adaptation to climate change and the rise of the water level.		Development of Hammarby Model.
Economic	Investment: 3-4 billion euro	Functional mixity: residences, commercial areas and offices.	20% social housing	Public sector sets the standards, private sector provides technical solutions.
Social	Citizens Association: "Hammarby 2.0	Citizens awareness and mobilization	integrated planning	

Jangwi New Town - Seoul, South Korea

1. Context

The New Town Regeneration project was first proposed by Seoul's urban renewal committee in 2002. The intention behind the initiative was to accelerate urban renewal efforts that have already been underway by investing substantially in urban infrastructure. The regeneration efforts are targeted towards improving quality of life in Seoul as well as reducing economic disparities between districts.

Prior to the advent of the New Town Regeneration project, Korea had recently entered the global economy in a meaningful way thanks to the Incheon Free Economic Zone (IFEZ). The city that emerged as a result of the economic boom, IFEZ Smart City, boasts being the only "real" smart city in Korea; Seoul, some IFEZ officials claim, is more of a "smart town" compared to Incheon. The process for smart city development for which Incheon is acclaimed is a cycle of design, training, implementing, operating, extending, and collaborating that has many iterations. "True" smart city development, according to some IFEZ officials, has no "end point."

Seoul and the New Town Regeneration projects it contains cannot avoid economic pressures from smart cities like Incheon. One prominent economic and social pressure

in Korea that has affected how the city of Seoul has implemented its urban renewal projects is the issue of housing. In fact, the intended purpose of urban regeneration in Korea was to address the housing shortage. Since the Korean War, the population density in Korea has been very high and the need for housing redevelopment has been an increasingly pressing issue.

With the housing crisis at the forefront of urban redevelopment efforts in Seoul, an important goal of new town regeneration projects is to lay the groundwork for creating a comprehensive renewal protocol to accommodate a variety of housing types and needs, a consideration that did not exist prior to the advent of the New Town Regeneration projects.

2. Project goals

To this end, each of the three regeneration projects were designated a certain role in the development process. The first type, the "new town" type of project, was assigned to low-development regions that needed to boost their population density. The second type, "Downtown" type projects, were projects assigned to regions that needed to diversify and develop a variety of urban functions, including their residential and commercial features. Third, the "residential-centered" type were projects that were intended specifically to revamp housing that was dilapidated due to the high volume and density of occupants, as well as to develop surrounding infrastructure to provide access to roads, parks, and other resources that occupants need. The pilot regeneration project was Eunpyeong District, followed by the Ahyeon District. Finally, the third New Town Regeneration project, Jangwi District, was proposed in December 2005.

Each of the 11 regeneration project was assigned a theme. The naming of these projects has played an important role in their realization. The small Jangwi New Town regeneration project, approximately 2 km² in size, in particular attempted to tackle several of these designations at once in four main ways by taking on certain "personas." The first is as an "eco-friendly city," the second as a "cultural city," the third as a "well-organized city," and the fourth as a "young and lively city."

3. Project features

Some of the outstanding features of the Jangwi regeneration project are building a transit network to connect the interior of the town as well as to connect it to surrounding towns and districts. With an emphasis on width and linearity, the project serves to open up the space to accommodate traffic flow—not unlike the famous French boulevards of Haussman from which many Korean urban developers glean their inspiration.

Constructing truly public spaces is an important attribute of the project and of Korean urban regeneration projects at large. The Jangwi district has sought to foster a "living" central street where cultural activities appealing to youth in particular can be held. To accomplish this feat, developers have partnered with nearby universities to better understand and serve this demographic of young, educated professionals. Such spaces are intended to serve as a platform for daily cultural exchange in the forms of art,

music, conversation, and community service. The new town is organized such that these socially and culturally critical facilities are no more than a 10-minute distance from the residential areas of the city.

A large emphasis has also been placed on preserving and expanding green space in an adaptive manner that complements existing ecological infrastructure as opposed to contradicting it. In this same vein, using existing natural resources and land is an ecologically and economically efficient means for redeveloping the region. Green space has become such a central attribute of sustainable urban growth in the Korean definition that, colloquially, the word for "sustainability" in the Korean language has largely been replaced by the term "green growth."

4. Stakeholders

Up until the 1980s, land readjustment was the predominant method for urban renewal. Then, because the housing shortage was so grave, the methodology for urban renewal switched to public land development and the government took over the constructions of new towns. In this way, developing the housing sector has been reliant on public redevelopment. Land redevelopment, on the other hand, has historically remained under the jurisdiction of the private sector, and the public sector intervenes only in limited cases.

Today, the way that the government develops land can be classified in two ways: First, there is land readjustment/clearance. This process originated in Germany and is preferable for smaller urban development projects because it yields quick results and a great deal of profit in a relatively short amount of time. The second approach to land development comes in the form of public land development or land expropriation. In this case, the public sector intervenes and comes and purchases land. This process is more drawn out and is therefore more profitable with larger scale projects.

Over the course of the Jangwi New Town regeneration project, both processes have been employed in quick succession of one another. The last two mayors of Seoul are recognized for their very different approaches to urban development. Former mayor Wansan Park has employed the former strategy of incremental redevelopment. Incumbent mayor Taihung Ho, on the other hand, has employed the latter method, which consists of redeveloping and rebuilding the district on a large scale, investing a lot of money and resources at one time in order to accomplish that feat. It is clear that there is a need for some consistency in urban redevelopment approaches in order for the project to reach its full potential.

There is also an impetus for these projects to increasingly involve the public sector. Just because the project started with a privately led initiative does not necessitate that it must end that way. Private money is not meant to finance public interests. Therefore, an important initiative of new town regeneration that distinguishes it from earlier urban renewal efforts in Korea is its intention to better integrate public agencies and public interests into the urban revitalization process.

5. Analysis

➔ **Summary of Strengths:**

Ecological/Sobriety: Given its global power, Asian cities at large are interested in improving communication within city boundaries and with the rest of the world. Beyond merely meeting sustainability goals, there exists a question of how to improve communication with citizens and government agencies so that urban redevelopment projects are iterative and self-sustaining. Communication is reportedly the crux of the issue in Asian cities and the reason why sustainable urban development has historically been a process of making new cities as opposed to improving existing ones. The Jangwi New Town regeneration project has made remarkable strides in mobilizing present resources to make changes to the city as opposed to seeking such resources elsewhere in the country or the world.

Ecological/Creativity: In anticipation of the municipal government's tendency to rely on the private sector for urban development, the Jangwi New Town regeneration project has taken advantage of a relatively young public-private partnership agency known as Korea Land & Housing to implement its redevelopment plans. Through this agency, land, which has typically been controlled by the private sector, and housing, which is under the jurisdiction of the public sector have been married in the form of a corporately structured organism that is publicly funded. As with any public-private partnership, the two parties are thus better equipped to hold each other accountable for making a profit as well as minimizing legal risks while still upholding the public good however possible.

➔ **Summary of Weaknesses:**

Economic/Inclusion: There is a sad and unavoidable caveat to Seoul's strength in its ecological sobriety. Its desire to minimize its use of natural resources in order to develop existing urban infrastructure as opposed to expanding the urban fringe into the wilderness is praiseworthy, yet it consumes more natural resources. The unfortunate consequence is that great numbers of people must be uprooted and displaced from their homes to make way for the construction of new and refurbished apartment buildings, which many cannot afford to move back into themselves. This practice of upheaval has led to widespread homelsessness in Seoul and the propagation of informal settlements or slums.

These homeless individuals resemble the refugees of the 50s and 60s to the extent that the Korean language does not even distinguish between them. There are conceptual parallels in the language drawn between the shabby dwellings of refugee camps and the shabby dwellings of informal slum housing. In most cases, an insufficient legal system and the relatively inactive role of the public sector in housing development are two factors that can be held responsible for the difficulty urban planners have had in making renewal projects efficient and not traumatizing for displaced residents.

➔ **The "Korean approach:"** The Korean approach towards sustainability can be characterized by its sensitivity to its ecological resources and its ability to

mobilize creatively and adaptively. However, the Korean project struggles to uphold many social aspects of sustainable development. This is due in part to the degree of power that the private sector has over urban regeneration projects and in part due to its legacy of an intensely rapid and disruptive housing redevelopment practice

Compared to the strong ecological fulfilment and weaker social fulfilment of sustainability goals, the economic administration of the project is neither problematic nor remarkable. Efforts have been made to establish an economically sound sustainable city. But the short-term impact and long term effects of these efforts have not been fully realized within the scope of this report. In the end, the lack of return of investment on the regeneration project—as well as some of the social repercussions it has imbued perhaps—have incentivized the city of Seoul to eventually abandon the regeneration project in 2012 and opt for an entirely different kind of urban renewal approach dubbed the Human New Town.

Key: ▮ = Strength   ▮ = Weakness   ▯ = Neutral

	Sobriety	Resilience	Inclusion	Creativity
Ecological	Adaptation of residential sites to natural landscape.	12 parks within living zones and 7 green area connector.	Construction of the Green+Blue transit network to connect to other towns.	Merging of Land and Housing departments to promote land stewardship while developing housing.
Economic	63% high density, apartment housing.	Maximization of the utilization of existing resources and infrastructure.	Redevelopment of existing land leaves current residents homeless.	Mobilize resources from nearby universities.
Social	"Green growth" ideology has replaced "sustainability."	Urban redevelopment intended to address housing shortage.	Public characterization of neighborhood streets to build reputation.	Central main street development dedicated to cultural events.

Progresa Fenicia - Bogotá, Colombia

1. Context

In 1994, violent demonstrations exploded in the heart of Bogotá, killing politicians and civilians alike. This event was a trigger for the migration of the Colombian population, who fled the center of the city towards the calmer peripheries, creating what could be called a "donut effect". Despite this, institutions and organizations have remained in the downtown area, generating significant commuting demand every day. The other major consequence, which incentivized urban renewal, is the degradation of the neglected housing in the city, accompanied by a form of disinvestment in the area and leading to the rise in crime. As a result, the University of the Andes, which had remained in place since then, suffered from this change of atmosphere. It was not able to easily change the location of all its facilities, and so an urban renovation project was born in 2004.

The first project the university presented to the municipality was rejected, as was the next one, because it did not meet all the objectives established by the administration. Ultimately, the third plan was accepted because it corresponded better with the general law pursued by the Municipality, the POT of 2004 (Plan de Ordenamiento Territorial para la ciudad). The Plan which was finally adopted in 2008 proposed an innovative program, an unprecedented approach, discussing the possibility to create an inclusive renewal process for the local population, allowing them to remain living in the neighborhood and focus on improving their living conditions while maintaining the biodiversity very close to the area.

The planned implementation period was eight years, from 2014 to 2022. Though the completion of the project was not scheduled for 2021, the execution is nevertheless still behind schedule. Because the Partial Plan is a private initiative, it must fit into both the Secretaria Distrital de Planeación (SDP) via article n. 1254 del 2013 as well as the Plan Zonal para el Centro de Bogotá (PZCB 2007) and the Operación Estratégica Centro del Plan de Ordenamiento Territorial para la ciudad (POT 2004). The program is developed in the form of a trust through the private company Alianza Estratégica S.A. (Sociedad Anónima), with the participation of the following three trustees: The University of Los Andes, the owners of the land and private investors.

2. Project goals

The Progresa Fenicia project is an especially democratic project which emphasizes the social good in finding its essence within a majority social approach. This project is singular in this respect, and notable in the quality of its democratic approach, even receiving an International Planning Award in 2020. The main objective of this initiative is to be participative. The project consists in the renewal of 9 hectares of land in the centre of the city of Bogotá. The motto of the project is "we stay together, we move together", including all inhabitants of the area.
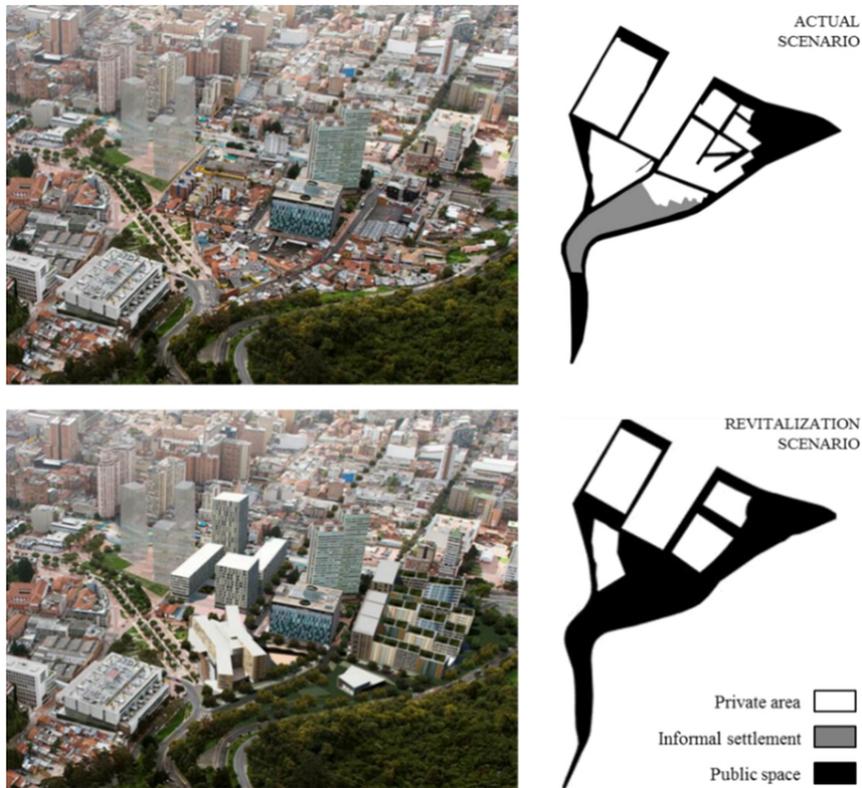
Figure O: Distribution of land use _ Triangulo Fenicia

Hundreds of landowners live in the area, and instead of using expropriation, the ambition is to include each of them in the negotiation. No decision can be adopted without the citizens' approval. Furthermore, it is agreed that each inhabitant should receive the same built area as he had before the process.
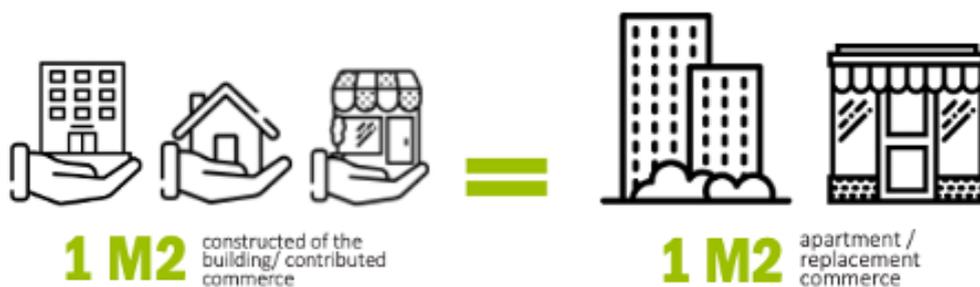

Figure P: Principle of equity in land redistribution

The project is based on four primary pillars: *renewal, innovation, cooperation,* and *heritage.* During our interview with Juan Felipe Pinilla, the focus was put on revitalisation moreso than renewal. The goal is to focus on citizens' perception of their neighbourhood more than on the neighbourhood itself. The project aims to make the area attractive, "offering an optimal quality of life from a social, environmental, economic and urbanistic point of view."

Finally, in the Partial Plan of 2008, the objectives were summarized this way:

➜ Contribute to the consolidation of the Zonal Plan for Downtown Bogota,
➜ Attract new residents to the center,
➜ Generate new public space,
➜ Strengthen the downtown economy,
➜ Optimize downtown urban infrastructure (transportation, services, etc.),
➜ Integrate downtown facilities with public space,
➜ Integrate the eastern hills to the city,
➜ To guarantee the permanence of owners and residents of the area by promoting social inclusion, and
➜ Guarantee the conservation of the assets of cultural interest in the area. (Decree 420/2014 Article 2)

To comply with those objectives, the urban design principles followed six axes as seen in Figure Q:
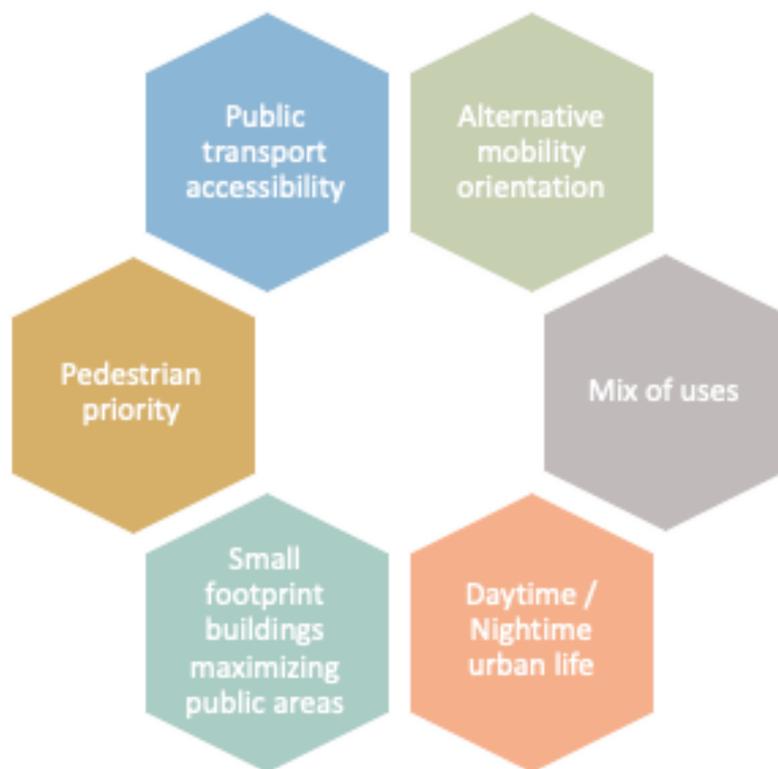
Figure Q: Six axes of the Plan Partial of Progresa Fenicia

With the renovation of the area, the project aims at creating more public spaces. The objective is increasing the efficiency of land use. The ambition for that is to rebuild 50% of the area.

3. Project features

In order to achieve real revitalization, the urban renewal project of Progresa Fenicia aims to reach functional mix, in order to energize the neighborhood at all times, while remaining inclusive, allowing the current inhabitants to remain on site while improving the quality of life and diversity of services offered.
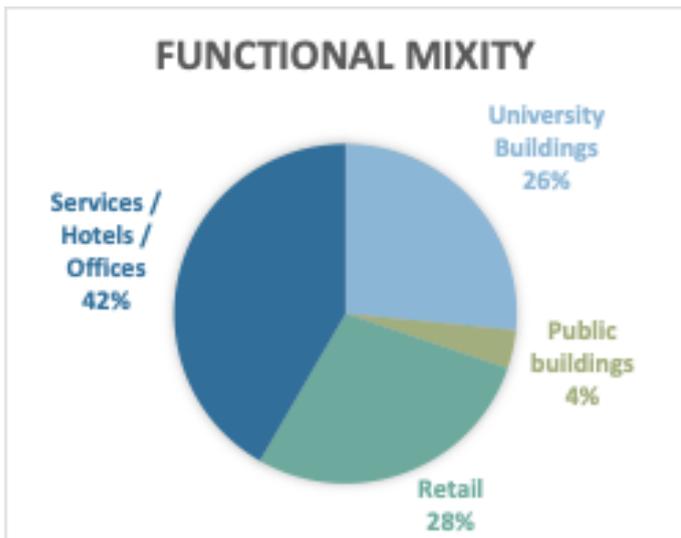

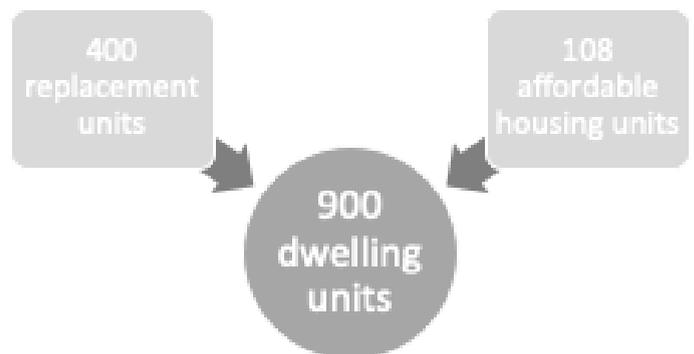Figure R: Distribution of building function - Progresa Fenicia

Figure S: Distribution of dwelling units - Progresa Fenicia

Although no buildings have yet been built at all, many social initiatives have been implemented, and many are successful and very inclusive. One of the first accomplishments, in line with the participative process, is the creation of participative workshops in 2012. It is then that the negotiation began between the different stakeholders: the citizens, the university or the municipality. Only one year later, the first social program was implemented to tutor students from The University of Andes.

Figure T: Result of the first participative consultation in the UDU1

In 2016, the first Urban Decision Unit (UDU) was created through a participatory process, creating a democratic grid of the neighborhoods affected by the project. The result was that of the 43 property owners in the area of this UDU, 40 signed the document giving their agreement to the project, which corresponds to 93% of the inhabitants of these buildings.

In the end, the project is divided into five UDU, allowing for a very local negotiation between the stakeholders. But above all, it allows the construction of the project to be divided into five phases corresponding to the zoning, as seen in Figure U. However, the reality of the project is that as of today, in 2021, only phases 1 and 2 have been completed.

Figure U: Zoning of the five UDUs

Apart from the workshops on the design of the renewal of the neighborhood, a major social realization is tutoring, offered by the University's student volunteers to local children. Similar courses are also set up for adults, to teach them the use of computer tools, or to help the development and competitiveness of some companies in the area, or even to train young people in the necessary skills to enter working life. Always with the goal of improving citizen participation and awareness of the project, in 2014, a local newspaper, Directo Fenicia, was created for the residents of the neighborhood to share local events and achievements. A year later, the Huerta Fenicia, a community space for urban agriculture, was created. In addition, the project also has an inclusive artistic focus, again with the aim of strengthening its social cohesiveness. The first event of this kind was the week of the arts and humanities, initiated in 2015, offering creative workshops and exhibitions aimed at the cohesion of citizens around art. This ambition was confirmed in 2017 with the decision to locate the Bogotá Philharmonic Orchestra in this neighborhood, making this previously disinvested area more attractive and increasing community cohesion through the practice of music.

4. Stakeholders

It was a historical context that prompted a private organization, the University, to

launch the project. This administrative configuration implies a close public-private collaboration in conjunction with an incessant discussion for the orientation of the program, as well as the inclusion of the citizens themselves, without whom no phase of the project can be implemented. Particular attention is therefore paid to explaining the objectives of the revitalization of the neighborhood to everyone, in order to reach a global agreement. In addition to these actors, there are those who are cited as "allies" of the project, and the "structurers" of the program.

Allies include, of course, the municipality of Bogotá and the University of the Andes, but also other companies, such as Enel, Bogotá's energy utility, or the private developers Marval and Prodesa. On the other hand, the structurers of the project are companies that are necessary for the realization of the project. Among others, we find engineering companies that propose innovative technical solutions to the challenges of the project such as the vegetation of a major part of the roofs (Greener Cities, Ingetec), but also actors of the legal aspect of the project in framing the elaboration of the Partial Plan, some consultants and urban planners, and architects for the imagination of the future buildings that will structure the neighborhood, and will reflect its identity.

5. Analysis

➜ <u>Summary of Strengths:</u>

<u>Economic/Creativity:</u> Urban renewal projects often mean "gentrification", that is to say direct or indirect expropriation of the inhabitants of the neighborhood because of the increasing of the amenities of the area. In Bogota, in front of Triangulo Fenicia, the Manzana 5 project was the perfect example of a renewal project leading to gentrification. Rapidly executed, the populations were replaced by new ones in a neighborhood renovated without further obstacles to the developers. Almost facing it, the University of the Andes launched the project, under the control of the public authorities, promoting citizen participation and negotiation to avoid expropriation. With a true public-private partnership, local governments and their urban plans have a real influence on the project, while private actors apply themselves to respond to the constraints decided in a creative way. In fact, no decision can be made without the agreement of all citizens. This participatory democracy is exemplary, a model that has been hailed and is to be replicated in Colombia.

<u>Social/Sobriety:</u> The particularity of the Progresa Fenicia project is to have initiated social support programs even before the urban transformations are carried out. The students of the University are fully involved and invested in the project, creating a sincere proximity between developers and owners of the neighborhood. Thus, several tutoring programs have been set up, accompanying young people and adults in their personal accomplishment, allowing the social progression of the inhabitants of the district and their sensitization to the democratic stakes of the project even before the renovation of the buildings.

<u>Social/Inclusion:</u> The particular division of the Colombian project into 5 units, even smaller than the initiative already launched at the neighborhood level, allows not only a distinct phasing for each area, but above all a more inclusive

negotiation of each inhabitant, increasing the weight of his voice by reducing the number of participants in the consultation of each area. Although the project remains global at the neighborhood level, this system has strengthened the participation and efficiency of the workshops in order to reach agreements that satisfy everyone.

➜ <u>Summary of Weaknesses:</u>

<u>Ecological/Sobriety:</u> The Bogota urban revitalization project is not focused on the environmental aspect, but rather on resilience. The project does seek to integrate into its environment, but few concrete objectives aimed at reducing the impact of the urban area on the environment are developed. Nevertheless, we find what could be said to be the basics of projects that want to be more sober, such as reducing the footprint of the built area from an environmental point of view. But beyond that, the project does not necessarily develop additional and innovative alternatives, such as rainwater management for instance. The revitalization goes rather through what is apparent than through more inconspicuous but technically effective solutions.

➜ <u>The "Colombian approach":</u> The Colombian model of Fenicia is a strong participatory democracy, exemplary at setting the citizens as the main actors of the project. In an increasingly liberalized country, the public-private partnership was straightforward and well-received. The balance between the University's initiative and the public interest is effectively framed by the Local Urbanization Plans, focused on the needs of the citizens. In order to meet these requirements, the program proposes solutions that are fair to everyone, and must leave no one behind. This system of permanent negotiation is a model that is encouraged to be replicated in the rest of the country.

But such level of negotiation means that the project takes a long time to begin implementation. When considering the current stakes of the climate emergency and in the context of pressing social vulnerability, speed is crucial. Moreover, while the project excels in taking social criteria into account, it lacks creativity when it comes to environmental issues.

Key: ☐ = Strength   ☐ = Weakness   ☐ = Neutral

	Sobriety	Resilience	Inclusion	Creativity
Ecological	Reduction of the footprint of the building area.	Introduction of new innovative energy supplies ENEL in testing.	Connection with the Monserrate Mountains – National Park of Colombia.	Establishing urban farming with the aim of strengthening the ties between the citizens.
Economic	Improving public transport accessibility and implementing alternative mobility orientation.	Improving urban security and citizen wellbeing through the revitalization of the activities.	Attractivity improved through functional mixity.	Avoiding expropriation establishing negotiation and exchange rate 1:1 of house surface.
Social	Tutoring to help citizens improve their capacities.	Strong proximity between the University and the citizens.	Crossed stakeholders initiative: Triangulo Fenicia and workshop improving public participation.	Considered as a testing lab in terms of social requirements and guarantees.

Lloyd EcoDistrict - Portland, Oregon, United States

1. Context

The EcoDistrict idea originated from a proposal by the Portland mayor's office in 2008 during the global economic recession. At the time, sustainability initiatives were just beginning to gain traction in the United States, and this initiative was recognized for its potential for sustainable economic recovery. The initiative received significant government funding and support at the time, but shortly thereafter the mayor resigned due to unrelated political opposition. With the sudden change in leadership and lack of funding, the EcoDistrict initiative dissolved and was reestablished, after several iterations, as the Lloyd EcoDistrict and the umbrella EcoDistrict organization that exist today.

Figure V: Lloyd EcoDistrict, Portland, Oregon.

The Lloyd EcoDistrict in Portland, Oregon is a primarily commercial neighborhood of about 160 hectares just outside of Portland's central business district. The residential population is limited to about 5,000, but more than 16,000 workers commute in and out of the district, making the businesses that employ them key stakeholders in the neighborhood. Land use is nearly all commercial, with about 7% and 1% zoned for residential and industrial use respectively, and Portland's convention center and sports stadiums are located in the district.

In addition to the Lloyd Ecodistrict, we conducted interviews with EcoDistricts in Pittsburgh, Pennsylvania as well as the umbrella "Ecodistricts" organization to gain a national-level picture of neighborhood sustainability initiatives in the US. The official nonprofit organization, "EcoDistricts", which is based in Portland, Oregon, manages the certification and accreditation of "EcoDistrict" neighborhoods around the country. Across the United States, there are 19 certified EcoDistricts and a number of others in the process of being certified.

In Pittsburgh, Pennsylvania, three EcoDistricts (Millvale, Sharpsburg, and Etna) have been officially certified in recent years. Millvale has a population of about 3,000 and an area of about 180 hectares. Sharpsburg has a population of about 3,000 very densely concentrated into an area of under 1.3 km^2. Finally, Etna has a population of about 4,000 in a small 2 km^2 area. The neighborhoods are located close together in a formerly heavily industrialized area that is at high risk of flooding, which spurred some of the initial interest in the EcoDistrict initiative. Together, the three neighborhoods make up the Triboro EcoDistrict.
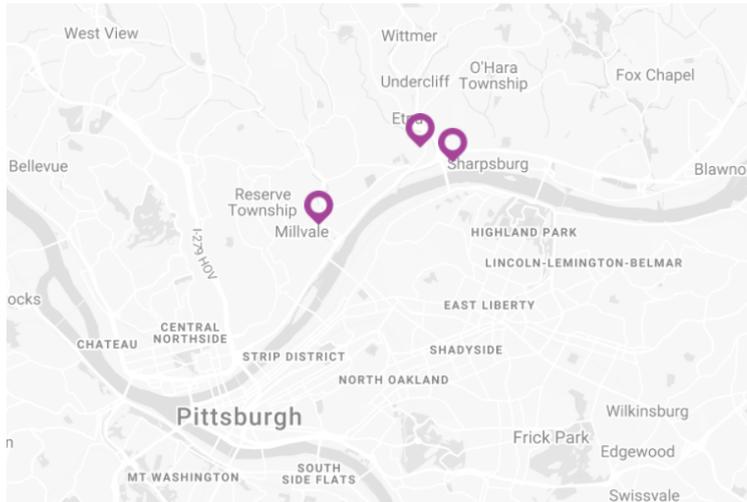
Figure W: Geographical location of the Sharpsburg, Millvale, and Etna EcoDistricts near Pittsburgh, Pennsylvania.

2. Project goals

The EcoDistrict organization provides a framework for neighborhood planning based on the criteria of climate, equity, and resilience, and offers 3rd-party verification during and after the planning process. This framework distinguishes it from the LEED certification, which stops once certain goals are met. Ultimately it is up to each neighborhood to determine their own metrics and goals for reaching the climate, equity, and resilience criteria. The Lloyd EcoDistrict and the three projects in Pittsburgh, PA have each established their own set of objectives beneath this underlying framework.

Figure X: EcoDistrict Protocol Framework

The cornerstone of the Lloyd EcoDistrict initiatives is the Energy Action Plan, which sets benchmarks for reducing greenhouse gas emissions with the ultimate goal of net-zero energy by 2060. Their most recent roadmap includes a number of goals: to reduce energy consumption by 60%, meet both human and natural needs through reliable and affordable water management, zero waste and optimized materials management, achieve healthy urban ecosystems that protect and regenerate habitat and ecosystem function, and provide access to clean and affordable transportation options.

Figure Y: Lloyd EcoDistrict's Sustainability Framework

In Pittsburgh, the three EcoDistrict organizations have each undertaken their own approaches to the EcoDistrict framework. Millvale has established programs particularly focused on air quality, mobility, and equity, conducting an air quality research pilot program with a heavy emphasis on citizen involvement. Sharpsburg created a roadmap plan for sustainability especially focused on preserving neighborhood characteristics and history in addition to creating new greenways. Etna is particularly interested in mitigating stormwater challenges following significant flooding by using green infrastructure.

3. Project features

In the Lloyd EcoDistrict, most of the efforts towards reducing greenhouse gas emissions are centered around tracking energy usage and monitoring consumption while updating buildings with solar panels and LED lighting. In addition, newly constructed buildings are encouraged to reach LEED certification standards. Other significant ecological initiatives include a pilot program for electric bikes and an innovative "pollinator bikeway corridor" to increase biodiversity. These ecological initiatives are especially significant in their integration of local business stakeholders from start to finish. In one particularly interesting example, the Lloyd EcoDistrict implemented a project connecting local bike messengers to local restaurants for delivering food waste to homeless residents of Lloyd.

In recent years, the Lloyd EcoDistrict's projects have expanded to include more community-focused initiatives. For example, the Right2DreamToo initiative provides sleeping areas for the homeless in tiny homes powered by solar panels in partnership with high school students, who built the solar batteries. Rather than provide sleeping bags or options that might produce more waste, the Lloyd EcoDistrict team looked for the most "eco" of solutions in approaching the problem of the neighborhood's homeless encampment. Another example includes a community mural at an intersection, and numerous park cleanups and other volunteer community events. These community-focused initiatives similarly work to incorporate stakeholders at all levels from start to finish.

The EcoDistrict organizations no longer receive any government funding and function as non-profits. They typically do not have major government stakeholders. They are funded primarily by grants and local businesses, and much of their work is focused on finding different funding sources for individual project proposals. The Lloyd EcoDistrict has some securely established funding through the neighborhood's commercial stakeholders using tax-increment financing. Many of the other EcoDistricts receive funding from foundations, like the Heinz and Hillman foundations in Pittsburgh. The challenge of funding can draw focus away from large-scale infrastructure projects and means that a lot of the initiatives done by the EcoDistricts are small-scale and focused on integrating local businesses.

4. Stakeholders

While there is government support for projects in the form of approval for zoning, there is not a lot of stakeholder involvement on the part of local governments, much less state or federal level policies. Instead, the ecodistrict approach is truly grassroots: the primary stakeholders are community members, both in their leadership and their financial support. The EcoDistrict organizations, including Portland's Lloyd EcoDistrict and Pittsburgh, Pennsylvania's Millvale, Sharpsburg, and Etna districts, are typically very small and run by just a few people. The leaders of these organizations are frequently community members with significant backgrounds in community development. The leader of the Sharpsburg EcoDistrict, for instance, implemented the EcoDistrict protocol as a city councilwoman, and is now undertaking a run as mayor. The grassroots nature of these organizations, led by small numbers of people, mean that there is a greater possibility of fragmentation and some challenges in maintaining the longevity of these plans.

In addition to local leadership, local businesses are significant stakeholders in these EcoDistrict efforts. In the Lloyd EcoDistrict, the Business Improvement District (BID) of the neighborhood holds significant sway, in part because of the heavily commercial nature of the neighborhood, but also because the EcoDistrict organization receives

much of its funding from the BID's tax-increment financing scheme. In Pittsburgh, local business owners are frequently involved in donating advertising materials for community engagement as well as creating their own initiatives for sustainable change, such as a joint purchasing agreement to eliminate straw usage. The lack of significant government stakeholder involvement means that community members and businesses play a strong role in sustainable community development.

5. Analysis

➔ **Summary of Strengths:**
Economic/Inclusion: The Lloyd and Pittsburgh EcoDistricts have undertaken a number of small successful sustainability projects. These projects are very much embedded in their respective communities and frequently engage local businesses. Many local businesses have been heavily involved in the implementation of EcoDistrict programming, and there is significant inclusion of these community stakeholders.

Economic/Creativity: The challenge of sustainable funding sources is very real, and the EcoDistrict organizations have undertaken a number of different approaches to securing funding, as discussed in the context of Lloyd's business improvement district and tax increment financing. Moreover, because of the high inclusion of local business stakeholders, many innovative programs have been initiated, like a partnership between local bike messengers and restaurants to deliver food waste to homeless shelters.

Social/Inclusion: Equity plays a strong role in the formation and implementation of every initiative. For example, for the LAMP (LED lighting) project in the Lloyd Ecodistrict, which involves installing LED lights to reduce energy consumption, the Lloyd EcoDistrict partners with a local installation company that is minority-owned.

➔ **Summary of Weaknesses:**
Ecological/Sobriety: At this point in the development of the EcoDistricts, it is difficult to say how successful some of the larger ecological projects have been in terms of reducing carbon emissions. Because of fragmented, small-scale stakeholder investment, many large-scale infrastructure projects such as those in Hammarby remain out of reach. These smaller efforts, like modifying a riverfront park, do not demonstrate a strong consistent commitment to reducing carbon emissions.

Ecological/Resilience: While there are certainly examples of projects within the EcoDistricts that demonstrate interesting approaches to ecological resilience, like an air quality study aimed at engaging citizens, these projects simply don't

have the scale to reach broader ecological goals. The air quality pilot, for instance, has stopped after the initial study was completed; the project received only enough funding from Carnegie Mellon University to continue for a short time, without a long-term, holistic approach. These ecological weaknesses demonstrate most clearly the challenges of the American approach: longevity and scale.

➔ **The "American approach:"** The first feature to note is that the EcoDistrict organizations have many sustainability goals, but the one that appeared often to overshadow all the others throughout the research process is "equity", with a focus on racial and socioeconomic equity. As highlighted in the official EcoDistricts protocol, equity must be included in each project's process, decision-making, and outcomes.

Moreover, the innovation and level of community engagement within many of these projects is significant. We can see that in the American context it is possible to have inclusive and creative projects that truly encourage economic development in the context of local businesses. However, without government involvement and large-scale projects, it seems challenging to achieve some of the bigger ecological goals and move towards a more holistic approach.

Key: ⬛ = Strength   ⬛ = Weakness   ⬛ = Neutral

	Sobriety	Resilience	Inclusion	Creativity
Ecological	Pittsburgh - proposed riverfront park captures rainwater for treatment on site, revitalizing industrial area.	Pittsburgh - Breath Easy air quality pilot - adapting to individual city context, citizen science and data collection	Portland - Pollinator Placemaking - planting low-water flowering plants in medians to encourage bees	Portland - Right2DreamToo- the "eco" way to approach problems of equity: providing solar tents for homeless community
Economic	Portland - Energy Action Plan - utility tracking for office buildings	Pittsburgh - business district - joint purchasing agreement to move away from plastic straws Pittsburgh - Launch Millvale program - incubator program for food entrepreneurs	Portland - LAMP program - installing LED lighting, pairing local businesses with minority-owned installation company	Portland - business improvement district - tax-increment financing guarantees strong revenue source Portland - circular economy - partnership with bike messenger company linking food waste from local restaurants to homeless shelters
Social	Pittsburgh - Solar Microgrid education program - solar panel installation work for teen job training	Pittsburgh - high citizen engagement - partnerships with local businesses to provide advertising for community engagement - estimated 12% of population reached	Overwhelming theme of equity - in process, decision-making, and outcomes	Portland - intersection murals, access to arts for residents

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III. Discussion

Organization of Discussion

Over the course of this comparative inquiry, we have uncovered some important features of urban sustainability initiatives across four continents: Europe, Asia, South America, and North America. The purpose of this section is to now bring these projects into conversation with one another to ultimately determine whether—and to what extent—a quintessential "French" method for sustainable urban development can be identified.

This section is organized in two main parts. The first part considers the guiding questions presented at the beginning of the report. Based on the findings in the Results section, we seek to answer the central thesis question of the research project: "Can a quintessential "French" method for sustainable urban development be identified? If so, to what extent? What are the limitations? Answering this central question and its adjuncts constitutes the second part of the section.

To facilitate discussion, we have compiled two summative tables below that encapsulate the findings in the Results section. Both tables present the same Holistic Sustainability Analysis framework that appeared in the Results section. This time, the cells in the first table display all the projects that were successful in certain aspects. Conversely, the cells in the second table display all the projects that were weak in other aspects.

1. SUMMATIVE TABLE OF SUSTAINABILITY - STRENGTHS

	Sobriety	Resilience	Inclusion	Creativity
Ecological	France Sweden South Korea			France Sweden South Korea
Economic			France United States	Colombia United States
Social	Colombia		Colombia United States	

2. SUMMATIVE TABLE OF SUSTAINABILITY - WEAKNESSES

	Sobriety	Resilience	Inclusion	Creativity
Ecological	Colombia United States	United States		
Economic	Sweden		South Korea	
Social				

Guiding Questions

1. What are the greatest strengths and weaknesses in sustainable development globally? What are the greatest strengths and weaknesses regionally?

We find that France, Sweden, and South Korea have all excelled in the ecological components of sustainable development as outlined in the Holistic Sustainability Analysis framework—namely with regard to ecological sobriety and ecological creativity. This signifies that these nations have made an effort to conserve natural resources and to do so in an innovative manner. All three of the sustainability projects in these countries that were investigated for this report share a concerted effort to dedicate a specific portion of their redevelopment to green space. The French project pledged to allocate 50% of its territory to green infrastructure and South Korea has allocated 15%. But the number itself does not seem to be as significant as the intentionality and strategy behind achieving that goal.

As it turns out, these countries are meeting the standards they have set for themselves in different ways by employing many different creative strategies. France has developed an innovative renewable energy source in recycling waste water while Sweden has focused on a more conceptual innovation in its development of the Hammarby model to frame its citizens' understanding of energy conservation. South Korea has been creative in an entirely different way by completely revamping its governance infrastructure to integrate a public-private partnership into urban renewal projects. This goes to show that there are a diverse array of strategies that countries can employ to meet their sustainability goals. Furthermore, contextualizing and localizing these strategies as France, Sweden, and South Korea have done should be considered a strength and not a weakness.

On the other hand, Colombia and the United States were relatively weak in the ecological sobriety aspects. The logical question to ask would be what do Colombia and the United States have in common that would make them less equipped to excel in the aspects of ecological sobriety and ecological creativity compared to France, Sweden,

and South Korea? For one, the tables show that neither Colombia nor the United States excels in the ecological creativity category, but France, Sweden, and South Korea all do. Lacking a robust innovative spirit to undergo effective resource conservation appears to be a disadvantage for exhibiting strong ecological sobriety.

That is not to say that Colombia and the United States are less holistically creative in their approach to sustainability relative to France, Sweden, and South Korea. In fact, both Colombia and the United States excel in their economic creativity if not their ecological creativity. They both do an outstanding job of inviting private local stakeholders into their work—and in so doing, fostering a sense of social solidarity. For example, participatory democracy is an economically creative strategy for Colombia to check the balance of power of its private stakeholders. Likewise, the United States offers tax incentives for communities to take part in community-based urban renewal projects, such as its EcoDistricts.

2. Which features of sustainable development complement one another and which detract from one another? Are there trade-offs to sustainable growth?

In responding to the previous guiding question, we have explored the possibility of a complementary relationship between ecological creativity and ecological sobriety. It appears that for countries to use their resources efficiently, they must have robust, innovative strategies in place for doing so. In addition, some other complementary relationships appear in the table that are worth exploring. By simply looking at the cells and observing which populated cells overlap the most and which do not, we can infer some complementary relationships.

One such complementary relationship could be economic inclusion and social inclusion. The United States is one country that excels in both sectors. Logically, we can see how the two categories may be compatible, seeing that unified socio-economic inclusion is widely considered to be a positive characteristic of urban regeneration. In the case of the United States' sustainable development initiatives, better integrating local businesses into the broader economy is an important factor of social equity. This is exemplified by the example of the Lloyd Ecodistrict in Portland, Oregon which has endorsed minority-owned local businesses. Economic creativity of this kind in mobilizing local businesses in a unique way can also be perceived as a bolster for economic inclusion. Unsurprisingly, the United States therefore excels in this regard just as well as it excels in the socio-economic inclusion aspect.

Another complementary pairing might be ecological sobriety and ecological resilience, both of which prove to be a weakness for the United States. In this case, ecological sobriety and ecological resilience are considered weaknesses for the United States given the fact that the EcoDistricts initiatives are relatively young and their impact on carbon emissions and climate change has not yet registered. In this way, the age of a sustainable development project could be considered a weakness. This is a notion that is supported when evaluating the Colombia project, which has failed in the aspects of ecological sobriety, but not in ecological resilience. Relative to the EcoDistricts project in Portland, Oregon, Progresia Fenicia is a much more mature project since it was

founded in 2004 and the EcoDistricts label has only become widely known in the last decade.

When it comes to trade-offs, we may consider ecological and economic creativity to be two aspects that are diametrically opposed. We have seen that countries that are ecologically creative are not necessarily *economically* creative and vice versa. More broadly, ecological interests and economic interests generally appear to be incompatible. France is the only country that excels in an ecological aspect as well as in an economic aspect of sustainability according to the tables. And, interestingly, it is economic inclusion where it excels (as opposed to economic sobriety, economic resilience, or economic creativity). In our assessment, this is thanks to its inclusive housing policies. We may speculate based on this finding that housing could be a critical issue in ensuring economic inclusion in sustainable urban development. Where France excels in its inclusive housing, South Korea has failed in that very same sector and the consequences of this failure have been dire in the Korean context.

3. What are the implications of these findings for sustainable development policies in France and elsewhere?

Previously, we saw that the topic of housing appeared to be an essential economic issue in the emerging sustainable city when we compared how France's successful inclusive housing policies differed from Korea's housing displacement practices. In this way, we may consider a conscientious housing policy to be a crucial component of sustainable urban development.

Additionally, we might evaluate just about any of the cells populated in the table that have been designated as weaknesses to be important attributes of urban development. Among them, as discussed, ecological sobriety stands out as a weak point of both Colombia's project and the United States' projects, which as we have discussed, may be a function of the relative immaturity of the EcoDistrict initiative compared to France, Sweden, and South Korea's projects. Similarly, economic inclusion could be deemed an important factor as well, seeing as it was a weakness for South Korea—although not so for France or the United States. For Colombia, ecological sobriety is a weakness because it is simply not a main focus of the initiative. Taking into account what municipal governments deem "important" is a necessary step in agenda-setting and budgeting for the project.

Interestingly enough, economic sobriety is a category of the Holistic Sustainability Analysis framework that we have not yet discussed. According to the framework, economic sobriety has proven to be a weakness of the Swedish project. This is due to the fact that the Swedish administrative structure enables municipalities to retain large financial resources. This model is not transferable and therefore the economic sobriety is seen as a weakness of the project. With this last finding, we can assert that knowing how to generate revenue and how to allocate funds is a seemingly fundamental and yet wholly essential step in a successful urban renewal process. The main implication to be made from this finding is that money and resources need to be focused on every component. If not, it renders that specific component a weak spot in the sustainable city.

Central Question: Can a quintessential "French" method for sustainable urban development be identified?

We have now arrived at the central question for which this report was written to answer. The question concerns whether—and to what extent a quintessential "French" method for sustainable development exists. In other words, what are the strengths and weaknesses of the French method according to the Holistic Sustainability Analysis framework and how do these strengths and weaknesses compare to the other projects studied over the course of this comparative research inquiry? What potential political advantages or disadvantages does the French system have over other countries relative to their sustainable urban development strategies?

In a word, the "French" way that emerges based on the framework is one that is *holistic*. France is the only country of the five studied to not display any sort of weakness whatsoever. On the other hand, the strengths that are apparent pertain to aspects of ecological sobriety, ecological creativity, and economic inclusion. As we have discussed, ecological sobriety and ecological creativity are strengths that France shares with Sweden and with South Korea. Economic inclusion is a strength that it shares with the United States.

 It appears that the French approach to sustainability would be most similar to Sweden and South Korea's approaches because they align in two aspects (ecological sobriety and ecological creativity). South Korea aligns slightly less with France than Sweden does because South Korea opposes France slightly in one aspect (economic inclusion, which is a weakness for South Korea but a strength for France). France and the United States share only slightly similar approaches because they only align in one aspect (economic inclusion). Colombia and France do not appear to align in any aspect at all.
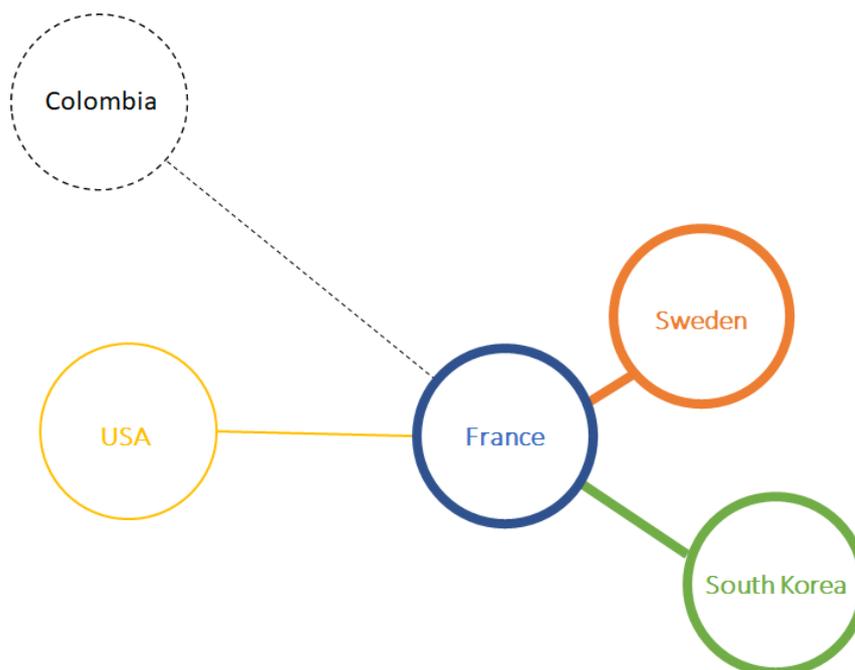

Figure W: Proximity diagram comparing four sustainability projects to France. The

proximity of the circles to one another relative to France indicate degrees of similarity. The thick solid line and relatively close proximity of the circles indicates a very close similarity. The thinner solid line indicates a slightly less close similarity, and the dotted line indicates a strong dissimilarity.

When the information is visualized in this way, the geographic disparities become strikingly clear. While it is logical that, due to their geographic proximity to France, Sweden and South Korea would be more similar to France in their approaches than either the United States or Colombia are, the proximity map proportionally displays an almost perfect geographical representation of the physical distance between the countries, with Sweden being the closest geographically, followed by South Korea, the United States, and Colombia. With the limited sample size, there is no way to guarantee that the way the projects have fallen is not random. But on the contrary, there is also no reason to assume that they have fallen randomly either. For, the alignment of the countries coincide with the graphic not only geographically, but also economically and politically. Sweden and South Korea's economies and centralist governments more closely resemble France's than those of the United States and Colombia.

We would also be remiss to ignore the fact that Colombia is the only country in the comparison that belongs to the global south, and it is also the farthest away from France and the other major global players in the diagram. Of the four countries, it is most similar to the United States than the United States even is to France because Colombia and the United States align on three aspects (economic creativity and social inclusion as strengths, and ecological sobriety as a weakness). If an African country had been represented in the comparison, would we have seen a similar result?

While we acknowledge the comparative dissimilarity between France and Colombia, we also have to acknowledge the very close relationship between France and Sweden. Unlike with the United States, there weren't any aspects in the table where France and Sweden opposed or contradicted each other (i.e. where one country was strong in one aspect and the other was weak), but there were areas where one country thrived or failed and the other remained neutral. For instance, a strength of France is its economic inclusion but this is a neutral aspect for Sweden. Inversely, a weakness of Sweden is its economic sobriety, but this is a neutral aspect for France. (This finding also supports the earlier hypothesis that ecological and economic aspects are not complementary to one another.)

These results beg the question of whether there could be a continentally-based (and, thus, geographic) component to different sustainability methods in addition to a national one. Politics and economies aside, this would make sense because climate change is fundamentally a geographic issue and different countries are witnessing different effects of it based on where they are located. Therefore, instead of there being a quintessential "French" method of sustainable urban development, perhaps there is—or needs to be—a "European" way, and an "Asian" way, a "South American" way, etc. This may promote a more equitable and holistic appreciation of the many individual methods that countries and their cities can employ towards a greener earth while preserving the solidarity of belonging to a larger entity that understands the greater impact of such sustainable urban policies.

Concluding Remarks

Through this analysis, we have come to understand and appreciate the need for global conversations to happen that mobilize cities in efficient and relevant ways in order to mitigate the effects of climate change. What we are now considering the "European" (French) method could be one strategy for sustainable urban revitalization. France as a country is remarkable in that it bears no apparent weaknesses in any of the aspects presented in the Holistic Sustainability Analysis framework—only strengths and neutralities. This makes the French éco-quartier a very acceptable and relevant model to begin evaluating the strengths and weaknesses of other countries' urban development initiatives and reformulating them as necessary to have more strong points than weak points.

However, this is not by any means to say that the European (French) way is the only way or the best way. Urban sustainability is not an exercise in simple policy transfer, which has many drawbacks. Simply replicating the French model as a prototype to use elsewhere in the world is impractical, as we have seen that none of the other countries studied align perfectly with France In any aspect of strengths and weaknesses. In fact, some (such as Colombia) remain completely distinct from the French method in all aspects. This diversity, in and of itself, should be perceived as a source of strength and not a weakness. For, where countries like Colombia do not excel in areas that France excels (ecological sobriety, ecological creativity, and economic inclusion), we see that they excel in the very areas where France does not (economic creativity, social sobriety, and social inclusion).

Directions for Further Research

The scale of our research was greatly limited by time and travel constraints. We were only able to investigate five countries on four continents whereas, ideally, this study would be an inquiry of every nation and every city in the world. While the prospect of completing such an expansive study, even with an unlimited amount of time and resources, would be an arduous undertaking, we encourage future researchers who are willing to adopt this project to incorporate as many different countries and cities across all continents as possible. With a larger sample size, the comparison becomes more difficult but also more robust and statistically valid than what we were able to produce in a very limited time frame with limited resources.

Our goal in completing this report was to offer a rigorous qualitative framework that could be used for the very purpose of expanding the study to any city or sustainability project therein. The Holistic Sustainability Analysis framework we have created is very much a starting point and not an end point, and it is meant to be built upon—to be, true to its name, as *holistic* and all-encompassing of various definitions of sustainability as possible. We hope that the framework can eventually be generalized to be representative of all modern cities' approaches to sustainable development. In particular, we would be interested in seeing how rapidly growing cities in the global south influence the framework in their definitions of what sustainability could or should look like.

We caution future researchers to bear in mind that no matter how holistic a theoretical model can be, each case must be treated as an individual, and there will always be outliers and components that do not fit within the parameters of the framework. Rather than reworking the case to meet the conceptual restrictions of the framework, we advise and urge future researchers to consider reworking the framework itself to be more globally inclusive.

Acknowledgements

Bibliography

Boulogne–Billancourt - Paris, France

BNP Paribas Real Estate. (2017, January 11). La réussite du quartier Trapèze à Boulogne. BNP Paribas Real Estate. Retrieved from: https://www.bnppre.fr/actualites/marche-immobilier/la-reussite-du-quartier-trapeze-boulogne.html

Ekopolis. (2020, May 13). Ecoquartier Île Seguin - Rives de Seine. Ekopolis. Retrieved from: https://www.ekopolis.fr/operation-amenagement/ecoquartier-ile-seguin-rives-de-seine

Ministère de la Transition Écologique. (2021.). Seguin Rives de Seine. ÉcoQuartier : La Plateforme Officielle. Retrieved June 14, 2021, from http://www.ecoquartiers.logement.gouv.fr/operation/1068/

SPL Val de Seine Aménagement. (2020). Ile Seguin Rives de Seine. Ile Seguin Rives de Seine. Retrieved from: https://www.ileseguin-rivesdeseine.fr/

Ville de boulogne-billancourt. (n.d.). Ile Seguin - Rives de Seine. Ville de Boulogne-Billancourt : Site Internet. Retrieved June 14, 2021, from: https://www.boulognebillancourt.com/ma-ville/urbanisme-et-grands-projets/ile-seguin-rives-de-seine

Hammarby Sjöstad - Stockholm, Sweden

Favaro, L. (2014-2015). Master thesis: "A comparison between different "eco-neighborhoods": urban, architectural and energy parameters."

Grosjean, J. (2014). "Le concept de la ville durable en Suéde, Les quartiers durables d'Hammarby Sjostad et de Norra Djurgarden." Ambassade de France en Suède, service economique de Stockholm.

Ignatieva, E. M., & Berg, P. (2014, 12th February). Hammarby Sjostad: a new generation of sustainable Urban Eco Districts. Retrieved from: https://www.thenatureofcities.com/2014/02/12/hammarby-sjostad-a-new-generation-of-sustainable-urban-eco-districts/

IVL Swedish Environmental Research Institute. (2015). Successful renewal from Industrial area to a model sustainable district. Retrieved from: https://smartcitysweden.com/best-practice/60/eco-city-hammarby-sjostad/

Montgomery. (2014). Hammarby Sjostad. Standford Edu. Retrieved from: http://large.stanford.edu/courses/2014/ph240/montgomery2/docs/HS_miljo_bok_eng_ny.pdf

Urban Green Blue Grids. (2016). Hammarby Sjostad, Stockholm, Sweden. Retrieved from: https://www.urbangreenbluegrids.com/projects/hammarby-sjostad-stockholm-sweden

Slideshows shared by Yves Chantereau:

Chantereau, Y. (n.d.). "Suède: un exemple?", Equator Stockholm, Sweden.

Chantereau, Y. (2018). "La fabrique de la ville." Stockholm, Sweden.

Karlsson, M. (n.d.). "Hammarby Sjostad, the best environmental solutions in Stockholm." City of Stockholm, Sweden.

Interviews:

1. Interview with Julien Grosjean, Regional counsellor on sustainable development at the French Embassy in Sweden. 08-04-2021
2. Interview with Yves Chantereau, french architect at Equator in Stockholm, Sweden. 15-04-2021

Jangwi New Town - Seoul, South Korea

Incheon Free Economic Zone. (2021). "Outline of Incheon Free Economic Zone (IFEZ)"

Nam-jong, J. (2017, March 28). "New Town Project in Seoul." *The Seoul Institute.* Retrieved from https://seoulsolution.kr/en/content/new-town-project-seoul

Nam-jong, J. & Yang, J. (2008). "Seoul's New Town Project Implementation and Tasks for Improvement," Seoul Institute.

Seoul Metropolitan City. (2010). "Seoul's Seven Year-Records of New Town Project"

Seoul Metropolitan City. (2012). "Seoul's Efforts and Tasks for New Town and Redevelopment Project"

Seoul Metropolitan City. (2014, May 27). "Happy New Town." Retrieved from https://fr.slideshare.net/simrc/happy-new-town

Woo, J. (2019, April 16). "A Father's Near-fatal Choice to Keep His Home of 32 Years" *Yonhap News Agency.* Retrieved from https://en.yna.co.kr/view/AEN20180413002000315

Interviews:

1. Interview with Andy Kim, Land & Housing Corporation. 07-05-2021; 14-05-2021
2. Interview with Sunjoo Kim & Mike Jung, Seochogu Office. 14-05-2021
3. Interview with Ryan Lee, Incheon Free Economic Zone (IFEZ). 29-04-2021

Progresa Fenicia - Bogotá, Colombia

Aschner, J. (2014). Les transformations architecturales et urbanistiques de l'université des Andes et de ses abords immédiats à Bogotá, Colombie.

Cifuentes, A., Lufkin, S., Pérez, M. G. R., & Rey, E. (2015). Sustainability assessment of an urban neighbourhood revitalization project in Bogotá, by transposition of a European indicator system to the Colombian context. 79-92. 10.2495/SC150081.

Directo Fenicia. (2014) Primera Edicion. Retrieved from:
https://progresafenicia.uniandes.edu.co/images/documentacion/Periodico_Fenicia_Edi
cion_1.pdf

Egardo Contreras Nossa. (n.d.) Las alianzas público-privadas y la gentrificación del centro de
bogotá. Caso: proyecto plan parcial "triángulo de fenicia". Retrieved from
http://sedici.unlp.edu.ar/bitstream/handle/10915/55090/Documento_completo.pdf-PDFA.pdf
?sequence=1&isAllowed=y

Proyecto Fenicia. (2020). "Progresa fenicia obtiene premio internacional en planeación".
Retrieved from:
https://fenicia.co/progresa-fenicia-obtiene-premio-internacional-en-planeacion/

Universidad de los Andes. (2014). Ajustes a la Formulación, Plan Parcial Triángulo de Fenicia,
Bogotá. Retrieved from:
http://www.sdp.gov.co/sites/default/files/dts_2014-08-08-min.pdf

Proyecto Fenicia. (n.d.). University of the Andes program. Retrieved from :
https://progresafenicia.uniandes.edu.co/index.php/nuestros-programas-sociales

<u>Interviews:</u>

1. Interview with ⸀Johnny Fabian Tascon Valencia⸀, Coordinator of the social component. 26-04-2021.
2. Interview with ⸀Juan Felipe Pinilla P.⸀, Legal coordinator and relation with local authorities. 07-05-2021.

Lloyd EcoDistrict - Portland, Oregon, United States

EcoDistricts. (2018). EcoDistricts protocol: The standard for urban and community development,
version 1.3.

EcoDistricts. (n.d.) District registry. Retrieved from https://ecodistricts.org/district-registry/.

Evolve EA. (2016). Millvale ecodistrict pivot 2.0 report. Retrieved from
https://issuu.com/evolveea/docs/millvale_pivot_2_final_report_highr.

Lloyd EcoDistrict. (2014). One goal, five years, fifteen actions: Lloyd ecodistrict energy action
plan. Retrieved from https://www.ecolloyd.org/reports/.

Lloyd EcoDistrict. (2017). Energy action plan update. Retrieved from
https://www.ecolloyd.org/reports/.

Lloyd EcoDistrict. (2016). Annual report, 2015-2016. Retrieved from
https://www.ecolloyd.org/reports/.

New Sun Rising. (n.d.). Project we support: Triboro ecodistrict. Retrieved from
https://www.newsunrising.org/project/triboro-ecodistrict/.

Portland Sustainability Institute. (2011). Pilot report: Lloyd ecodistrict development, fiscal year
2010-2011. Retrieved from https://www.ecolloyd.org/reports/.

Portland Sustainability Institute. (2012). Lloyd ecodistrict roadmap. Retrieved from
https://www.ecolloyd.org/reports/.

<u>Interviews:</u>

1. Interview with Sarah Heinicke, Executive Director at Lloyd EcoDistrict. 05-04-2021.
2. Interview with Teva Needleman, Program Manager at EcoDistricts. 30-04-2021.
3. Interview with Anna Rosenblum, Senior Project Manager at Evolve Environment/Architecture. 10-05-2021.

Photo Credits

A. Ministre de la Transition Écologique. (2021). http://www.ecoquartiers.logement.gouv.fr/

B. Created by Capstone Research Team.

C. SPL Val de Seine Aménagement. (2020). Ile Seguin Rives de Seine. Ile Seguin Rives de Seine. https://www.ileseguin-rivesdeseine.fr/

D. SPL Val de Seine Aménagement. (2020). Ile Seguin Rives de Seine. Ile Seguin Rives de Seine. https://www.ileseguin-rivesdeseine.fr/

E. SPL Val de Seine Aménagement. (2020). Ile Seguin Rives de Seine. Ile Seguin Rives de Seine. https://www.ileseguin-rivesdeseine.fr/

F. SPL Val de Seine Aménagement. (2020). Ile Seguin Rives de Seine. Ile Seguin Rives de Seine. https://www.ileseguin-rivesdeseine.fr/

G. SPL Val de Seine Aménagement. (2020). Ile Seguin Rives de Seine. Ile Seguin Rives de Seine. https://www.ileseguin-rivesdeseine.fr/

H. Chantereau, Y. (n.d.). "Suède: un exemple?", Equator Stockholm, Sweden.

I Chantereau, Y. (n.d.). "Suède: un exemple?", Equator Stockholm, Sweden.

J. Karlsson, M. (n.d.). "Hammarby Sjostad, the best environmental solutions in Stockholm." City of Stockholm, Sweden.

K. Karlsson, M. (n.d.). "Hammarby Sjostad, the best environmental solutions in Stockholm." City of Stockholm, Sweden.

L. Chantereau,Y. (n.d.). "La fabrique de la ville." 2018, Stockholm, Sweden.

M. Karlsson, M. (n.d.). "Hammarby Sjostad, the best environmental solutions in Stockholm." City of Stockholm, Sweden.

N. Chantereau, Y. (n.d.). "La fabrique de la ville." 2018, Stockholm, Sweden.

O. Universidad de los Andes. (n.d.). "Todos nos quedamos, todos nos movemos". Programa Progresa Fenicia, Bogotá, Colombia.

P. Universidad de los Andes. (2014). Ajustes a la Formulación, Plan Parcial Triángulo de Fenicia, Bogotá.

Q. Valencia, J. F. (n.d.). "Progresa Fenicia, An approach to participatory urban renewal" Universidad de los Andes, Bogotá, Colombia.

R. Created by Capstone Research Team. Based on figures of the Universidad de los Andes, Bogotá, Colombia.

S. Created by Capstone Research Team. Based on figures of the Universidad de los Andes, Bogotá, Colombia.

T. Created by Capstone Research Team. Based on figures of the Universidad de los Andes, Bogotá, Colombia.

U. Valencia, J. F. (n.d.) "Progresa Fenicia, An approach to participatory urban renewal" Universidad de los Andes, Bogotá, Colombia.

V. Egardo Contreras Nossa. (n.d.) Las alianzas público-privadas y la gentrificación del centro de Bogotá. Caso: proyecto plan parcial "triángulo de fenicia".

W. Created by Capstone Research team.

X. EcoDistricts. (2018). EcoDistricts protocol: The standard for urban and community development, version 1.3.

Y. Portland Sustainability Institute. (2011). Pilot report: Lloyd ecodistrict development, fiscal year 2010-2011. Retrieved from https://www.ecolloyd.org/reports/.

Z. Created by Capstone Research team.