

**SUSTAINABLE GREEN CITIES AS A MODEL FOR MOROCCAN
ARCHITECTURAL IDENTITY**

Noussaiba RHARBI

Master's Dissertation

Department of Architecture

Programme in Building Information

Supervisor: Assoc. Prof. Dr. Mehmet İNCEOĞLU

Eskişehir

Eskişehir Technical University

Institute of Graduate Programs

April 2023

*This thesis has been supported by the project, which is approved by
the SRP Committee.*

FINAL APPROVAL FOR THESIS

This thesis titled SUSTAINABLE GREEN CITIES AS A MODEL FOR MOROCCAN ARCHITECTURAL IDENTITY has been prepared and submitted by Noussaiba RHARBI in partial fulfillment of the requirements in “Eskişehir Technical University Directive on Graduate Education and Examination” for the Degree of Master's in Architecture Department has been examined and approved on 11/04/2023.

<u>Committee Members</u>	<u>Title, Name and Surname</u>	<u>Signature</u>
Member	: Assoc. Prof. Dr. Mehmet İNCEOĞLU	
Member	: Assist. Prof. Dr. Hatice Günseli DEMİRKOL	
Member	: Assoc.Prof.Dr. Duygu KAÇAR	

Prof. Dr. Murat TANIŞLI

Director of the Institute of Graduate Programs

11/04/2023

SUPERVISOR APPROVAL

Master's student Noussaiba RHARBI, whom I supervise, has completed this thesis titled SUSTAINABLE GREEN CITIES AS A MODEL FOR MOROCCAN ARCHITECTURAL IDENTITY. According to my inspections, the work is scientifically and ethically appropriate for the student to the thesis defense exam.

Supervisor

Assoc. Prof. Dr. Mehmet İNCEOĞLU

ABSTRACT
SUSTAINABLE GREEN CITIES AS A MODEL FOR MOROCCAN
ARCHITECTURAL IDENTITY

Noussaiba RHARBI

Department of Architecture

Program in Building Information

Eskişehir Technical University, Institute of Graduate Programs, April 2023

Supervisor: Assoc. Prof. Dr. Mehmet İNCEOĞLU

From the early 2000th, Morocco has challenged sustainability as a way of development in construction. It adapted the concept to its current needs. The results are encouraging since the emergence of several green sustainable cities in the last decade. Moroccan cities are well known for their strong identity due to the long shaping of these cities through history. However, the new sustainability trends introduce new values and a new identity. The trends of globalization and the efforts to incorporate the concept of sustainability in the existing cities resulted in few contradictory choices.

The study aims to discuss the example of Morocco as it is a unique one due to its historical background and climate context. It is currently an experimental laboratory of new settlements and green cities. With its pledge to become a leader in sustainability in the African continent, Morocco presents the failure and success of sustainability transition on an urban scale.

This research takes account of the Moroccan position on the world scale. It aims to highlight its standing point in the global sustainability criteria by comparing six different projects with four leading sustainable cities in the world. Four projects are research projects and two achieved green cities: Zenata at the center of the country and Benguerir situated in the south. It highlights the reason behind the need for Moroccan green cities, the efforts that the government had made, and the problems that green Moroccan cities face while trying to maintain their identity.

Keywords: Sustainability, Green cities, Cities identity, Morocco, Zenata, Benguerir.

ÖZET

FAS MİMARİ KİMLİĞİ İÇİN BİR MODEL ÖNERİSİ OLARAK SÜRDÜRÜLEBİLİR YEŞİL ŞEHİRLER

Noussaiba RHARBI

Mimarlık Anabilim Dalı

Bina Bilgisi Bilim Dalı

Eskişehir Teknik Üniversitesi, Lisansüstü Eğitim Enstitüsü, Nisan 2023

Danışman: Doç. Dr. Mehmet İNCEOĞLU

2000'li yılların başlarından beri Fas, inşaatla bir gelişme yolu olarak sürdürülebilirliğe meydan okuyor. Konsepti güncel ihtiyaçlarına göre uyarlamıştır. Sonuçlar, son on yılda birkaç yeşil sürdürülebilir şehrin ortaya çıkmasıyla cesaret verici. Küreselleşme eğilimleri ve sürdürülebilirlik kavramını mevcut şehirlere dahil etme çabaları, birkaç çelişkili seçenekle sonuçlandı. Fas şehirleri, bu şehirlerin tarih boyunca uzun süre şekillenmesinden dolayı güçlü kimlikleriyle tanınırlar. Ancak yeni sürdürülebilirlik trendleri, yeni değerler ve yeni bir kimlik getiriyor.

Çalışma, tarihsel arka planı ve iklim bağlamı nedeniyle eşsiz bir ülke olan Fas örneğini tartışmayı amaçlamaktadır. Şu anda yeni yerleşimlerin ve yeşil şehirlerin deneysel bir laboratuvarıdır. Afrika kıtasında sürdürülebilirlikte lider olma taahhüdü ile Fas, sürdürülebilirlik geçişinin başarısızlığını ve başarısını kentsel ölçekte sunuyor.

Bu araştırma, Fas'ın dünya ölçeğindeki konumunu dikkate almaktadır. Altı farklı projeyi dünyanın önde gelen dört sürdürülebilir şehri ile karşılaştırarak küresel sürdürülebilirlik kriterlerindeki yerini öne çıkarmayı hedefliyor. Dört proje araştırma projeleridir ve iki başarılı yeşil şehirdir: ülkenin merkezinde Zenata ve güneyinde yer alan Benguerir. Fas'ın yeşil şehirlerine olan ihtiyacın ardındaki nedeni, hükümetin gösterdiği çabaları ve yeşil Fas şehirlerinin kimliklerini korumaya çalışırken karşılaştıkları sorunları vurgulamaktadır.

Anahtar Sözcükler: Sürdürülebilirlik, Yeşil şehirler, Şehir kimliği, Fas, Zenata, Benguerir.

ACKNOWLEDGEMENTS

I hereby would like to express my special thanks of gratitude after God, to my Professor Assoc. Prof. Dr. Mehmet İNCEOĞLU FOR HAVING SUPERVISED and helped this study to take place. I also greatly appreciate Assist. Prof. Dr. Hatice Günselli DEMİRKOL who contributed to nourishing my research skills.

I am deeply indebted to my parents who have supported my long academic career and boosted me up morally. They have been the only sturdy pillar for every step I took in my life. I am grateful to every member of my family who has supported my growth and accomplishments.

I also would thank both the Moroccan Ministry of national special planning, housing, urban planning, and city policy as well as the Ministry of energy transition and sustainable development for their understanding and help in providing the data and information requested for this research.

Noussaiba RHARBI

STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

I hereby truthfully declare that this thesis is an original work prepared by me; that I have behaved in accordance with the scientific ethical principles and rules throughout the stages of preparation, data collection, analysis and presentation of my work; that I have cited the sources of all the data and information that could be obtained within the scope of this study, and included these sources in the references section; and that this study has been scanned for plagiarism with “scientific plagiarism detection program” used by Eskişehir Technical University, and that “it does not have any plagiarism” whatsoever. I also declare that, if a case contrary to my declaration is detected in my work at any time, I hereby express my consent to all the ethical and legal consequences that are involved.

Noussaiba RHARBI

CONTENTS

	<u>Page</u>
HEADER PAGE	i
FINAL APPROVAL FOR THESIS	ii
SUPERVISOR APPROVAL	iii
ABSTRACT.....	iv
ÖZET	v
ACKNOWLEDGEMENTS	vi
STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES	vii
CONTENTS	viii
LIST OF TABLES	xi
LIST OF FIGURES	xiii
LIST OF IMAGES.....	xv
GLOSSARY OF SYMBOLS AND ABBREVIATIONS	xx
1. INTRODUCTION	1
1.1. Problem Statement.....	1
1.2. Aim of the Study.....	2
1.3. Limits of the study.....	2
1.4. Methodology of the study	4
2. GREEN SUSTAINABLE CITIES AND IDENTITY	7
2.1. Sustainability and Green Cities History	7
2.2. Sustainability Principles	9
2.3. Green cities parameters	11
2.4. Identity	13
2.4.1. Architecture identity: Sense of place and estrangement.....	14
2.4.2. Architecture identity parameters.....	15
2.4.3. Transition and Identity	18

2.4.3.1. Globalization and Architectural Identity	19
2.4.3.2. Sustainability and Identity.....	21
3. GREEN SUSTAINABLE CITIES EXAMPLES	23
3.1. Stockholm city, Hammarby Siöstad, Sweden	24
3.1.1. Stockholm city urban development	24
3.1.2. Stockholm city identity.....	29
3.1.3. Stockholm city and Sustainability: Western Harbor District.....	30
3.2. Freiburg city, Germany	32
3.2.1. Freiburg city identity	32
3.2.2. Freiburg city urban development.....	33
3.2.3. Lessons learned from Freiburg example.	36
3.3. Vancouver city, Canada.....	37
3.3.1. Vancouver city identity	37
3.3.2. Vancouver city urban development.....	38
3.3.3. Lessons learned from the Vancouver example.....	40
3.4. Brisbane city, Australia	41
3.4.1. Brisbane city identity	42
3.4.2. Brisbane city urban development.....	42
3.4.3. Lessons learned from Brisbane example.	43
4. STUDY CASE: MOROCCAN GREEN SUSTAINABLE CITIES	45
4.1. History of the shaping of Moroccan cities	45
4.1.1. Pre-colonial Moroccan cities: Imperial cities	47
4.1.2. Colonial Period Moroccan cities : La ville nouvelle	54
4.1.3. Post-Colonial Moroccan cities	57
4.2. Moroccan sustainable transition.....	60
4.2.1. Law and regulations that framed sustainability in Morocco.	61
4.2.2. Geographic position and climate zone	63
4.2.3. Moroccan sustainable cities, research projects	65
4.2.3.1. Eco-cities Projects.....	66
4.2.3.1.1. Dakhla Ecocity	66
4.2.3.1.2. Benslimane Ecocity.....	71
4.2.3.2. Eco-neighborhoods Projects	76

4.2.3.2.1. Marrakech city, Daoudiate neighborhood	77
4.2.3.2.2. Tangier city, Djmaa neighborhood	85
4.2.4. Moroccan green cities.....	93
4.2.4.1. Zenata Eco-city	93
4.2.4.1.1. Zenata city sustainability Principles.....	95
4.2.4.1.2. Zenata city sustainability Parameters	96
4.2.4.2. Benguerir Green City	99
4.2.4.1.3. Benguerir city sustainability Principles	102
4.2.4.1.4. Benguerir city sustainability Parameters	102
5. CONCLUSION AND DISCUSSION	107
5.1. Moroccan cities identity transition Impact.....	107
5.1.1. Sustainability parameters influence on Moroccan cities identity.....	110
5.2. Analysis of Moroccan Green Cities Standpoint	114
5.3. Lessons to learn from Moroccan sustainable transition and context.....	117
5.4. Summary of the systems	121
5.5. Conclusion.....	124
REFERENCES.....	126
APPENDIX.....	139
CURRICULUM VITAE	

LIST OF TABLES

	<u>Page</u>
Table I. Methodologies, tactics and outcome expected of each one. Source: Author	5
Table II. Sustainability Development Goals issued by United Nations and the goals served by sustainable green design. Source: Author	8
Table III. Sustainability and Green cities parameters cited in literature. Source: (Beatley, 2014), (Fraker, 2013), and (Doug & Wrobel, 2004).	12
Table IV. Architectural Identity characteristics projection for cities and pattern examples. Source: Author.	16
Table V. Sustainability parameters targeted by Sustainable development project of Stockholm. Source: Authors.....	32
Table VI. Sustainability parameters targeted by Freiburg city. (●) Principal target; (○) Indirectly targeted; (-) Not targeted. Source: Author.....	36
Table VII. Sustainability parameters targeted by Vancouver city. (●) Principal target; (○) Indirectly targeted; (-) Not targeted. Source: Author	41
Table VIII. Sustainability parameters targeted by Brisbane city. (●) Principal target; (○) Indirectly targeted; (-) Not targeted. Source: Author	44
Table IX. Moroccan traditional houses used materials, images from (LASKY, 2012).	50
Table X. (Continued on pages 51-53) Architectural and urban elements of Moroccan cities. Source: Author; images: Google images.....	51
Table XI. Urban development of Morocco polices project, inspired from (PHILIFERT, 2014). Source: Author.	59
Table XII. Sustainable Urban Transition of Morocco Through the years. Source: Author.	63
Table XIII. Different Climatic Zones of Morocco and their Consumption limits imposed by RTCM for residential and tertiary buildings.	65
Table XIV. Eco neighborhood examples launched by Moroccan Ministry of development, town planning, housing and city policy. Source: Author.....	77
Table XV. Architectural identity characteristics of Moroccan cities through time. Source: Author.	108

Table XVI. Architectural identity parameters in Zenata and Benguerir. Source: Author.	112
Table XVII. Comparative analysis summary of worldwide cases sustainable cities and Moroccan sustainable cities. Source: Author.....	114
Table XVIII. Sustainable parameters that are mainly targeted by each of the green cities studied in the research. Source: Author.....	120
Table XIX. Identity parameters that the cities Benguerir and Zenata maintained. Source: Author.	121
Table XX. Summary of architectural and urban solutions proposed by Moroccan studied cases that ensure sustainability and conserve architectural identity.	122
Table XXI. (Continued) Summary of architectural and urban solutions proposed by Moroccan studied cases that ensure sustainability and conserve architectural identity.	123
Table XXII. (Continued in pages 139-142), Analyzed documents that trace Moroccan city's architectural identity and parameters from Precolonial time till Modern days. (Y: Architectural identity is discussed specifically. N: Architectural identity is not discussed). Source: Author.	139

LIST OF FIGURES

	<u>Page</u>
Figure 1. Qualitative Study tactics and means used for it. Source: Author.	4
Figure 2. Main characteristics of architecture identity according to Zohreh T. and Sara B. Source: (Torabi & Brahman, 2013).	16
Figure 3. Sustainability and identity parameters found in literature. Source: Author.	22
Figure 4. Rental houses decline between years 1990-2020, First raw: The decline in Stockholm city. Second Raw: The decline in the city inner center. Source: Author.	27
Figure 5. Stockholm urban development timeline gathered from literature. Source: Author.	28
Figure 6. Freiburg main sustainable districts; Rieselfeld, Vauban, Weingarten	34
Figure 7. Vancouver city position and the three main green neighborhood of the city, University of British Columbia campus, Olympic village and Southeast False Creek, (Kirstie O'Neill, 2018).....	38
Figure 8. Moroccan Resource energy implementation to the energy mix. Source: Author.	62
Figure 9. <i>Climatic Zones for Morocco adopted to fit the thermal regulation in buildings, ADEREE</i>	64
Figure 10. Urban actions and their phases, source: (The Ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020).....	68
Figure 11. Pedestrian Plan of Zenata city, source: Société Development de Zenata, SAZ	96
Figure 12. Temperature range of Benguerir using Climate Consultant Software.	100
Figure 13. Moroccan Approach for integration of Sustainable Parameters in the Moroccan Identity context. Source: Author.....	111
Figure 14. Left: Sebbah system incorporated to the research project green city Benslimane and Green city Benguerir in Morocco. Right: Sebbah system in the street of Fez Medina, Morocco, Google image.	112
Figure 15. Sustainability implementation process in cities. Source: Author.	116
Figure 16. Number of targeted sustainability parameters and architecture parameters for the cities studied. Source: Authors	117

Figure 17. Zenata corridors flow Design, Source: Author..... 119



LIST OF IMAGES

	<u>Page</u>
Image 1. Ocean neighborhood town hall “Mehdi Ben Barka”, previously church Saint Joseph, Left: current state, Right the church during French colonization, Rabat. Image from http://rol-benzaken.centerblog.net/	19
Image 2. Left: The six principal Stockholm districts. Right: The main cities of the plan expansion from the mainland. Mapping by (William-Olsson, 1940).	24
Image 3. Panoramic view of Stockholm in 1875, (Neuhaus)	25
Image 4. Population distribution of Stockholm for 1880 and 1930, (Sidenbladh, 1965)	26
Image 5. Evolvment from trade node identity to European established town. Left: Stockholm from Mosebacke by (Martin) in 1787. Right: Northeastern Stockholm by in 1889.	29
Image 6. Stockholm Hammarby neighborhood waterfront development, (MEDVED, 2017).....	30
Image 7. Master plan for Hammarby, Stockholm City Planning administration.....	31
Image 8. Freiburg in 2014, source: Sebatian Fastenrath	33
Image 9. Vauban district mix usage, Freiburg, Germany, (MEDVED, 2017)	35
Image 10. Vauban family buildings, Freiburg, (MEDVED, 2017)	36
Image 11. Downtown Vancouver, source: Julia Affolderbach, (Kirstie O'Neill, 2018).	38
Image 12. The Olympic Village neighborhood, Vancouver, source: (Kirstie O'Neill, 2018).....	39
Image 13. C.K. Choi building, University of British Columbia, source: (Kirstie O'Neill, 2018).....	40
Image 14. <i>Brisbane city view</i> , source: (Sebastian Fastenrath, 2018).....	42
Image 15. Left: Brisbane built-up area and suburbs. Right: Brisbane traditional houses. Source: (Sebastian Fastenrath, 2018).....	43
Image 16. Left: The emerald city, Fez el Bali aerial view, Qaraouine University settlements. Right: Meknes settlement. Morocco. Source: Google image.....	48

Image 17. Left: The gate of Shellah, Rabat, by Edwin Lord Weeks. Right: Jewish Wedding in Morocco as seen by Foreigner painters, Pierre-August Renoir, picture by Barney Burstein	49
Image 18. Axonometric view of Dar Ben Simhoun, Fez showing all the elements of Moroccan court yarded house identity, made by (Susan Gilson Miller, 2001).	51
Image 19. Left: The Ecochard master plan and the shanty town for Casablanca, the city of Modernism experimentation. Source : Photothèque du ministère de l’habitat marocain. Right: Fez la ville nouvelle center, 1930, Source: Adj. Chef : Orihuel.	54
Image 20. Left: “The Big” Street in Mellah district, Fez el Jadid, La Grande rue. Right: General Peymirau Avenue, Fez, Morocco. Source: Google image.....	55
Image 21. Left : Fez el bali, Fez el Jadid, La nouvelle ville settlement view, Shift of the center. Source: Google earth. Right: Mass and void for the principal Boulevard in La ville nouvelle de Fez. Source: Author.	56
Image 22. Hassan II Mosque, Aerial view of the city Casablanca, the announcement of neo-Moroccan architecture, Google image.	58
Image 23. Map of Moroccan Mega-projects and sustainable green cities projects disposition in the kingdom. Source: Author.	61
Image 24. Left: Dakhla city, Morocco, Bird Vue. Right: Existing state of the city, source: (The Ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)	67
Image 25. Integration of Greenery in the urban tissue, Up Left: Before state, Up Right: After integration, Bottom: Different integration of greenery for the proposed parcels usage in Eco-cities	69
Image 26. Greenery and Blue infrastructure proposed for the city with four main parcs, source: (The Ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)	70
Image 27. The University is a reference facility that could energize the South of the city, an example of eco-district proposal for residency neighborhoods extensions in the city. source: (The Ministry of	

National Spacial Planning, Housing, Urban Planning and City Policy, 2020)	71
Image 28. Benslimane zones at the current state, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020).....	73
Image 29. Green infrastructure of Benslimane city, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020).....	74
Image 30. Densification of the central zone, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)	75
Image 31. The University is a reference facility that could energize the center of the city, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)	75
Image 32. Section of principle in a neighborhood that is considering bioclimatic constructions, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)	76
Image 33. Limits of the unit 4 of Daoudiate neighborhood, Marrakech, Google earth.....	78
Image 34. The unit 4 city street view, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	80
Image 35. Pergola design introduction for the south, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	82
Image 36. Creation of sports fields and green spaces in the coexistence space, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	83
Image 37. The overall masterplan proposal for Daoudiate neighborhood Unite 4, Marrakech, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	85
Image 38. The main functions of Djmaa neighborhood, Tangier, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	86
Image 39. Extension of the street to open cul-de-sac and provide more accessibility to the district, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	88

Image 40. Left: Djmaa neighborhood street, Right: West entrance of the district with view to the hill, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	89
Image 41. The unoccupied lands turned to proximity parcs, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	91
Image 42. The overall proposal of green Djmaa neighborhood, Tangier, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)	93
Image 43. Zenata position besides the two metropolis, Rabat and Casablanca, Source: Société Development de Zenata, SAZ	94
Image 44. Zenata main Design, a green main axe with transversal corridors from west Atlantic Sea. Source: Société Development de Zenata, SAZ	95
Image 45. Example of neighborhood mix functions in Zenata proposal. Source: Société Development de Zenata, SAZ	97
Image 46. Left: Zenata Health center, multifunctional city. Right: The green axe which is the skeleton of the city design. Source: Société Development de Zenata, SAZ	99
Image 47. Benguerir Green city main boulevard, Morocco. Source: Google image.....	100
Image 48. Benguerir City and two examples of the existing city and the new green city, Densities and Urban Forms Referential, Urbanism and Territory Ministry, 2016	101
Image 49. Left: Riad neighborhood in the existing old city of Benguerir. Middle: OCP old social housing settlement nearby the green city of Benguerir. Right: Marguerite villas district for OCP engineers. Source: Author, Morocco 2021	103
Image 50. University Polytechnic Mohammed VI, LEED silver certified buildings: Left: Learning building. Right: Pole Sport. Source: Recardobofill.com.....	104
Image 51. Researcher villas, Gated neighborhood, Benguerir Green City, Morocco, 2021. Source: Author.....	105

Image 52. Urban Pergola, University design of integrated PV pergola and shade design. Source: Google image.	105
Image 53. Left, Marrakech old streets of Medina, walkable with arched Sebbah. Source: Google image. Right: Benguerir green city, Villas chercheurs street. Source: Author.	118



GLOSSARY OF SYMBOLS AND ABBREVIATIONS

RTCM	: “Règlement Thermique de Construction au Maroc”, Thermal Regulations for Moroccan Contruction.
SAZ	: “Société d’Amenagement Zenata”, Zenata development company.
OCP	: “Office Chérifien des Phosphates”, Moroccan Phosphates Company
MDG	: Millennium Development Goals.
SDG	: Sustainable Development Goals.
MENA	: Middle East and North Africa Region.
CDG	: “La Caisse de dépôt et de gestion”, Assets Managements Company.
ADEREE	: “Agence Nationale Pour Le Developpement Des Energies Renouvelables Et De L'efficacite Energetique”, National Agency For The Development Of Renewable Energy And Energy Efficiency).

1. INTRODUCTION

Situated in far northwest Africa, Morocco is a country of history, culture, and traditions. It has a powerful geographic positioning by bridging two continents: Africa and Europe. It also has two long waterfronts: the Mediterranean Sea on the north, and the Atlantic Ocean on the west. These elements have granted Morocco natural assets that made it a node for trade. However, with no natural gas or oil, the country had tried to find alternatives to boost its economy and sustain itself, especially overcoming the challenges of its semi-arid climate context. The efforts had long started with dame strategies to regulate the water shortage and long drought years back in 1997, and were initiated by the late King Hassan II. With the fast demographic growth and economic development, Morocco had to search for alternative solutions in order to minimize its external dependency and cover its energy needs. The country's policy since the early 2000th have been promoting the energy transition from primary energy usage of fossil to green energy by implanting solar, and aero stations.

1.1. Problem Statement

After the independency establishment, Morocco has witnessed fast urbanization that could not cope with the pace of the country's development, resulting in various current problems in the majority of the cities such as slam spread. With the enforcement of sustainable development, construction strategies have also taken the bait. The building sector is one of the most energy-consuming sectors in Morocco. Nationally it is estimated that this sector consumes 33% of total energy consumption. Adding to that, the construction sector is one of the highest producers of Greenhouse gas emissions. For these reasons, the country has tried by all means to reduce the impact of the sector be it on the economic bill or environmentally. A new thermal regulation in Morocco was implemented to introduce eco-energy practices in this sector to reduce this consumption. The country witnessed new transitions be it on an urban scale or a building scale. It was a general implementation of sustainability in the region.

This transition that Morocco has undergone, has had an impact not only on the country's general policies but also on the planning of different new cities. In the future, an expectation of these transitions could be witnessed in existing old medinas too.

Nevertheless, the changes made had albeit impacted the essence of the city's growth, and identity. It impacted in one way or another the citizens, therefore Moroccans' life.

Morocco has different architectural identities that have distinct architectural features and characteristics. It has set sustainability goals as a new development strategy. The country is dealing with the economic gain of fast urbanization. In front of such a problems, the kingdom has taken several choices for a sustainable urban transition.

1.2. Aim of the Study

This study is a reflection on the positioning of the Moroccan kingdom in the sustainability stream and it's sustainable transitioning efforts. It is well known that the kingdom is paving its place internationally and specifically in the African continent by setting an example for a leading sustainable model. This was reflected in the huge investment made in recent years in the transition to renewable energy, and social and economic sustainability. The dissertation aims at evaluating the current Moroccan state in order to move forward with better projects and fill the gap between the theory and literature sustainability and the practical reality within a specific context.

Sustainability seems to be an architectural trend for many years. Nevertheless, this trend is validated by causes and has proven to be an effective solution to various urbanism problems. This study is to showcase the implementation of this concept in a particular context as well as the execution phase and changes that may occur and may reflect on the identity of the existing cities.

The objectives that this study attains are:

- Create a link between sustainability transition and identity change or establishment in cities.
- Identify Moroccan city's identity traits and their traces in the newly established green cities.
- Showcase the impact of sustainability transition in the established cities as well as on the new settlements and the challenge of identity rupture.

1.3. Limits of the study

Sustainability has been a trendy concept since the late 80s, especially in the architecture field. The reason for choosing such a subject was the movement of developing countries to promote successful examples of sustainable integration into

urbanism and architecture in recent years. This comes after a long history of examples from Europe and the US. However, developing countries represented a new challenging context. This thesis comes in response to the late challenge set by one of these countries, which deemed sustainability as their last resource for development. This study takes account of pioneer world examples as a reference for Moroccan progress. These examples are set in different contexts such as the European context, the American context, and the Australian context. They gave a different perspective about sustainability. The transition periods of these examples are variant. They represent a wide range to understand the challenge of sustainable urban transition.

The ground of the study is set in the big scale of cities as it seems that smaller scale analysis is limited for two reasons: Firstly, countable data is harder to generalize in one building scale, especially when talking about certain specifications for sustainability parameters. Secondly, qualitative analysis on a building scale could not easily be obtained. The identity concept is a collective one that should be applied to a city scale to be analyzed. Hence the results observed would only make sense once analyzed at a bigger scale.

This study takes into account four different international green cities: Stockholm, Freiburg, Vancouver, and Brisbane. The reason for these choices is to give examples that are, at the same time mature, in terms of longevity, and also to give examples that are different and unique. Freiburg and Stockholm are examples of longevity, while Vancouver is supported by a university research, and Brisbane is a struggling city.

The reason behind the choice of the country is that the African context is still not well known or studied in the literature, especially the north African context on the frame of sustainability. Context and a climate such as the Moroccan one are scarcely existing; thus, it is an opportunity to shed light on the struggle of implementing new concepts in a new context as well as providing a key to other studies in such context. The choice of the cities was based on the completeness status of the existing examples. Some examples such as, “Chrafat city, Bouskoura city”, do not have the quantitative data required for this study and thus were not taken into account. It is also important to mention that the

Moroccan green cities studied are the only cities that held this title officially by the governmental statement or that were labeled by some international certifications.

This study represents six different case studies of sustainable green cities in the country made into two categories: “Research projects” that represent the analyzed targeted projects by the Moroccan government, but not constructed yet, such as Dakhla and Benslimane. Then, “executed projects” such as Zenata and Benguerir. The purpose of choosing both research and executed projects is to grasp fully the intent behind the creation of these cities regardless of their situation or timeline progress. Research projects represent the mastermind and the theory part of Moroccan green cities. The executed projects represent the success or the failures of these theories.

1.4. Methodology of the study

Different architectural research methodologies can be found in literature such as historical research, narrative research, qualitative research, correlational research, experimental and quasi-experimental research, logical argumentation, case studies, and combined case studies, (WanG, 2013). This study is a discussion of two concepts: Sustainability and identity in Moroccan cities. The concept of sustainability is still fresh on for most developing countries, Morocco is no exception. At the same time, Morocco is a country with a history and a strong identity. The seemingly smooth transition that the country aims to achieve for its cities is a more complex one. This research would use combined research methodologies to touch every aspect of these two concepts. Four research methodologies would be implicated: firstly, literature research, qualitative research, a case study, and then a correlational study, Table I.

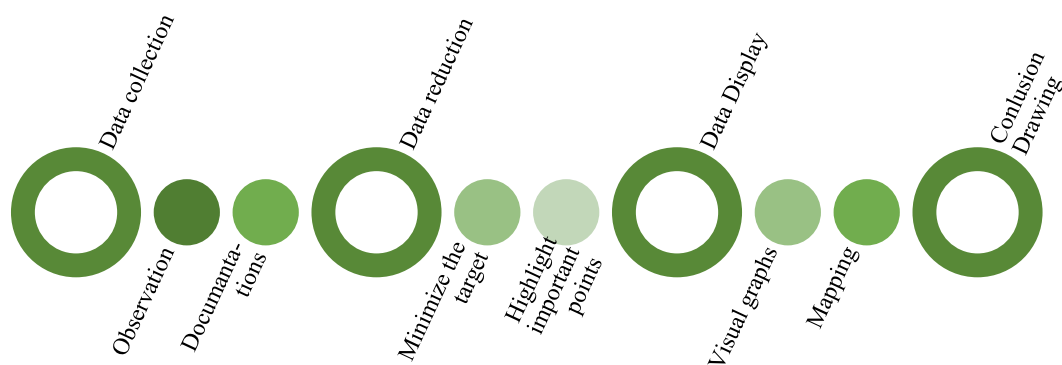


Figure 1. Qualitative Study tactics and means used for it. Source: Author.

Literature research: Using the keywords, research on the previous literature works about Sustainability, Sustainable green cities principles, parameters, and architectural identity...was conducted by using engines such as: Science direct, ProQuest, Google scholar, etc. The works were collected categorized and analyzed accordingly to find a link between sustainability and identity.

Table I. Methodologies, tactics and outcome expected of each one. Source: Author

Methodology	Tactics	Outcome
Literature research	Data collection, Data classification, Data analysis	Sustainability, and identity definition Sustainability and identity parameters
Qualitative research	Data collection, data reduction, data display, and conclusion	Practical implementation of sustainability and identity parameters
Case study research	On site familiarity, documentations, field observation, visual comparison,	Sustainability and identity parameters existing/ missing
Correlational research	Observation, Data collection, field survey, mapping	Link between the case study and qualitative research results, Suggestions to improve the sustainability and identity parameters.

Qualitative Research: It is an interpretation of a matter with a collection of data in a natural setting, (WanG, 2013). It aims to understand a matter while creating a relationship pattern, (Mishler, 1990). Different approaches for this methodology could be sought: Ethnography approach, Phenomenology, Grounded theory, and Integrative approach which is the integration of the three aforementioned approaches. In this study, the grounded theory would be utilized in terms of explaining theories of sustainability and its link to architectural identity, (Clarke, 2005). This approach is usually used to understand a culture, identity, and social phenomena, which is linked to our study, Figure 1.

Case Studies: The study case method is essential to ground the theories already set, and analyze the gap between theory and practical implementations. Finally, it paves the way to other studies in the same context to benefit from the experience studied and share new developments for new solutions. There are three types of case studies: Explanatory, Descriptive, and Exploratory. Each type could be analyzed according to a type of structure

such as linear analytic, chronological, theory building, and Un-sequenced structure, (Yin, 1994). In this study case, the theory of building structure is followed to explain and explore one of the Moroccan sustainable green cities' identities.

Correlational Research: It focuses on naturally occurring patterns, and uses statistics to clarify patterns of relationship, we can identify two types of correlational research; relationship studies and casual comparative studies. The latter type was deemed to be suitable to evaluate the study case using tactics such as mapping and field observations, to compare the case studied to other examples of sustainable green cities and position it by giving grounded analytic results to the parameter integrated or missing.



2. GREEN SUSTAINABLE CITIES AND IDENTITY

Sustainability's meaning comes from the word "sustain", it was first mentioned in the "forestry" field as the growing forest chopping in Europe had become harmful to the system and concerns about regenerating forests had risen. The world then was introduced to us as sustaining method for forestry in the late years of the nineteenth century, (Beatley, 2014). The world since then had integrated several fields. The concept has long been glued to the green term and environment field.

2.1. Sustainability and Green Cities History

One of the earliest works of the literature mentions of sustainability was by Ebenezer Howard. The author described the problem of the spread of industrial cities in contrast to farming fields. His book, Garden Cities, had been a reference for multiple urban designers and planners, (Howard, 1898). It also inspired fantasies about the integration of gardens into every corner of the city and created the excessive garden suburbs that spread across American cities. Mumford had been vocalizing about the same problem of the scary spread of the cities' size and population with no breathing space, (Mumford, 1938). The growth of the cities was not the only problem, the growth was uncontrollable with many compacted buildings disregarding the dwellers' interest. After the second worldwide, the fight between nature and humans seems to not have subsided yet, (Leopold, 1949). It was not until the sixtieth that it was realized that the cities should emphasize the relationship between buildings and users. The cities should no longer be economy boosters but also a place of belongings and living. Small-sized neighborhoods with streets that encourage pedestrian usage were more favorable, (Jacobs, 1961). Another book had made a sensation in the seventieth was the optimistic approach of Ian L. McHarg in "Design with nature", (McHarg, 1969). All these publications demonstrate the changes in sustainability concept.

It seems that the concept of sustainability had since then shifted from the simple integration of nature and greenery to the design to go beyond it. This shift could be clearly stated by the book "Limits to growth". It was a quantitative study that put sustainability in the mainstream again. It underlined all the current problems with the overgrowing economy while disregarding the limitations of the resources, the population excessive growth, and the wide gap between rich and poor, (Donella Meadows, 1972). *"Sustainability [...] It speaks of the greatest change in human thought and behavior for*

3000 years.", (Nhamo & Mjimba, 2019). The authors have actually marked by this expression a turning point in human history. It is no longer a matter of surviving by any means but a matter to survive globally.

Table II. Sustainability Development Goals issued by United Nations and the goals served by sustainable green design. Source: Author

Sustainability Development Goals	Green and sustainable designs shared Goals	Reasons
1. No poverty		-
2. Zero hunger		-
3. Good health and well being	✓	Providing spaces that improve the users' health and comfort.
4. Quality education		-
5. Gender equality		-
6. Clean water and sanitation		-
7. Affordable and clean energy	✓	Promoting buildings integration to renewable energy recourses
8. Decent work and economic growth	✓	Boosting job opportunities.
9. Industry, innovation, and infrastructure	✓	Providing a new sector for new technologies and methods.
10. Reduced inequalities		-
11. Sustainable cities and communities	✓	Promoting green sustainable cities
12. Responsible consumption and production	✓	Optimizing resource consumption, be it on transportation, materials, or energy at usage phase.
13. Climate action	✓	Reducing waste, consumption.
14. Life below water		-
15. Life on Land	✓	Taking on account the land built in; the ecosystem involved. For new cities, its primordial to know the impact of such spread of buildings on the life of the land used in it
16. Peace, justice, and strong institutions		-
17. Partnership for the goals	✓	Connecting multiple fields and disciplines to achieve green design.

Thus, new models for economy and development were needed after the predicted failure of past growth, (Past growth that was after the industrial revolution and achieved economic gain only). New measures for development are introduced, measures that take into consideration human well-being factors. The progress, of both economy and human factor, was finally glued to the word sustainable, (Daly, 1973). The oppressing climate change consequences also played a big role in catching international concern to the dilemma between economic progress and human being decline, which led to the launching of the United Nations Governmental panel in 1987, (World Commission on Environment and Development, 1987). Sustainability since then has been taken seriously

by the United Nations and the committed countries. Rio declaration had set 27 principles to take into account as well the famous eight United Nations Millennium Development Goals, (The Rio Declaration on Environment and Development, 1992). An addition for more accurate achievements.

The 125 committed nations are obliged to give a five-year report on their progress. Despite the progress made, it seems that the ongoing efforts are still lacking to save the world. The cities had decided to join the trend, especially since buildings seem to be the sector that consumed the most after transportation, (International Energy Agency, 2019). Over the years, the trend of sustainability had been even more reinforced and prominent which had made the term lose its vitality. The claim has been long to seek the best balance between nature and manmade, as some of the extreme environmentalist would find that the return to the starting point of evolution is a must, (Campbell, 1996). However, sustainability as a term is about moving forward for a better future. In the following years, the eight-millennium goals were revised into 17 Sustainable Development Goals, which were more global and targeted the pressing matters of the world, (Nations, 2015). Green and sustainable designs shared nine of these goals, (**Table II.** Sustainability Development Goals issued by United Nations and the goals served by sustainable green design).

Sustainability is now globally accepted to be: “*meeting the needs of the present without compromising the ability of future generation to meet their own needs*”, (World Commission on Environment and Development, 1987). Therefore, green sustainable cities are cities that can meet the needs of their citizens while having the ability to provide the same for future generations, (Doug & Wrobel, 2004). According to May Hald, a green city is “*a city that provides an acceptable standard of living for its human occupants without depleting the ecosystems and biochemical cycles on which it depends*”, (Hald, 2009). Sustainable cities are from then on defined and quantified by precise parameters.

2.2. Sustainability Principles

Sustainability in general touches on different aspects. As it can be developed into different approaches that touch on social, economic, and environmental aspects. The intersection of these approaches as well as the constant management of them would make the green sustainable city. As sustainability means changed development measures, nowadays “the three Es”: Economic development, Environment quality, and Equitable society are the pillars for any successful green sustainable city, (Doug & Wrobel, 2004).

The integration of the economic and environmental aspects to development was due to the anticipated decline of the economy after all energy is used and pollution accumulated, (Morrisey, 1999) Therefore, an acceptable standard of living does include the social, economic, and environmental aspects of the city that provide such standards, (Hadi, 2008). Sustainability principles could not be directly quantified without indicators.

As more cities are willing to integrate sustainability, various standards to measure sustainability were made for international uniformity. Those standards measure the city performance from citizen point of view, as well as its vulnerability to future impacts, its adaptation capability. Since sustainability cannot be implemented for a short time efficiently, the assurance of the durability to the principles implemented should also be assured by the measures. According to ethnographic research conducted to investigate the experience of citizens in different cities, four different city clusters could be defined: Balanced Innovators, Post-industrial Opportunists, Evolutionary Cities, and Fast-growing Megacities. (ARCADIS, 2018). The clusters reflect the behaviors of the city thus explaining their index rating and the results of the measures. For instance, Istanbul as well as our case study, Benguerir are evolutionary cities taking the pillars of sustainability in the city into consideration: social, economic, and environmental. People's involvement in this cluster is limited which makes it lose points on the social pillar. Overall dissatisfaction with development could be sensed due to the limited impact of it or that it is not well distributed on the targets.

After the Rio declaration back in 1992, few principles of sustainable green cities were already imposed. Those principles addressed the global warming impact directly such as: **Reduction of energy consumption, the limit of waste, bringing the landscape to cities and management of it, lessen the carbon emissions globally**, (The Rio Declaration on Environment and Development, 1992). But the challenge is not to put into practice those principles, it is to implement them in a way that would take away the originality of the place implemented in. The question was brought up by multiple architects and designers on finding a way between sustainable strategies that would enhance people's experience and life without conflicting with it, (Fraker, 2013). For this reason, more specific parameters were introduced.

Few architects had defined these principles, noting Brenda and Robert Vale that emphasized learning from vernacular architecture and defined the principles

as: **conserving energy, working with climate, minimizing new resources, respect for users, respect for site, and holism**, (Vale & Vale, 1991). Another example of green sustainable design principle would be Hannover principles that untitled: **Insist on the rights of humanity and nature to co-exist in a healthy, supportive, diverse, and sustainable condition; recognize interdependence; respect relationships between spirit and matter; accept responsibility for the consequences of design decisions upon human well-being; create safe objects of long-term value; eliminate the concept of waste; rely on natural energy flows; understand the limitations of design; seek constant improvement by the sharing of knowledge**, (Hannover, 1992). In general, sustainability principles are the main lines that are quantified into specific parameters.

2.3. Green cities parameters

Few models for Sustainable Green cities were developed such as Doug and Wrobel model that classified the parameters into: Natural Systems, Land Use Systems, Mobility Systems, Energy Systems, Environmental Management Systems, Building Systems, Governance Systems, (Doug & Wrobel, 2004). These systems were translated into practical parameters to be analyzed by later architects. According to (Beatley, 2014), these parameters are:

- **Land use and urban design, transportation, environmental planning and restoration, energy and material use, social equity, environmental justice, economic development, green architecture and building, food system and health.**

Going with the same lines, according to (Doug & Wrobel, 2004), these parameters are:

- **Sustainable energy resources and practices, ecological urban form and function, community-based resources management, land use optimization, social and economic equity**

One can argue about these dimensions and their application. However, each parameter is essential to satisfy a sustainable principle given. In a study case made by Harrison Fraker to the famous European sustainable cities, he identified seven parameters to use to analyze their potential. (Fraker, 2013):

- **Process and plan, Transportation, Green Space, Energy, Water, Waste, Materials and Social Agenda.**

Table III. Sustainability and Green cities parameters cited in literature. Source: (Beatley, 2014), (Fraker, 2013), and (Doug & Wrobel, 2004).

Authors	Beatley	Doug and Wrobel	Fraker
Urban Design and Function	*	*	
Environmental Planning	*		*
Sustainable Energy, Resources	*	*	*
Social Equity	*	*	*
Environmental Justice	*		
Economic Development	*	*	
Land Use Optimization		*	
Transportation	*		*
Food System and Health.	*		
Material Use	*		*
Water			*
Waste			*

As the above table shows, common parameters can be highlighted such as:

- **Social equity:** The city should be able to provide an infrastructure to all mix, opportunities for all citizens, immigrants, middle class, or poor. The social aspect is essential, social equity is considered an important point for the quality of life in the cities, (Pacione, 2003).
- **Sustainable energy and resources:** Sustainability touches essentially the immediate impact of the construction on the environment, thus any measure that could minimize greenhouse gases is primordial. Limitations to energy consumption for cooling and heating needs are imposed by kWh/m² yearly depending on the building's usage. The calculation methods could differ according to which simulation software is used, as well as the occupant behavior could play a role in changing the expected consumption. To answer those needs, sustainable green cities should provide a clean resource that would at least partially cover part of the demand, such as solar panels. It also refers to self-energy production by integrating green energy resources: Solar, wind, etc....
- **Materials:** Even though it was not considered a primordial parameter by some researchers. However ,following our study, construction materials should be as

local as possible to avoid transportation fees and energy waste, longevity of materials is primordial as well as their life cycle.

- **Environmental planning:** Integration of nature in the best way possible, the greenery should be planned where to be put, and how to be used, it is not just for aesthetic purposes as such.
- **Urban design and function/ land use:** It is the most important parameter that determines the choices made generally to integrate sustainability as well as the identity of the city. To do so, the involvement of people in urban design choices is essential. It should be a place for people that ensures mixed use for a wider range of the society to settle down, diversity of form and functions as well as management for the community, (Yeang, 2000).

Sustainability in cities have many parameters. This study takes into consideration six main parameters discussed in the literature.

2.4. Identity

Identity is a wide concept that cannot fit one dimension. It can hold various meanings depending on the context it is used for. The term itself could signify continuity and unity, it cannot hold one stagnant definition, (Relph, 1976) . The identity of a person could have signified the name, age and maybe security number. It also could mean the culture, history, memory, or simply the sense of belonging, (Heidari, 2016). An important point to highlight is that identity is accumulative, it can never be achieved instantly, the process itself takes time and the accumulation defines the identity, (Thompson, 1996), (Castells, 1997). In a way, identity is unique to a person but also defines the person within a group, (Anthias, 2008). One cannot define identity without a context, that is why Berger has said: Identity is “socially bestowed, socially transformed”, (Gervais-Lambony, 2006). It is a process to belong to a milieu, (Correa, 1983). It can also mean the collective culture, and wealth, that a society shares, (Tomlinson, 1999). Lynch classified Identity into two categories: The sense of recognition and the emotional aspect, (Lynch, 1960). The sense of recognition is the sense of belonging, the ability to recognize a group, a space, an environment and predict it. The second category is the bound that is created by the sense of recognition. This is why identity is seen as a process and not a fixed definition. It is a process to identify, recognize and attach to it, maybe change it later on by changing the

means that had tied you to it in the first place. The complexity of this concept comes from the underlings of the disciplines that bind it, (Paasi, 2002). Identity as we have seen, is a process that takes time and thus creates history. In a way, it is a form of civilization, (Abel, 1997). The definition of Identity is vast, especially when it is related to cities.

Identity has different principles, according to (Graham, 2009), it has three principles. Distinctiveness, continuity, self-esteem. (Breakwell, 1993) add to those previous principles the self-efficacy.

2.4.1. Architecture identity: Sense of place and estrangement

Architectural space cannot be defined abstractly. Space is defined by the social relations between it and human. *“The study of space offers an answer according to which the social relations of production have a social existence to the extent that they have a spatial existence; they project themselves into a space, becoming inscribed there, and in the process producing that space itself”*, (Henri, 1991). The place can turn to specific place when the users can identify themselves in it. It is what Norberg-Schulz refer to it as the spirit of place. *“Man should be able to orient himself, [...], has to identify himself with environment”*, (Norberg-Schulz, 1980). Architecture identity is what links the people to the city and creates collective memory. This link is actually coming from the identity of the user reflecting on it architecturally. *“Objects of identifications are concrete environmental properties, and that’s mans’ relationship to these is usually developed during childhood”*, (Norberg-Schulz, 1980). Every space on itself has a meaning, the users’ interaction with it creates the process of memory, thus a sense of belonging and identity within the user, (Polat, 2011). The interaction of architectural elements and human creates memories that become a specific identity. Albeit society reflect its identity on architecture in many ways, it is also the society expectations that shape and create identity, (Adam, 2012). Identity is the interaction of the user and the space. It can also be given to the space through architectural elements.

In the same way, city’s identity is given by citizens. This argument was stated by multiple writers such as (Goldsteen, 1994) and (Correa, 1983). For (Meiss, 1990), architecture identity can be defined by users’ interaction with forms, functions, social cultural aspects. In opposition, (Erses, 1999) describes the city as an organism on itself, thus having a social and physical presence, and creating, and defining its own identity. As (Roth, 1993) claims, architecture in itself is a display of culture, a heritage, and a silenced piece of identity. In research made by (Örer, 1993) in Istanbul, he classified the

manifestation of identity in cities into two categories: Environmental and social. Environmental aspects could be natural or manmade, it is the context in general. The social aspect is the collectiveness that gives a group of people an identity, it could be religion, language, laws, or cultural manifestations. Hence, the city's identity specifically can be attributed to several features such as religion (Islamic cities), language (Montreal as an example with Quebec and anglophone sides), climate, topography, landscape... These attributions create a unique environment that is then linked to the people. How they interact with it is what creates the identity of the individuals, (Oktay & Bala, 2015). As (Lalli, 1992) referred, urban identity is the interaction of people and their context making that context-aware of this interaction, thus building in a support of the continuity of this relationship. It is then a mutual relationship where the city gives, and people take and give back. We can conduct that city's identity is more powerful as it contains many layers beyond the architectural aspects.

It is no question that architecture contributes to giving a space an identity, thus serving it in a way that goes with the space's meaning or not is up to the architects and deciders, (Dovey, 2010). For instance, identity can be given or defined. The new city's identity is essentially premade on the marketed image; however, this instance can be changed according to citizens' interactions with the city. The sense of place is planned to strengthen the local identity, (Yeang, 2000). The destruction of identity can also occur architecturally. City's identities are ruined by wars and reconstructions, by technology and development, (Bulut, 2019).

2.4.2. Architecture identity parameters

The identity is reflected architecturally by many tools. According to (Bulut, 2019) it can be seen in forms, mass/voids, street organization, and materials. Identity can also be reflected visually, in materials, and rhetorically: “Visually” as the architecture styles manifests in materials. They represent the origin of the place, its’ soil, and geographical characteristics, and “rhetorically” by using critics and literature to highlight the place, (Candace Jones, 2017). To understand how architecture can manifest identity, Zohra T. and Sara B. identified the main characteristics as: **Spatial organization, time organization, semantic rganization, general design principles, shapes and forms, building materials and relationship with the context**, (Torabi & Brahman, 2013), Figure2.

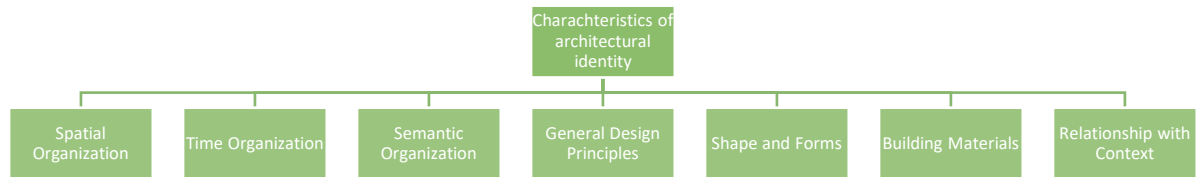
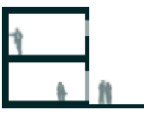


Figure 2. Main characteristics of architecture identity according to Zohreh T. and Sara B. Source: (Torabi & Brahman, 2013).

On an urban scale, these parameters take different dimensions, as the architectural aspects are different from the building scale. To project these parameters on urban scale, it can be explained as Table IV showcases.

Table IV. Architectural Identity characteristics projection for cities and pattern examples. Source: Author.

<i>Identity characteristics</i>	<i>Definition</i>	<i>Pattern</i>
Spatial Optimization	City general organization and planning design principles	   Circular city Grid City (Mass in voids) (Voids in mass)
Semantic Organization	Signs, perceptions, experiences that keep the community's identity	
General Design Principles	Forms used to organize the urban space such as parcels distribution	   Closed parcel Semi-open parcel Continuous parcel
Shapes and Forms	Buildings' forms and shapes	  Courtyarded building Multistoried one block building
Materials	Material used in which aim, such as opacity, transparency, local materials...	
Relationship with Context	Physical relationship of buildings with its' surroundings: Physical one, visual one by using transparency, uniform color or design...	  Physical relationship Visual relationship

Spatial optimization: It is the city's general planning strategy. The early medieval cities were often organically growing, and even the main axes are not always regarded. It

is the case of North African medieval cities. The organic organization would often follow slope or terrain characteristics for the settlement spread. Roman medieval cities had often a strong South-North axe and a West-East one in a cross shape to organize the general layout. Grid systems were introduced with the modernism movement to create even parcels and better land distributions. An example of it would be Barcelona city planning. Another spatial optimization that popped especially with the garden cities concept is the circular urban development offering various circles that have different functions inside each circle for perfect perimeter distance between each one.

Semantic Organization: It refers to signs, perceptions, and experiences that keep the community together. These signs could be reflected architecturally in the disposition of certain elements, or the presence of certain functions. An example of it is the reflection of the Islamic religion on Islamic cities. Islamic cities are often growing around a mosque since ablution is very important, and water presence is often regarded as public spaces for the city such as fountain squares or basin gardens. Each district has a must to include a public bath, a mosque and a school, a street market, and a public traditional oven. These elements together create an experience and memory for citizens as they developed a certain habit with them.

General Design Principal: This is the principle of parcel distribution and organizations as well as if it is a void in mass or mass in voids. Medieval cities tend to be designed as a mass that has some voids to create circulation outside the mass. Buildings are characterizing the streets and open spaces. Modernism introduces the mass in voids type where a design is set in a void and thus the design for public spaces and avenues becomes more primordial.

Shapes and Forms: On an urban scale the forms would refer to the buildings adopted style, movement, and shapes. Social housing in the postwar area had created box concrete deserts as a remedy to the shortage housing crisis. The same shape of apartments spread over the suburbs for less fortunate citizens.

Materials: The construction of the cities tends to use materials that follow urban planning policies. Sustainable cities are often using local materials, recyclable ones, and materials with high energy efficiency. Modernism used concrete as the main material due to its fast construction time and adaptability to modernism principles. Materials do also

reflect the origin of the place, and its natural assets and thus can play the role of an identity card if used locally.

Relationship with the context: This parameter refers to both the urban scale, the adaptability of the city or urban settlement with its surrounding, as well as the smallest scale, the relationship of the building and the city. Modernism is often criticized for creating a rupture between buildings and their context by elevating them from the ground, often not respecting the existing history or vista of the place implemented on it.

2.4.3. Transition and Identity

Transition is the change of a state, going from one phase to another one in a progressive matter, (Haslett, 2003). It is a natural phenomenon, and it ensures that matters cannot stay stagnant, (Durmus, 2012). Transition or any form of transformation in architecture is essential for continuity, (Abel, 1997). The case is that architecture needs to keep up with time. To ensure that, various elements need to change be it architecture styles, forms that reflect how we live our lives, etc. If identity ensures the continuity and the link between architecture and people, then we can conclude that transition holistically does not conflict with identity.

Architectural transitions though usually try to consolidate, reorganize or revitalize history in an attempt to keep the identity, (Akkurt, 2012). The aim is to keep the memory as it is what makes people realize their identity, (Tran, 2010). It helps to serve the continuity by reviving the lot link, (Benswessi, 1987). If we take an example of a functional transition. The town hall of "Ocean neighborhood" in Rabat, Morocco was renovated and had been a town hall for more than sixty years. Though all Rabatians call it "Kanisa" meaning "the church". The collective memory of Rabat citizens had stayed with the initial function of the building that served as a church to French settlers in the neighborhood. After independence and the settlement of Moroccans in the said place, the building was transformed losing not only its function but a few architectural aspects that indicated it. The transition was not translated for the Moroccans as the memory was kept. Generations that have never seen the hall as a church still call it "the church" though. The language followed up the memory. This is not to say that all architectural transitions face the same fate. Some transitions need time to be crafted on the memory of people. Some other changes can be instant and do transform the identity almost immediately or create it. Still, even the immediate change does take some time since identity is about continuity

and accumulation through time. The architectural transition may state a new identity or continue an existing one, that is why it is important to know the context of implication, its past and present, and try to develop new opportunities for new architectural narratives that would contribute to the development of the place, (Bruzzone, 2013).



Image 1. Ocean neighborhood town hall “Mehdi Ben Barka”, previously church Saint Joseph, Left: current state, Right the church during French colonization, Rabat. Image from <http://rol-benzaken.centerblog.net/>

According to world urbanization prospects back in 2014, the urbanization rate is the fastest and is estimated to increase especially for developing countries around the world. The African continent is not an exception to these changes. This fast rate has various reasons be it the demographic growth not matching the economic growth of the country leading to internal migration to the cities for better opportunities. This leads to a housing shortage thus fast urbanization. It is also caused by the fast economic growth, thus fast market changes, the need for new infrastructure and new lifestyle as we witnessed for the gulf countries. Regardless of which reason urbanization is increasing, it is also known that it not only an expansion of urban footprint, but it is also a spatial transformation of society, and therefore represents a cultural evolution, (Beatley, 2014). In a way, urbanization itself is a transition.

2.4.3.1. Globalization and Architectural Identity

As we stated above, the identity of cities is the product of the relationship between the people and a city but also is what defines one city from another. Thus, the globalization trends that blurred the boundaries between cities, had made it more difficult to maintain the authenticity or even the identity of each city separately. Globalization is learning about everyone and having to live with consequences, (Robertson, 1992).

According to Harvey capitalism is the motive and the destructor of spaces, (Karababa, 2015). As capitalism is the reason behind more globalization trends, it also destroyed a lot of spaces that have belonged to our memories or that have shaped the identities of places. In general, the urban economy is built surrounding these two aspects of built and destruction, (Frank Gaffikin, 1999). Globalization has interfered with the economic, political, social, and cultural sides of the world, (Mahmoody, 2012). It may seem to have an economic impact only, but it is the transition that had the most impact on the cities, (Schaafsma.M, 1998). The boost of the economy and sudden growth makes cities and urbanization grow faster. Adding to this, other aspects of employment, housing shortage, and price inflations. Globalization seems to change places drastically with the help of decisions makers.

This is where the concept of place-making comes forward. The concept is deeply linked to identity because the shift from a mere space to a definite place is due to the attribute of identity characteristics. It is important to keep this concept as it reflects the quality of the bond between the space and its people to even mobilize the flow of globalization trends, (Neill, 2013). It seems that it is more and more difficult to find uniqueness in places and ourselves, (Moussavi, 2006). Aspects of globalization are then manifested in the sharp division between the poor and rich giving the urban space a whole new identity (Elsheshtawy, 2004). There is no bad or good identity as it should not be categorized. In the same way, the old or new identity that is acquired should only be qualified by its impact on the people. It is arguable if the notion of place-making or community even withstand globalization, if those notions are no longer used, then of course, identity does not exist anymore, (Beck, 1997). Globalization do not touch directly the identity.

Another argument takes place stating that globalization has not a negative impact on the city's identity. Global cities are cities that are either places to organize the global economy, or places that produce goods for the global economy, (Sassen, 1998) Meaning that the place identity is not touched by globalization directly but by its consequences. Following this argument, Parsons argues that internationalization will bring a new collective identity that is not limited to certain borders, (Parsons, 1994). The boundaries between places as well as the boundaries between people seem to melt down, the immobility has fewer restraints and there is no need for a physical statement of a context making it fluid and continuous through time, (Parin, 2007). It is not to say that

globalization is the end of boundaries distinctions, (Newman, 2013). The uniqueness of each place stays the same, however, its borders impact, (Larco, 2010). An example of this is the uniqueness of Japan as a country. It has been closing its borders for so long in its history. However even with its borders opening nowadays and Tokyo becoming a megacity with global impact, Tokyo can still be regarded as Tokyo. The distinctiveness of the place is still there regardless of its global impact. Globalization does harmonize cities. The continuity of transportation, and communication assured a connectivity in global cities, (Martinotti, 1994). It is up to the cities to be completely swift by it or not. Therefore, globalization is not about one identity. It is about humanity, (Appiah, 2007). Unfortunately, the examples of globalization that we may see are examples where harmonization did not take place, instead, a rupture from the past is displayed, and the identity of the place is lost in the new, (Featherstone, 1995). Globalization is a consequence of city's growth and expansion, few of them can showcase a balance of globalization and identity conservation.

2.4.3.2. Sustainability and Identity

Sustainability is a new concept and measure that has been recently adopted. This adoption is a way of transition, it can be manifested physically by various means and measures, leading to spatial and cultural transition. Spatial transformation does directly impact the daily life of users, creating new habits, and new lifestyles. Cultural transition gives new meanings, ideologies, and principles. These two transitions change identity as it is the perception of individuals on their surroundings. In another way, the transition impacts the sense of belonging of individuals. Accordingly, the first direct impact of the implementation of sustainability would be impacting the existing identity.

The impact of the sustainable transition is not a negative one. Nevertheless, the introduction of a new concept, the transition, is a change to an existing mode, meaning an impact on the identity of the place. In addition to that, taking sustainability as the different technologies implicated in order to reduce the environmental, economic, and social impact of urbanization, it becomes a mere procedure that is added or taken into consideration. In a way, they answer to our countable needs but fail globally on sustaining the meaning of the place. These measures would be quantified, exerted, and typically integrated until our buildings would be semblable, then the cities on themselves.

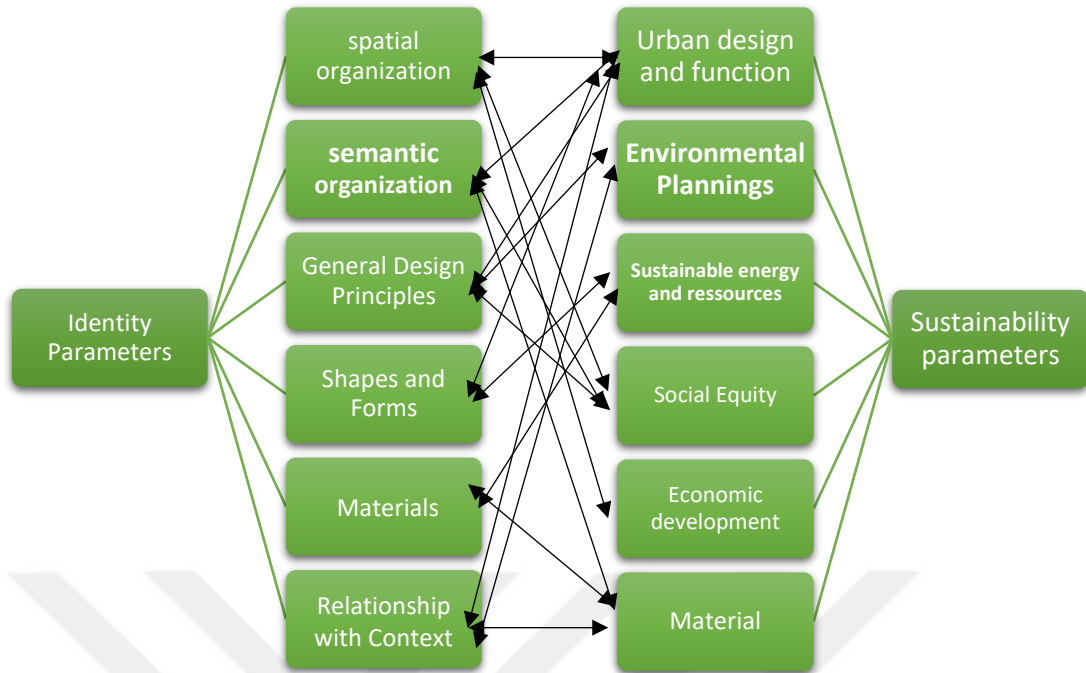


Figure 3. Sustainability and identity parameters found in literature. Source: Author.

Sustainability parameters and identity parameters share some of their values. It may seem that some of these parameters do not interfere or touch the others, however, their consequences may be different. An example of it would be sustainable energy and resources technologies that could interfere in the shape and forms of the buildings or even the cities. The tilted roofs adopted to solar panels impose a certain form to the buildings. The same goes for the efficient use for water resources.

Sustainability and architectural identity parameters are intertwined. The examples studied in this research would showcase various sustainability and identity parameters.

3. GREEN SUSTAINABLE CITIES EXAMPLES

Sustainability parameters are specific and measurable. However, in order to assess those parameters large scale is necessary. To verify the potential of systems working together and the balance created by the different parameters, it is only reasonable to research on a wider range, thus urbanism scale, (ARCADIS, 2018). Nevertheless, these parameters are not the only measures to apply to get the desired results automatically. The technical strategies to implement should be considered in each context differently and answer the challenges of the implementation individually.

The first cities to even introduce the term are European ones, it is not to say that other cities around the world were never sustainable. Sustainability as we have seen is actually a combination of parameters that serve three essential pillars. However, before the term was discussed in the literature, those parameters were present in middle-ages' cities in the east. Cities such as Damascus shone with their vernacular optimized architecture, (Opaluwa Ejiga, 2012), urban design and solutions such as water management, (Mark Manuel, 2018), economic prosperity, environment awareness, and social development. The term seems to be only referring to modern cities nowadays. It is always interesting to hold into those examples to dissect them in nowadays criteria and learn new methods for our future cities.

The ancient cities examples unfortunately lack in terms of quantitative studies that measure their results. For this reason, this study is referring to two old green sustainable examples of Northern Europe. They are “conventional” examples based on the case study and the overall progress in Morocco. It is also important to add those quantitative aspects of sustainable cities are no longer arbitrary but bond with various indices or labels. The most common recent index is the sustainable cities index which highlights all 3 pillars in detailed measures. According to 2018 rapport, it demonstrated that small Northern European cities are indeed successful examples of balancing all three pillars, (ARCADIS, 2018). Another study that highlighted the potential of these cities made back in 2013 described them as the earliest examples thus providing data that goes beyond a few years of usage. They also present different solutions to different settings, (Fraker, 2013). The two other examples are from two other different continents, Vancouver city of North America, and Brisbane city of Australia. They represent examples of different contexts therefore different solutions were obtained for the challenges that rose in this type of

context. Vancouver is a global city that challenges global transitions and sustainability continuation. Brisbane city is a city that challenges new climate context and policies sustainability facing economic pressures.

3.1. Stockholm city, Hammarby Siöstad, Sweden

Stockholm is a city that has been rewarded with many sustainability awards. The city has always had the green brand linked to its image. Nevertheless, the city has a long history of sustainable transition in Europe. Few world cities, especially capitals have been awarded or even branded the same way. Stockholm has grown after the second world war as a city with a sustainability concept. With all the challenges that its status as Capital city could bring, or even its growth as a global city, it has maintained until nowadays the sustainable image.

3.1.1. Stockholm city urban development

The city dated back to the 13th century by the kingdom Birger Jarl. It slowly developed into a traditional european port city. It was only until the 17th century that it has become the capital. Suffering from multiple fires, it had to be rebuilt, thus a master plan was put in and has been renewed since then, (Sidenbladh, 1965). The city then expanded over the mainland into six main districts: Vasastaden, Ostermalm, Norrmalm, Kungsholmen, Sodermalm, Staden Mellan Broarna (mainland and city center), (William-Olsson, 1940). The plan of expansion that was inspired by Haussmann Paris Plan could not be fully adopted due to sprawl restrictions, (Stenport, 2004), **Image 2**.

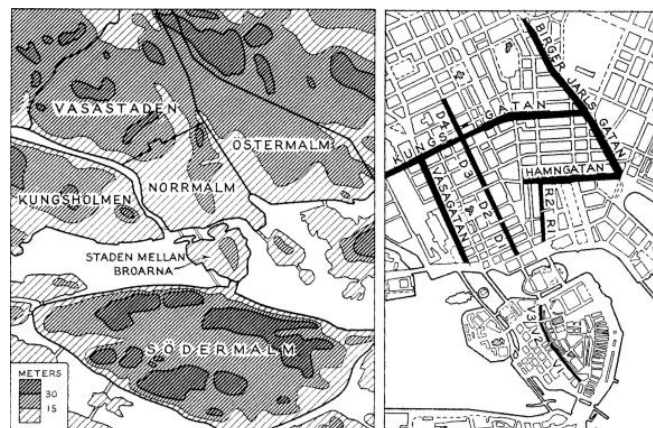


Image 2. Left: The six principal Stockholm districts. Right: The main cities of the plan expansion from the mainland. Mapping by (William-Olsson, 1940).

Stockholm lands until the 17th century were mainly city or monarchy owned, however privatizing the land that was already restricted geographically had led to a shortage of state-owned land to fully adopt the plan back in 1866, **Image 3**. By 1912, an urban competition to resolve the city expansion problem was held, and the plan chosen could not be implemented regardless, it was only until 1945 after World War II that another plan was proposed for the city's growing problems, (Sidenbladh, 1965).



***Image 3.** Panoramic view of Stockholm in 1875, (Neuhaus)*

The following year the plan was again revised and implemented slowly, (Uggia, 2012). The consequences of the war had let the city face fast-paced urbanization spreading it to the neighboring municipalities. The connectivity of the city was very concerning especially the suburbs spread. The social housing of the modernism movement was implemented as a solution to integrate most of the citizens in a shorter time, (Kaijser, 2007). At the start of the 60s, the plan was again revised to consolidate the center, expand the business section, and create new clusters with a total of 18 communities of a population of 25000 each. The development of the rail system made the centerless important expanding the city spread, (Sidenbladh, 1965). This can easily be noticed in the shift in the population concentration, **Image 4**.

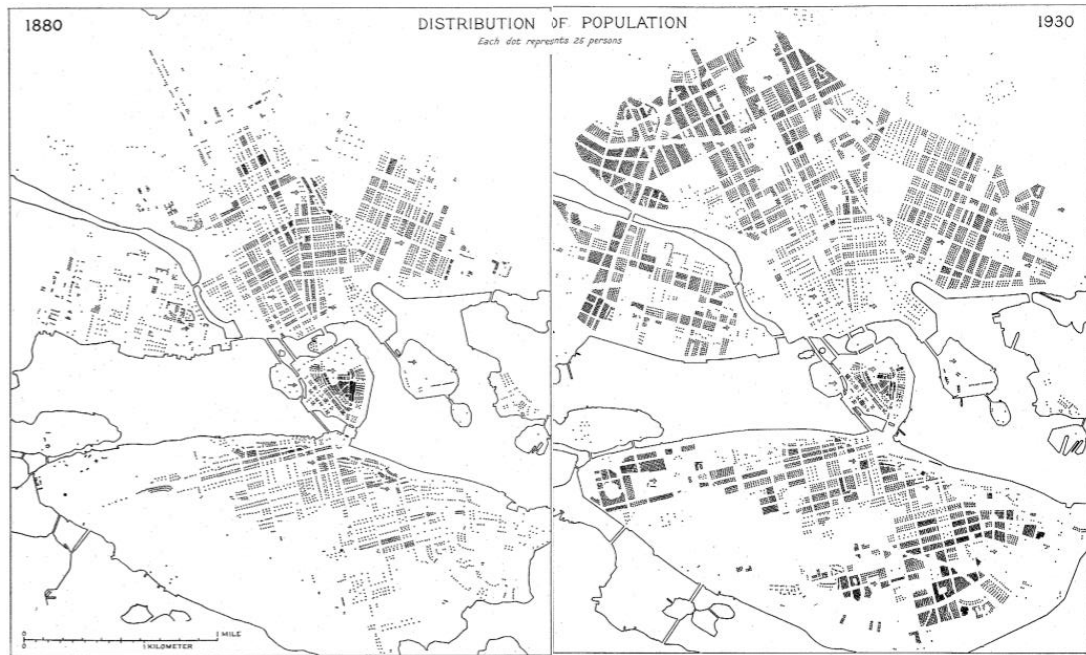


Image 4. Population distribution of Stockholm for 1880 and 1930, (Sidenbladh, 1965)

Between 1970-1980 a reform movement was noticed against the social housing buildings. Instead, single-house planning was implemented, and most social housing buildings were demolished, (Kaijser, 2007). This movement will be later referred to as the neighborhood movement in literature. This transition will benefit Stockholm its green image. The challenge of the city was since then to match its greenery to its growth, (Uggia, 2012). Sustainability is indeed the optimal answer for the conflict between industrialization and urbanization, (Jabareen, 2006), Stockholm has shown an example of it.

After the 1980s more and more commercial buildings occupied the city center. Stockholm like all cities around the world had spread from the walkable city limit, when transportation was not developed, to a larger peripheric where the borders between the rural and urban disappeared, (Kaijser, 2007). With the fast economic growth, the inner parts prices went skyrocketing, consequently, a striking segregation was shown between the rich center, the inner suburbs, and the outer suburbs full of immigrants and underprivileged population. This led the city to a movement engaged in incorporation with the state changing to overcome crime, and homelessness by privatizing the public spaces, (Stahre, 2004). The transition of tenure policy was imposed by the government in the late 1990s switching the rental from private to community-owned to increase

ownership, this transition led to deeper segregation and the gentrification of the center, (Turner, 2014).

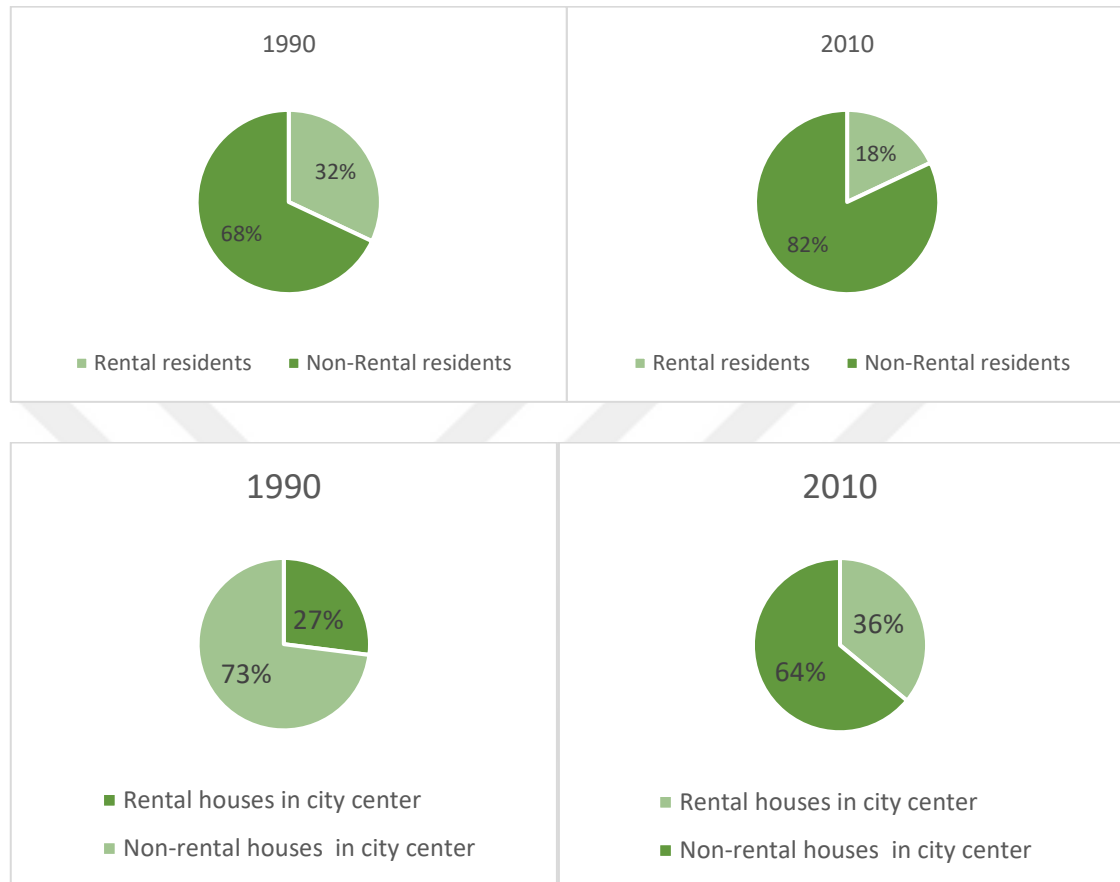


Figure 4. Rental houses decline between years 1990-2020, First row: The decline in Stockholm city. Second Row: The decline in the city inner center. Source: Author.

1999 new plan had come to resolve the city's ongoing growth and loss of sustainability by preserving the green fields sites within the city. However, this plan again was revised in 2009, Vision 2030, the green fields would be compensated by green areas in the city, such as parks. The plan implies that the city would continue to spread but does not detail how to ensure its compactness and sustainable growth, (Uggla, 2010).

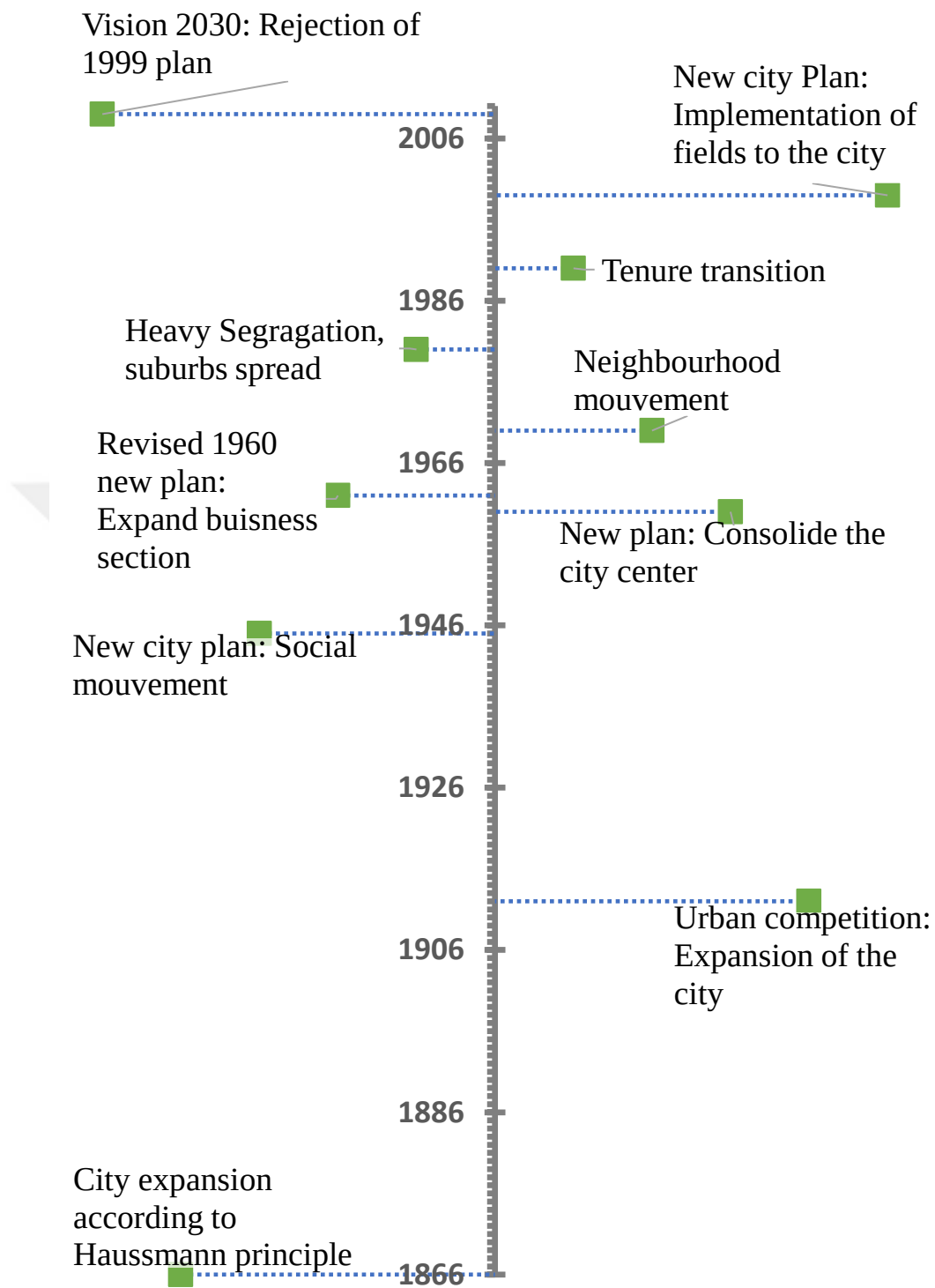


Figure 5. Stockholm urban development timeline gathered from literature. Source: Author.

3.1.2. Stockholm city identity

Stockholm is a port city built on hills at the edge of the Balkan Sea, **Image 5**, This gave the city a unique environment and characteristics with the waterfront and infrastructure to adequate the city's needs and spread. The architecture, landscape, and nature helped to restrict the height of the city to conserve those characteristics, at the same time it reflects the rigidity of the city to preserve the memory and identity of the place.



***Image 5.** Evolvement from trade node identity to European established town. Left: Stockholm from Mosebacke by (Martin) in 1787. Right: Northeastern Stockholm by in 1889.*

The city's identity could be regarded as a multilayered one. although it may seem that after Stockholm was regarded as the green capital title, (Olsson, 2013), the city has had a constant “Green sustainable” image as an identity. It has not always been the case, The city up until the 18th century was an organic small town with typical narrow streets and stone monuments, it was built originally as a fortress and then became a port city, (Stenport, 2004). The city since then had adopted Haussmann ideologies and the two identities merged with the old enter and new suburbs' spatial characteristics coming together. It seems that Stockholm was seeking to adopt another identity, one that could match its sprawl needs. The wide boulevards led to public spaces, grid systems with wider parcels. The new city characteristics were different, from the narrow organic plan of the city center.

Traditionally, Sweden is known to keep its farm owners, farms, workers, and workers housing in the same community, (Kushner, 1993). No segregation regarding land use, people, and places. This led to certain social equity gained even if it would be later lost by other urban policies. Stockholm's vibrant green suburbs had made the concept

popular and appealing even to American suburbs with the continuous spread of garden single houses. The concept failed in the United States for different causes, one of them was the context, the city's compactness and limitations were different from Stockholm's too. The greenery concept became the image of the city when the decentralization took place and the city spread to other municipalities, it became the city's attractive point. It is still playing a role in the bigger image of the country by balancing and saving biodiversity, (Uggia, 2012). Adding to that, the effort of the city plans to keep the center of old Stockholm intact and even keep or recreate the demolished facades to keep the memory of the place, (Kushner, 1993). Post-war Stockholm has seen an economic bloom making it a global city by providing a strong data communication service, (Stahre, 2004). Its title of the global city has not changed even after all the years. With the new economic challenges, the city's vision was to keep its green image and identity while continuing to grow.

3.1.3. Stockholm city and Sustainability: Western Harbor District

As a European city, Stockholm has had a harsh winter with little sunlight, it is also estimated to have some social problems such as pricey welfare and a crime rate. Its' sustainability status was not a given matter and its' longevity is directly linked to the urban growth policies, (Bobkova, 2019).



Image 6. Stockholm Hammarby neighborhood waterfront development, (MEDVED, 2017)

The old port and industrial area were freed by 1990 as the factories faced bankruptcy. The city seized the opportunity to design a sustainable district for 4300

residents and transform it into an economic center, (MEDVED, 2017). Inspired by the 1800s designs, the district was built as highly dense, mixed buildings facing the street and 6-storey buildings facing the sea with a public promenade area. Hired architects were responsible for assuring the municipality's goals for development. However, no rules or sanctions were applied for the failed goals' achievements. The area was designed while being divided into multiple projects, each aiming at a different architect and producing a different project. The strategy allowed the district to have a diversity of solutions and designs. The waterfront had a mix of high-rise and high-low buildings. Dominant design form of closed or partially closed parcels with an inner yard as community public spaces allowing social interaction of neighbors.

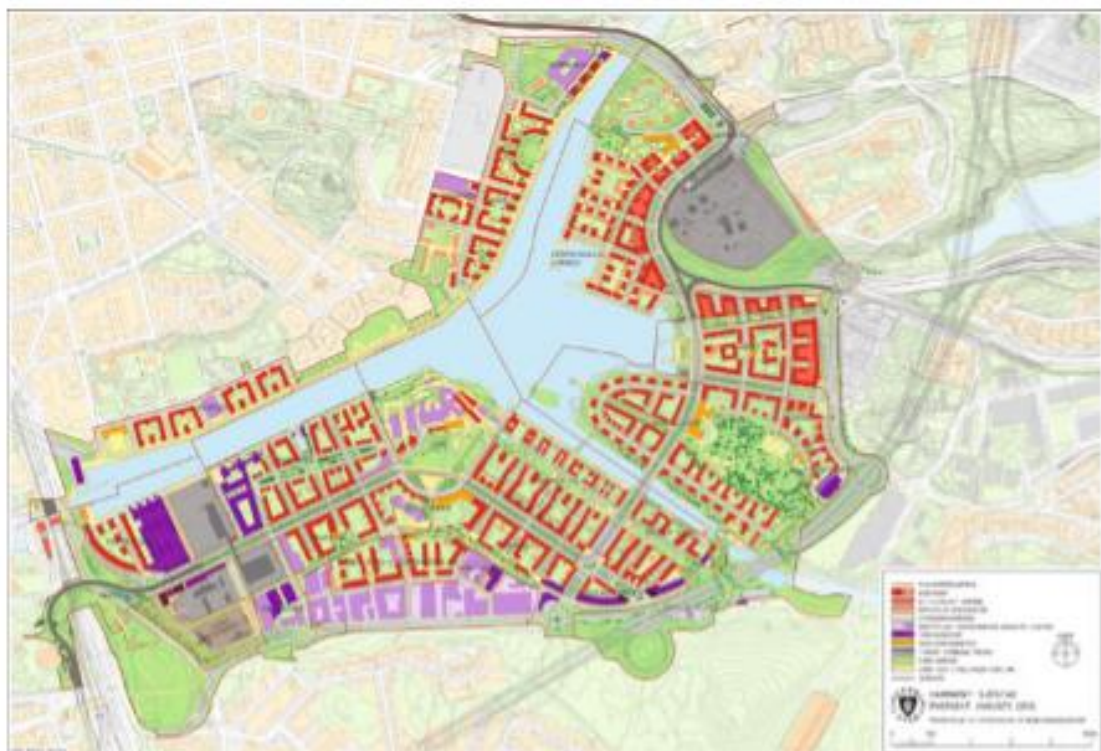


Image 7. Master plan for Hammarby, Stockholm City Planning administration

3.1.4. Lessons learned from the Stockholm example.

Stockholm is a city that has had many challenges in order to keep its green image through the years. It has revised its master plan several times through the years. However, it represents the challenges of keeping up with such a concept and becoming a global city.

Table V. Sustainability parameters targeted by Sustainable development project of Stockholm. Source: Authors

Sustainability Parameters	Social Equity	Sustainable Energy and resources	Materials	Environmental Planning	Urban Design and Function	Economic Development
Stockholm	•	•	-	•	•	•

The sustainable projects had ensured several sustainability parameters such as “social equity” by providing accessibility to the waterfront. The project targeted “Environmental planning” parameter by integrating the fields into the city scape. The overall targeted parameters are shown in **Table V**.

From the above research few lessons can be learned:

- Stockholm even labeled as a green city had faced multiple challenges and tried to solve them by experimenting with new plans and policies again and again.
- The greenery image had come from the city's own traditions thus incorporating it was not a foreign concept to that context.

Stockholm was not built overnight green, it was and is still a fight between urbanization's pressing needs and sustainability adaptations, Afterall, the constant challenges have made the concept mature enough to ensure the identity of the place not to be lost with the constant change.

3.2. Freiburg city, Germany

Freiburg city in Germany is one of the first cities to be entitled a sustainable city. The city has a unique relationship with this concept as it had literally developed bit its citizens. Its’ natural assets had played a big role in establishing people's awareness of environmental protection. The city is an example of the development of sustainability initiated by its people to its people. It hugely impacted the factor of the longevity of the concept and not dying after failures through time.

3.2.1. Freiburg city identity

Freiburg is a German city located in the southwest of the country, nearby the black forest with a landscape of mountains and traditional buildings, (Lösch, 1988). The city development has a history of activism leading it to be the capital of the environment and green city in Germany. The Chornobyl incident back in 1986 led activists in the city to

protest against the nuclear of the “Why1” neighborhood, (Sebastian Fastenrath, 2018). The city since then has tried to reform its policies to follow the public beliefs. Starting with a building reform, in the 70s and 80s cities mainstream policies and practices were aimed at green building and energy efficiency.



Image 8. Freiburg in 2014, source: Sebastian Fastenrath

Three pillar principles were considered: Energy conservation, production of renewable energy, and development of environmentally friendly technologies. The concept of green buildings transition took another dimension with the concept of an “alternative milieu” that opened doors for cultural norms to be included, socio-cognition, and space experimentations. The experimentation of energy efficiency in buildings took a turn to a more holistic approach to sustainability rather than a limited solar panel implementation solution. After the city experience, a shortage of housing and the pressure about it led to 80ha development of the suburb area Rieselfeld. The following year is marked by the approval of the low energy standard setting Freiburg to a limit of 65 kWh/m².

3.2.2. Freiburg city urban development

In the 1990s, Freiburg leading green transport development opportunity contributed to the birth of its eco suburb, (Broaddus, 2010). Rieselfeld suburb was a wastewater land that was transformed. It quickly becomes a test field for neighborhood development for energy standards. In 1993, a master plan for the area won the competition. It was established for 10000 inhabitants. A district was developed with buildings in a block of five floors with inner yards. Compacted and small-scale was established to ensure a mix of investors and occupants. The development's main criteria were energy standards

previously established by the city council. The standards could not always achieve as some of the buildings would face north and have little access to sunlight required for solar panels usage. These challenges faced were first of the kind for, no other prior example was set for it, instead of sanctions imposed, communication of different stakeholders was primordial. In 2010 the city was still successful and have high demand.

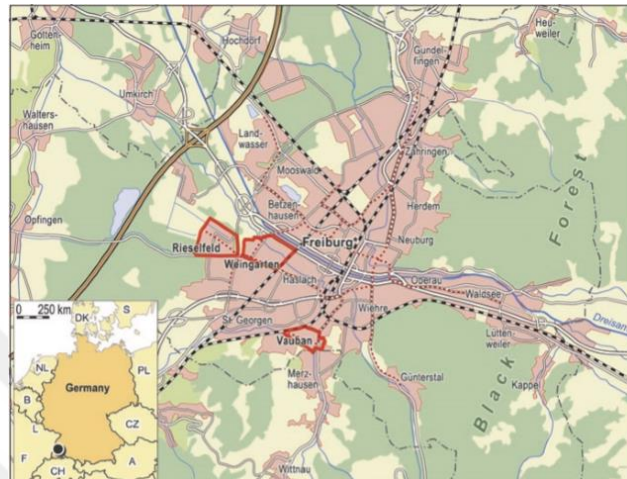


Figure 6. Freiburg main sustainable districts; Rieselfeld, Vauban, Weingarten

After the French withdrawal from Germany in 1992, Vauban's empty lot of 34 ha with military barracks was left over. Vauban master plan had a principle of car-free housing included with power generation solar village and standard cooperative family housing without parking. Construction began in 1998 for 5000 residents, it won the UN Habitat II conference in Istanbul for best practice examples. After Rieselfeld success, the planners take it a little further instead of low-energy buildings passive houses were promoted with a 30 kWh/m² requirement (not mandatory). Auditioning it 2006 a plus energy neighborhood “Solar settlement” was built by Rolf Dish choosing local materials “wooden” integrated into a photovoltaic system. Vauban is a great example of a non-compulsory and voluntary green district. However, as it is taking to more than the sustainability of energy other challenges could be distinguished. The identity of the place is at risk with the uniformity of buildings and group blocks. To fight this, the old barracks were revitalized to become a student housing project contributing to the social mix and diversity of buildings. Vauban becomes Freiburg university town with 20 years of environmental experience, (Schroepfer & Hee, 2008). It represent the sustainable campus town.



Image 9. Vauban district mix usage, Freiburg, Germany, (MEDVED, 2017)

The district planning follows the guidelines of the city. The main axe serves as a commercial building and is linked to the parking area that also serves as solar power delivering the necessary energy for the district. The blocks are designed to be mixed with public spaces and assuring the necessary compactness. Green spaces and parks were also left inside the blocks. Vauban had also strived to ensure a better residential mix, especially by providing social family housing in the student dorms retrofitted from the military barracks. The district assures high functionality but faces community critics about the limited job opportunities, the limited land use as the district is restricted and cannot spread further, and the design restrictions limited by passive housing best practical choices, (Schroepfer & Hee, 2008). The district is linked to the university, it has limited diversity in terms of buildings' functions.



Image 10. Vauban family buildings, Freiburg, (MEDVED, 2017)

The center of the city has also witnessed some reform, especially the low-income district of Weingarten funded by the government. The high-rise buildings would have some retrofit measures that would allow the building to become more energy efficient, (triple glazing, insulation, fan system...)

3.2.3. Lessons learned from Freiburg example.

Freiburg city is an exemplary sustainable city. It targeted several parameters in sustainability especially the use of energy and environmental planning, **Table VI**.

Table VI. Sustainability parameters targeted by Freiburg city. (●) Principal target; (○) Indirectly targeted; (-) Not targeted. Source: Author.

Sustainability Parameters	Social Equity	Sustainable Energy and resources	Materials	Environmental Planning	Urban Design and Function	Economic Development
Freiburg	●	●	●	●	○	●

Freiburg in a way is a city of experimentation and “learning by doing” sustainability example:

- It had **aimed for certain standards and then goes beyond** them willingly and from community involvement.
- The narrative of the city comes from the **dwellers and activists** coming together to state their needs and willingness for a better sustainable approach.

- Physical planning and neighborhood scale directly affect the quality of life. Freiburg focused on creating small-scale neighborhoods even with the high pressure of housing needs, (Hamiduddin, 2015).

3.3. Vancouver city, Canada

Vancouver is a global city that had once established its image as a nature city, the same way as Canada in general is a country of nature. This image that promoted the city, especially with its natural assets has become its own boundaries. The cities' policies have faced multiple challenges between keeping the ongoing image and the possibilities of further development by abandoning these principles. Vancouver is not the perfect example of a sustainable green city. It represents the dilemma of global transition and sustainability maintenance. It is an example that shows that natural assets can sometimes be not the motive and factor to maintain sustainability.

3.3.1. Vancouver city identity

Vancouver is located on the west coast of Canada, with a littoral of the Pacific Ocean from the West and Mountains from the north. The presence of this settlement surrounded by nature has always painted it with a green image making the public consciousness aware of the environment, (Kirstie O'Neill, 2018). The city of Vancouver has 600000 inhabitants, and The University of British Columbia is one of the cities municipalities with great leading greening impacts. The whole region of British Columbia is known for its “greening policies” in contrast to other regions of Canada. Despite all the reputation, it seems that the city faces challenges with its own assets. The natural limits of Mountains and the ocean have reduced its spread possibilities making the city one of the highest in terms of affordability, (Osborne, 2015). The urban policy for the city for the last 20 years had been the densification of the already existing residential area as part of its growth policy.



Image 11. Downtown Vancouver, source: Julia Affolderbach, (Kirstie O'Neill, 2018).

3.3.2. Vancouver city urban development

The city is famous for its own “Vancouverism” urbanism, which is about a dense center, and better public spaces that help the social mix of the city, (Berelowitz, (2005). The city has taken a global status due to its good integration of the different parts of society. The current state of the city is to attract the suburban citizens back to the low dense center. It has become one of the first cities to apply livable core planning.



Figure 7. Vancouver city position and the three main green neighborhood of the city, University of British Columbia campus, Olympic village and Southeast False Creek, (Kirstie O'Neill, 2018)

The city has reinforced its planning policies by implementing various green buildings, passive houses, and LEED-certified neighborhoods along either Metro lines to the city center. Sustainable planning of the city goes back to the 1980s when the city

encouraged the buildings mixed usage, the latter decade witnessed the improvement of the city's transportation and connectivity. The process of implementation involved society through voluntary individual actions. In 2006, the city implemented an Eco-density policy for the low dense center, (Rosol, 2013). The plan targeted various problems of the city; density, affordability, traffic, etc... It was until 2011 that the city introduced the Greenest city plan action for 2020 which pushed forward international recognition for the sustainability efforts in the city. The plan also introduced the quantification of the measures of sustainability. It seems that in Canada, in general, sustainability has started to take an immense effect with the introduction of Labialization and LEED certifications especially back in 1990, the country also established Canada Green Building Council (CAGBC). Both of these actions have contributed to deepening the sustainability concept in Vancouver as all actions could be accounted for internationally.



Image 12. *The Olympic Village neighborhood, Vancouver, source: (Kirstie O'Neill, 2018).*

The Olympic Village neighborhood, False Creek was established in Vancouver following all the sustainable innovations that the city developed in order to maintain its green image. It had won various sustainable titles such as the 2010 LivCom award. The site was an underdeveloped waterfront back in 1860 occupying a wider area until industrialization limited its spread. It was until 1990 that the area could breathe again with sustainable development after freeing the area from heavy industry. The transition booster was specially imposed by 2010 Winter Olympics planners., (Temenos & McCann, 2012). The district was pushing for net zero green buildings and sustainable communities. It was also destined as a multi-functional residence area. Thus, public involvement in the planning was essential though it remained as involvement in the idea steps without a

concrete direct one. Originally, it was a development with midrise multifunctional buildings creating a relationship with water and a central neighborhood. The plan was abandoned for more mixed high-rise buildings and houses due to international economic pressure. The Olympics were a set bar for the city to showcase its sustainability internationally, thus it finally opted for best practices implementations and quick green urbanization.



Image 13. C.K. Choi building, University of British Columbia, source: (Kirstie O'Neill, 2018).

The University of British Columbia in Vancouver had also been a ground for sustainability experimentation. The campus has a residential area of 10000 residents. In the 1990s, various green building experimentations took place in this area including the usage of passive recycled materials. researchers William Rees and Mathis Wackernagel also helped to push forward the research in the field and practice it. The campus became a living laboratory for research and implementation. The land use is operated by the university since it is also the investor for all research, it has been lenient on long investment return years. This allowed a certain flexibility towards new ideas and created a research hub promoting how to do hacks for the city's green buildings and sustainability practices. One of the examples is C.K. Choi building which is considered the first LEED-certified building in Vancouver city.

3.3.3. Lessons learned from the Vancouver example.

Vancouver is a global city that seeks the economic development as priority. It had targeted sustainable development as a strategy to keep its 'nature' image. For these reasons, the city did not target mainly some of sustainability parameters. An example of it would be providing "social equity" in designs, or providing "recyclable materials" for

all certified buildings. The main sustainable parameters targeted by Vancouver are shown in Table VII.

Table VII. Sustainability parameters targeted by Vancouver city. (●) Principal target; (○) Indirectly targeted; (-) Not targeted. Source: Author

Sustainability Parameters	Social Equity	Sustainable Energy and resources	Materials	Environmental Planning	Urban Design and Function	Economic Development
Vancouver	○	●	○	●	●	●

Vancouver is an example of a global city that strives to keep and protect its environment with all the international pressure.

- Vancouver had taken another strategy by following the **certifications' targets**. It allowed it to have specific goals and targets to achieve beforehand.
- The **involvement of the university** also made the city a **backup research hub** for experimentation and investment in new sustainable technologies.

The disposition of the city and its' **natural assets** had been the reason to push forward sustainable urbanism as well as challenge it.

3.4. Brisbane city, Australia

Brisbane city is one of the sustainable Australian cities. It may be not to the level of other examples. However, it is taken into account in this research for two main reasons: It is an example of a different climate context that may be an extreme one comparatively with other European or Australian cities. Secondly, It is not a smooth transition to sustainability transition as the city had witnessed many failures and setbacks. It is a great example to look up due to the reality that is close to developing countries cases.

3.4.1. Brisbane city identity



Image 14. *Brisbane city view*, source: (Sebastian Fastenrath, 2018)

The city is located on the east coast of Australia and is the third most populated city in the country with 2.3 million habitants, (Australian Bureau of Statistics, 2016). It is a river city spreading around the Brisbane River. The city has known rapid urbanization and an immense rapid population growth allowing the city to spread and merge with its surrounding neighborhood cities, (Sebastian Fastenrath, 2018). The city is also known for its drastic climate: Intensive heat, droughts, and wet periods, a subtropical climate with its challenges, (Climate statistics for Australian locations, 2017). The city must accommodate all these variables. The region of Queensland is also known for its historical heritage and usage of light timber in construction, iron roof, and verandas in response to the climate.

3.4.2. Brisbane city urban development

The city is known for its American urbanism with low density and suburban spread. The city has known a shift in urbanism with the Brisbane CityShape 2026 vision released in 2006. Polycenter policy had been suggested with intense density growth. Nevertheless, the city had struggled to introduce effective sustainable actions. Green buildings were not effective either usage of cooling devices was more regular, (Miller, Buys, & Bell, 2012). Thus, research for passive solutions and shading used the city as grounds for experimentation. Back in 1960-70. The city had already introduced the sustainability concept with the architect Szokolay and the Queensland university research initiatives.



Image 15. Left: Brisbane built-up area and suburbs. Right: Brisbane traditional houses. Source: (Sebastian Fastenrath, 2018)

In the 1990s, the city council decided to involve research in city planning for sustainable urbanism. A house code and energy efficiency code has been established. The residential buildings has also witnessed a shift to greener strategies especially due to Sydney 2000 Olympics, (Braun, 2000)One of the first green districts was GreenSmart Village in Springfield Lakes, a community-based sustainable project. It involved different stakeholders in order to provide a benchmark example for future projects. Different principles were taken into account:

- Passive design (orientation, insulation, glazing, higher ceilings, shading)
- Energy-efficient appliances
- Greenhouse gas efficient hot water system
- Water efficiency

Green star certification was also introduced for tertiary buildings creating competitiveness for better efficient buildings. This had led to various sustainable actions made for the city. Though this sustainability did not last long before a shift in policy in 2010 made an end to it. The new priorities of the city were development, sustainability was cast aside. The lack of policy continuity made it very challenging even for the private sector to continue with the concept, furthermore, the community has witnessed a very short period of sustainability to completely be aware of it and try to advocate it.

3.4.3. Lessons learned from Brisbane example.

Policies changes in Brisbane did not allow the longevity of the sustainability transition. Hence, only few parameters are mainly targeted. Sustainable energy parameter

was needed to lessen the usage of cooling devices as well as achieving economic development, **Table VIII**.

Table VIII. Sustainability parameters targeted by Brisbane city. (●) Principal target; (○) Indirectly targeted; (-) Not targeted. Source: Author

Sustainability Parameters	Social Equity	Sustainable Energy and resources	Materials	Environmental Planning	Urban Design and Function	Economic Development
Brisbane	○	●	○	○	○	●

Brisbane is a changing city with an extreme climate context for sustainability that had pushed forward new strategies and innovation in the world.

- It presents a case of discontinued sustainable development due to policy change demonstrating that this development could only be achieved by a strong community-based initiative or state-based one.

It had shown that the development of a certification system had helped to accelerate sustainable development in the city.

4. STUDY CASE: MOROCCAN GREEN SUSTAINABLE CITIES

Morocco represents one of the leading African examples in terms of sustainability. It has pledged to become a leader in sustainability in the continent. Since the MDGs have been set, Morocco has set its own new goals aligned with the global sustainable development goals. The country has chosen this path for many reasons. Morocco has been historically linked to Europe due to its proximity, its colonization history, etc... This has led the country to share economic relationships with the neighborhood continent. After the establishment of independency, Moroccan development took an example of the leading sustainable development of European cities in order to attract investment and tourism. It was not a natural process but a result of various interior and exterior pressures. Nevertheless, it has kept its ground through various trials and failures. Nowadays it can be seen as a successful example of sustainable green cities in the MENA region.

This chapter dives into the context of sustainable Moroccan cities. It first sets the context of Moroccan cities through history following the timeline of three periods: Pre-colonial area, colonial area, and post-colonial area. It gave examples of the layered Moroccan cities identity. Then follow the transition witnessed after the independency and how cities have changed until the implementation of sustainability. It would also give the policies and climate background of the country. Six projects in total were analyzed, four research projects and two executed projects. Those are not the only sustainable projects of Morocco, but the only ones achieved until now with some quantitative data that can be analyzed.

4.1. History of the shaping of Moroccan cities

It is known that Moroccan cities have a long history from pre-Romans, Roman, Amazigh, Arabic Conquest, Portuguese, French, and Spanish colonization, postwar, and post-dependency. The cities have unique characteristics and strong identities displayed architecturally by materials, geometry, urban texture, hierarchy... Each period had distinct characteristics adding to the existing identity another layer. The current statue of Moroccan cities is the overlaying strong identities impacting each period and coming together. Unfortunately, the dominant narrative of the middle east or north Africa region, Morocco included had for long ignored these aspects and only focused on the underdevelopment narrative as if the identity of these cities is the state of underdevelopment. The Moroccan cities had been for centuries even before colonization,

thus they had been in constant development and self-creation way before modernism. The impact of colonization only contributed to the continuation of the development, (Elsheshtawy, 2004). The colonization period is a continuation of Moroccan cities history.

Moroccan modern history has been accounted only in few sources; most of them by foreigners, (Calderwood, 2012). Thus, Moroccan city's identity in literature has been discussed mainly on the transition between the historical periods. The accounts have targeted the social, economic, and political changes, (Boubrik, 2022). Gilson has discussed the transition between precolonial and colonial Moroccan cities, (Miller S. G., 2005). The same discussion has been highlighted by Geertz who thought that the transition does not represent a coherent historical continuation, (Geertz, 1989). Postcolonial transition has been discussed in terms of the fragmentation of the cities due to political instability (Katarzyna, 2007), as well as tendency of preserving the precolonial Moroccan architecture, (Douglas, 1965). Moroccan cities' identity was not ruptured by colonization.

The discussion of architectural identity of Moroccan cities has been agreed upon on precolonial period. A specific narrative for the shapes, (Hakim, 2008), and urban systems, (Weber, 1964); (Dale, 1974), are constantly present in the literature. The colonial period, however, has been discussed differently. While some have argued that the colonial state policy was protecting historical sites from harm, thus creating new cities and identities, (Holden, 2007). Others have taught on the transition, a display of rooted colonial mindset (Abu-Lughod, 1980); (Morton, 1998); (Wyrzten, 2017). The differences between the cities under French colonial administrations and the ones under Spanish colonial administration have also been discussed by Adria, (Adria, 2013). The influence of French colonization was in a bigger scale.

Identity in postcolonial Moroccan cities have had different narratives. Abu Lughod has discussed how Moroccan city's identity become shattered in the colonial period (Janet, *Dependent Urbanism and Decolonization: The Moroccan Case*, 1979). Others have argued that postcolonial cities had successfully re-established the forgotten pre-colonial identity, (Brenda, 2001); (Douglas, 1965). In general, French colonization preserved the existent while building a French identity besides it.

Literature has tried to understand the conflict of the transitions and the impact of political changes on Moroccan cities. However, architectural identity has not been discussed according to a framework. Rather, it is analyzed as a consequence of a socio-political cause. New cities that are trying to resolve the consequences of previous transitions are not regarded as a new identity transition (Atia, 2022); (Wagner L, 2014). The literature about Moroccan cities history has discussed architectural identity in different perspective. The following table summarize 30 documents that trace Moroccan city's identity through history. Some of the documents do not target architectural identity mainly, however they provide an insight of socio-economic and political state of the cities. Therefore, these analyses set up the background of architectural identity changes in Moroccan cities.

The data collected showcase that architectural identity is often discussed broadly in term of Semantic organization. Precolonial cities were often analyzed in terms of their spatial organization and the importance of their strong semantic organization. The colonial period is discussed as a rupture of the existing pre-colonial identity. The spatial organization of the new regime as well as the difference between French and Spanish semantic organization is traced. The postcolonial period is a struggle period to restore the country's identity. Implementation of certain architectural identity parameter in Postcolonial cities was a way to continue the rupture caused by colonial period. Modern cities from 2000 up till now is discussed more critically in term of shapes and forms, spatial organization, etc...

4.1.1. Pre-colonial Moroccan cities: Imperial cities

City planning for Precolonial Moroccan cities was rather organic than a planned one, no grid or distinct axes can be seen. The city's octagonal shape comes from the adaptation of the city slope to what was supposed to be rectangular, (Bonine, 1990). The growth is spatially around mosques facing the “qibla”, the sacred destination, which is the direction facing the holy mosque, with the presence of necessities such as fountains, schools, or high education institutions called “madrassa”. Morocco represents a unique case from other Islamic cities because most of its cities were established as new settlements, thus they manifest most of the crude Islamic urbanism, (Abu-Lughod, 1980). The “medinas” or the Islamic cities were also preserved during colonization period.

There are four imperial Moroccan cities, meaning that those cities used to be the capitals of the different dynasties. The first capital is Fez founded by the Adarisa dynasty. Originally was a small town constructed in the 8th-century moulay Idriss Ist on the left side of Fez River. The city continued to grow with the settlement of Andalusian families running away from Cordoba. Later on, the city was further spread to the right bank with the Merinds dynasty from the 13th century creating the old Fez (Fez el Bali) on the left side of the river, the new Fez (Fez el Jadid) on the right side. During this period the oldest university in the world ‘Qraouine university’ would be built, and the influence of Andalusian architecture would also create the Moroccan Medieval architecture characteristics, (Bonine, 1990). The evolution of the Medina does not follow any pattern, only the streets directly nearby the mosques facing the sacred direction. The general settlement is following the hill slope, **Image 16**. The site of the old Medina (Fez el Bali and Fez el Jadid) entered UNESCO’s Heritage and is under conservation in 1981, (UNESCO, n.d.). Three more imperial cities would follow suit with more or less the same characteristics as Fez. Meknes city was built in the 10th century by the Almouwahid dynasty, Marrakech in the 11th century and become the capital of the Almoravid dynasty, Rabat built on the 12th century and become the capital of the Alaouite dynasty from then on till nowadays.

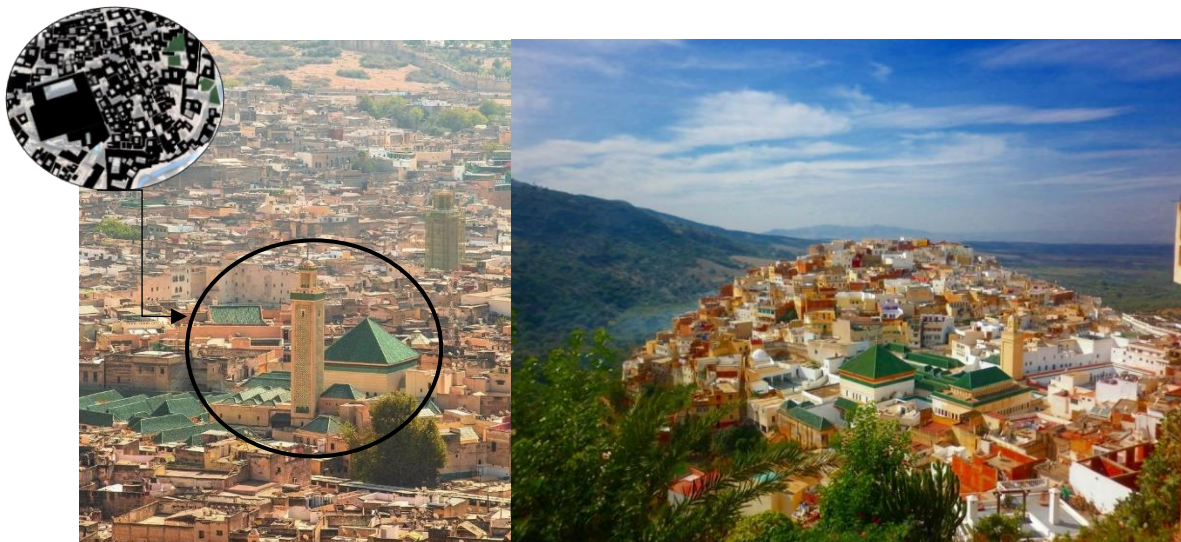


Image 16. Left: The emerald city, Fez el Bali aerial view, Qaraouine University settlements. Right: Meknes settlement. Morocco. Source: Google image.

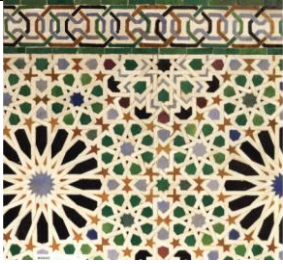
Apart from imperial cities, most of the “medinas” were built in the period between the 8th and 17th centuries and have distinct features of Islamic cities mixed in Amazigh features: walled cities or fortresses for protection reasons, (Dale, 1974). The houses were spatially inspired by the Andalusian courtyard houses typical for the region of Arab cities, and Amazigh “Ksours” that are known for their geometrical shapes and clay use. Overall, the cities had strong characteristics influenced by the culture and the climate needs. Another distinguishing feature of the medinas was the color annotation for certain cities. Due to climate context, the settlement in Marrakech was mostly made by using earthen materials. The clay would give the buildings an ochre color that would, later on, be the source of the city name, “Marrakech the red city”. Same as Casablanca meaning the white house, a name was given by the Portugal as they first saw the white House of Anfa, (the original name of Casablanca). Fez had also been associated with green as it had always been considered the color of Islam. The city reflected it with the emerald roof tiles of its important mosques, madrasas...



Image 17. Left: *The gate of Shellah, Rabat*, by Edwin Lord Weeks. Right: *Jewish Wedding in Morocco* as seen by Foreigner painters, Pierre-August Renoir, picture by Barney Burstein

The houses of Medinas are also distinctive by their architecture, forms, materials... Typically the houses would have no window on the street only small aeration opening covered in Musharabi. They usually had a courtyard where most of the living activities took place, built on it, a small fountain or a basin for ambulation and serenity, (Hakim, 2008).

Table IX. Moroccan traditional houses used materials, images from (LASKY, 2012).

	Ceiling	Floor	Indoor walls	Exterior walls
Materials	Carvated Plaster Atlas Cerdar wood	Zlij Marble	Zlij and crafted Plaster	Clay and Stones
Examples				

The rooms access and opening are around the courtyard. The roof terrace is used as a space of living, a cooking area, a laundry area and even an open bedroom when it gets hotter. Roofs functions were limited to this, the proximity of the houses and the narrowness of streets allowed an easy access between the houses. Roofs were ways to communicate, especially for woman who sacredly leave their houses. Verbal and physical communication could take place easily without the eyes of man. In colonial period, roofs of medinas allowed an easy access for the resistance troupes to hide from house to house while running away from the colonial.

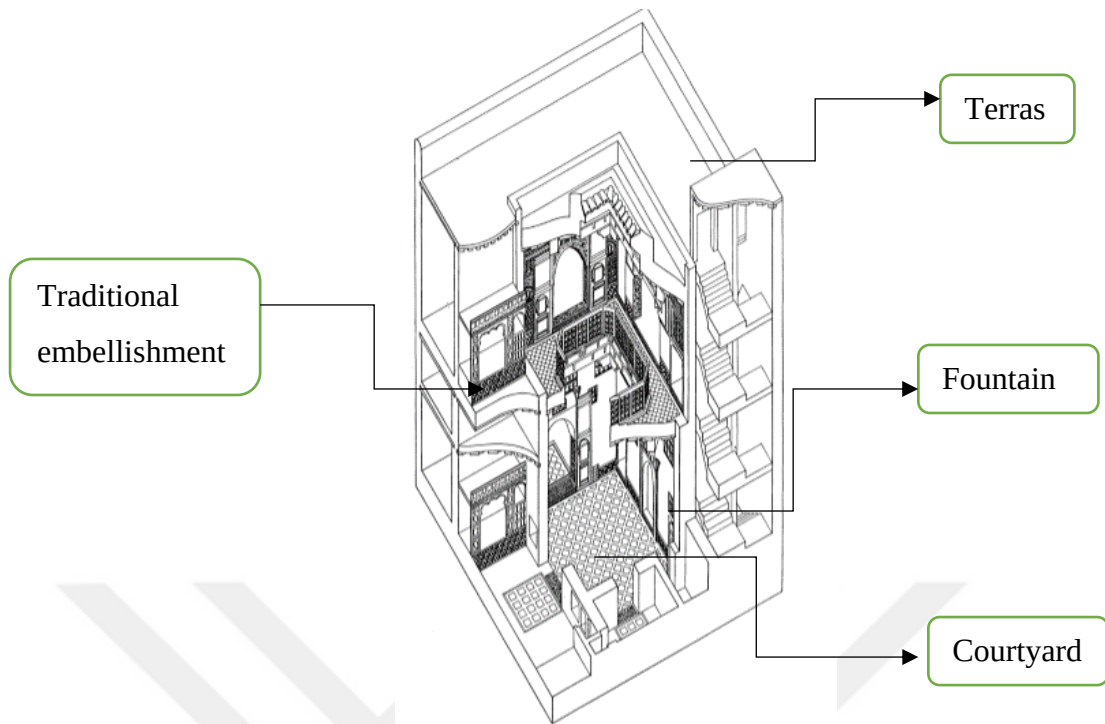
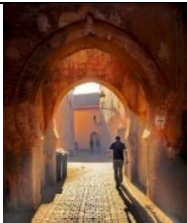


Image 18. Axonometric view of Dar Ben Simhoun, Fez showing all the elements of Moroccan court yarded house identity, made by (Susan Gilson Miller, 2001).

Table X. (Continued on pages 51-53) Architectural and urban elements of Moroccan cities. Source: Author; images: Google images.

	Elements	Types	Characteristics
Urban Elements	Derb "street"	 Open street  Closed street	Derb: a segment between two blind walls. Very narrow, with high facades for more shadow and less sun access to the streets. The hierarchy of Medinas' derb is usually the main street leading to narrower streets "drouba", that also leads to narrower closed derb.
	Sebbah	 Doorway Sebbah	Sebbah: Overhead extension covering part of the street and providing extra shadow. Sebbah takes multiple forms, either as a doorway with Islamic arch or as a simple extension of the house.

		 Extension of parallel forms.	
	Sakifa “Pergola”	 Wooden pergola  Textile pergola	A covered part of the street. Usually, it is a commercial street to increase the shadows. It can be a wooden fixed pergola, or a textile hang on a wooden structure that is movable.
	Jnan	 Outskirt garden.  Cultivation field.	Greenery is usually put in the outskirt of the cities. It is either Imperial gardens or cultivation fields.
Architectural elements	Riad/ Dar	 Muslims Riads  Jew Riads	Riads are traditional Moroccan courtyard houses of 2 to 5 stores. Muslim riads: Balconies opened from the inside for more privacy. Jew riads: Balconies from outside facades.
	Water	 Skaia “Fountain”	Water is usually placed in the patio of courtyard Moroccan houses. Skaia is a fountain used for abulation and decreasing the interior temperature.

		 Lhoud “Basin”	Lhoud; is a shallow basin with a depth of about 20 cm that replace the fountain function.
	Stah “Roof Terrace”	 Accessible terrasse roof”	Accessible terrasse that also permit accessibility to neighborhoods terrasses.
	Douaya “courtyard”	 Closed courtyard  Open courtyard	The patio is either closed by a wooden roof or left open.

The Moroccan courtyard house was inspired by Sham architecture, a fusion of Andalusian culture, (Hugh, 1985). It became the iconic symbol of houses in Morocco, the courtyard interior is designed to represent Moroccan craftsmanship, identity, and climate adaptations, (Bat, 2021). The term “Riad” means garden in Arabic. The courtyard is usually a small garden area or contains water elements. The craftsmanship reflected the history and the culture, the materials portrayed their original place. Cedar wood was used for ceilings, marble, and colorful ceramics, and “Zlij”, were used for floors to keep fresh indoors, **Table X**. The courtyard not only represents the good usage of materials for the climate, but the form itself represents a passive solution. The closed facades not only provide privacy but hide the string of direct sunlight exposure that causes uncomfortable indoors.

Urban and architectural elements of Medinas are part of its own identity. They constitute elements of Moroccan vernacular architecture that is efficient for the region climate. **Table XI** summarize these different elements.

4.1.2. Colonial Period Moroccan cities : La ville nouvelle

The French protection imposed by Marshal Lyautey in 1912 would be the changing point of Moroccan cities' identity. Morocco was considered indigenous; in a way it meant that the French had nothing to do with the Moroccan people or history, (Wyrzten, 2017). Morocco in general was separated into two sections: Useful Morocco, which are regions of agriculture, and mining, the useless Morocco, which is the desert area of the south, (Peter, 2013). The city Tangier in the north was considered an international one as it was a strategic point for various leading countries as it faced both the Atlantic Ocean and the Mediterranean Sea, (Miller S. G., 2005). Contrary to the Algerian colonization strategy, the colonization did not involve the history and architecture of the existing cities, (Morton, 1998). Indirectly the policy of creating a new city, “La Ville nouvelle”, a settlement outside of the walled cities Medinas shifted the identity of the cities, (Stacy, 2007). The new French centers were planned by French architects and urbanists. The cities were built to make them as French as possible to accommodate their people, (Hassan, 1992). The big boulevard ending with the train station or the city councils, the central post, and hotels lay on the side of the boulevards, then the residential apartments and villas were planned behind it, (Ezeddine, 1984). The French city was designed for the French just besides the Medinas.



Image 19. Left: The Ecochard master plan and the shanty town for Casablanca, the city of Modernism experimentation. Source : Photothèque du ministère de l'habitat marocain. Right: Fez la ville nouvelle center, 1930, Source: Adj. Chef : Orihuel.

Learning from the failures of the other French colony, especially Algeria, new policies were considered in Morocco. The “indigenous” heritage as Lyautey claimed was to be let, referring to the Islamic heritage and the Medina. Medina was for Moroccans, La ville nouvelle for French (Benoist-Méchin, 2007). This duality may seem like a

consideration and respect for the old patrimony. In reality, this imposed segregation was to limit the revolts of Moroccans and their access to the new city, at the same time providing the foreign visitor with an accurate image of “orientalism” while living in the comfort of the modern city, (Lauren Wagner, 2014). The planning was made by several French planners that were specially designed by the general. The planning main idea was to highlight race segregation and embodied it physically by choosing a drastic modernism that is far away from the form, and identity of the existing city, (Bahi Hassan, 1992). The consequences of such planning would be manifested in the post-colonial period by an extreme shortage of housing, and a lack of integration between the two parts of the city. The existing Medina was thus referred to as the “place of memory” and was afterward registered under UNESCO heritage, (Janet, Rabat: Urban Apartheid, 1980). The conservation of the site was not but a tentative to erase the living space of the city and make it only peace of the past. However, the main public spaces and buildings were built in an “Orientalism” style. Meaning buildings like Moroccan Bank, and the post, had Moroccan architectural features such as ornaments, door details, etc, (Claudio Minca, 2014). La ville nouvelle had oriental facades to serve as Moroccan context display.



Image 20. Left: “The Big” Street in Mellah district, Fez el Jadid, La Grande rue. Right: General Peymirau Avenue, Fez, Morocco. Source: Google image

All the main vital public buildings are aligned in the main Boulevard with the train station allowing the visitor to see the magneticity of French planning on foreigner soil, in a way, it is an open exhibition of French colonization. In the name of conservation, no electricity or other facilities were introduced to Medinas making it completely cut out

from the new city. The duality created had been one of the main characteristics of Morocco and how it was portrayed outside. The tourist attraction to these new cities was hooked with the oriental layer painted in some edifices combined with tours in the indigenous places. Lyautey also made some chosen historical sites, into museums and restored other forgotten sites such as the Hassan site in Rabat for tourism promotion, (Wright, 1991). This romanization of the “indigenous” architecture created the “arabesque” movement. It is well known that this duality in the policy of recognition of identity and denying it at the same time was a mockery in physical form, (Homi K. Bhabha, 1986). The medinas were left untouched and uncared for even if they were the “real” Moroccan experience.

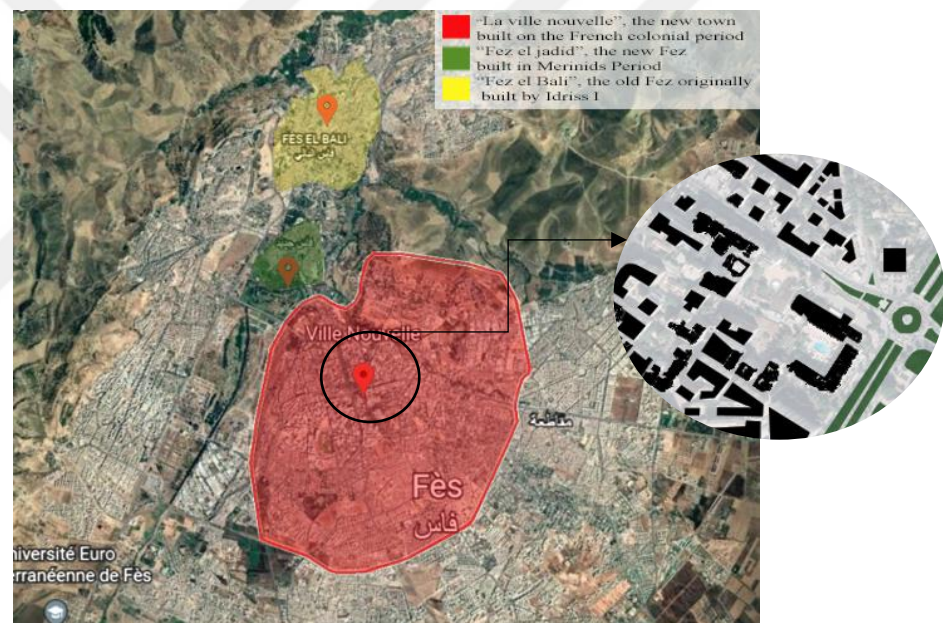


Image 21. Left : Fès el bali, Fès el Jadid, La nouvelle ville settlement view, Shift of the center. Source: Google earth. Right: Mass and void for the principal Boulevard in La ville nouvelle de Fès. Source: Author.

Lyautey had shaped not only Moroccan Colonial cities but also impacted Post-colonial Morocco in many ways. Especially the landscape that was behind the definition of Moroccan heritage “Le Patrimoine Marocain” which was defined by the colonial general, (Claudio, 2006). The stress on the old Medina had caused the years after colonization to witness an extreme housing problem leading to the expansion of the city and new social housing projects through the development of Megaprojects, (Bogaert, 2012). The narrative of the Medina becoming an open heritage and touristic attraction did

last after colonialization with some exceptions. The medina become no longer the heart of Moroccan settlement as the city expanded leading it to become further and further away from the murals of the Medina. It also lost its original dwellers, especially the rich Moroccans that settled in the French quarters after the colonial period. This drove the old city heart to become marginated attracting rural dwellers searching for low rent.

4.1.3. Post-Colonial Moroccan cities

The post-French colonization had a significant impact on shaping Moroccan cities. One of the reasons behind it is the need to bridge the old historical parts of the town with the new settlements created by the radical changes. This suggested an intense inclination towards the international movement especially the French architectural movement since the Moroccan architects were mostly students at French schools. The years between the 80s and 2000 were marked by economic problems and intense drought leading the agriculture country to lose youth in rural areas to urban areas. The consequences were fast urbanization, slums, and unshaded cities with problematic neighborhoods that showed intense social, and economic segregation, (Otmami, 2018). This period also is marked by the resettlement of the Medina dwellers. The economic crisis touched the old town making it harder for families to take care of the old historical houses. Another reason for the movement of the dwellers from Medina to the new center was work opportunities for the younger generations created in the newer parts of the city as well as proximity and accessibility.

The end of colonization in 1956 marked the end of French cultural interference. Politically, the new king Hassan II had strived to revive the origin of the Moroccan identity, and what better tool to do it than architecturally and physically displaying it? The country was thrown into chaos with the independency announced. The need to stabilize the throne and create an identity for Moroccans to hang on to and forget the half-century of colonization was pressing. The announcement of Mosque Hassan II was a needed step. The mosque was a display of the new power and the remanence of the true Morocco identity. It was built on the Casablanca waterfront with the help of original Moroccan craftsmanship with a majority of materials imported from different regions of the country, (Roberson, 2014), “Image 22”. The new king has taken this policy seriously, French modernism was long forgotten and only a “neo-Moroccan classism” movement would take place. The movement did not shy away from using modern materials such as concrete or establishing more modern urban systems while still incorporating classic

principles. Morocco struggled in the post-colonial period as the effect of long wars had drenched its economy, socially and politically, (Mounia, 1997). Thus, such reform in policies was highly requested.



Image 22. Hassan II Mosque, Aerial view of the city Casablanca, the announcement of neo-Moroccan architecture, Google image.

An intense shift and city growth were noticed since the 50s. The new centers and neighborhoods abandoned by the French were occupied by the well-off Moroccans leaving their old medinas to the new rural comers. Consequently, the population in historic centers decreased drastically shifting the identity of the cities towards the French centers, (Duarte, 2008). This made it suffer from intense segregation. A social housing plan was promoted by the experimentations led by Ecochard, “Ecochard housing grid 1950”. After 2004, an intense program for development was made to bridge the different parts of the cities and minimize the gap. To achieve this policy, Morocco embarked on an ambitious program to create new towns. A true national strategy for urban planning, it was originally fifteen cities that were to be created to eventually decongest the big cities, rebalance the territory, and accommodate more than one million inhabitants. However, it is clear that there is a significant gap between the initial expectations of the program and the results recorded. In 2015, less than a third of the projects announced passed the test of implementation and the projects in progress very largely show a delay in the construction of housing, public facilities, infrastructure for access, and settlement. This discrepancy is partly explained by the extension of so-called “opportunity” and “catch-up” urban planning in urban planning practices in Morocco, (Tarik, 2017). These two strategies are as follows:

Opportunity town planning in the sense that the location, size, and surface area of these new towns have mainly been dictated according to the availability of land and

private investment put at the service of the program. No territorial planning study or feasibility study was requested upstream.

Catch-up town planning since the main challenge of this New Towns Program is to reduce 80% of the deficit in social housing in a fairly short time. In this context of “emergency housing”, the focus was primarily on the construction of housing and not on local facilities or access infrastructure to the mother city. These large urban projects are therefore reduced to becoming so-called “dormitory” cities, struggling to become attractive territories.

Table XI. *Urban development of Morocco polices project, inspired from (PHILIFERT, 2014). Source: Author.*

1990-1991	Riots leading to change of policies: open access economy
1992	Political reforms without any urbanism reform
2000	Shortage of housing estimated by 1.24million unit. Slums spread. 42-00 Law reform related to the upgrading of human settlement. Adoption of notational territory planning blueprint (Shema National d’Aménagement du Territoire)
2001	50 local workshops, 16 regional forums for Casablanca conference, illegal housing in Rabat and urban heritage of Fez Action Plan to reduce unsanitary housing: Get rid of 860000 shanty houses, creation of new zones for social housing
2003-2009	Public involvement in urbanism changes
2004	6 urban planning agencies established under Ministry of planning to produce accelerated master plans. Cities without slums project
2005	Private sector involvement in urbanism and city planification 15 new cities launched supported by the government (the project was halted as it was not feasible)
2012	4 new towns implemented: Tamsna, Tamansourt, Chrafat, Lakhyayta Mega Projects were launched: Rabat Bouregrag valley, Tangier port “Tanger-Med”, Casablanca “Casa-Marina”
2013-2017	23 town projects launched for urban development, renovation of old medinas, reinforcement of urban hubs

The country politics made it clear that a sustainable development is the only solution for a country, that is unlike other MENA region, do not have Gaz of Oil. More slums were eliminated specially after 2010 with intense redevelopment to the segregated areas of the city, (Kingdom of Morocco’s Official Newsletter, 2010). The consequences of such fact remedy to regulate the social problems were much more severe, (Koennard,

2011). The displacement of slum habitats into places further away from the city in social quarters created ghettos neighborhoods. The continuity of the program seems to be frightening as it just contributed to the gentrification of the city for the foreign investor while hiding away the source of the problem. The failure of the program is witnessed in Temara the new city nearby the capital that was the destiny of the displaced habitant of Rabat slums. Temara nowadays has more and more problematic neighborhoods. Social housing programs benefited the middle class instead of the vulnerable, the reality showcased the segregation and social problems of the displaced habitant of the slums, (Le Tellier, 2009). Another phenomenon started especially with the country's policies to sustain and promote the tourism industry. More and more foreigner settlements in the old Medina had risen. Artists or retired Europeans could easily afford the maintenance of the historical parts of the city, (Escher, 2016). The Medinas are filled with foreigners while Moroccans can only settle in the new affordable cities and suburbs.

Apart from the social housing movement, general reforms were imposed, consisting of opening up the general policies. It is reflected in urbanism by creating different state companies that promote and the planning the new cities. These companies like “Alomrane”, taking care of social housing, “CDG”, funding mega projects, “OCP”, taking care of mining sites, and funding the new green sustainable city of Benguerir, (Barthe & Vigna, 2014). The state companies were also competing with the private sector as new policies allowed them to enter the market of urbanism. The urban development of Moroccan cities in post-colonial period was summarizes in **Table XII**.

4.2. Moroccan sustainable transition

Moroccan urban transition started with the planning of new cities. Then it launched a series of Mega projects to promote big cities. Mega project strategy for urban development seems to be a concept strategy by developing countries, (Del Cerro, 2013). Arap countries have seen variations of this type of project that exploited littoral land, developing brownfield sites, to bring more foreign investors, (Barthe & Vigna, 2014). Fast population growth and urbanization have made more and more spreading mega projects, but they lack complete integrations and often represent problematic environments with a lack of essential infrastructures: Transportation, schools, and mosques, it is mostly spreading for a certain category, upper class or missile class, thus lack of diversity. The mega projects of Morocco, (Tanger-med, Casa-marina, Bouregrag), are either foreigner-funded or planned. Meaning that they hold very little regard for the

existing identity of the cities. The impact of these projects cannot be countable until they finish and are used for years. Each stage of the project has an impact on the city, the land dispute, the displacement of the citizens, the long years of construction and traffic problems, the job opportunities created the estrangement of the project in the daily life of locals... (Barthel & Planel, 2010). Besides “mega project” strategy, that is a fast economic gain, sustainable urbanization was also developed.

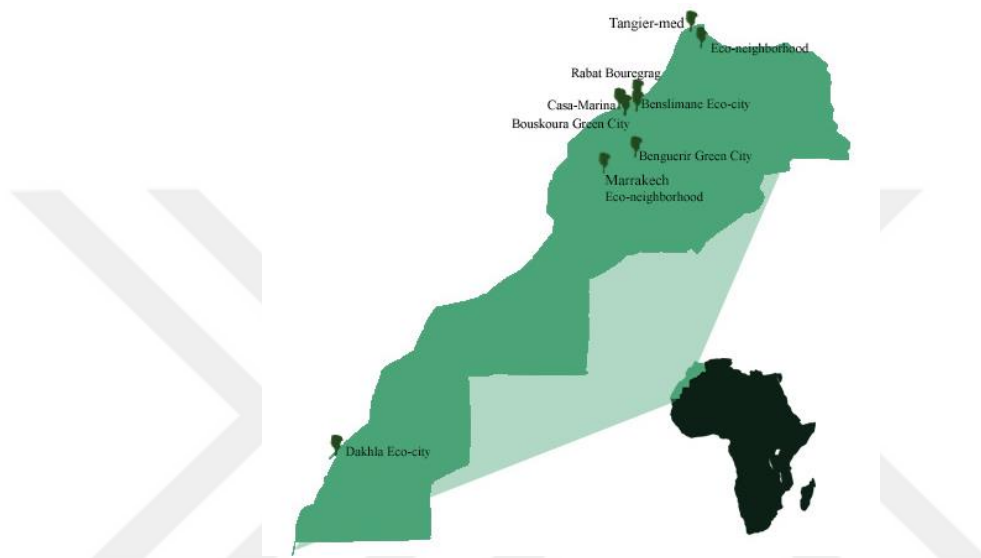


Image 23. Map of Moroccan Mega-projects and sustainable green cities projects disposition in the kingdom. Source: Author.

The Ministry of National Spatial Planning, Housing, Urban Planning and City Policy has set its main objective: The preparation for future territories by 2040 through the launch of a national sustainable urban planning program that adopted four operational and strategic pillars: **Sustainable strategic planning, territorial resiliency, territorial sustainability, and digital transformation of territories**. Thus, the department launched a study for the promotion of eco-cities, eco-neighborhoods (eco: ecologic, a term referring to sustainability in French urban usages) as a new privileged framework for innovation action, experimentation, and transfer allowing the frame of sustainable and active urban development models for the country to be set, (The Ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2020).

4.2.1. Law and regulations that framed sustainability in Morocco.

Mena region (middle east north Africa) is one of the regions that is mostly impacted by climate change, (World Bank, 2016). The vulnerability of the region is due to the

territory positioning in mostly the dry region creating a scarcity of water and other socio-economic challenges such as drastic segregation, territory disputation, and wars..., (Schaar, 2019). Morocco is one of the few countries in the MENA region that has limited fossil fuel resources, (no oil or natural gas), (Klimburg-Witjes & Gunay, 2016). The limited resources pushed the government for new development strategy.

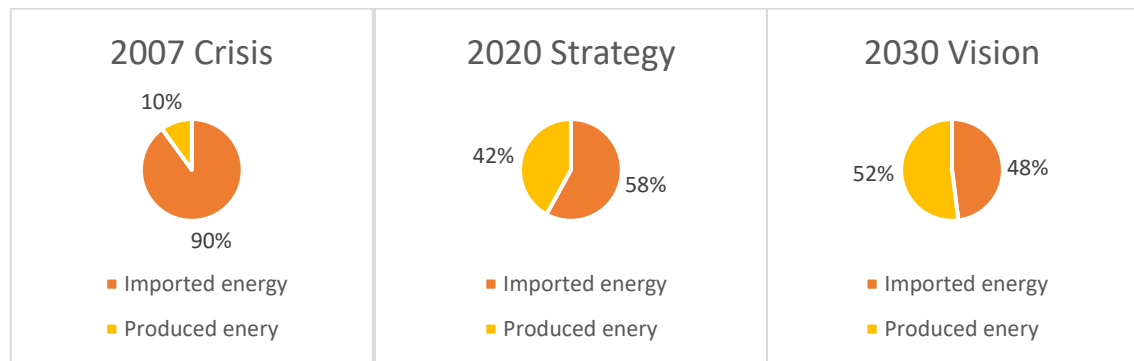


Figure 8. Moroccan Resource energy implementation to the energy mix. Source: Author.

The government had aimed to reduce its foreign dependency, especially energy dependency by exploiting self-resources. The country's strategic geographical positioning and climate were the only assets. The global vision of development for the kingdom has become sustainability with its' three aspects: Social, Economic, and Environment. The economic crisis of 2007 due to the increase in fuel prices led to the 2020 strategy of renewable energy increase in the energy mix of the country to increase its autonomy, (Boulakhbar, et al., 2020), **Figure 8**.

The strategy was to solve the problematic of the population fast growth, the urbanization increases and the challenges of development and electrification. In 1995 Morocco was facing various economic and social problems, one of them was that only 18% of the territory had access to electricity. By 2015, 98% of Moroccan territory was electrified, (Boulakhbar, et al., 2020). This development had also pressured the government to push for better electric mix. One of the country's biggest projects, was the solar plants. It is implemented in different regions of the territory with the largest solar plant project "Noor1" in Ouarzazate, (Klimburg-Witjes & Gunay, 2016). The country's general policy pushed for sustainable energy, and sustainable urbanization.

Table XII. Sustainable Urban Transition of Morocco Through the years. Source: Author.

Years	Actions
2004	“Cities without shanties” Program New cities launching
2011	Zenata Sustainable City: CDG development, Call for expressions of interest, New City of Zenata
2012	Benguerir Green City project: Launched by OCP Group
2016	Eco-Projects: Djemaa neighbourhood, Gueliz neighbourhood by BET International "Territorio y CUIDAD"
2017	Referential for sustainable town planning
2020	Eco-City Benslimane: Ministry of development, town planning, housing and city policy; Promotion of an ecocity in Benslimane Eco city Dakhla: Ministry of development, town planning, housing and city policy; Promotion of an ecocity in Dakhla

Green growth was the main strategy launched by King Mohammed VI, it targeted sustainability and implemented practical projects within that context. Several sustainable urban projects were launched since 2004 targetting socio-economic problems, **Table XIII.**

Meanwhile, to keep up with urbanization, the government launched some prototypes for sustainable neighborhoods in order to generalize the new policies. Untitled “Eco neighborhoods” were redevelopment of problematic neighborhoods that had been the shift phase between the old town centers and the new centers were targeted as they were the most conflicted parts of the city. Not only are they part of the shift making them a complex part of the city, but their proximity to both centers had made them affordable and convenient. These neighborhoods, however were neglected by both parts of the city, they didn’t get the attention of the historical centers nor the growth and development of the new centers. The government reached two of these neighborhoods one in Tangier (Djemaa neighborhood) and the second prototype in Marrakech city (Gueliz neighborhood) in order to eliminate the problems. Other sustainable cities projects have started to develop.

4.2.2. Geographic position and climate zone

Morocco is an African country in the far Northwest of the continent. With two waterfronts one in the north with the Mediterranean Sea, and another one in the west with the Atlantic Ocean. A total area of 446,300 km², (Word Bank, 2022) and a population of

approximately 37 million, (Haut-Commissariat au Plan, 2018). The country has also limited its different climate zone to six zones according to the ADEREE agency. Each climate zone gathered the cities with semblable climate characteristics, Figure 9. The six zones have been characterized by specific limits to their energetic consumption according to the Moroccan agency of Energy Efficiency, (Agence Marocaine pour l'Efficacité Energétique, 2016).

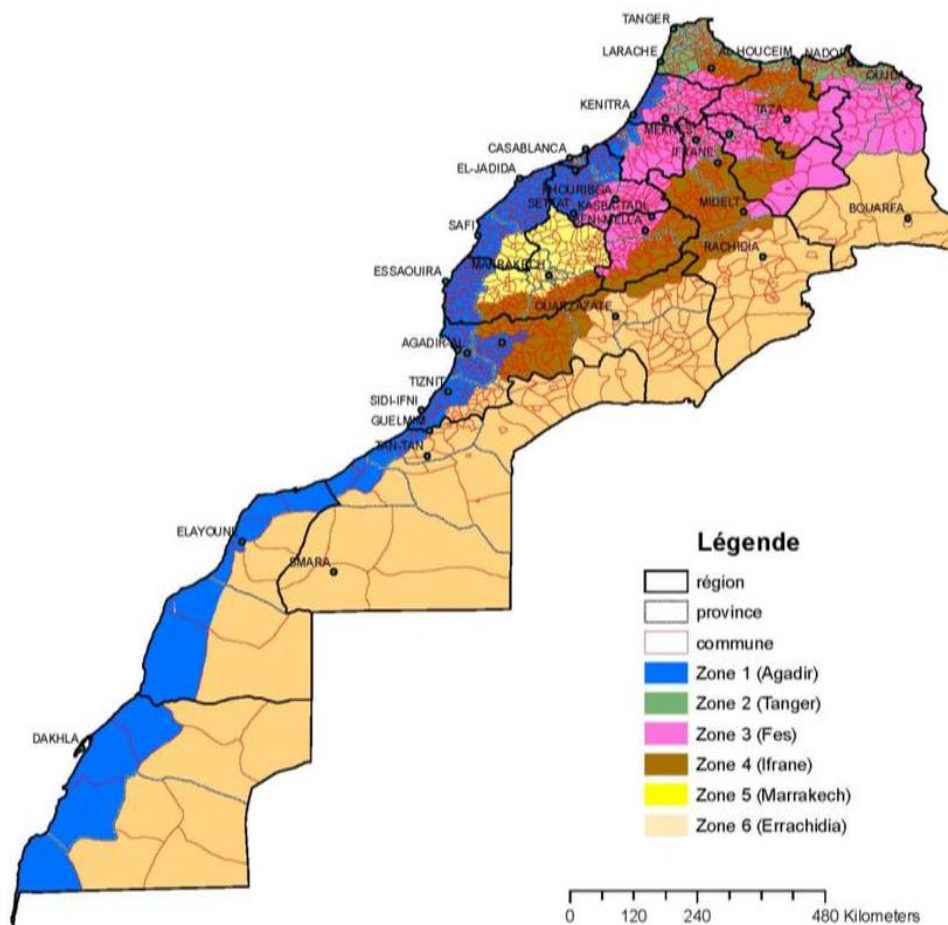


Figure 9. Climatic Zones for Morocco adopted to fit the thermal regulation in buildings, ADEREE

The country had also limited its different climate zone to six zones according to the ADEREE agency. The studies of territory zones were carried out in collaboration with the ADEREE agency and National Meteorological Department. The six zones were recorded between the years 1999 and 2008. Each climate zone gathered the cities with semblable climate characteristics, and respecting administrative limits, it has also a nominated city as its representation.

Table XIII. Different Climatic Zones of Morocco and their Consumption limits imposed by RTCM for residential and tertiary buildings.

Zones		Residential kWh/m ² /year	Tertiary kWh/m ² /year			
			Schools	Administrations	Hospitals	Hotels
Z1	Agadir	40	44	45	72	48
Z2	Tanger	46	50	49	73	52
Z3	Fes	48	61	49	68	66
Z4	Ifrane	64	80	35	47	34
Z5	Marrakech	61	65	56	92	88
Z6	Errachidia	65	67	58	93	88

The six zones have been characterized by specific limits to their energetic consumption according to the Moroccan agency of Energy Efficiency, (Agence Marocaine pour l'Efficacité Energétique, 2016). The limits were regarding each type of functionality happening in a building. Four categories are established: Schools, Administrations, Hospitals, and Hotels. According to the performance approach, the technical specifications of minimum thermal performance of buildings are fixed, as well as the prescriptive technical specifications are expressed in the same way for the entire tertiary sector with the aim simplification of the implementation of the thermal regulations, **Table XIV**.

4.2.3. Moroccan sustainable cities, research projects

Morocco is still in its early years of sustainable transition. It may seem that the governmental consciousness about sustainability started in early 2000. However, the launched projects faced many setbacks. The projects of the development of Rabat city for example launched in 2008 had not progressed in any way till 2014. Thus, it seems there is a drastic difference between the decisions and executions. In this chapter of Moroccan green cities examples. Two different categories are taken into consideration. **The research projects** are a study of cases done by the Moroccan Ministry of National Planning, Housing, Urban Planning, and city Policy department of urbanism in partnership with other ministries and research companies. These projects are studied and even made into workshop implementations with the help of local authorities in these cities. However, they are still not executed, either waiting on funds, or due to local policies changes. The second category would be **the executed green cities** which two examples are taken into account as they are almost finished and have begun to show results.

4.2.3.1. Eco-cities Projects

An ecocity is made up of neighborhoods or neighborhood units of compact spatial configuration, designed for pedestrian use and able to accommodate multiple functions. They are located in areas designed for public transport and integrated into a polycentric urban system. The conditions of sustainability and habitability contribute to improving the health, physical safety, and quality of life of the population, facilitating the process of identifying people with their place of residence. It participates in the implementation of the orientations of sustainable development, in particular, responsible management of resources, and the preservation of the natural, cultural and historical heritage while promoting economic dynamism, solidarity and social exchanges, the conviviality of meeting places, and green infrastructure. The objective of a sustainable development policy is therefore to promote the establishment of a mode of production and development compatible with the long term and centered on people. Each city must reinvent solutions in order to achieve a balance in its ecosystem. There is no single ecocity model.

4.2.3.1.1. Dakhla Ecocity

Dakhla is located in the extreme south of Morocco, slightly north of the Tropic of Cancer (23° 43 north latitude and 15° 56 west longitude), 637.5 km by road or 9 hours south of Laâyoune, 1500 km from the capital Rabat. The city develops on a narrow peninsula that extends over approximately 40 km and 2 to 5 km wide parallel to the Atlantic coast, in a northeast-southwest direction, forming an exceptional bay of around 400km². The city of Dakhla, the capital of the Dakhla-Oued Ed-Dahab region, has a population of 102,098 inhabitants, (The High Commission for Planning, 2014). It is experiencing a rapid evolution due mainly to strong urban growth and migratory flows. Between 2004 and 2014, it has experienced growth of slightly less than 6% per year. It is a young population: 39.6% of the population is under 20 years old. The number of households is 25,469 with an average of 4 people per household. The city extends over an area of 868 Ha (without the airport) with 60% residential zoning and 9.2% amenities. The current spatial configuration of the city is in an elongated form in the North-South direction, following the direction of the peninsula, which also dictated the location of the airport and the installation of military barracks. This configuration turns its back on the nearby Atlantic coast. The morphology of the urban fabric is determined by the various programs of subdivisions of plots of 80 to 100m² and a gross density of 30 dwellings/Ha

or 120 Hab/Ha. It is a monotonous city with few green spaces (2m²/inhabitant) and a permeability index of 16.5%.



Image 24. Left: Dakhla city, Morocco, Bird Vue. Right: Existing state of the city, source: (The Ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)

Dakhla is located in a geographical area marked by a temperate arid climate characterized by the scarcity of rainfall (less than 30mm), permanent sunshine (300 days/year), and by northerly winds (an average of 69 km/h). The wind is an undeniable asset for the city of Dakhla (wind energy, development of water sports, etc.), but it also constitutes a real danger of erosion which threatens the stability of the Atlantic coasts and the lagoon.

Principles:

The principle of the sustainable city is to anticipate and adapt:

Process: A phasing must be put in place so that the eco-city is carried out in harmony with the level of coverage in terms of equipment, services, and transport. It is necessary to "Build the city on the city" while improving the quality of life in residential spaces with the re-urbanization of the various districts into a space of coexistence. Applying 5R town planning: Renewing, rehabilitating, reconvertig, revitalizing and re-densifying are the main actions of the urban model.

Expansion: By 2028, the population will be around 185,000. The current urbanized area is sufficient to meet the needs of the city (need of 1300 dwellings/year, density 60 dwellings/Ha); From 2028 to 2038, the population will increase to approximately 250,000 inhabitants. It will therefore be necessary to open new districts to urbanization (impact of the Atlantic port, relocation of the airport and barracks); However, it is likely that the population of the city will peak at 185,000 inhabitants and that the current area will be sufficient with the relocation of activities to the Atlantic port. The natural expansion will

continue from the city to the south in front of the activity zone, to the west on the side of the Atlantic Ocean, and to the north.

Public Spaces: The city is built as an open system of public spaces in articulated continuity, multiplying the opportunities for diversity. There is no city without shared public spaces designed for the population and conducive to contact, relationships, and exchange. The public space appears as the object of intervention par excellence in the construction of the city. This quality of the "total" urban object is also due to the collective, public character of its property and its uses. Public space is the cement of the social, economic, and civic life of the city, at least in urban societies where the values linked to the existence of the community still have a fairly broad expression in the daily practices of space.

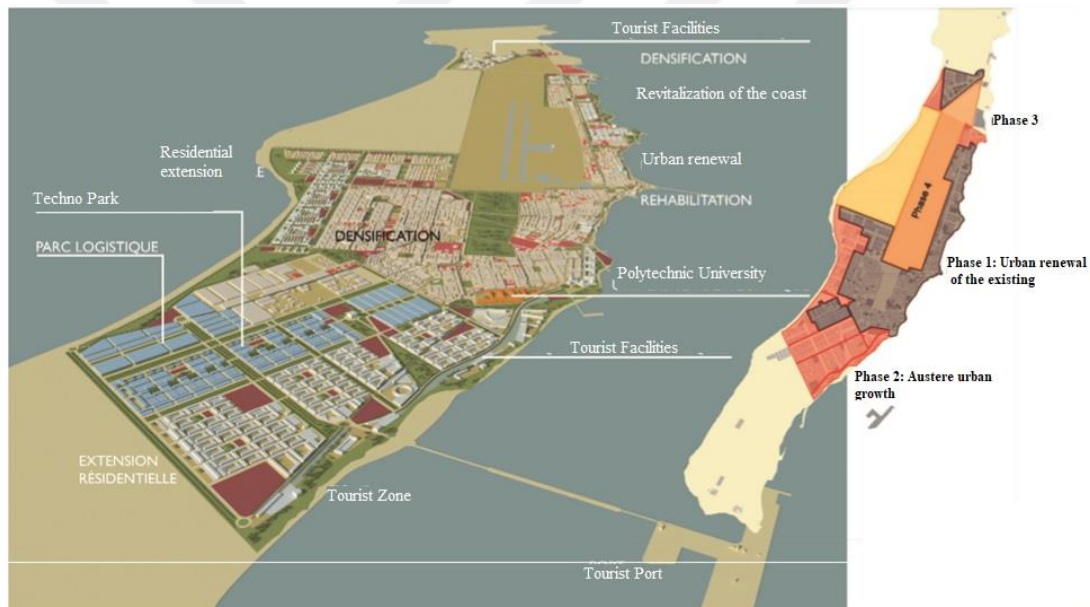


Figure 10. Urban actions and their phases, source: (The Ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2020)

Sustainability Parameters: Eco city of Dakhla has taken on account few parameters.

Social equity (Mix) The eco-city must be attractive thanks to cultural facilities on the scale of the Region and to economic activities such as the logistics and technical park, the university, and tourist areas.

Transport: The ecocity model must integrate multimodality as a guiding principle of mobility by planning multimodal zones where the different mobility networks meet (public transport, pedestrian, cycle paths, roads, parking).

Environmental Planning: The objective of ecocity is to preserve the natural environment and local identities by highlighting the remarkable elements of the natural and landscape heritage while ensuring ecological continuity between natural spaces and urban spaces. The ecocity model provides for several types of natural spaces, urban parks (3 large parks are planned for a total area of approximately 210 Ha: regional park, Bay Park and Atlantic Park), 14m² of green spaces per habitant, linear parks and nearby green parks, **Image 26.**



Image 25. Integration of Greenery in the urban tissue, Up Left: Before state, Up Right: After integration, Bottom: Different integration of greenery for the proposed parcels usage in Eco-cities

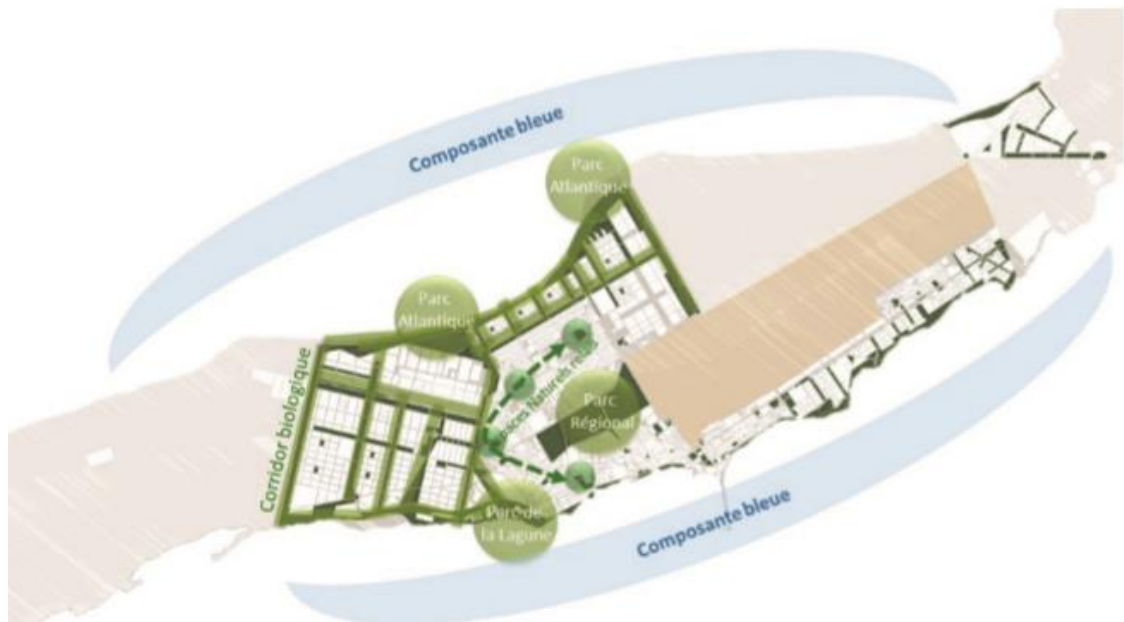


Image 26. Greenery and Blue infrastructure proposed for the city with four main parcs, source: (The Ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2020)

Urban designs and functions: The “ecocity” urban model is made up of eco-districts and neighborhood units of compact configuration, designed for pedestrian use and, in addition, capable of accommodating multiple functions. Each facility on the scale of the city or region must be an opportunity to develop a new primary centrality. Each social facility must be an opportunity to create secondary centralities. Each district must have a local centrality with its shops and day-to-day services.

Diversity, understood as the basic principle of any ecosystem, must be multiple: the diversity of uses and activities, the diversity of housing types, the diversity of typology and architecture, the diversity of public facilities and services, the diversity of the public space, the streets and their layout, and finally the diversity of the social composition of the residents, **Image 27.**

Buildings must be mixed as the ground floors are reserved to retail or other commerce/service activities. All new real estate operations must offer at least 30% social housing by integrating them into mixed collective housing complexes. The objective of this measure is to facilitate access to decent housing at an affordable price for all, but to avoid ghettos.

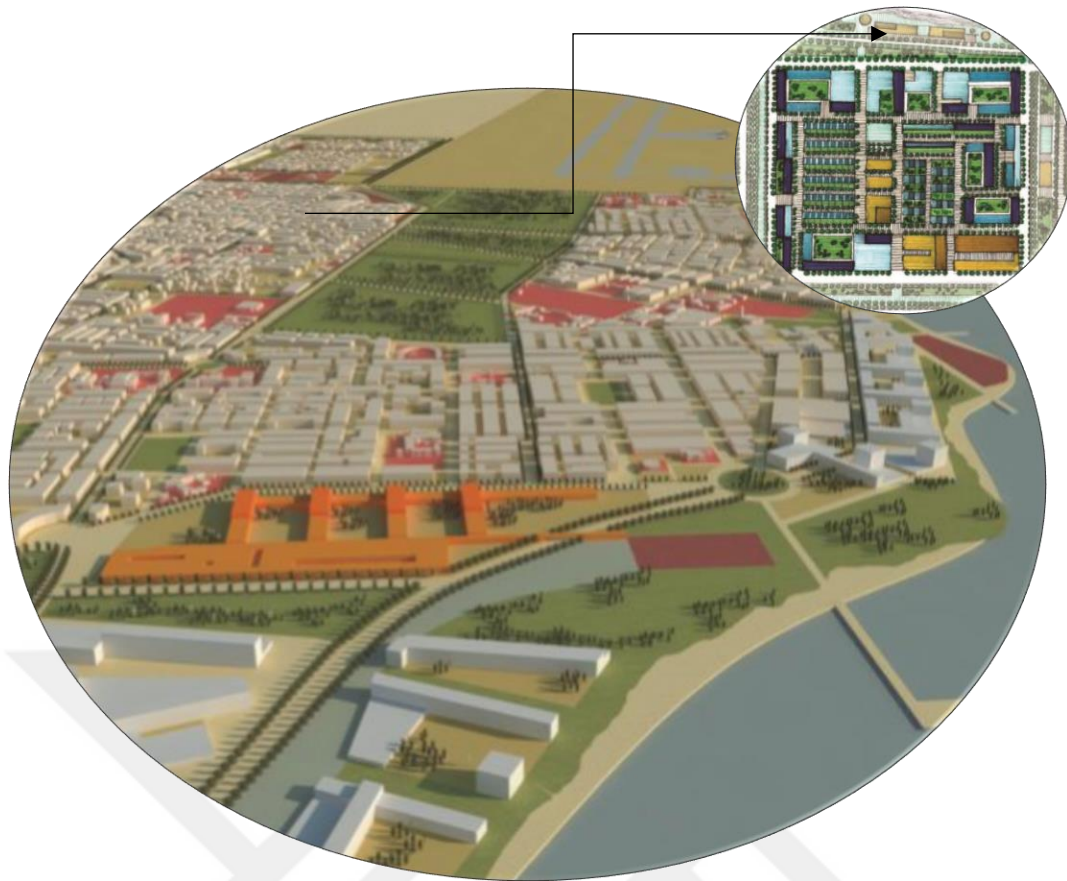


Image 27. The University is a reference facility that could energize the South of the city, an example of eco-district proposal for residency neighborhoods extensions in the city. source: (The Ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2020)

Sustainable energy and resources: Improving the energy efficiency of existing and new constructions with a reflection on bioclimatic architecture, construction materials, orientations, thermal inertia of buildings. Promoting the integration of renewable energies and new technologies to improve the energy efficiency of public lighting. Encouraging the construction of innovative buildings by authorizing the increase in constructability according to local facilities endowment, and bioclimatic characteristics (green facade and green roof, solar collector, thick walls, double glazing, shutter). Promoting local know-how and using efficient construction techniques with appropriate sustainable and recyclable materials. It would be "building to last". The city would also have a solar central built to cover some of its needs.

4.2.3.1.2. Benslimane Ecocity

The city of Benslimane is 60 km from Rabat and 55 km from Casablanca. The Benslimane province is part of Region No. 6, Casablanca Settat. It is limited to the north by the region of Rabat-Salé-Kenitra and the Atlantic Ocean, from the province of Settat to the south. (33° 36 North latitude and 7° 06 West longitude). Benslimane is located in

the 2nd crown of greater Casablanca. For a long time, it was the only urban center within a large rural space. The city represents both a migration destination for precarious rural people and for city dwellers looking for a second home and investment in high productivity agriculture, (DIRASSET, SDAU, Urban Development Master Plan, 2016). The city of Benslimane, capital of the province of Benslimane, has a population of 56,138 inhabitants, (The High Commission for Planning, 2014). It is experiencing low population growth. It is a young population. 33.9% of the population is under 20 years old. The number of households is 13,092 with an average of 4.3 people per household (4.2 national urban). The productive activity of the city is linked to agriculture, forestry, construction and industry. The Benslimane Forest is a microclimate conducive to the development of ecological tourism. This forest environment is ready for hiking and horseback riding near the major urban centers of Morocco (Rabat and Casablanca). The total area of the urbanized area of Benslimane amounts to 816.5 hectares, divided between the following uses: Residential 27,42%, Industrial 1,58%, Touristic 3,4%, Big facilities 18%.

Principles

The city of Benslimane aims to develop several vocations: Health, sport, ecotourism and university. These different vocations are complementary. The city, which brings together economic attractiveness without sacrificing the factors of integration, social cohesion, spatial coherence and sustainability, protection of the natural, architectural and urban heritage, naturally constitutes a favorable framework for investment and creation, multiple opportunities and riches.

Cohesion: There is no real city center. The theme of social diversity is specific to Benslimane. Indeed, there are three types of population: the permanent residents of the city, the daytime population made up of rural people who come during the day and the weekend inhabitants of secondary residences. The city must take into account the poverty of the permanent and daytime population (peddlers, slums, etc.); The vocations of the city should become: **Green city, University city, City of leisure and sport**; The activities of the industrial zone are not very dynamic and create few jobs. That is why the city must develop the organic label, **Image 28**.

Environment: Watering green spaces in the absence of groundwater poses a sustainability problem. Adding to that, the forest should not be a space of exclusion that the inhabitants use as a deposit of rubble, but a recreational space. It must be protected and developed to become a locomotive of development.

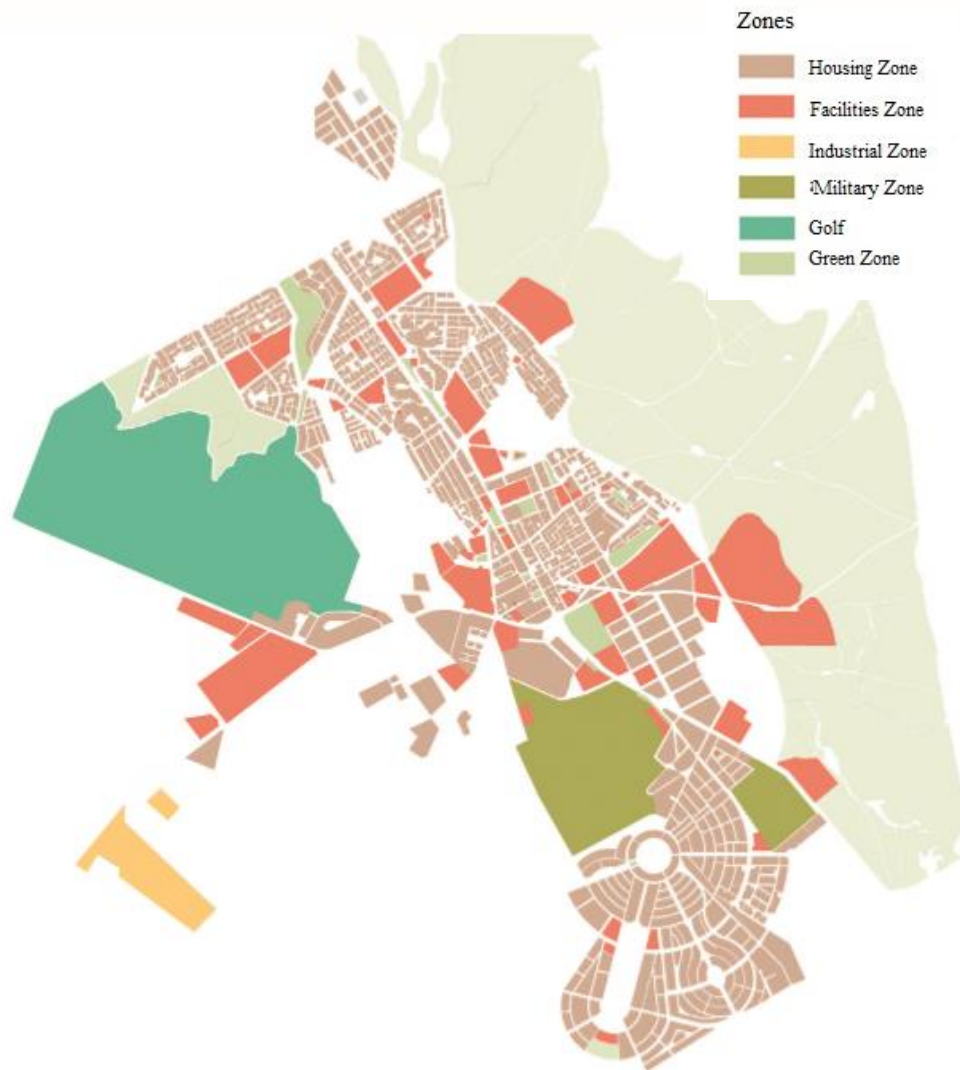


Image 28. Benslimane zones at the current state, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)

Sustainability Parameters:

Environmental Planning: The objective of ecocity is to preserve the natural environment and local identities by highlighting the remarkable elements of the natural and landscape heritage, while ensuring ecological continuity between natural spaces and urban spaces. Urban parks (four large structuring parks: Central Park, Lalla Meriem Park, Golf Course Forest Park and Ecological Parks on the edge of the city with the Benslimane Forest). Their location ensures a balanced distribution within the urban perimeter. Provide Linear parks with a dual function: ensuring biological connectivity and soft mobility between residential neighborhoods. The area of green spaces is 25m² per inhabitant. In addition, the development regulations must provide for compulsory alignments of trees on the main roads and car parks, 20% of local green spaces with children's playgrounds

at least in the coexistence space and incentive measures for the creation of green facades or roofs and green alleys, a real oasis of freshness, **Image 29**.

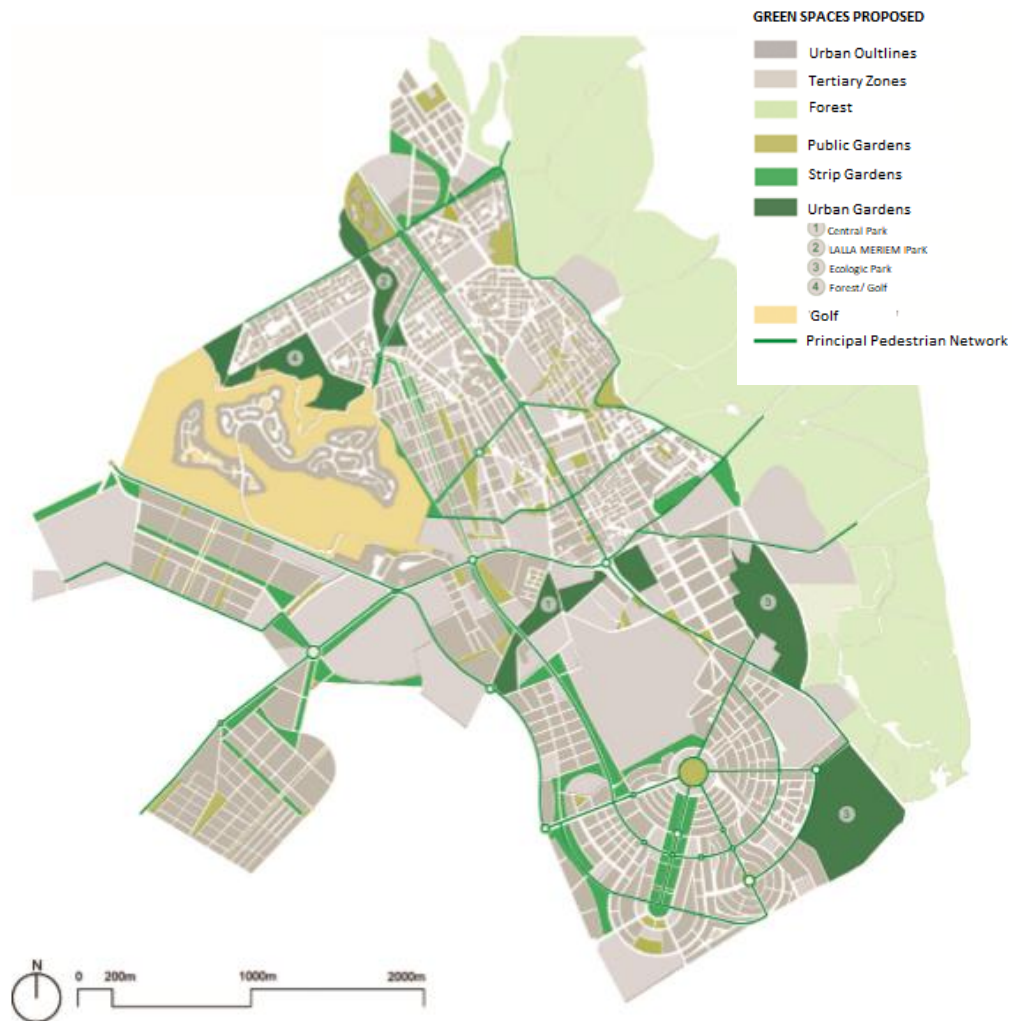


Image 29. Green infrastructure of Benslimane city, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)

Urban designs and functions: The master plan of the city must incorporate maps of natural risks, to avoid any new urbanization in sensitive areas and carry out thematic studies, in accordance with the provisions of article 3 of the law on urban agencies. New urban extensions should be planned in continuity with the urban fabric, especially with mobility networks and urban services and facilities. In addition, extensions must not be located in a risk zone (flooding, landslide) and must not alter areas of high environmental or agricultural value... Organize the city of proximity for soft mobility (minimize the distances, in time and space, between activities in order to reduce travel needs). The challenge is to compact and densify the center zone with various functions.



Image 30. *Densification of the central zone, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)*

The land use for productive purposes must respect the following guiding principles: Establish new productive zoning guaranteeing the integrity of the soil to be protected and locate the new developments called upon to meet the demands of the city, in continuity with the existing developments in order to allow proximity between residence and employment, which will contribute to sustainable and efficient mobility, **Image 30.**



Image 31. *The University is a reference facility that could energize the center of the city, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)*

Sustainable energy and resources: The city promote the bioclimatic design that state that access to solar energy is determined by seven factors: the latitude (distance from

the equator) of the building, its slope, shape, and orientation, building height, street width and orientation, **Image 32**. Ventilation is determined by the same factors, except that latitude is replaced by the direction of the prevailing winds. The city also promote the improvement of habitability and the rehabilitation of existing buildings in the city that are over 35 years old with the introduction of sustainability and environmental protection criteria.

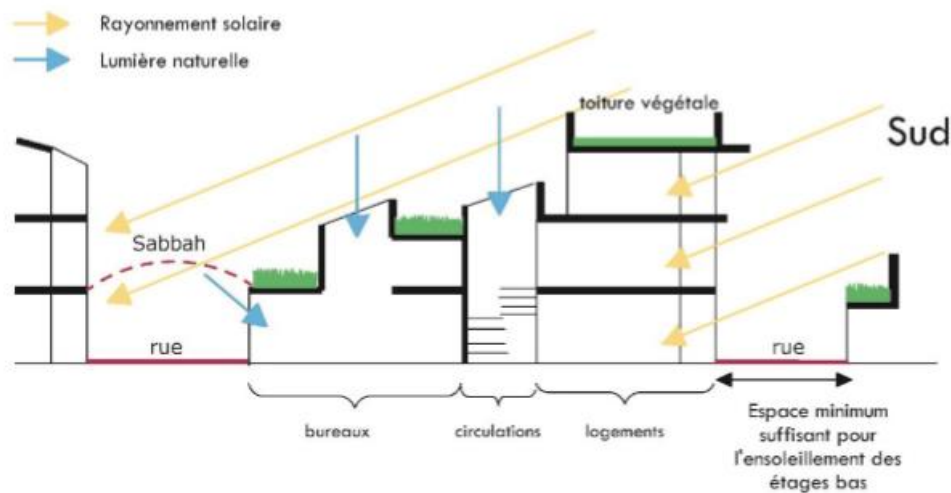


Image 32. Section of principle in a neighborhood that is considering bioclimatic constructions, (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2020)

Benslimane and Dakhla cities represent a research projects that solve the existing settlement problems by presenting sustainable urban expansion.

4.2.3.2. Eco-neighborhoods Projects

The eco-district is an appropriate intermediate scale to establish a sustainable development. It is the urban space of the city which has the adequate dimensions to carry out policies and actions in each of their components. Especially since the neighborhood develops the sense of importance of the community, which contributes to the establishment of the effective process of participation. The concept of eco-district starts from the conception of the city as a set of centers that are both interconnected and autonomous and assumes the idea of the ecological regeneration of the city as a framework for fundamental action (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016).

Table XIV. *Eco neighborhood examples launched by Moroccan Ministry of development, town planning, housing and city policy. Source: Author.*

Eco-neighborhood projects: Ecoquartier	City	choice of the neighborhood	Problems	Eco-projects goals
<i>Djemaa neighborhood</i>	Tangier	The new center	Chaotic neighborhood very complex traffic: narrow streets, heavy commercial streets...	Accessibility Transportation network
<i>Daoudiate neighborhood</i>	Marrakech	The new center: in order to de densify the old medina	Well mixed density with lack of infrastructure Density problems Traffic network Mix: Souk (Bazaar), residential area	Diversity Good Mix Sustainability Greenery

Prototype implementation had been made in order to generalize the new policies. Eco neighborhoods were one of these implementations. The problematic neighborhoods that had been the shift phase between the old town centers and the new centers were targeted as they were the most conflicted parts of the city. Their proximity to both centers had made them affordable and convenient. These neighborhoods, however, were neglected by both parts of the city. They didn't get the attention of the historical centers nor the growth and development of the new centers. The government reached to two of these neighborhoods one in Tangier (Djemaa neighborhood) and the second prototype in Marrakech city (Daoudiate neighborhood), in order to eliminate the problems noticed as shown on the **Table XV**.

4.2.3.2.1. Marrakech city, Daoudiate neighborhood

The unit 4 neighborhood located in Daoudiate in the Gueliz district of Marrakech was built at the end of the 1970s on the model of neighborhood units to densify the Medina with a clear hierarchy between motorized and pedestrian routes, **Image 33**. Its area is 37 ha. Daoudiate is composed of several adjacent neighborhood units, weakly connected to each other, separated by large traffic lanes and structuring facilities.



Image 33. Limits of the unit 4 of Daoudiate neighborhood, Marrakech, Google earth

Transport: In terms of mobility, the unit 4 district is adjacent to Boulevard Allal Al Fassi, one of the main north-south axes of the city. It is therefore well served by public transport and close to the nerve centers of the city, such as the Medina or Guéliz center. Thus, there is no point in the pilot district more than 350 m from at least one bus line. However, public transport suffers from irregular frequencies, lack of information for users, discomfort, and insecurity. The small collective taxi remains an easy means of travel, and an appropriate alternative for travel to sparsely populated areas of the city. However, there is no taxi stand in the area. Moreover, the district has enormous potential for the development of soft mobility, not only due to its position in the city, but also because the original project counted on a network of pedestrian alleys inside the blocks. The motorized traffic along the secondary and interior motorized streets in the district is not very important. The parking areas are insufficient, encouraging motorists to park on the sidewalks. The latter are irregular and not conducive to the movement of people with reduced mobility. Finally, it is an accessible district, close to amenities and attractive locally.

Sustainable mobility requires a rebalancing between all motorized transport. In this case, the challenge is to achieve sustainable mobility in an existing neighborhood. The general objective is therefore to take advantage of the urban structure of the neighborhood unit with a new functional approach to achieve sustainable mobility and improve the

quality of life of citizens. The proposed urban operating model is the adaptation of the neighborhood unit into a "super-Parcel". Indeed, the Unit 4 district is an urban area forming more or less a square of 600 m side. It has a flat topography. It is surrounded by the main thoroughfares (Boulevard Allal Al Fassi, Rue Abdellah Bnou Moutaleb, Rue Ibn Jabran and Rue Iman Jazouli). This territorial position makes it an urban area well-articulated with the rest of the city. Public transport is present within its perimeter and the district is well articulated in terms of communication with other parts of the city. However, inside the district, mobility presents a chaotic aspect: conflict between motorized and pedestrian traffic, disorderly parking of private cars, promiscuity between activities. The super-island will qualify public spaces by promoting internal mobility.

Public space can be redesigned as streets of coexistence where priority is given to pedestrians and other non-motorized means of transport by offering new facilities and local gardens. This platform will have a unit treatment of coatings and environmental requalification. The developments highlight the central area of the eco-district, where the Mosque-Market-Hamman is located, which is the subject of a specific treatment in order to restore its identity as a secondary urban center of Unit 4 . These facilities are designed to allow vehicles to travel at low speeds. Trees, benches, candelabra will be located in such a way that the car can only drive slowly at less than 10 km/h, thus allowing children to play in the street in complete safety. The island is designed so that the most vulnerable pedestrians, such as children and people with reduced mobility, are safe. The trafficable part of the lane which will not be differentiated by a specific coating will be narrowed in places with barely 2 meters for the passage of vehicles, thus forcing them to drive slowly.

Urban designs and functions: From the point of view of diversity, the district has a compact configuration around its "souika" center where the daily shops are located. It is well served by socio-cultural facilities (school, college, high school, health center, student house, sports ground). Beyond the social facilities and services, the original project envisaged basic community facilities of traditional inspiration, such as the neighborhood mosque, the school, the oven and the hammam. Thus, the pilot district is basically residential, but it presents a configuration with a fairly balanced diversity of functions. Its typology takes up elements of traditional architecture such as in the pedestrian streets, a hierarchy between public and private spaces reinforced by sabbahs,

Image 34. The dominant morphology is that of adjoining single-family dwellings,

grouped into small blocks. The height of the buildings varies between Ground floor+1 and Ground floor+2. There are buildings G.F+3, at the intersection of Avenue Hay Mohammadi and Boulevard Allal Al Fassi, in the Maniss Laayoune district. The density is approximately 115 dwellings and 430 inhabitants per hectare and the population of the district is around 16,000 inhabitants for 4,200 dwellings. The neighborhood associations are dynamic and will make it possible to extend the process of developing the eco-neighborhood. The neighborhood is friendly with a lively center. Regulation between existing businesses and street vendors is necessary. The district is adjacent to that of the university and welcomes students as tenants.



Image 34. The unit 4 city street view, source: (The ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2016)

The new functional urban organization of the neighborhood as a space of coexistence makes it possible to develop a set of local facilities spaces on the scale of the neighborhood, balanced and complementary. Their locations are proposed within the residential blocks of the district. Each island will have a piece of facility in its center.

Reinforce the Moroccan architectural identity: This measure aims to improve the architectural identity of the district, by establishing a set of recommendations and prescriptions which will make it possible to confer on the built environment of the district an identity and an architectural cachet which are the emanation of its own history and the culture of its inhabitants. For the operationalization of this program propose first of all to see to the insertion in the regulation of the development plan a set of measures which aim at the promotion and the production of an architecture carrying meaning and expressing the values of the community.

It should be remembered in this respect that the Unit 4 district was designed on a model of neighborhood unit which, moreover, was largely inspired by the urban structures of the old medinas. As a result, new constructions as well as elevations must respect this initial design. This is why the program would like the development plan and its regulations to recommend:

- Prohibit the elevation on the sabbats of the Unit 4 district;
- Forbid construction under the Sabbahs;
- Respect the verticality of the windows and opening in a 4/5 proportion;
- Superimpose the openings which must be of medium size (1.20*1.50, 1.00*1.25, 0.80*1.00);
- Fit the openings with shutters of the solid wood type to improve thermal insulation;
- Avoid door frames in tiles, marble, terrazzo or other borders;
- Prohibit half-arch windows and tiles on openings;
- Prohibit patterns in the paint;
- The bases are made of bush-hammered plaster, painted the same color as the wall;
- Prohibit foundations made of tiles or similar materials;
- Prohibit the installation of air conditioners on the facade;
- Encourage the principles of green facades (climbing plants, planted walls);
- Encourage wooden elevations with insulation;
- Encourage construction with thick walls greater than 0.40m;
- Encourage green roofs on part of the terrace;
- Encourage the installation of solar collectors for hot water;
- Prohibit the elevation of the 3rd floor;
- Encourage the installation of wooden or veil pergolas on the terraces.

The objective of these recommendations is to highlight the architectural elements of the built heritage of the district, with the aim of rediscovering and enhancing the architectural identity of Unit 4. This measure is specified in the realization of a technical study to formulate the conditions for improving the urban image of buildings with a view to its inclusion in the town planning regulations (PAS). The study will develop the criteria set out in the form of a regulatory proposal.



Image 35. Pergola design introduction for the south, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)

The construction of pergolas is proposed on the facades of the sunniest residential fabric (south and west facades). These construction elements are designed with a multifunctional character. In addition to the function of generating shade and sun protection, they can be used for the development of markets, flea markets, fairs and even workshops or cultural exhibitions, **Image 35**.

Environment As for the theme of nature, it is perhaps the most preoccupying at the level of the study area. Indeed, the connectivity between green spaces is very insufficient with a total of green spaces of 13,630 m² or 0.85 m² per inhabitant, including 7,570 m² of public parks (0.47 m² per inhabitant) and the rest of gardens which are inside the equipment. The rows of trees are irregular. Beyond air and noise pollution, which is largely the responsibility of motorized traffic throughout the city, it is important to rationalize the use of resources. It is also a priority for the city which, when organizing COP22, expressed its commitment to reducing its impact. In this context, efforts are made by the municipality to improve all the indicators, namely the reuse of wastewater for watering golf courses, the installation of electric buses, the distribution of electric mopeds, etc.



Image 36. *Creation of sports fields and green spaces in the coexistence space, source: (The ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2016)*

The new plan would include many free spaces that can be planted, receive equipment and have a better urban layout for the inhabitants. Furthermore, it would be wise to use the benefits of the greening of facades by gradually integrating them into this new urban planning approach. To involve and encourage the inhabitants in this process, it will be preferable that the public administrations proceed in the first place, with the greening of the facades of their administrative premises. The planted spaces will include alignment trees with draining surfaces and urban landscaping with benches and suitable lighting. The durability, solidity and durability of the materials must be studied to meet the concern for sustainable development and avoid constant and costly maintenance by the Municipality. The eco-district project expands the existing parks and gardens by redesigning the main arteries. Create a system of balanced neighborhood gardens in the interior blocks of the district with the possibility of being allocated, in part, to urban agriculture, **Image 36.**

Sustainable energy and resources: The houses have post-beam structures with filling in bricks or agglomerates often without double partition with vacuum favoring insulation. This type of construction has low thermal inertia and low resistance to heat in summer and cold in winter. To remedy this situation and achieve sustainable buildings in the medium term, it is proposed to carry out a program aimed at improving the energy efficiency of the housing stock. This measure has two objectives, on the one hand, the reduction of energy losses detected in the building stock and, on the other hand, the

improvement of the use of water resources in existing buildings. In order to maintain the comfort of users and improve the energy efficiency of buildings, we seek to limit energy needs, but also to integrate the use of renewable resources at the level of the building itself or of the occupants. To do this, the following solutions can be applied:

- Improvement of the thermal inertia of the roof terraces and the walls of the house so that the heat stored during the day is returned at night when the temperatures are lower;
- Execution of new facades (vegetable or wooden) that protect the house from external heat and prevent internal heat loss;
- Installation of solar protection devices, such as pergolas or sunshades, in order to create shaded areas and limit heat gain in summer, without disfavoring the contribution of natural light and passive heating in winter (protect yourself from the summer rays of a solar height 65° and take advantage of winter rays from a solar height $< 35^\circ$);
- Revision of the glazing used in order to improve the insulation of the openings in relation to noise and temperatures;
- Installation of VMC systems (Controlled Mechanical Ventilation) in order to renew the indoor air in the event that the building must remain closed so as not to let in or out heat, cold, outdoor dust;
- Use of energy-saving lamps, and even the possibility of placing awnings in the interior streets in order to create shaded areas during the summer months;
- Use of night ventilation to cool indoor air which has been heated during the day, the average thermal amplitude being 15°C ;
- Use of air blowers to create air movement for the thermal comfort of the occupants;
- Installation of solar water heaters
- Promotion of the rational use of energy through awareness campaigns.



Image 37. The overall masterplan proposal for Daoudiate neighborhood Unite 4, Marrakech, (The ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2016)

4.2.3.2.2. *Tangier city, Djmaa neighborhood*

The neighborhood studied is located nearby the Marshane neighborhood. This is the Sbila Djemaa district also called new medina within the framework of the development plan of the city of Tangier and the Marshane hill, a natural space and villas located behind the cemetery and in front of the old mountain. As part of the study of eco-districts, the study has established a shared diagnosis around 3 themes and 12 targets of the sustainable city. It is through these targets that it has transcribed the current functioning of the district and will then propose proposals to improve it. The investigation area has the particularity of presenting large urban complexes entirely dedicated to

pedestrian traffic, namely the medina, Marshane (Sabila Djema'a), Dradeb and the cliffs of Marshan (Hafa and Bouknadel).

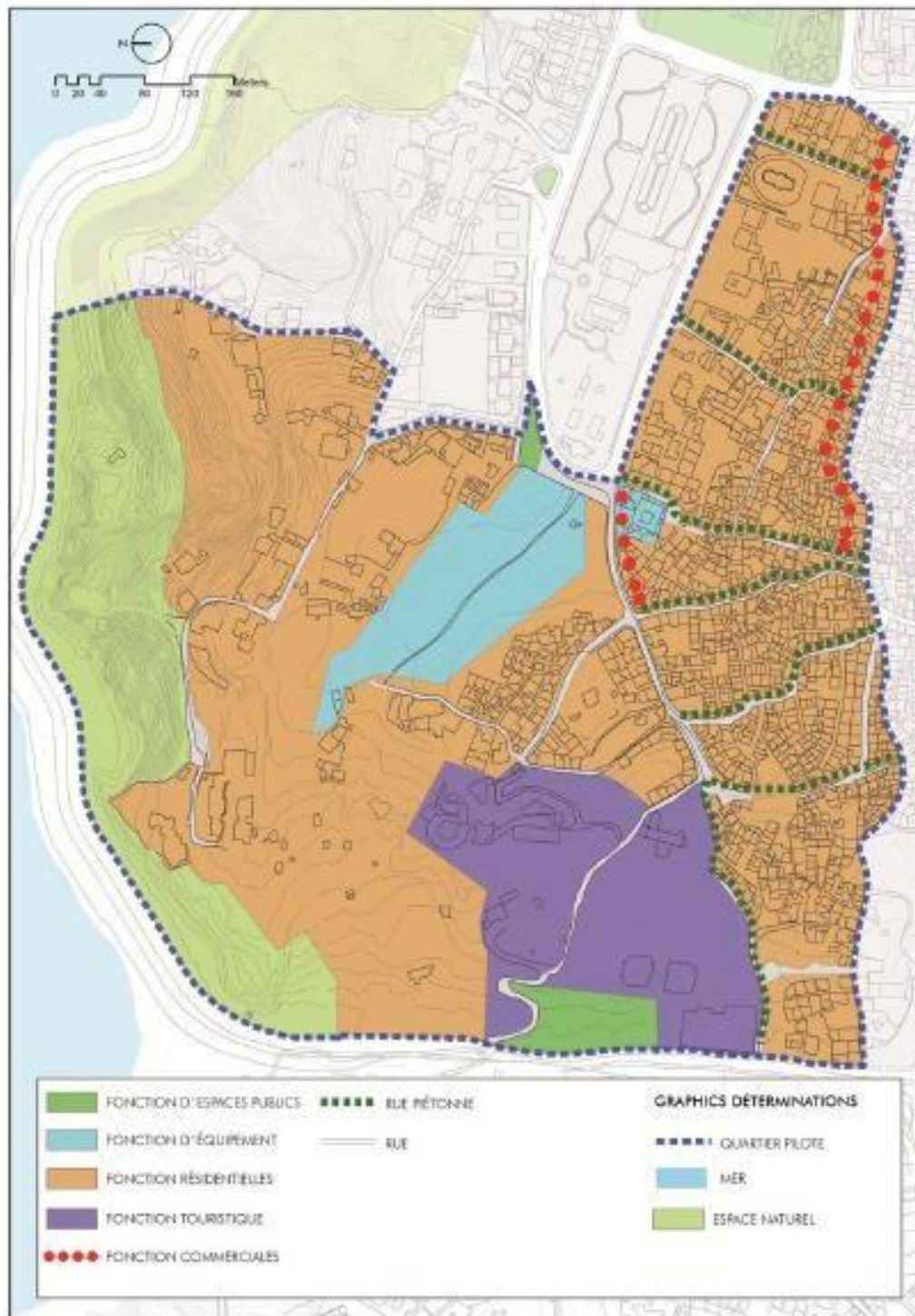


Image 38. The main functions of Djmaa neighborhood, Tangier, (The ministry of National Special Planning, Housing, Urban Planning and City Policy, 2016)

Transport: In terms of mobility, the district is quite well served by public transport. A small taxi station is located on Imam Hanafi Street. However, note that the difference in height between Dradeb and Sabila Djema of 70m is a problem for the inhabitants when they are loaded with packages, but also for the elderly and people with reduced mobility. Public transport still does not have its own site, which would give it a real advantage over private cars (speed, frequency). Indeed, and as for the whole city of Tangier, the buses have a frequency of more than 30 minutes.

Currently, the urban area of Marshan-Djema'a does not have a complete street structure. There is a lack of adequate connections within the district (D'jemaaa in relation to the Littoral area), with the access roads to the adjacent districts (inter-district roads: Hadj Mohamed and USA avenues) and with the main primary axes of the city (Route de la Plage). The inadequacy of the current street structure does not allow traffic flows to be properly channeled and distributed in the neighborhood, which makes it impossible to immediately and directly implement a solution to reduce private vehicle traffic on the street. Imam Abu Hanifa, the main axis that structures the life of D'jemaa. At the same time, this insufficiency means that access to the public transport service is not efficient, since it is impossible to set up new stops and it is not possible to generate a modal exchange. In order to improve public transport, it is advisable to organize sustainable mobility by providing a nod in front of the cemetery that would include a bus stop adjoining a parking lot for cars and bicycles as well as a taxi station.



Image 39. Extension of the street to open cul-de-sac and provide more accessibility to the district, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)

The construction of a street between street Moulay El hassan and Rue de la plage constitutes a new access for the district to the coast. It will improve the integration of the eco-district with the rest of the city and will facilitate the implementation of other measures, in particular the creation of a multifunctional building with covered parking, shops and a hotel. Adding to that an Extension of Imam Abu Hanifa Street North. This action would improve the interior structure of the Djema'a district plays a key role in the correct orientation of the motorized flows entering and leaving the central part of the eco-district (Djema'a), by solving the dead end -current bag from Imam Abu Hanifa Street.

Urban designs and functions: The district is relatively well equipped considering the population of the municipality and the level of accessibility. However, Marshan D'jemaa has shortcomings and gaps in proximity facilities. The level of service and accessibility (pedestrian) by type of facility generally complies with the standards laid down by the guidelines of the urban planning department. Several primary schools, colleges and high schools, health centers and hospitals are located less than 750 m from the prototype district. The Marshan sports ground is located less than 30 minutes away on foot and its surface area (3.5 Ha) is well above the standard of 1500 m². The district is basically residential, but it is very marked by a functional mix. There are local shops and activities (village hall, Miramonte campsite) which could be attractive to residents of other districts. The center formed by Imam Abu Hanifa Street, which serves as a

secondary center, is very attractive for the inhabitants of the district. They can find all the usual shops there at low cost (groceries, traditional bakery, butcher, chickens, etc.). At the level of the investigation area, there are also attractive activities for the inhabitants of other districts (Kortobi hospital, palace of Italian institutions, Psychiatric hospital, SAPT, the treasury, Hafa café, Phoenician tombs, etc.). The neighborhood also has a diverse population. The poverty rate is 3.81% and the vulnerability rate is 15.24% in the commune. The population of the Djemaa district has become impoverished a little like the medina. With the advent of automobiles, the middle class moved to neighborhoods that were more accessible by car. However, the cliff areas and those of the Marshan hill include villas with a very privileged situation appreciated by the wealthy.

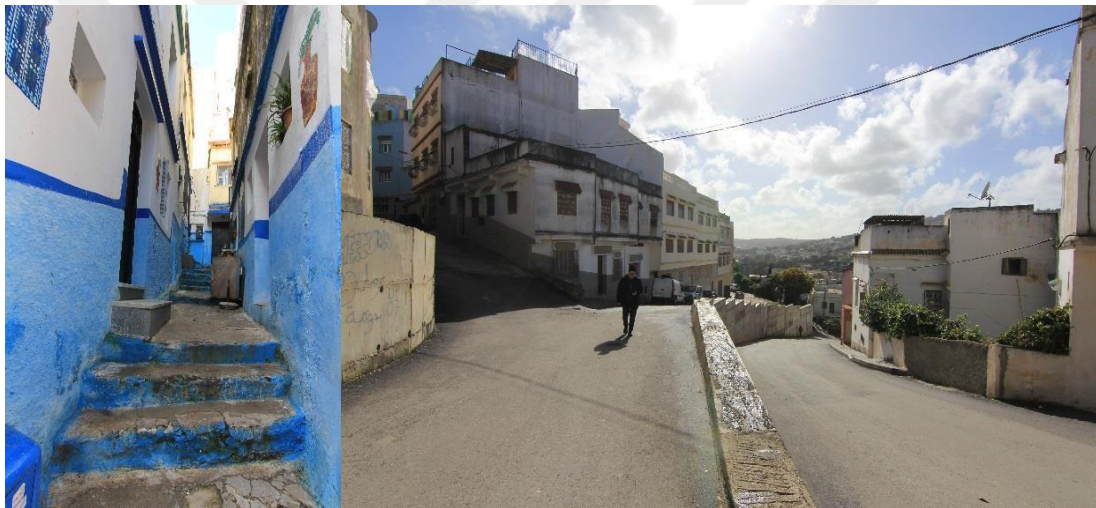


Image 40. Left: Djmaa neighborhood street, Right: West entrance of the district with view to the hill, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)

The diagnosis showed that most of the housing in the neighborhood is over 40 years old and has not undergone recent renovation work. Likewise, it has diagnosed the existence of some dilapidated and abandoned buildings, as well as pockets of sub-housing within the eco-district that must be eradicated, in order to promote social cohesion, avoiding the risks of insecurity and marginalization, and by proposing to relocate this population in the proposed new residential buildings, preferably the one located in the new western access to the eco-district. Finally, in order to guarantee basic housing needs and to achieve one of the principles of ecological urban planning, based on social cohesion, the objective is to meet the demand of young people living in D'jemaa who

wish to emancipate themselves and want to continue to live in the neighborhood, both inside and around, taking advantage of some vacant land that will be used to extend the residential offer. After the relocation operation, it is proposed to use plots occupied by unsanitary housing (slums) and buildings that are in danger of ruin for the construction of small amenities and green spaces in the neighborhood.

New multifunctional building was proposed as hotel facility. The objective is to promote multi-purpose building strategy as well as generate a new landmark at the entrance to the eco-district from the Route de la Plage. The proposed functional program calls for an innovative and experimental architectural response that promotes a new "brand image", creating a point of attraction for the eco-district for the rest of the city. In this complex building, it is considered essential to achieve a mix of tertiary and tourist uses in conjunction with the means necessary for the implementation of sustainable mobility actions. It is an action that promotes the economic and social development of the district.

Environment: The district is a privileged area in relation to the presence and proximity of natural space, which gives it many opportunities. It has a high biotic index of 67.53%. On an area of 45 Ha, our pilot district benefits from around 10 Ha of natural space made up of the cliff and the slope on the plateau on the West side with a view of the Vielle Montagne, around 7 Ha of residential green spaces located on the Avenue des USA and between the plateau and the cliff. The district benefits from the large public garden of Marshan with an area of 3.5 ha less than 10 minutes away on foot. This space is very attractive for all social categories, young and old. It can therefore be seen that while the overall surface area of natural spaces is satisfactory, with approximately 12m² per inhabitant, certain uses are in deficit, in particular children's play grounds and the local public garden. On the social side, pockets of semi-wild vegetation and spontaneous, albeit modest, initiatives to plant trees and even small gardens in abandoned or residual spaces can be observed in the neighborhood.

In relation to biodiversity, the close presence of highly naturalized spaces, such as cliffs or mountains, relieves the lack of green spaces and the high density of the built environment on the threshold of Marshan/Dradeb. Other semi-natural spaces, such as the cemetery, the private gardens or the Miramonte campsite, the vacant spaces also contribute to biological connectivity for the benefit of bird and insect species. These

spaces are currently undeveloped urban wastelands that should be preserved by protective measures.

In the Sabila D'jema district, due to the high level of built-up area, it is difficult to remedy this deficit. However, some vacant urban land or areas to be renovated may offer small neighborhood play areas of 50 to 100 m². These small lots will enhance the urban landscape. Furthermore, allowing the planting of climbing plants in the streets will also improve connectivity and the urban landscape. The objective is to ensure that most of the population of Sabila D'Jemaa has a green space within a reasonable distance of about 200 meters. This concept is also intended to be extended to the surroundings of the eco-district, also taking advantage of the existence of vacant land. Thus, it is necessary to adapt all the small unoccupied spaces that appear in the urban fabric of the district for its landscaping.



Image 41. *The unoccupied lands turned to proximity parcs, source: (The ministry of National Spacial Planning, Housing, Urban Planning and City Policy, 2016)*

The most significant unoccupied land near Djema'a and which would make up for the lack of urban parks is located to the west of the neighborhood on the hill. It is a steeply sloping terrain that will be accessed by the new connection road between the beach road and the neighborhood. This land is located in a Tourist Zone (ZT). The development of

the park with restanques would allow the insertion of some leisure equipment. On the other hand, the Prototype district of Marshan could in the area of the cliff devote part of its natural spaces to urban parks. This will be an opportunity to reinforce the plantations and to provide some pedestrian paths in connection with the cornice. This complementary action will make it possible to meet the needs of the parks in the eco-district and for the city. This will be possible with the addition of the park located on the hill, **Image 41**.

Sustainable energy and resources: The objective is to develop a program to promote works aimed at improving the habitability and rehabilitating existing housing by adopting a sustainable approach. The goal is to make more than half of the existing buildings in the district sustainable within 10 years, so that energy consumption in the district can be reduced by 15% by 2028. Improve the architectural identity of the district, by establishing a set of recommendations and prescriptions for the protection of the urban and architectural fabric of the district. It should be remembered that the district was built at the end of the 19th century on the urban model of the medina. This district is steeped in history and deserves special protection rules. The development plan provides ZR zoning for the neighborhood that requires restructuring; in accordance with article 32 of these regulations. Therefore, the plan should consider the Sabila Djema'a district as a slum, which is unsuitable for the actual situation. This additional measure therefore, aims to modify the development regulations in order to modify the zoning of the district for which it is recommended rehabilitation zone zoning with prescriptions adapted to the district.

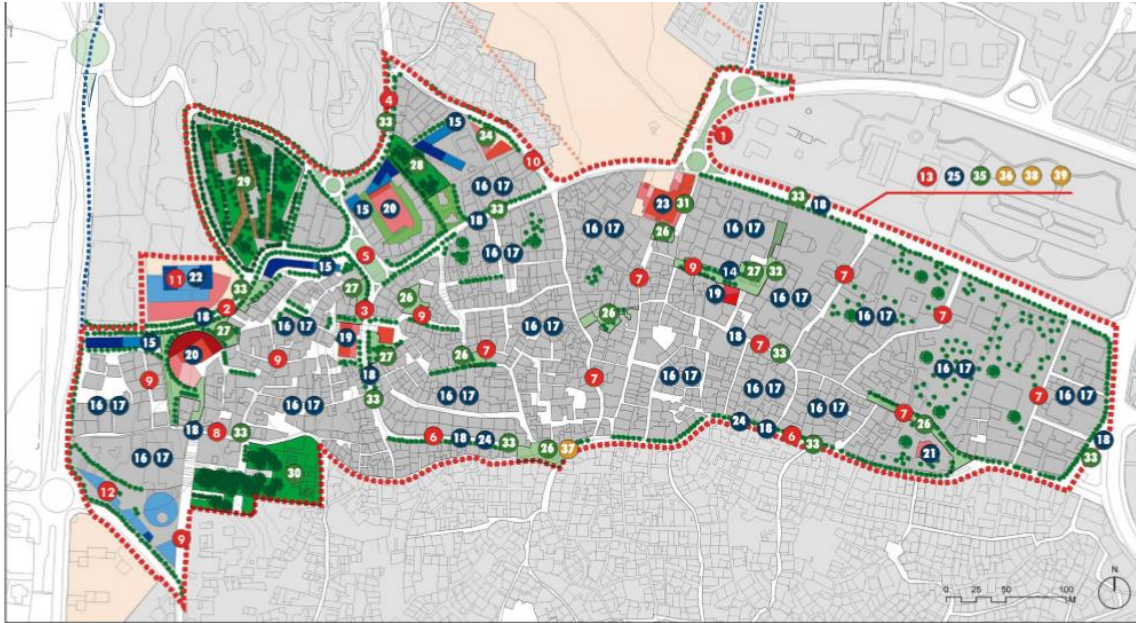


Image 42. The overall proposal of green Djmaa neighborhood, Tangier, (The ministry of National Spatial Planning, Housing, Urban Planning and City Policy, 2016)

4.2.4. Moroccan green cities

This part targets the constructed green cities of Morocco. Zenata city that is situated between Casablanca and Rabat, and Benguerir city nearby Marrakech. Both towns are on the last steps to be completed, **Image 43**. This section will discuss the sustainability principles that funded the green cities, as well as the sustainability parameters targeted by the cities.

4.2.4.1. Zenata Eco-city

The Grand Casablanca region, which alone has 3.7 million inhabitants, is particularly affected by the environmental issues that Morocco face and the African contest face. While its west side has developed particularly well in terms of facilities, the east side of the city remains landlocked and poorly served by urban infrastructure. Casablanca's wastewater collection network is not fully connected, leading to common discharges into nature or into the sea. The region also faces the challenge of uncontrolled dumps that pollute the air. and groundwater around the city.

However, these urban issues are increasingly taken into account in prospective debates on the city. The notion of sustainability is at the heart of discourses on the country's urban strategy. Morocco is proving to be a “leader of urban projects labelled “sustainable”, (Pierre-Arnaud, Premiers quartiers urbain «durables» dans les pays arabes:

enseignements sur une génération spontanée, 2011). Especially since this new benchmark for action echoes Morocco's diplomatic ambitions: to position itself on the African continent as a leader in sustainable development. However, in many cases for Moroccan projects, the concept of sustainability is often used to produce a communication effect, to attract investors and future buyers rather than to describe a reality.



Image 43. Zenata position besides the two metropolis, Rabat and Casablanca, Source: Société Development de Zenata, SAZ

Located at the crossroads of the operations of new towns and sustainable towns, the Zenata eco-city was able to take advantage of this first feedback so as not to repeat the mistakes of the old operations. Considered as one of the most promising projects in Morocco and on the African continent, supported by international donors (AFD, EIB), subsidized by the European Union and labeled HQE Eco-city, Zenata eco-city as a test platform in Morocco for a paradigm shift in urban planning strategy: from a new town logic to a new sustainable town logic. The city of Zenata is located halfway between the capital Rabat and the Metropolis Casablanca. It is part of Casablanca region, and has an Atlantic waterfront that is extended to 5.35 km. The city general surface is 1830 ha that was conceived to be a sustainable development with 1/3 surface designed for green space, (Pierre-Arnaud, L'exportation au Maroc de la « ville durable à la française », 2014). This

distribution corresponds to approximately 15 m² of green spaces per inhabitant, knowing that the WHO (World Health Organization) recommends 9m²/ inhabitant. The city has 400000 inhabitant, and was built favoring human scale.

4.2.4.1.1. Zenata city sustainability Principles

Environmental Planning

Zenata seeks to optimize natural resources at the city level through a bioclimatic strategy. The air is used by an oblique aeraulic grid which creates islands of freshness, thanks to the orientation of the future elements of the building according to the winds. The city is therefore naturally ventilated, allowing cooling (2 to 3 degrees) in summer, and humidity regulation in winter, **Image 44**. Also, the water is drained towards retention basins on the surface, thanks to the natural unevenness as well as the canals. This development allows the regeneration of groundwater, to reduce the capacity of underground conduits, as well as to minimize the size of the discharge structures towards the sea. In 2016, the eco-city was labeled HQE Aménagement by the certification body Cerway. It is also ISO 14001 certified for the environment. Although the Zenata eco-city has not yet established a precise strategy concerning renewable energies, the “green corridor” aims to become an area for experimenting with the energy mix in the territory.



Image 44. Zenata main Design, a green main axe with transversal corridors from west Atlantic Sea.
Source: Société Development de Zenata, SAZ

Economic equity

The Zenata eco-city also allows industrial relocation, with the development of a 69-hectare industrial zone. A veritable "locomotive" of the territory, the trade hub, which aims to create value, wealth and jobs, is already entering its second phase. In 2013, SAZ

signed a development agreement with three major players: Marjane Holding, Sonae Sierra and Al Futaim. Zenata aims to become a city of services, and to achieve 100,000 jobs for 300,000 inhabitants. Also, the eco-city obtained the CSR label in 2016.

4.2.4.1.2. Zenata city sustainability Parameters

Zenata city Transportation

The Zenata eco-city will be fully accessible. Its objective is to combine collective mobility and soft mobility in order to reduce the ecological footprint of the city. Thus, the collective mobility plan provides for the establishment of a multimodal station: train, RER, tram, bus... The whole city is equipped with cycle paths. The Zenata eco-city aims to be a “walkable city” thanks to “a local network made up of “street gardens” [which] makes it possible to prioritize the different forms of mobility”. A plan made up of 13 km of autonomous pedestrian paths makes it possible to connect the various neuralgic points of the city, **Figure 11**.



Figure 11. Pedestrian Plan of Zenata city, source: Société Développement de Zenata, SAZ

In general, the eco-city promotes local mobility since the city is organized according to the principle of Moroccan medinas: each living unit is built around a public

square, which offers all the necessary equipment (health, education, worship, trade). Each service must be accessible within a 10-minute walk.

Social equity

Zenata eco-city aims to meet the social challenges of the area and the project. This planning is led by the Resettlement Action Plan (RAP). In 2013, a first rehousing plan for slum families was launched, without consulting the population, as part of the government program “Cities without Slums”. If habitats have been built for rehousing, these have not been accepted by the population, often established in the territory for generations.

In order to meet the demands of slum households, the SAZ, accompanied by the social contracting authority, has started a resettlement plan. This system aimed at granting plots of land to slum families is preferred, because in addition to offering them the possibility of remaining on their land, resettlement can be free, thanks to the associated third-party system. The associated third party allows slum families to be exempted from financing their new accommodation. Two shantytown families called “pairs”, beneficiaries of the same plot of land can associate by contract with a third party not eligible for the VSB program (developer, investor, etc.). This associated third party then undertakes by this contract to finance and ensure the construction of a building with several levels of housing, the delivery of housing to each family, as well as the assumption of the cost of the land normally returning to slum dwellers. In return, they get the two remaining floors, where they can live in , rent, or sell.

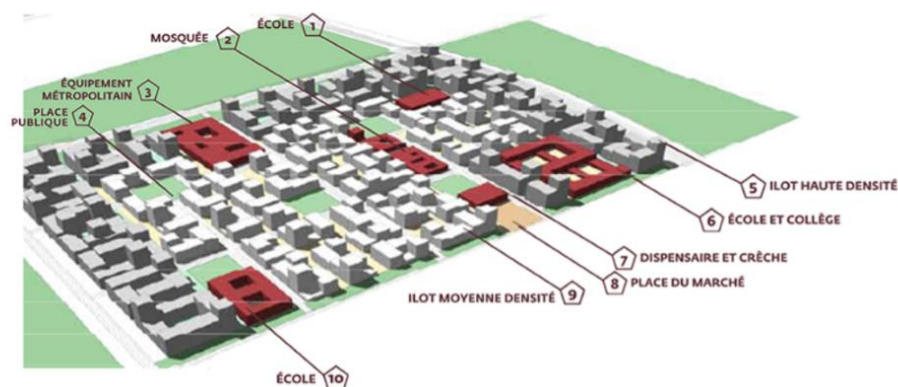


Image 45. Example of neighborhood mix functions in Zenata proposal. Source: Société Développement de Zenata, SAZ

The Zenata eco-city tends to be part of an increasingly inclusive and participatory approach. The first inhabitants of the Zenata eco-city, the slum dwellers are consulted one day a month. The group participating in this consultation represents 20% of the total population, distributed according to a varied and egalitarian socio-spatial representation. During exchange workshops, citizens are informed of the progress of the eco-city project in general, as well as of the conditions, timetable, costs, procedures, etc... These discussions allow residents to share their questions and demands. In general, taking into account the social aspect in the project marks a change in the way of thinking and conducting development projects and public policies in Morocco.

Urban Design and Function

The development of land is not only supplying houses and residential areas, but also the infrastructure that would withstand the livable city motto that the city tries to push. This is why the first phase of the development of the eco-city is the development of a metropolitan axis, crossing the entire territory of Zenata, from the road to the sea. The objective is to be able, from the departure, enhance the territory by creating economic activity, develop local facilities and access infrastructure. For this, three strategic poles, called “locomotive poles” are being built even before the development of the first residential complexes, **Image 45**.

The urban planning is following aeraulic grid showcasing nodes such as noise pollution nodes, that would be taken in account for sustainable land distributions. Zenata city can go beyond Moroccan regulations. For example, nothing obliged the SAZ to draw up a resettlement plan for slum households living in the douars present on the territory of the eco-city. Indeed, to date, no urban operation in Morocco has gone so far in a resettlement operation with so many constraints. In other projects, developers are content to expropriate and compensate households. In Zenata, the project meets the requirements of the World Bank related to the resettlement of slums.



Image 46. Left: Zenata Health center, multifunctional city. Right: The green axe which is the skeleton of the city design. Source: Société Développement de Zenata, SAZ

The Zenata project therefore claims to be a test and a demonstration platform for new urban practices. Planners of the city cannot push over planning decisions they impose urban regulation on Moroccan cities, but they can provide a working example for sustainable urbanism that can act as referential for other green cities. Thus, new practices, and suggestions are experimented in the city ground. Zenata still displays the ambition to make a well mix city. 10,000 shantytown households are a good start. Afterwards, the question is whether these families from the slum citizens mix in the same way as the others will. Or will the segregation and discrimination find its way to reproduce themselves in this new space, despite the ambitions of its client? Zenata displays a certain ambition by resettling the slum dwellers in the heart of Zenata: it is to consider them stakeholders in the new city.

4.2.4.2. Benguerir Green City

Benguerir city is not an imperial city. Settlement there had been mostly due the military presence in the region. The city is at 50km from Marrakech one of the oldest imperial cities of Morocco. The development of the city was only due to necessity with the growth of phosphate mining industry nearby. After riots in the region due to social problems and segregations between the Office Cherifien for Phosphate, more known as OCP (Moroccan state-owned phosphate miner) and residents, the office decided for a transition in policies to change the mining cities to sustainable cities. One of their biggest targets was Benguerir city, (Abdelaziz, 2006), **Image 47**.

In 2012, OCP had the idea to create new mining cities image that would change the company image too, (Boyer André, 2014). Benguerir city new vision was to create a green city that is centered around research, thus create a research hub. The focus point was to

create a university that would help start and boost the city, (SADV(societe d'aménagement et de developement vert, OCP), 2012).



Image 47. Benguerir Green city main boulevard, Morocco. Source: Google image.

Benguerir is situated at the south of Morocco with dominant semi-arid climate, (Agence Nationale Pour le Developement des energies renouvelables et de l'efficacite energetique, 2018). It has long months of dry summer, the temperature reaches its highest points in July, and short cold season. As the figure shows the grey area for adaptative comfort zones temperatures throughout the year, Benguerir mean temperatures are mostly outside that zone either too cold or too hot with maximum of 45 C in July, **Figure 12.**

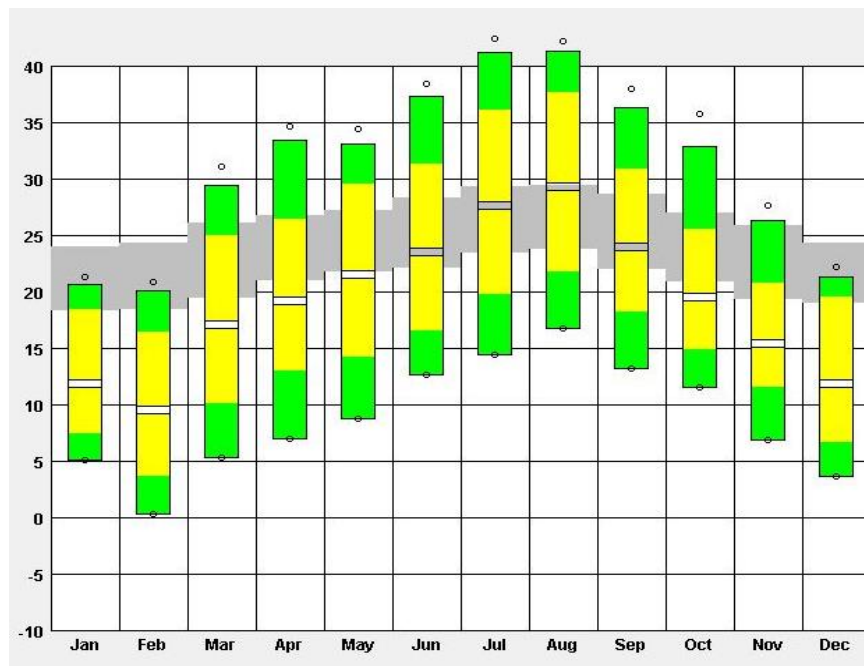


Figure 12. Temperature range of Benguerir using Climate Consultant Software.

The city aims to hold 91000 habitants. The initial phase had been achieved containing Education Quarter: Excellency Highschool with expectation of 1800 resident students in 2025, phase I of the university Mohammed VI polytechnic university having 6000 students in the horizon of 2025, Tech Park zone including: Data center, Innovation incubator, Green Park energy center, Green smart houses park, with Solar decathlon 2018 prototype houses. Residential Quarters: Research villas neighborhood, Marguerite villas neighborhood, **Image 48**.

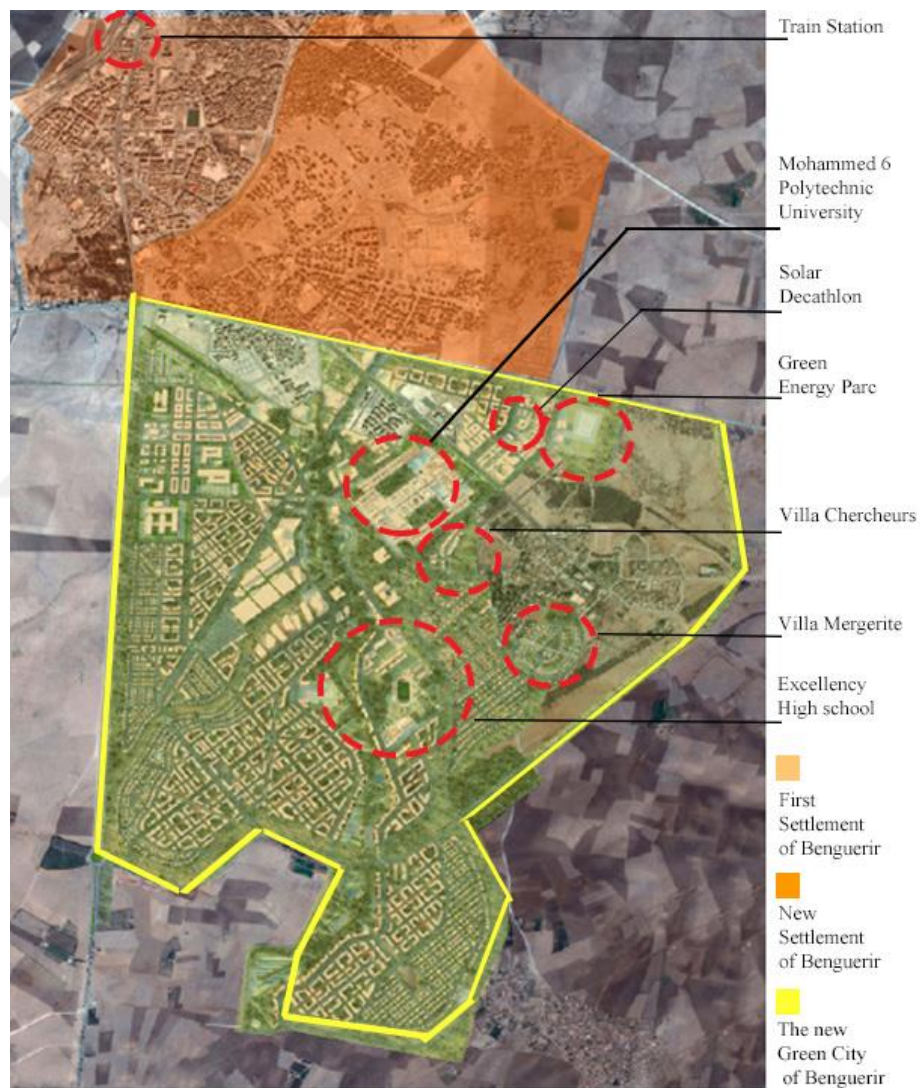


Image 48. Benguerir City and two examples of the existing city and the new green city, *Densities and Urban Forms Referential*, Urbanism and Territory Ministry, 2016

4.2.4.1.3. *Benguerir city sustainability Principles*

Environmental Equity

The city was planned to be an oasis in this challenging climate. The city main purpose of being centered around university and research hub is to create innovative technologies to overcome the challenge of greenery and desert. The main research laboratories that are set: such as the experimental farm, that would innovate arrogation and other challenges, and energy park that provide clean energy and efficient solutions to integrate are set in the city to promote research and help keep up with its sustainability challenge.

Economic Equity

OCP pledged to create various job opportunities throughout the project of the green city development be it direct or indirect. The city includes an Economic Activity Zone dedicated to innovation players, with a range of services and specific support. The introduction of the huge projects, such as the university and research hub had made the city have other economic resources than relying on its mining function. It also gave it the status of a city rather than a rural small settlement.

Social Equity

The university funded by OCP had been the focus of the social attribution of the company. It provided scholarships, solidarity markets and mixed use buildings (residential/commercial) to citizens.

4.2.4.1.4. *Benguerir city sustainability Parameters*

Transportation

The city main focus is minimizing CO2 emissions, therefore various alternatives are provided such as: Public transportation: bus lines, fast rail shuttle linking Marrakech, a car sharing application. The city also had planned a bike road that started with full line map at university campus and would be extended towards other parts, as well as a pedestrian crossings path.

Environmental Planning

12.5 ha urban park of greenery planned for Tech-park. The remaining most environmental planning is focused on the CO2 cut down while planting olive trees for compensation. The city is also planning various sports fields and playgrounds that provide interactive spaces for the residents.

Urban Design and Functions

The initial plan for the city is to be an experimental urbanism and an example for African sustainable cities. Quality living spaces coupled with a future real estate offer and attractiveness services. Designed as a privileged place of life for its inhabitants, the Green city of Benguerir project aims to offer an optimal quality of life, minimizing nuisances, promoting tranquility and harmonious cohabitation in the community. In order to achieve this objective, the city has been designed around: autonomous districts, each with the facilities necessary for its inhabitants (schools, public spaces, etc.) and providing accessibility for all. This modular design aims to guarantee residents local access to shops and services and thus reduces travel and CO2 emissions. Green Axe, “Coulée Verte”, the true backbone of the urban center, which will include the city's major facilities, structure all the soft routes, and organize the network of roads with all the districts and the site. Positioning sustainability and intelligence within its thinking, the city will be equipped with smart urban networks and services for the greater comfort of its future users.



Image 49. Left: Riad neighborhood in the existing old city of Benguerir. Middle: OCP old social housing settlement nearby the green city of Benguerir. Right: Marguerite villas district for OCP engineers.
Source: Author, Morocco 2021

The region was known for use of earthen materials specially” clay” for housing in order to offer comfort inside the building. However, with years of quick urbanization and the concrete spread and easy manipulation, the buildings of those region lost their thermal efficiency as concrete does not have the same thermal masses and insulation capacity as

clay has. The old original part of the city that originally was the initial settlement, had continued its growth specially with the economic boost of the green city and the creation of more job opportunities. New neighborhoods are still created in the North part of the city. Accompanying this growth, the continuation of the green city of Benguerir at the South, **Image 49**.

Energy Efficiency

The city stakeholders had decided to introduce labialization system to the city buildings in order to promote sustainable awareness and the competitiveness for it. LEED certification was chosen as it had led to more global audience, and it made Benguerir city the first one to choose an English label instead of the French HQE. Till these days, two buildings of the university had been granted silver LEED certification. The sport pole building had improved 14 % on baseline building performance and 7% onsite renewable energy usage. In 2015 the Learning building had also been certified silver by 18% of improvement of the baseline, (Green Building Information Gateway, n.d.).



Image 50. University Polytechnic Mohammed VI, LEED silver certified buildings: Left: Learning building. Right: Pole Sport. Source: Recardobofill.com

Benguerir green city had targeted the issues of excessive cooling needs in residential areas specially and tried to adopt more adequate solutions that would create sustainable and green buildings. One of the executed projects is “Villas des chercheurs” in Moulay Rachid neighborhood. The project was to create villas that use mostly passive solutions in order to minimize energy usage. The villas are built in the traditional way with court yards, stone and clay materials domes for the living spaces.



Image 51. *Researcher villas, Gated neighborhood, Benguerir Green City, Morocco, 2021. Source: Author*

The heat is stored during summertime with the help of greenhouse effect from the tower system installed on the roof of each villa. It is simple chamber with captors and plastic cover to maximize the heat stored. Then the system is linked to a package bed that is layered underground the building with stones that retain the heat for winter months. In the winter, Temperature captors would activate the system to release the heat through the house if needed, (Harmeet Singh, 2010). In summer, the thermal mass of the thick walls delays the heat access until the night-time when it is colder, and some heat would not harm, **Image 51.**



Image 52. *Urban Pergola, University design of integrated PV pergola and shade design. Source: Google image.*

Other projects were designed with the same targets, reduce energy usage, renewable energy integration and spatially hold on the identity of the region. Even with bigger projects such as Polytechnic University campus, the main targets were still present such as the usage of local building methods and typology, **Image 52**.



5. CONCLUSION AND DISCUSSION

Morocco had pledged to be a leader for African cities sustainable transition. The policies may have started due to the political and social constraints. However, the pledge is still on going for many years despite the rocky road. The process that the kingdom is witnessing is worth of record and interpretations very few countries share the same experience. The country, however shares the same context as many other north African and Arabian countries, thus it is a set for experimentation and research in this field.

This chapter would introduce the roadmap of Moroccan sustainable and green cities projects that has been until now executed and researched. Four research projects were considered, (See 4.2.3): Benslimane city. Dakhla city, Tangier city eco-neighborhood, Marrakech city eco-neighborhood. Another two executed green cities were also analyzed, (See 4.2.4): Zenata city and Benguerir city.

The sustainable transition did not happen overnight but was a result of identity crisis and post colonization urban crisis. Thus, an introduction to the transition impact on the overlaying existing Moroccan cities is firstly discussed, then an analysis of the progress and challenges of Moroccan example in comparison to the progress made by worldwide cases discussed previously (See 3). It would allow further studies to take into account the possibility of Morocco as a study reference. Then it would be concluded with lessons learned from Moroccan experiences as well as the possibilities of solutions to improve this experience.

5.1. Moroccan cities identity transition Impact

The development of Moroccan cities had seen various changes from the new Islamic cities, French modernism settlement to Postcolonial cities. Each of these periods have distinct identity portrayed architecturally shaping the cities into a whole different setting.

The Pre-colonial period had defined Moroccan architecture especially as it showcased the fusion of Andalusian and Amazigh architecture coming together. The cities built at this period were new settlement and mostly portrayed the Islamic urbanism characteristics by keeping the religion as a focus for planning decisions, such as city growing around mosques, privacy is priority for design, etc. It also took into account the context which is the reason of settlement appropriation with site slope, courtyard designs

as a passive solution to be protected from heat, integration of water elements for cooling and absolute usage of materials with high thermal inertia to delay the solar gains from creating discomfort indoors.

Table XV. *Architectural identity characteristics of Moroccan cities through time. Source: Author.*

Time Frame	Spatial Organization	Semantic Organization	General design Principal	Shape and Form	Building Materials	Relationship with the context
<i>Pre-colonial Period</i> <i>600-1700</i>	Organic growth. One core/ Walled cities or fortresses	Privacy reflected in society and buildings	Voids in mass	Courtyard houses	Clay, stone, wood	Existing
<i>Colonial period</i> <i>1912-1956</i>	Grid system One core	Oppression by introducing bigger forms, massiveness	Mass in voids	Art décor, Modernism	Concrete	No relation
<i>Post-colonial</i> <i>1960-2000</i>	Semi structured planification, Grid System, unbalanced centers	French dependency by reflecting the same shapes	Mass in voids	Modernism, Deconstructivism	Concrete	No relation
<i>Sustainable cities</i> <i>2000-2022</i>	Grid system Multiple centers	Same as Medinas	Mass in voids	Courtyard passive houses Green buildings	Concrete, local materials	Existing

Colonial period had shaped new identity by introducing Modernism movement to the country and leaving the old settlement as it is. This had created a rift in the cities, two centers that each group use. Moroccans using Medina, Foreigners using La Ville nouvelle. The introduction of the city new planning and hierarchy changed the citizens lifestyle, too. Neighborhoods are no longer for Moroccan communities. This influence would linger in the shaping of the future urbanization of Morocco.

Post-colonial period is highlighted by two narratives: the rejection of French modernism and return to Pre-colonial identity, especially for government places. The second narrative is the ongoing French city planning for new cities as consequence of lack for Moroccan expertise. It would be only after 2004 that the country would strive for a new Moroccan urbanism that would mend all the problems, **Table XVI**.

Moroccan cities are witnessing a sustainable transition as a way for development. It had put a strategy for Moroccan green development and urbanization, a frame for all

future cities transition projects. Beside the environmental transition, sustainability transition strategy aims to return the lost Moroccan cities identity by reintroducing certain elements such as:

Respecting the existing settlement and continuing it: Most of the research projects that the country proposed are based on the principle of “Build the city on the city”. For the case of Dakhla city, 4.2.3.1.1), the aim was to create scenarios for the development of the city without hindering its existing identity. The centers were not touched keeping the base of social life and the sense of place, (See: 2.4.1). The areas of development were the outskirts industrial areas and the expansion of the city direction. In the case of Benslimane city, (See: 4.2.3.1.2), the development was mainly to give the city a sense of identity. The city was a disruptive settlement without a center or a sense of place. The Eco-city was an example of establishing an identity that has not existed yet. This was made by having the city suit the principle of the Medinas. The experimental eco-neighborhoods examples also show the same principle of the redevelopment projects: they do not touch the existing buildings or the architectural identity of the place, (see 4.2.3.2).

Create multicenter that have same characteristics and sematic organizations as the Pre-Colonial cities' identity: Common Ground of the sustainable projects of Morocco is to keep the semantic organizations of the Moroccan Pre-colonial cities, (see 2.4.2). Meaning by it some of the essential functionality in each district that keep up with Moroccan culture. Each center would at least have a public bath, a public oven, a school, and a mosque. Those essentials were the constitution of every district in Medinas to be even called a district. In the same way the green cities try to incorporate these elements not only to keep the culture but also the habit of Moroccans that made them recognize a neighborhood as such, (see 2.4.1)

Return to the forms and shapes of old Medina and preserve the courtyard Moroccan houses: One of the most striking aspects of architectural identity is the physical representation of this identity meaning the form, (see 2.4.2). The shift that happened between the precolonial and colonial period that had changed Moroccan architecture identities, (see 4.1.2), seems to fade away with emergence of new green cities that keep the precolonial identity using the forms and shapes of the past. It is revival of the old cities rather than duplication of the medinas as it is only referring the forms in their usage. A good example of this would be Benguerir “Research Villas”, (see 4.2.4.1.4). The villas

used the typical courtyard Moroccan form to achieve better energy efficiency as the form helps keeping minimum soar gains in the long summer months, (see 0).

Integration of local materials to achieve better energy efficiency and reflect the identity of the place: The examples of the research projects promoted “local Know how” by integrating both local technics and materials, (see 4.2.3.1.1). It is common practice to use vernacular architecture as a mean for energy efficiency. It seems that this practice was also integrated in the context of southern Morocco cities such as Dakhla and Benguerir, (see 4.2.4.1.4).

Sustainable cities are trying to bridge the gap that colonial period urbanism had created with drastic different identities in the same city. Even though the planning may still face challenges for the already spread cities such as the case for the imperial cities. It is a step for the relatively new settlement to continue a sustainable urbanism while keeping the original of Moroccan identity.

5.1.1. Sustainability parameters influence on Moroccan cities identity.

Morocco seems to live a sustainable transition that quickens its pace in recent years especially with the risen awareness among the youth. This transition is taking a slow pace that allows the identity to handle these changes. The examples of Moroccan sustainable cities are in two categories: Research projects, which are projects are currently only made into proposals, and yet wait to be applied in reality. Then there is funded government projects such as the two cities exposed in this article: Zenata funded by SAZ and Benguerir city funded by OCP, these examples had already been constructed and are slowly being finished.

Sustainable parameters actually are arguably interfering in multiple ways with the identity as the choice made between the two may mean losing the other. Is it actually very well known that sustainability application worldwide is not imposed by any international laws. The SDG, (See:2) are in the same way not bided by any restrictions. However, the application of this parameters may require governmental interferences and sometimes regulations for immediate or quick integration.

Energy Efficiency and Renewable Resources: Renewable Resources such as solar panels integrated in buildings are usually a form imposing in the construction. It may seem more natural with forms that are already fitted such as inclined roofs which is not

the case for the majority of North African and Moroccan climate context, (see 4.2.2). There are few models for such context making the European approach not fit as examples. The reason why Morocco is taking a living lab approach in the executed projects such as Benguerir city, (See 4.2.4.2), is basically trying to combine technology with exiting historical vernacular solutions. It is still experimental for generation in the whole country. They represent the compromise between the sustainability parameters and identity in the Moroccan context. The Moroccan methodology is as follows:



Figure 13. Moroccan Approach for integration of Sustainable Parameters in the Moroccan Identity context. Source: Author.

Materials: The Restriction that was imposed by the [RTCM], (See 4.2.1) is limiting the choices for materials usage. The reason is that RTCM is mainly for concrete-based construction that favorize the usage of insulation. Morocco’s half territory is a semi-arid one that do not need insulation as much as thermal usage to reduce the heat for long summer months. Meaning that the country needs clay/stone construction regulations or at least referential that favors such materials usage. Sustainability do not restrict or influence identity if it is not for the imposing regulations that the government seems to impose for it.

Urban Design and Function Land Use: There is an important influence of the Design forms policy token by Morocco after sustainability transition. The design encouraged are mostly a throwback to Moroccan medieval forms especially the promotion of the traditional Moroccan courtyard system. The reason for this return to old forms and designs is due to the climate exigences. Most of cold climate could easily solve the need for energy efficiency at buildings by incorporating insulation as well as other passive solutions. For hot climate this solution is not that effective, (Arthur Grimes, 2016). It seems that passive designs impose a certain vernacular architecture to be integrated. Thus, this return is in a way aligned with the Moroccan identity. The new

cities such as Benslimane is incorporating “Sebbah” feature, which is one of Moroccan Medinas feature, **Figure 14**.



Figure 14. Left: Sebbah system incorporated to the research project green city Benslimane and Green city Benguerir in Morocco. Right: Sebbah system in the street of Fez Medina, Morocco, Google image.

Sebbah is usually a continuation of the same house on the second floor with two parts facing each other on the ground. It allows the street to be accessible as well as it ensures them to be narrow enough for this measure. This feature may have been used in medinas organically however green cities are adopting it to keep fresh streets by creating shadow and narrow wind corridors.

Another influence of sustainable parameter on the city’s identity is the return to walkable neighborhood. Especially Zenata incorporating the medinas principle to small parts of the city such as districts.

Table XVI. Architectural identity parameters in Zenata and Benguerir. Source: Author.

	Spatial Organization	Semantic Organization	General design Principal	Shape and Form	Building Materials	Relationship with the context
Zenata	Aeraulic grid with integration of Bioclimatic planning	Medina concept in neighborhoods	Mass in voids	Lowrise and Midrise	Concrete	Existing
Benguerir	Grid system with green main axe	Vernacular architecture	Mass in voids	Lowrise single housing	Stone and Concrete	Limited

To examine the influence of the transition, Benguerir example give better ideas on how the green city helped to establish the city identity. The old part of the mining city suffers from the not planned growth of the city as well as non-regular constructions.

Contrary to Rhamna villages and settlement, Benguerir mostly did not have clay construction as method despite the climate, (See 4.2.4.2). The concrete construction without had continued in the old parts of the city even after the creation of the green city. These constructions are merely even adopting RTCM (see 4.2.1). With the establishment of the green city, more features of Moroccan medieval cities were integrated allowing the city to gain an identity that do not conflict with the initial identity of the region. Even though the general organization of the green city is a grid system it follows various principles from medinas principles especially in residential district.

Environmental Planning: World Health Organization demand for active green area in a livable city is stated as 1.84-meter square per person. The problem of these implementations in Moroccan context comes from the water shortage and hot climate in the majority of its territory. However, gardens surrounding cities wall such as Marrakech is not a foreigner concept to Moroccan medieval cities. Water efficiency was guaranteed with the usage of water basins at the outskirt of the city gathering mountain water brought to the city gardens. Cities such as Dakhla, (see 4.2.3.1.1) in sub saharian context cannot incorporate such measure easily. It will also give another new identity of greenery that was a foreigner in the existing city.

Social Equity: The parameter, in itself, can hardly touch the cities' identity. However, the interpretation of it changes the city's identity. An example of it is shown by Zenata city, (See 4.2.4.1). The city was first set as a solution for the resettlement of shanties house of Casablanca Metropol. The developing company decided to establish it as sustainable city with the heart of it as Shanty houses habitants in the center of the city. There is still not much of record of how this social agenda improved the integration of this society, but it definitely had branded the city as social hub for all parts of the society.

All the parameters interfere in a way or another giving a new identity feature to the city or retuning back to the lost identity of Moroccan cities. It is definitely much deeper that painting in the green since it touches different aspects of the city. The biggest fear of these parameters to be established in the same way and manner for all other features examples in Morocco, **Table XVII**.

5.2. Analysis of Moroccan Green Cities Standpoint

Despite the progress that Morocco has achieved since the start of cities sustainable transition, it is necessary to measure the progress with the pioneers of sustainability in cities in order to know Moroccan cities standpoint. Each city of the world example has assets that Morocco can take into account for better green cities. The challenge of appropriating the concept of sustainability to Moroccan context would still be challenging. These examples however represent the failures and success of green cities worldwide. It is surely a good reference to the achievement of Moroccan cities.

Table XVII. Comparative analysis summary of worldwide cases sustainable cities and Moroccan sustainable cities. Source: Author.

Cities	Climate context	Implementation method	Process	Sustainable Parameters sensitivity	Identity transition
Freiburg	Maritime, warm and temperate	Down to Top	No sanction imposed. Community proposals and competitiveness	Energy Efficiency Design Forms	Continued
Stockholm	Humid continental	Top to Down	Governmental guidelines Inter-Competitiveness between companies	Environmental Planning Design Forms	Changed
Vancouver	Moderate ocean climate	Top to Down/ Down to Top	Image keeping	Energy Efficiency	Continued
Brisbane	Semi-arid	Top to Down	Governmental Policies	Energy Efficiency	Established
Benguerir	Semi-arid	Top to Down	Government companies Referential	Energy Efficiency Materials	Changed
Zenata	Ocean	Top to Down	Government companies Referential	Design Forms	Established

Stockholm is an example that may be the closest to Moroccan context, (See 3.1). The city has a historical background and assets that may be not as old as Moroccan cities but it is still important. It had also witnessed a French planning in the 20th century as part of city development. The city ongoing growth with traditional farms and field around it had allowed it to win the green city title. The sustainable development was made with the ongoing spread of the city, the physical restrictions and its goal to keep the green title. The city had witnessed different policies and master planning, (See 3.1.1). It is still facing the dilemma of becoming bigger global city and keeping its sustainable principles. Moroccan Metropolitan cities, have similar context and challenges. They are witnessing a top to down transitions made by governmental efforts and trying to involve the local

community. The process in Stockholm was made utilizing competitive standards. The chosen plan is the best sustainable. It had also favored Urban designs and Environmental planning parameters to achieve livable districts. It seems that materials that reflected the identity of the old Stockholm were not taken as priority.

Freiburg city represents an early example that had to experiment with all the process of sustainability transition, (See 3.2). With its natural assets, it had an easier transition due to various factor: The people of Freiburg were already aware of the importance of their natural assets, thus the role of the activists leading to sustainable development of Freiburg first green district had seen the light very early. Sustainable development was not a foreign concept introduced to the city. People's awareness of its importance was not needed either. The whole process was a down top one as the people had basically forced the government to take such policies. The city was organized favoring Urban Design and forms as well as energy efficiency. Freiburg had outdone itself goals by always having no sanction policies and community participations.

Moroccan current green cities fell to compare to such development. However, considering the right context, few cities could easily grow in the same way giving the right directions. An example for that would be the city of Ifran. It is a small city in the middle Atlas Mountain. It is known for its cedar forests and green parks such as "La Prairie", "Ain vittel". It has a nearby campus district hosting "Alakhawyin university" that could be a great asset for the research investment and turning the city into green sustainable one. The city has great natural resources, but it lacks the sustainable planning as it is spread. The center is not well defined and gated communities are almost everywhere making the city lose its walkable potential. The city also lack work hub as the biggest work opportunity is only the university that is not generating enough work for underprivileged community of the Atlas.

Vancouver city is global city that has been labeled green since its start due to the country natural assets, (See 3.3). The city has great natural resources and potentials to value making the community well aware of it. It seems that the sustainability in this kind of cities is much naturally processed as the people are very aware of the kind of environment, they are living in. The city has faced many challenges to keep up with its growth and sustainable principles. The presence of the university British Columbia has helped to keep the research side ongoing. The projects researched are practically executed

into an experimental living hub that is bettering itself. The other wake up call for the city was the Olympic event that has made the city return to its sustainable principle even if by small scale. The implementation is still considered top-down decisions with the involvement of the university community proposals.

Brisbane city is an established green city that had struggled to even introduce the concept, (See 3.4). The city has a good start with policies been introduced for energy efficiency. Measures of good practices has been experimented and even witnessed some failures leading to innovative solutions for such climate. Brisbane could have become one of the greatest examples if not for the policies change. Since the process was a top-down one, the change in policies has meant that no community pressures the return of sustainability.

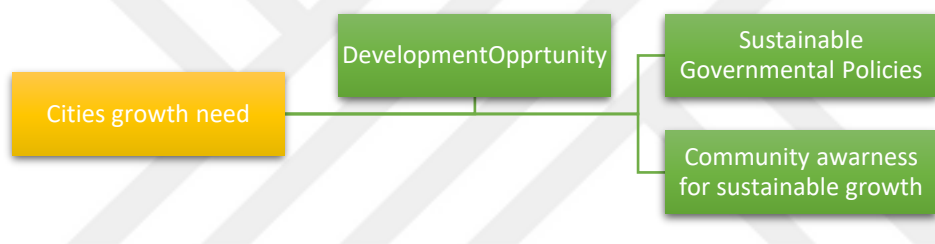


Figure 15. Sustainability implementation process in cities. Source: Author.

The **Table XVIII** had summarized the studied cases and their sustainability approaches. It is safe to say that a pattern is noticed for these cities. It is either starting with development opportunity and a public awareness or governmental decision for such transition. Each city has prioritized different sustainability parameters according to the situation given. Moroccan green cities have also taken different approaches. While Zenata decided to prioritize city concept design and form while benefiting from ocean corridors to minimize the heat and has built the whole city according to it, (See 4.2.4.1.2), Benguerir has taken a serious consideration for passive houses technic solutions with the help of the research center at the university, (See 4.2.4.1.4).

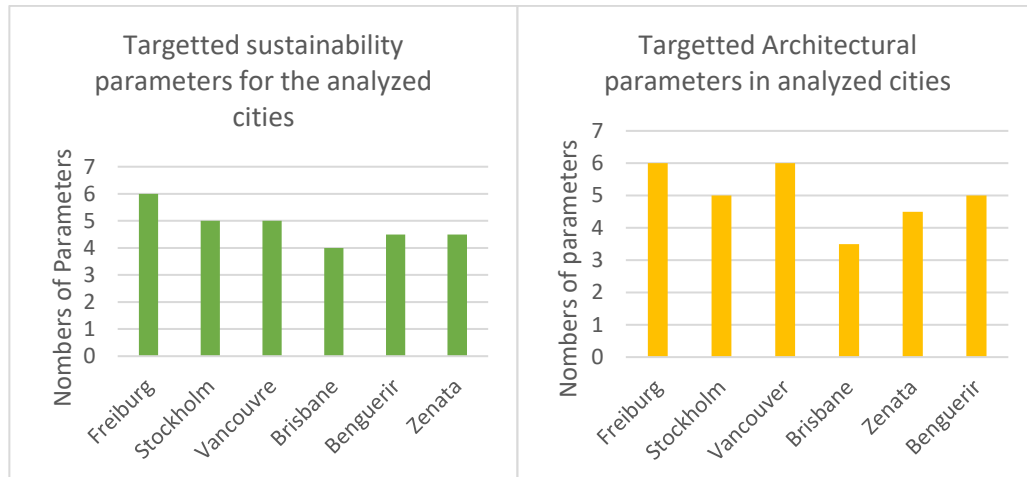


Figure 16. Number of targeted sustainability parameters and architecture parameters for the cities studied. Source: Authors

In general, Benguerir and Zenata cities are well positioned in comparison to the world examples studied. They have an average of 4/6 sustainability targeted parameters, and 4.5/6 architectural identity targeted parameters, **Figure 15**.

5.3. Lessons to learn from Moroccan sustainable transition and context

Moroccan sustainable transition is a model for African context. In term of Law, Morocco is still taking the design of its own climate change risk seriously. The commitment of the country to its SDGs plan, (See 2.1), is reflected by multiple green sustainable projects as well as the integration of the Moroccan thermal regulation of construction RTCM, (See 4.2.1). Even if this regulation is restricted towards new buildings and not abiding towards existing ones, it is an important step towards more laws and regulations that can frame the sustainability transition.

In general, Moroccan Urban sustainable transition have very strong pattern, which is usage of Moroccan Pre-colonial identity and sustainable solutions. Either in terms of retrofit neighborhood models that respect the existing and continue it on the new cities examples that are inspired from medieval Moroccan cities principles. However, one of the country's biggest challenges is Medinas in themselves. Medinas or the old Moroccan cities settlement is mostly protected by law and are under UNESCO heritage. These settlements retrofit to boost the energy efficiency of residential areas, but it's mostly done superficially for fear of interference.

Even with all types of sustainable projects that the country is undergoing, two cities are nearly finished and represent concrete examples to learn from Zenata, the city built on the outskirts of metropolitan Casablanca, Benguerir the mining city turned into a research hub. These two cities represent in a way Moroccan experiences and their results. Some of the lessons that Moroccan green cities have given are:

Bridge down segregation: Zenata city is a leading model as it was designed with slums displaced people as the main characters. The city placed the social quarters in its own center to give the sense that they are the original owners of the city. In comparison Benguerir social agenda set may still have more years to take place. The city in its current state has a major segregation as the old parts of the city still do not blend with the outskirts green one. The city may develop the other parts by creating transversal commercial axes linking the university to the old city commercial center.

Design in human scale: Both cities represent an example of Medinas own physical and semantic design principles. Medinas represent the essence of Moroccan Islamic cities identity. These types of the design are setting neighborhoods as priority that have well mix in term of functionality, forms, height... It is also a throwback to Moroccan's memory, thus these new cities do not give estrangement feeling for the new settlers.

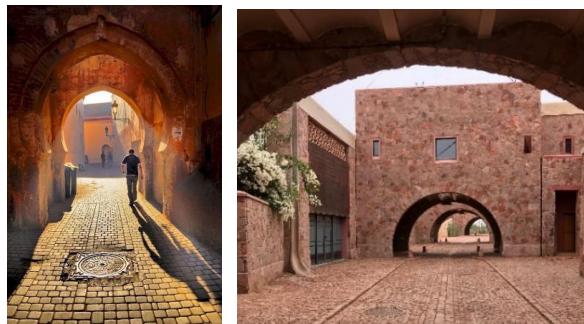


Image 53. Left, Marrakech old streets of Medina, walkable with arched Sebbah. Source: Google image. Right: Benguerir green city, Villas chercheurs street. Source: Author.

Creating city scale solutions for city scale problems: The chance to create green cities from scratch is rare for historically dominant context such as Morocco. However, this chance was fully exploited by using all means possible. Zenata city concept was to use ocean airflow in order to minimize the heat in the city. This was made possible by designing the city with corridors streets that are perpendicular to ocean waterfront. The

buildings designed in these streets' facades are high rise allowing more wind speed to access to inner center. Benguerir on another hand focused on materials choices and technology integration. However, as a green city, it has local experimental strategies and did not design a city scale solution.



Figure 17. Zenata corridors flow Design, Source: Author.

In conclusion, Zenata and Benguerir could be compared to international green cities examples in term of sustainability parameters. The following table represents a summary of the status of each city that was discussed in this study. The parameters are analyzed according to the data discussed in (3 and 4.2.4). This analysis is a summary of the parameter using simple scale: (●) is for a parameter directly targeted by the city, (○) for a parameter that was indirectly implied, or the results are still in progress as the current situation of the city does not show it, (-) is for parameters that were not targeted by the city directly or indirectly.

Social equity is only targeted in the mix and functional diversity in Zenata, the neighborhoods are designed in the same way as the old medinas with human scale, and the introduction of the misplaced slums habitants. However, one of the main problems that the city still cannot predict is the good integration of the different status that the city claims to support. Benguerir, on the other hand ,has failed to achieve real progress even though it is just three years away from finishing all its phases. The old settlement is not only physically separated from the green city, but the segregation is also witnessed by the propagation of gated neighborhoods, schools, and functions that are limited to a certain income. Benguerir having the opportunity to be fully funded by OCP and integrated by the research hub has permitted the city to find new innovative solutions to integrate. It has pushed forward innovative materials usage and designs in contrast to Zenata which

can struggle with such investment. Zenata's climate context being at waterfront has allowed the city a certain resource that help its green design purposes in contrary of Benguerir city that is still finding solutions that deal with water shortage and greenery claims.

A general observation of the results leads that Northern European analyzed cities are leading the way in every category. This could be explained by the long history and the timeline that these cities have already witnessed. Moroccan cities in comparison are still in the start line.

Table XVIII. Sustainable parameters that are mainly targeted by each of the green cities studied in the research. Source: Author

Sustainability Parameters	Freiburg	Stockholm	Vancouvre	Brisbane	Benguerir	Zenata
Social Equity	●	●	○	○	-	●
Sustainable Energy and resources	●	●	●	●	●	○
Materials	●	-	○	○	●	-
Environmental Planning	●	●	●	○	●	●
Urban Design and Function	○	●	●	○	○	●
Economic Development	●	●	●	●	●	●

Both cities represent the failures and the achievements of sustainability progress in Moroccan cities. Since the projects are not all achieved yet, they are slowly integrating with the rest of the territory. Morocco is paving its own way for the green transition and learning from the problems that are facing to create better cities example for the African context.

Table XIX. Identity parameters that the cities Benguerir and Zenata maintained. Source: Author.

Identity parameters	Spatial Organization	Semantic Organization	General design Principal	Shape and Form	Building Materials	Relationship with the context
Medinas	Organic system	Density and good mix	Voids in mass Walled cities or fortresses.	Courtyard houses, narrow streets, Sabbah composition	Clay, stone, wood	Architectural language, materials,
Benguerir	Grid system with main axe	Medina typology	Mass in void, gated neighborhoods	Courtyard houses, Sabbah composition, 2 to 5 stores apartments	Clay and Stone + Concrete	Continuity of color (Ochre), materials.
Zenata	Grid system with multiple axes	Medinas functions and principles	Mass in void	Passive apartments, Sabbah composition,	Concrete	Continuity of color (White),

The green-sustainable city transition in Morocco has set an example of keeping its identity and achieving its main goal. The main method to return to the vernacular identity and pair it with technology seemed to help this success. The new cities incorporate the main medinas principles be it typology, sematic features, or function dispositions. However, the transitions have only taken a physical aspect in recent years and this is expected to be completed in a long timeline. This assures the identity has time to adapt and establish itself. The old cities of Morocco have strong architectural language. The medieval part of the cities is usually protected,. though the cities seem to be arbitrary growing, they have a sense of self-organization through the usage of the same essential typologies and functions. The buildings were both functional and climate adequate. Zenata and Benguerir have created the same effect without copying the medina's city. The principle of growth and neighborhood organizations were kept in Zenata. Benguerir has dealt with its harsh climate by keeping the technology, research and vernacular architecture together.

5.4. Summary of the systems

Given Morocco's climate and cultural context, the country had tried to target sustainability parameters that conserved some of the architectural identity parameters. The following table is a summary of the architectural solutions proposed in the Moroccan context. It can serve as a proposal of framework solutions for similar contexts in other parts of the world.

Table XX. Summary of architectural and urban solutions proposed by Moroccan studied cases that ensure sustainability and conserve architectural identity.

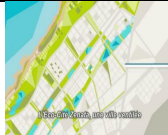
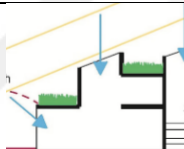
Urban Elements	Old Context	New context	Transition characteristics	Sustainability parameters targeted	Architectural identity parameters
Pergola			Conservation of function and semantic organization	Sustainable Energy and Resources Urban Design and Function	General design principles Semantic organization
Characteristics	Small areas. Textile + steel or wooden materials.	Bigger scale. Glass + steel materials.			
Sebbah			Conservation of forms and functions with simplification in typologies.	Urban Design and Function Sustainable Energy and Resources	Semantic Organization Shapes and Forms
Characteristics	Stone and wooden structure. Complex form.	Stone and wooden structure. Simple geometrical forms			
Green main axe/ Olive gardens			Introduction to outside elements within cities main planning	Environmental Planning	General design principles
Characteristics	Outskirts of the city.	Main axes of the city/			
Wind axes/ Canyon streets			Conservation of functionality while building in bigger scale	Sustainable Energy and resources Urban Design and Function	Spatial organization
Characteristics	Narrow streets planning.	Open wide corridors			
Facades unity			Conservation of language pattern in cities colors.	Materials	Semantic Organization Materials
Characteristics	Same paint color for each city	Same paint color for each city			

Table XXI. (Continued) Summary of architectural and urban solutions proposed by Moroccan studied cases that ensure sustainability and conserve architectural identity.

Architectural elements	Old Context	New context	Transition characteristics	Sustainability parameters targeted	Architectural identity parameters
Riad			Conservation of the forms and functionality with new urban planning.	Sustainable Energy and resources	Shapes and Forms Semantic Organization
Characteristics	Courtyard form. Attached buildings	Courtyard form. Independent buildings.			
Terrasses			Conservation of forms with an introduction to new function	Sustainable Energy and resources. Environmental planning	General design principles.
Characteristics	Accessible terrasses	Accessible green roofs			
Fountains/ Basins. Solar tower			Introduction to new technologies using vernacular materials proprieties	Sustainable Energy and resources	Shapes and Forms
Characteristics	Cooling element	Cooling and heating technologies			
Stone/ clay material			Conservation of materials in addition to concrete usage.	Materials	Materials. Relationship with the context.
Characteristics	Vernacular materials	Vernacular materials with concrete usage			

According to the results, the new emerging green sustainable cities of Morocco rely on vernacular solutions. For the urban scale, the solutions in the new cities are the same but on a bigger scale. The example of the traditional semi-covered markets is transformed into an urban pergola. The scale is not the only variable in this transition, the choice of

material differs too. New materials and technologies are introduced such as glass usage and concrete.

For architectural scale, Moroccan models integrate technologies into vernacular solutions. The heating and cooling passive solutions are combined with the integration of a solar tower, a technology that is newly developed. Overall, the solutions tend to keep existing forms, details, and solutions to conserve Moroccan cities' identity.

5.5. Conclusion

To conclude, Moroccan green cities represent a model of identity continuation. It integrates passive solutions that constitute part of the Moroccan architectural identity. The solutions are either urban-scaled or building scaled. In general, the solutions are heavily oriented toward sustainable energy and materials. It is advisable that upcoming models take into consideration more diversified sustainability parameters.

For urban scale, environment planning is targeted by greenery integration. Other solutions such as playgrounds or natural assets conservation are not touched on in all cities, (especially arid climate cities). The sought solutions should be appropriate to the existing assets. Benguerir city should seek solutions that are appropriate to the hot climate and integrate desert gardens. In the case of the water element, the new green residential buildings do not include it. The shortage of water and drought are valid reasons for it. Instead, the functionality of water fountains or basins is achieved via other solutions. However, climate such as the Atlantic climate in coastal cities needs more heating solutions for winter.

Moroccan example can be developed while:

- **Minimizing segregation effect:** Physical and psychological segregation between green cities and old cities should be eliminated. Gated green neighborhoods should be opened, and the old part of the city should be integrated into the newly developed green cities.
- **Minimizing globalization effect:** Sustainable neighborhood strategy “Eco-neighborhood” target existing cities' needs and accomplish the sustainable transition. This strategy can be developed to target economic needs and conserve the sense of place.

- **Conserving sense of place:** Green sustainable transition of Moroccan model targets vernacular methodologies with the integration of technologies. This policy conserves the sense of place as many solutions are not strange to the user. Forms, materials, and spaces are created according to the existing “medina model”. Passive and active technologies should be developed to target the varied Moroccan climate.

Throughout this study, Morocco represents a new sustainable transition model that relies on the continuation of Moroccan cities' identity. As shown in conclusion, the studied Moroccan sustainable cities have implemented various elements and technologies driven from the old context. Other technologies and strategies were inspired by international models and enforced in the Moroccan context. The new cities of Morocco should keep the old context characteristics while developing green urban solutions. Problems such as segregation between the old and new context, globalization effect, and economic crisis, should be targeted while respecting existing architectural identity characteristic.

REFERENCES

- Agence Nationale Pour le Developpement des energies renouvelables et de l'efficacite energetique. (2018). *Reglement thermique de la construction au Maroc* .
- Abdelaziz, A. (2006). Les villes minières marocaines face au défi du développement durable, . *GREGUMUMR ESO CNRS*.
- Abel, C. (1997). *Architecture and Identity, towards global eco-culture*. ArchitecturePress ITD.
- Abu-Lughod, J. (1980). The Legitimacy of Comparisons in Comparative Urban Studies: A Theoretical Position and an Application to North African Cities. *Urban Affairs Quarterly* 11.
- Adam, R. (2012). *Identity and Identification: The Role of Architectural Identity in a Globalised World. The Role of Place Identity in the Perception, Understanding, and Design of Built Environments*.
- Adria, L. (2013). Nationalist Mobilization in Colonial Morocco. In Imperial Rule and the Politics of Nationalism: Anti-Colonial Protest in the French Empire. *Problems of International Politics*, 166-213.
- Agence Marocaine pour l'Efficacité Energétique. (2016). *Le Règlement Thermique de construction au Maroc*.
- Akkurt, H. B. (2012). *Reconstitution of the Place Identity within the Intervention Efforts in the Historic Built Environment. The Role of Place Identity in the Perception, Understanding, and Design of Built Environments*.
- Anthias, F. (2008). *Thinking through the lens of translocational positionality: an intersectionality frame for understanding identity and belonging*. *Translocations: Migration and social change*, .
- Appiah, K. (2007). *Cosmopolitanism: ethics in a world of strangers*.
- ARCADIS, D. a. (2018). *Citizen Centric Cities The Sustainable Cities Index* .

- Arthur Grimes, N. P.-C.-B. (2016). Does Retrofitted Insulation Reduce Household Energy Use? Theory and Practice. *International Association for Energy Economics, Jstor*.
- Atia, O. (2022). Refusing a "City without Slums": Moroccan slum dwellers' nonmovements and the art of presence. *Cities*, 125.
- Australian Bureau of Statistics. (2016). *Regional population growth, Australia*. Canberra .
- Bahi Hassan, A. M. (1992). *Urbanisation et gestion urbaine au Maroc*. Rabat: Toumi.
- Barthe, P.-A., & Vigna, L. (2014). Arab Mediterranean Megaprojects after the 'Spring': Business as Usual or a New Beginning. *Built environment*,.
- Barthel, P.-A., & Planel, S. (2010). Tanger-Med and Casa-Marina, Prestige Projects in Morocco: New Capitalist Frameworks and Local Context. *Built environment*.
- Bat, A. M. (2021). Thermal impact of street canyon microclimate on building energy needs using TRNSYS: A case study of the city of Tangier in Morocco. *Case Studies in Thermal Engineering*(24).
- Beatley, S. M. (2014). *Origins of sustainability, The Sustainable Urban Development Reader*.
- Beck, U. (1997). *What is Globalization?* . Cambridge: Polity press.
- Benoist-Me' chin. (2007). *Lyautey l'africain, ou le reve immole*.
- Benswessi, A. J. (1987). *A Study of the Concept of Identity: Towards an Architecture as a Harmonious Identifiable Fabric*. Graduate School of Arts and Sciences, University of Pennsylvania.
- Berelowitz, L. ((2005). Dream city: Vancouver and the global imagination. M. Douglas içinde, *Vancouver*.
- Bobkova, E. (2019). *Towards a theory of natural occupation, Developing theoretical, methodological and empirical support for the relation between plot systems and urban processes*. University of Technology Doktorsavhandlingar vid Chalmers.

- Bogaert, K. (2012). New State Space Formation in Morocco: The Example of the Bouregreg Valley. *Urban Studies*, 255–270.
- Bonine, M. E. (1990). The Sacred Direction and City Structure: A Preliminary Analysis of the Islamic Cities of Morocco. *Muqarnas*.
- Boubrik, R. (2022). Nineteenth-Century Slave Markets, The Moroccan Slave Trade, AlMuntaqa. *Arab Center for Research & Policy Studies*, 63-79.
- Boulakhbar, M., Lebrouhi, B. E., Kousksou, T., Smouh, S., A. Jamil, M. M., & Zazi, M. (2020). Towards a large-scale integration of renewable energies in Morocco. *Journal of Energy Storage*.
- Boyer André, S. M.-J. (2014). Gouvernance d'entreprise et responsabilité sociale au Maroc: l'évolution de l'OCP. *Department of Research, Ipag Business School*.
- Braun, B. (2000). Konzeption und stadtstrukturelle Auswirkungen der 27. Olympischen Sommerspiele *Geographische Rundschau* , 4–9 .
- Breakwell, G. (1993). *Social representations and social identity. Papers on social representations*,.
- Brenda, Y. (2001). Postcolonial cities. *Progress in Human Geography* .
- Broaddus, A. (2010). Tale of Two Ecosuburbs in Freiburg, Germany Encouraging Transit and Bicycle Use by Restricting Parking Provision. *Journal of the Transportation Research Board*, 114–122.
- Bruzzone, M. &. (2013). *The Industrial Heritage and the New Architecture: Teaching, Researching, Designing the Place Identity*. . David Publishing Company.
- Bulut, E. (2019). *The suggestions for investigation and restoration of architectural identity of bursa coasts: mudanya and gemlik*. Bursa Uludağ University Graduate School of Natural and Applied Sciences.
- Calderwood, E. (2012). The beginning (or end) of Moroccan history: historiography, translation, and modernity in Ahmad B. Khalid al-Nasiri and Clemente Cerdeir. *Int. J. Middle East Stud*, 44, 399–420.

- Campbell, S. (1996). Green Cities, Green Cities, Just Cities? Urban Planning and the Contradiction of Sustainable development. *Journal of the American Planning Association*.
- Candace Jones, S. S. (2017). *The Architecture of City Identities: A Multimodal Study of Barcelona and Boston*. Research in the Sociology of Organizations.
- Castells, M. (1997). *The Information Age: The Power of Identity*.
- Clarke, A. (2005). *Situational analysis: Grounded theory after the postmodern turn*. Sage.
- Claudio Minca, L. W. (2014). *Moroccan Dreams Oriental Myth, Colonial Legacy*.
- Claudio, M. (2006). Re-inventing the 'square': Postcolonial geographies and tourist narrative in Jamaa el Fna, Marrakech. *Travels in Paradox: Remapping Tourism*, 155–184.
- Climate statistics for Australian locations. (2017). *Australian Government, Bureau of Meteorology*.
- Correa, C. (1983). *Quest for identity*. Powell.
- Dale, E. (1974). Is There an Islamic City? The Making of a Quarter in a Moroccan Town. *International Journal of Middle East Studies*, 5(3), 274–294.
- Daly, H. (1973). *The steady state economy, Toward a steady-state Economy*.
- Del Cerro, S. G. (2013). *Urban Mega projects. A Worldwide View*. Emerald Publishing Group Limited.
- DIRASSET, SDAU, Urban Development Master Plan. (2016). *Phase 1: Territorial analysis and development issues*.
- Donella Meadows, D. L. (1972). *Perspective, problem and models, Limits to growth*.
- Doug, U. M., & Wrobel, N. J. (2004). Model for Sustainable Urban Design With Expanded Sections on Distributed Energy Resources.
- Douglas, A. G. (1965). Review of Old Societies and New States: The Quest for Modernity in Asia and Africa, by C. Geertz. *The Canadian Journal of Economics and Political Science*, 31(4), 603–605.

- Dovey, K. (2010). *Becoming Places Urbanism / Architecture / Identity / Power*. Routledge.
- Duarte, J. R. (2008). A GENERATIVE COMPUTATIONAL MODEL FOR THE REGENERATION OF MARRAKECH MEDINA. *Traditional Dwellings and Settlements Review*.
- Durmus, S. (2012). Change and Transformation in Architecture: On the Concept of Zeitgeist. . *Global Built Environment Review*.
- Elsheshtawy, Y. (2004). *Planning Middle Eastern Cities: An Urban Kaleidoscope*.
- Erses, S. M. (1999). *Kent kimliği ve kuruluşundan günümüze metropolleşme süreci içinde İstanbul'un kimlik analizi*. YTÜ Fen Bilimleri Enstitüsü, Şehir ve Bölge Planlama Anabilim Dalı, İstanbul.
- Escher, A. (2016). Rehabilitation old the Mediterranean Medina in Morocco. *The Mediterranean Medina International Seminar*,.
- Ezeddine, R. (1984). *Etude et aménagement d'un quartier de la médina de Rabat*. UPA de Nante.
- Featherstone, M. (1995). *Undoing culture: Globalization, postmodernism and identity*.
- Fraker, H. (2013). *THE HIDDEN POTENTIAL OF SUSTAINABLE NEIGHBORHOODS, Lessons from Low-Carbon Communities*, . Island Press, .
- Frank Gaffikin, M. M. (1999). *City Visions: Imagining Place, Enfranchising People*.
- Geertz, C. (1989). Toutes Directions: Reading the Signs in an Urban Sprawl. *International Journal of Middle East Studies*, 21 , 291-306.
- Gervais-Lambony, P. (2006). *Reflecting on Identity of four African cities, Space and identity Thinking*.
- Goldsteen, J. B. (1994). *Designing America: Creating urban identity*. Van Nostrand Reinhold.
- Graham, H. M. (2009). *Literature review: historic environment, sense of place, and social capital*.
- Green Building Information Gateway. (tarih yok). *gbig.org*.

- Hadi, A. S. (2008). Spatial Urban Metabolism For Livable City. *Blueprints for Sustainable Infrastructure Conference*, (s. 2).
- Hakim, B. S. (2008). Islamic and ethical requirements. *Arabic- Islamic cities: Building and planning principles* (s. 95-96). içinde
- Hald, M. (2009). *Sustainable Urban Development and the Chinese Eco-City: Concepts, Strategies, Policies and Assessments*. Fridtjof Nansen Institute.
- Hamiduddin, I. (2015). Social sustainability, residential design and demographic balance: neighbourhood planning strategies in Freiburg, Germany. *The Town Planning Review*, 29-52 .
- Hannover, M. D. (1992). The hannover principles design for sustainability, THE HANNOVER PRINCIPLES.
- Harmeet Singh, R. J. (2010). A review on packed bed solar energy storage systems. *Renewable and Sustainable Energy Reviews*, 1059-1069.
- Haslett, M. (2003). *Pope to Burney, 1714-1779: Scriblerians to bluestockings*. Palgrave Macmillan.
- Hassan, B. (1992). Urbanisation et gestion urbaine au Maroc. Rabat: Toumi.
- Heidari, N. (2016). *The challenge of changing identity in urban transformation process: Kâğithane case*.
- Henri, L. (1991). *The production of space*. trans. Donald Nicholson-Smith.
- Holden, E. S. (2007). Constructing an Archival Cityscape: Local Views of Colonial Urbanism in the French Protectorate of Morocco. *History in Africa*, 34, 121–132.
- Homi K. Bhabha, e. H. (1986). "Signs Taken for Won ders: Questions of Ambivalence and Authority under a Tree outside Delhi, May 1817," in "Race," Writing, and Difference". Chicago: University of Chicago Press.
- Howard, E. (1898). *Garden cities of tomorrow, Garden Cities*. The sustainable urban development reader.
- Hugh, K. (1985). From Polis to Medina, Past and Present . 15-16.

- International Energy Agency. (2019). *Global Status Report for Buildings and Construction, Technical Report*.
- Jabareen, y. r. (2006). Sustainable urban forms: Their typologies, models and concepts . *Journal of Planning Education and Research*.
- Jacobs, J. (1961). *Orthodox planning and the North End, The death and life of Great American Cities*.
- Janet, A.-L. (1979). Dependent Urbanism and Decolonization: The Moroccan Case. *Arab Studies Quarterly*, 1(1), 49–66.
- Janet, A.-L. (1980). *Rabat: Urban Apartheid*.
- Kaijser, A. G. (2007). City-building regimes in post-war Stockholm. *Journal of Urban Technology*.
- Karababa, A. (2015). Trandiscursive enquiry on urban identity.
- Katarzyna, P. (2007). RuinsRumors and Traces of the City of Brass: Moroccan Modernity and Memories of the Arab Global City. *Research in African Literatures*, 38(4), 187–203.
- Kingdom of Morocco's Official Newsletter. (2010). Dahir n°1-10-200 dated 23 moharrem 1432 (December 29, 2010) promulgating the Finance Act n° 43-10 for the budgetary year 2011. *Kingdom of Morocco's Official Gazette n° 5904*, 2157.
- Kirstie O'Neill, J. A. (2018). Vancouver: Leading Green Building Transitions. *Green Building Transitions, Regional Trajectories of Innovation Europe, Canada, and Australia* (s. 99-132). içinde Springer.
- Klimburg-Witjes, N., & Gunay, C. (2016). Border Politics : Defining Spaces of Governance and Forms of Transgressions. *Springer International*.
- Koennard, B. (2011). The problem of slums: shifting methods of neoliberal urban government in Morocco. . *Development and change*.
- Kushner, J. A. (1993). A Tale of Three Cities: Land Development and Planning for Growth in Stockholm, Berlin, and Los Angeles. *The urban Lawyer, American Bar Association*.

- Lalli, M. (1992). Urban-related identity: Theory, measurement, and empirical findings. . *Journal of environmental psychology*.
- Larco, N. (2010). Both/and: Merging global and local identity through design. A case study of Puerto Madero, Buenos Aires. *Journal of Urban Design*.
- LASKY, J. (2012). MOROCCO'S SPELL . *Landscape Architecture Magazine*.
- Lauren Wagner, C. M. (2014). Rabat retrospective: Colonial heritage in a Moroccan urban laboratory. *Urban Studies Journal Limited*, 3011–3025 .
- Le Tellier, J. (2009). Programme Villes Sans Bidon villes et Ingénierie Sociale Urbaine au Maroc in Politiques d'Habitat Social au Maghreb et au Sénégal Gouvernance Urbaine et Participation en Questions. *L'Harmattan*.
- Leopold, A. (1949). *The land ethic, a sand County Almanac*.
- Lösch, P. (1988). Freiburg, the Environmental Capital of West Germany. *Earth Island Journal*, 34-35.
- Lynch, K. (1960). *The image of the city*. Cambridge MA MIT Press.
- Mahmoody, M. R. (2012). Globalization Issues Regarding Contemporary Architecture of Iran. *International Journal of Architecture and Urban Development*.
- Mark Manuel, D. L. (2018). The sustainability of ancient water control techniques in Iran: an overview. *Water Hist*.
- Martin, E. (tarih yok). *Stockholm fran Mosebacke, 1787*.
- Martinotti, G. (1994). *The new social morphology of cities*. UNESCO.
- McHarg, I. L. (1969). *Plight and Prospect, Design with nature*.
- MEDVED, P. (2017). Leading sustainable neighbourhoods in Europe: Exploring the key principles and processes. *Urbani izziv*, 107-121.
- Meiss, V. (1990). *Elements of architecture: From form to place*. Routledge.
- Miller, S. G. (2005). Finding Order in the Moroccan City: The Hıbus of the Great Mosque of Tangier as an Agent of Urban Change. *Muqarnas* , 22, 265-283.

- Miller, W., Buys, L., & Bell, J. (2012). Performance evaluation of eight contemporary passive solar homes in subtropical Australia. *Build Environment*.
- Mishler, E. G. (1990). Validation in inquiry-guided research: The role of exemplars in narrative studies. *Harvard Educational Review*.
- Morrissey, M. (1999). *City vision imagining place, Enfranchising people*. Pluto Press.
- Morton, P. (1998). A Study in Hybridity: Madagascar and Morocco at the 1931 Colonial Exposition. *Journal of Architectural Education*.
- Mounia, B. C. (1997). Le Maroc à l'épreuve du temps mondial. *Le temps mondiale*.
- Moussavi, F. &. (2006). Foreign Office Architects. . *Architectural Review*.
- Mumford, L. (1938). *Cities and the crisis of civilisation, Future of cities*.
- Nations, U. (2015). *The 2030 Agenda for Sustainable Development*.
- Neill, W. (2013). *Urban Planning and Cultural Identity*.
- Neuhaus, H. (tarih yok). *Panorama över Stockholm 1875*. Circa.
- Newman, D. (2013). *Boundaries, territory and postmodernity (No. 1)*. Routledge.
- Nhamo, G., & Mjimba, V. (2019). *The Green Building Evolution*.
- Norberg-Schulz, C. (1980). *Genius Loci: Towards a phenomenology of architecture*. Rizzoli, New York.
- Oktay, D., & Bala, H. A. (2015). A Holistic Research Approach to Measuring Urban Identity: Findings from Kyrenia Area Study. *International Journal of Architectural Research*.
- Olsson, J. M. (2013). *Sustainable Stockholm, exploring urban sustainability in europe's greenest city*. Routeledge.
- Opaluwa Ejiga, O. P. (2012). Sustainability in traditional African architecture: a springboard for sustainable urban cities. *Sustainable Futures: Architecture and Urbanism in the Global South*.
- Örer, G. (1993). *İstanbul'un kentsel kimliği ve değişimi*. . İTÜ Fen Bilimleri Enstitüsü.

- Osborne, H. (2015). London house prices most overvalued in the world, says USB . *The Guardian*.
- Otmani, N.-d. e. (2018). *An Evaluation Of Housing In Casablanca, Morocco: Anfa Case*. Bahçeşehir University.
- Paasi, A. (2002). *Bounded spaces in the mobile world: deconstructing 'regional identity'*. *Tijdschrift voor economische en sociale geografie*.
- Pacione, M. (2003). Urban environmental quality of human wellbeing: a social geographical perspective. *Land- scape and Urban Planning*.
- Parin, C. (2007). *New ways to read difference. Cross-cultural Urban Design: Global Or Local Practice?*
- Parsons, R. J. (1994). *The integration of social work practice*. . Brooks/Cole Pub Co.
- Peter, G. (2013). *"The Impact of the Enclaves on Spanish–Moroccan Relations". Europe or Africa? A Contemporary Study of the Spanish North African Enclaves of Ceuta and Melilla*.
- PHILIFERT, P. (2014). Morocco 2011/2012: Persistence of Past Urban Policies or a New Historical Sequence for Urban Action?, . *Built environment*.
- Pierre-Arnaud, B. (2011). Premiers quartiers urbain «durables» dans les pays arabes: enseignements sur une génération spontanée. *Espaces et sociétés*, 99-115.
- Pierre-Arnaud, B. (2014). L'exportation au Maroc de la « ville durable à la française . *Métropolitiques*.
- Polat, S. (2011). *A Method Proposed To Evaluate Architectural Identity In Public Open Spaces: Bursa-Cumhuriyet Square Case*. Uludağ University Graduate School of Natural and Applied Sciences Department of Architecture.
- Relph, E. (1976). *Place and Placelessness*. Pion Limited.
- Roberson, J. (2014). The Changing Face of Morocco under King Hassan II. *Mediterranean studies*.
- Robertson, R. (1992). *Globalization: Social Theory and Global Culture*. Sage.

- Rosol, M. (2013). Vancouver's "ecodensity" planning initiative: a struggle over hegemony? .
- Roth, L. (1993). *Understanding architecture: Its elements, history and meaning*. Boulder, CO: Westview Press. Sala.
- SADV(societe d'amenagement et de developement vert, OCP). (2012). ville verte de Benguerir, Brochure.
- Sassen, S. (1998). *Globalization and its discontents*. The new press.
- Schaafmsa.M. (1998). The cultural identity of the city, Boston. In Cultural Identity and Spatial Segregation, Aarau, Switzerland.
- Schroepfer, T., & Hee, L. (2008). EMERGING FORMS OF SUSTAINABLE URBANISM: CASE STUDIES OF VAUBAN FREIBURG AND SOLARCITY LINZ. *Journal of Green Building*.
- Sebastian Fastenrath, B. (2018). Freiburg: The Emblematic Green City. *Green Building Transitions, The Urban Book Series*.
- Sidenblad, G. (1965). STOCKHOLM: A PLANNED CITY. *Scientific American, a division of Nature America, Inc.*
- Stacy, H. (2007). Constructing an Archival Cityscape: Local Views of Colonial Urbanism in the French Protectorate of Morocco. . *History in Africa*(34), 121–132.
- Stahre, U. (2004). City in Change: Globalization, Local Politics and Urban Movements in Contemporary Stockholm. *International Journal of Urban and Regional Research*.
- Stenport, A. W. (2004). *Making Space Stockholm, Paris, and the Urban Prose of Strindberg and His Contemporaries*. University of California.
- Susan Gilson Miller, A. P. (2001). Inscribing Minority Space in the Islamic City The Jewish Quarter of Fez (1438-1 912),. *Journal of the Society of Architectural Historians*.
- Tarik, H. (2017). Le programme des villes nouvelles au Maroc: rupture ou prolongement d'un urbanisme de rattrapage? *Revue Internationale d'Urbanisme*.

- Temenos, C., & McCann, E. (2012). The local politics of policy mobility: Learning, persuasion, and the production of a municipal sustainability fix. *Environ Plann*, 1389–1406.
- The High Commission for Planning. (2014). *Benslimane population*.
- The High Commission for Planning. (2014). *Moroccan institution in charge of statistical production, planning, forecasting, analysis, Dakhla population*.
- The ministry of National Spacial Planning, Housing, Urban Planning and City Policy. (2016). *Rapport synthèse: eco-quartier action locales pour une ville durable*.
- The Ministry of National Spacial Planning, Housing, Urban Planning and City Policy. (2020). *Promotion of an Eco-city in Dakhla*.
- The ministry of National Spacial Planning, Housing, Urban Planning and City Policy. (2020). *The city Benslimane, Eco-city*.
- The Rio Declaration on Environment and Development. (1992).
- Thompson, J. B. (1996). *Tradition and self in a mediated world. Detraditionalization: Critical reflections on authority and identity*.
- Tomlinson, J. B. (1999). *Globalization and culture*. University of Chicago Press.
- Torabi, Z., & Brahman, S. (2013). Effective Factors in Shaping the Identity of Architecture.
- Tran, J. (2010). *Static Illusion: Architectural Identity, Meaning and History*. Perth: Curtin University.
- Turner, R. A. (2014). Segregation, gentrification, and residualisation: from public housing to market-driven housing allocation in inner city Stockholm. *International Journal of Housing Policy*.
- Uggia, Y. (2012). Construction of 'nature' in urban planning: a case study of Stockholm. *The Town Planning Review*.
- Uggla, Y. (2010). Risk, Uncertainty, And Spatial Distinction: A Study Of Urban Planning In Stockholm, Theoretical and Empirical Researches in Urban Management. *Research Center in Public Administration and Public Services*.

- UNESCO. (tarih yok). *whc.unesco.org*. Unesco world heritage Medin of Fez. adresinden alındı
- Vale, B., & Vale, R. (1991). *Principles of Green Design, Green Architecture*.
- Wagner L, M. C. (2014). Rabat retrospective: Colonial heritage in a Moroccan urban laboratory. *Urban Studies*, 51(14), 3011–3025.
- WanG, L. n. (2013). *Architectural Research Methods*. Wiley.
- Weber, M. (1964). *Theory of Social and Economic Organization*, trans. A. M. Henderson and T. Parsons. 136-39.
- William-Olsson, W. (1940). Stockholm, Its Structure and Development. *Geographical Review*.
- World Commission on Environment and Development. (1987). *Towards sustainable development, Our common future*.
- Wright, G. (1991). *The Politics of Design in French Colonial Urbanism*.
- Wyrzten, J. (2017). Colonial Legitimization-Legibility Linkages and the Politics of Identity in Algeria and Morocco. *European Journal of Sociology*, 205–235.
- Yeang, I. D. (2000). *urban design compendium*, homes and communities agency.
- Yin, R. (1994). *Typology of Case Study Research: Design and Methods*. Sage.

APPENDIX

Table XXII. (Continued in pages 139-142), Analyzed documents that trace Moroccan city's architectural identity and parameters from Precolonial time till Modern days. (Y: Architectural identity is discussed specifically. N: Architectural identity is not discussed). Source: Author.

Source	Period	Findings	Architectural Identity	Parameters
Eric Calderwood, (2012). The beginning (or end) of Moroccan history: historiography, translation, and modernity in Ahmad B. Khalid al-Nasiri and Clemente Cerdeira, Int. J. Middle East Stud. 44, 399–420	Pre-colonial	Beginning of Moroccan modern history accounting. Comparison of two accounts of War from both parties.	N	-
Rahal Boubrik, (2022). Nineteenth-Century Slave Markets, The Moroccan Slave Trade, AlMuntaqa, Arab Center for Research & Policy Studies, 63-79	Pre-colonial	Fez, Meknes, Rabat, Sale, and Marrakech was active trade cities and kept their activity as nodes for commerce as ancient imperial cities	N	-
Susan Gilson Miller, (2005), Finding Order in the Moroccan City: The Hubus of the Great Mosque of Tangier as an Agent of Urban Change, Muqarnas, 22, pp. 265-283	Pre-colonial	Religious buildings were the pillars of Moroccan Pre-colonial cities' urban body. Moroccan Pre-colonial and colonial cities are results of rupture represented in socio political change	Y	Semantic Organization
Clifford Geertz, (1989). "Toutes Directions: Reading the Signs in an Urban Sprawl," International Journal of Middle East Studies 21, 291-306.	Pre-colonial	The notion of the city had long started in Morocco. However historically, Moroccan cities do not represent coherent historical continuation. New cities tend to grow apart from the existing one.	Y	Spatial Organization
Max Weber, (1964). Theory of Social and Economic Organization, trans. A. M. Henderson and T. Parsons, 136-39	Pre-colonial	Habus system is a real estate that is rent serve for community services. Hubus system: urban reflection of Collective system for charity and solidarity	Y	Semantic Organization
Kennedy Hugh. (1985). "From Polis to Medina." Past and Present, 15-16	Pre-colonial	Mosques are the new urban forms that the islamic city is centered on	Y	Shapes and Forms
Besim S. Hakim, Arabic-Islamic cities: Building and planning principles, 2008, 95-96	Pre-colonial	The architecture principles of "Dar", Moroccan traditional courtyard house.	Y	General Design Principal
Eickelman Dale. (1974). Is There an Islamic City? The Making of a Quarter in a Moroccan Town. International Journal of Middle East Studies, 5(3), 274–294.	Pre-colonial	Typical cities architecture: The city could be fortified or not, the main feature is the sense of belonging.	Y	Spatial Organization
Janet Abu-Lughod, (1980). The Legitimacy of Comparisons in Comparative Urban Studies: A Theoretical Position and an	Pre-colonial	Moroccan precolonial cities organization	Y	Spatial Organization, Semantic Organization

Application to North African Cities.				
Gold Peter, (2013). 'The Impact of the Enclaves on Spanish–Moroccan Relations', Europe or Africa? A Contemporary Study of the Spanish North African Enclaves of Ceuta and Melilla.	Colonial	Protectorate system was imposed to Morocco with France as main protector, and Spain settling in the North and South	N	-
See Jos�e Luis Villanova, (2003). El Protectorado de Espa�a en Marruecos (Barcelona: Edicions Bellaterra, 2004), 53–70; and Josep Llu�s Mateo Dieste, La ‘hermandad’ hispano-marroqu�, 55–78.	Colonial	"The Protectorate" system of Lyautey in Morocco: A form of colonization unbodied in the protection that a powerful nation provides to a weaker nation	N	-
Ennaji Mohammed, (1978). Expansion europ�enne et changement social au Maroc, XVIe-XIXe si�cles, 40-43.	Colonial	Islamic cities had entered forced globalization by the entrance of the European colonization	N	-
Susan Gilson Miller, (2005). Finding Order in the Moroccan City: The Hubus of the Great Mosque of Tangier as an Agent of Urban Change, Muqarnas 22, 265-283	Colonial	The new urbanism starting with Henry Post designing the new city, "La ville nouvelle" in the major cities such as Tangier, Casablanca, Rabat, Meknes, Fes	Y	General Design Principal
Jacques le Golf, (1972). The Town as an Agent of Civilisation, The Fontana Economic History of Europe: The Middle Ages, 74	Colonial	Islamic towns sought organic forms but had ordered by centering the cities around religious edifices. Colonization cities sought uniform order regulated by leisure and work.	Y	Semantic Organization, Spatial organization
Pat Morton, (1998). A Study in Hybridity: Madagascar and Morocco at the 1931 Colonial Exposition, Journal of Architectural Education.	Colonial	Morocco was considered as indigenous; in a way it meant that the French did not accept Moroccan people or history	Y	Semantic Organization, Shapes and Forms
Wyrzten Jonathan, (2017). Colonial Legitimization-Legibility Linkages and the Politics of Identity in Algeria and Morocco. European Journal of Sociology, 58(2), 205–235	Colonial	Architectural displays of colonial states built by French architect was the pride of the French colonization The acceptance of the "indigenous" cultures was in developing cultural and economic projects such as "Les Villes Nouvelles" in Morocco. The projects were made to display "authentic" local culture. But it also segregates the existing historical cities.	Y	Semantic Organization
Abu-Lughod Janet, (1980). Rabat: Urban Apartheid in Morocco.	Colonial	The division of the traditional Medina and La Ville Nouvelle displayed the colonial political and social colonisation state. No	Y	Spatial Organization

		interference between the two parts of the city.		
Picard, c., & grummel, w. C. (1949). Volubilis: french excavations at a moroccan city. <i>Archaeology</i>, 2(2), 58–65.	Colonial	Marshal Lyautey, under French protectorate had also documented, and excavated historical sites and cities such as Volubilis the Roman city	Y	Spatial Organization
Holden, S. E. (2007). Constructing an Archival Cityscape: Local Views of Colonial Urbanism in the French Protectorate of Morocco. <i>History in Africa</i>, 34, 121–132.	Colonial	Medina was the Moroccan quarter, La Ville nouvelle was the city scape for European use The medina deemed a historical site was well preserved by colonial state	Y	Spatial Organization
Lawrence Adria. (2013). Nationalist Mobilization in Colonial Morocco. In <i>Imperial Rule and the Politics of Nationalism: Anti-Colonial Protest in the French Empire</i>, 166–213	Colonial	French and Spanish divisions of Morocco had made a different political division.	Y	Spatial Organization, General Design
‘Protectorate Treaty between France and Morocco’, (1912). <i>American Journal of International Law</i>, 6, 3, p.208	Colonial	Morocco is divided to useful Morocco and useless Morocco with a French dominance and Spanish help	N	-
Pieprzak, Katarzyna. (2007). “Ruins, Rumors and Traces of the City of Brass: Moroccan Modernity and Memories of the Arab Global City.” <i>Research in African Literatures</i> 38, 4, 187–203	Post-Colonial	Post-colonial Moroccan cities had faced socioeconomic problems due to political instability. It can be reflected in a period of fragmentation and alienation witnessed in cities. Industrial cities become quickly a hub for shanty towns due to the unbalances between the rural and urban areas Cities restoring their identity while building mosques and returning to Islamic cities features	Y	Semantic Organization
Anglin, Douglas. G. (1965). <i>Review of Old Societies and New States: The Quest for Modernity in Asia and Africa</i>, by C. Geertz. <i>The Canadian Journal of Economics and Political Science</i>, 31(4), 603–605.	Post-Colonial	Preserving spiritual identity of the cities by going back to Islamic cities Identity	Y	Semantic Organization
Yeoh Brenda (2001). <i>Postcolonial cities. Progress in Human Geography</i> 25: 456–468	Post-Colonial	Postcolonial cities of Morocco represent a case of the continuation of colonial urbanism while returning to Islamic identity. The colonial legacy was preserved,	Y	Semantic Organization

		and new elements of the city were added.		
Abu-Lughod Janet. (1979). Dependent Urbanism and Decolonization: The Moroccan Case. <i>Arab Studies Quarterly</i>, 1(1), 49–66	Post-Colonial	Moroccan cities were rebuilt but have been shattered by years of identity deprivation Linking the two differently colonized regions of Morocco was challenging. The north was not developed by Spain, the south was too centered by French urbanism Public housing program failure in front of the fast urbanization and housing shortage of the poor	Y	Semantic Organization
Amin Samir, (1970). The Maghreb in the Modern World: Trans, by Michael Perl	Post-Colonial	Socialist policies to solve housing crisis	Y	Semantic Organization
Najm-dine el Otmani, (2018). An Evaluation of Housing in Casablanca, Morocco: Anfa Case.	2000th	“Cities without slums” project implementation problems and challenges of Casablanca city housing.	Y	Shape and Forms, Spatial Organization, Material
Wagner, L., & Minca, C. (2014). Rabat retrospective: Colonial heritage in a Moroccan urban laboratory. <i>Urban Studies</i>, 51(14), 3011–3025.	2000th	Colonial policy for urbanization was to preserve the existing but still build next to it the alternative. Postcolonial cities had preserved this mentality by implementing mega projects that can attract the investors beside the historical part of the city.	Y	Semantic Organization
Adnane M'Saouri El Bat, and all, (2021). Thermal impact of street canyon microclimate on building energy needs using TRNSYS: A case study of the city of Tangier in Morocco, Case Studies in Thermal Engineering, 24	2000th	The ratio of canyon streets affects the microclimate indoors at outdoors due the benefit of vernacular narrow streets can be explained	Y	Shapes and Forms, General Design
Ona Atia, (2022). Refusing a “City without Slums”: Moroccan slum dwellers' nonmovements and the art of presence, Cities, 125.	2000th	Zenata was built as a green city that is centered around slum dwellers that are misplaced, but it was still hugely refused due to top-down programs.	Y	Semantic Organization

CURRICULUM VITAE

ORCID ID: 0000-0002-7882-8380

Name Surname : Noussaiba RHARBI

Foreign Language : Arabic, French, English

Education and Professional Background:

- 2023, Eskisehir Teknik University, Graduate Institution, Engineering Faculty, Architecture Department
- 2019, Eskisehir Osmangazi University, Engineering Faculty, Architecture Department

Publications and/or Scientific/Artistic Activities:

- 2022, Moroccan New Green Cities, Towards a Green Urban Transition, Journal of Islamic Architecture
- 2021, Study of some passive solutions integrated to a residential building using multi-objective optimization, 9th International Renewable and Sustainable Energy Conference (IRSEC)