



PHAROS UNIVERSITY IN ALEXANDRIA
FACULTY OF ENGINEERING
ARCHITECTURAL DEPARTMENT

“New Trends for Sustainable Energy INCTSE2016”

1-3 October

**Conference Topics :Energy and Environment
Energy and Sustainable Development**

Lecture Title

Green House as a Concept Design



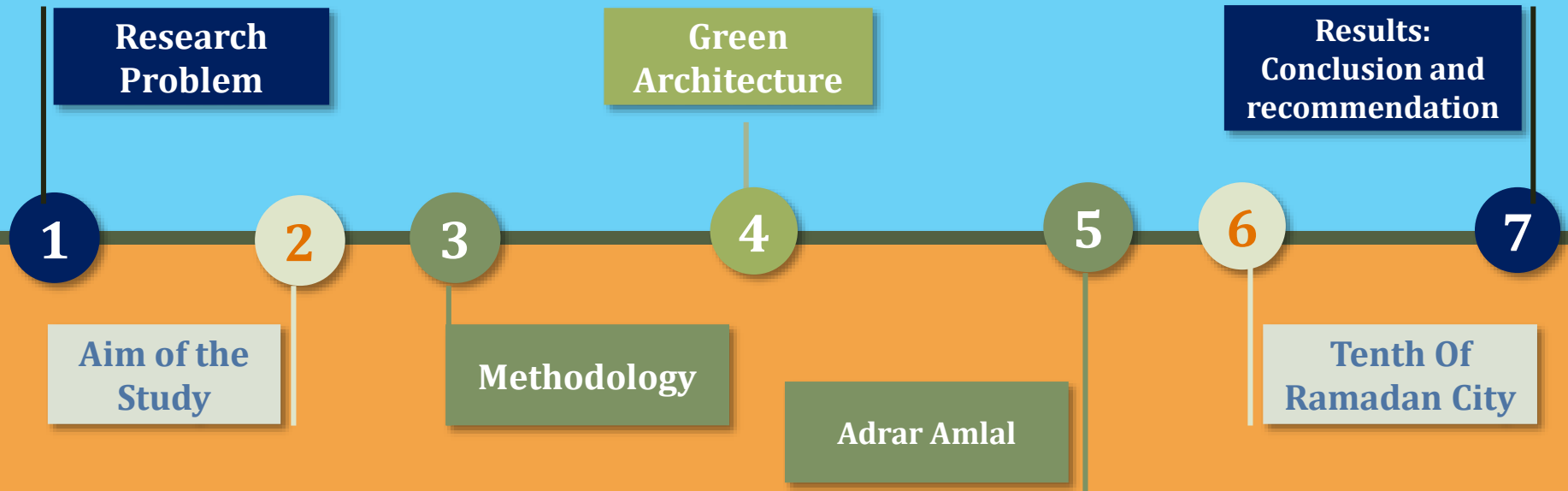
New Trends for Sustainable Energy INCTSE2016'

1-3 October

Conference Topics :Energy and Environment
Energy and Sustainable Development

Lecture Title

Green House as a Concept Design





New Trends for Sustainable Energy INCTSE2016'

1-3 October

Conference Topics :Energy and Environment
Energy and Sustainable Development

Lecture Title

Green House as a Concept Design

Research Problem

1

Aim of the Study

2

3

Methodology

4

Green Architecture

Adrar Amlal

5

6

Tenth Of Ramadan City

7

Results:
Conclusion and recommendation

Research Problem



There is no clear approach to design the green architecture



New Trends for Sustainable Energy INCTSE2016'

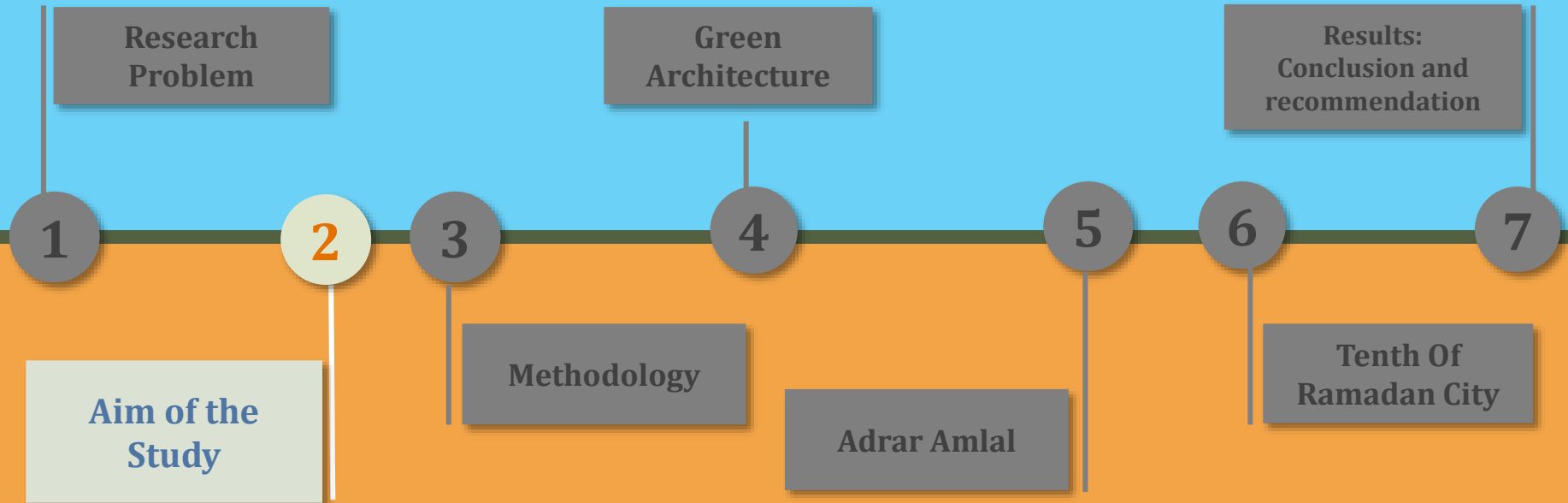
1-3 October

Conference Topics :Energy and Environment
Energy and Sustainable Development

Lecture Title

Green House as a Concept Design

Contents of the presentation

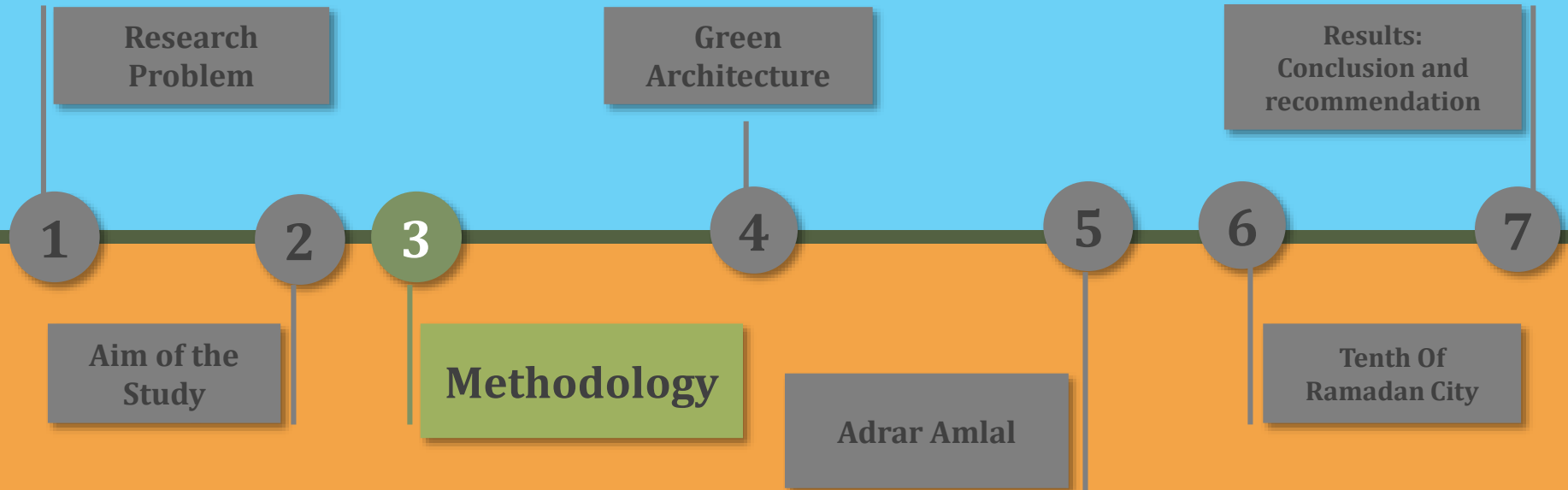


AIM OF STUDY



Access to appropriate methodology for Egypt correspond to different levels of design in terms of ecological techniques to advanced one

Contents of the presentation



New Trends for Sustainable Energy INCTSE2016'

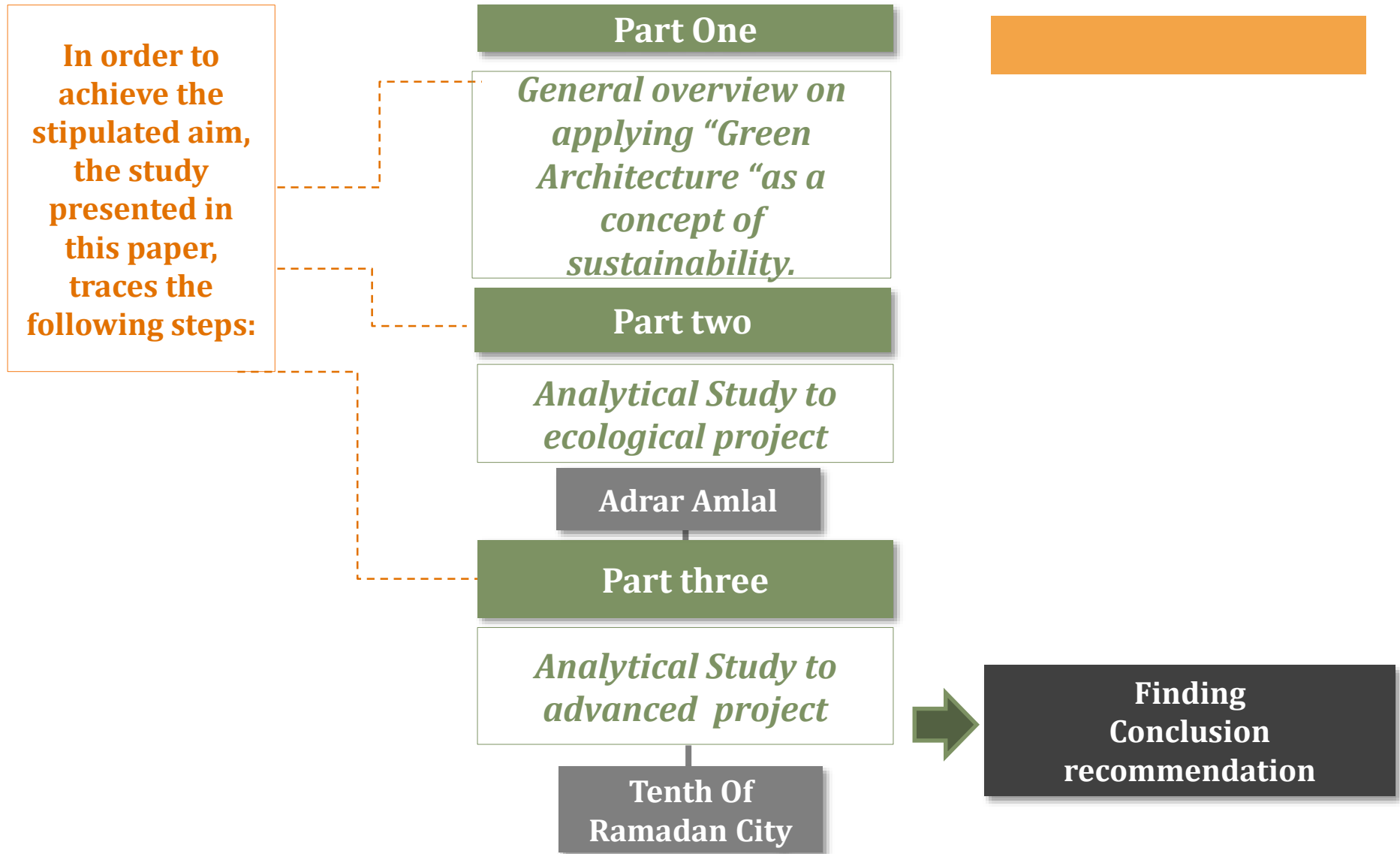
1-3 October

Conference Topics :Energy and Environment
Energy and Sustainable Development

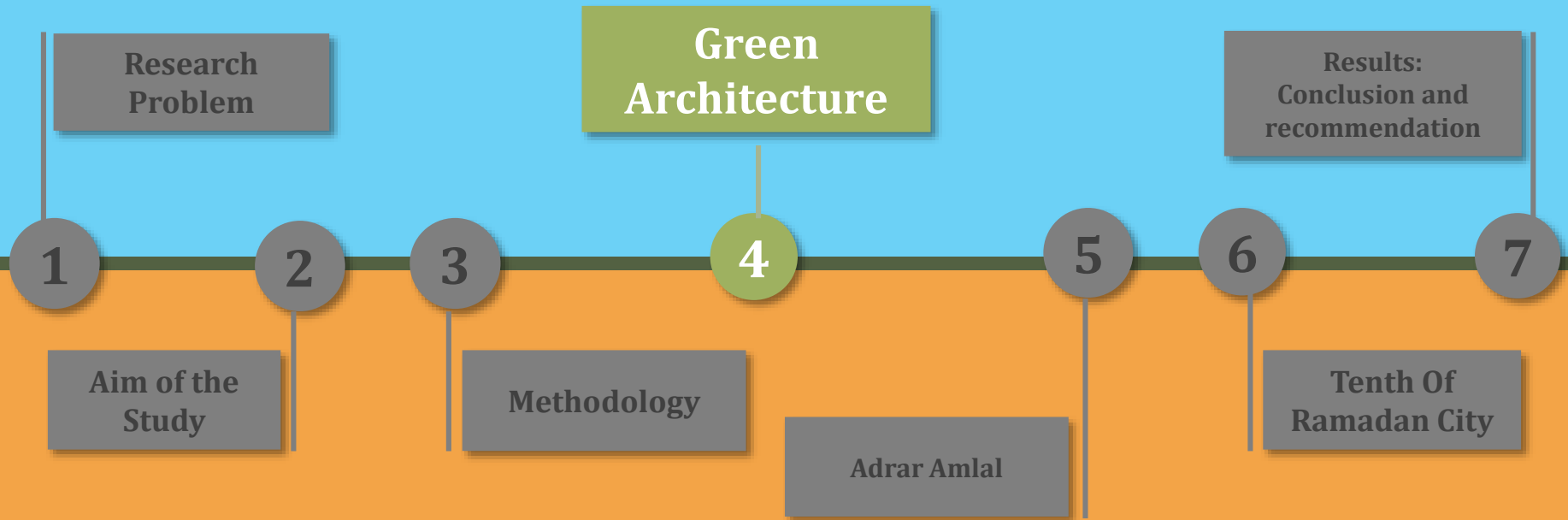
Lecture Title

Green House as a Concept Design

METHODOLOGY



Contents of the presentation



New Trends for Sustainable Energy INCTSE2016'

1-3 October

Conference Topics :Energy and Environment
Energy and Sustainable Development

Lecture Title

Green House as a Concept Design

Part One

General overview on applying “Green Architecture” as a concept of sustainability.

Green architecture, or green design, is an approach to building that minimizes harmful effects on human health and the environment.

The "green" architect or designer attempts to safeguard air, water, and earth by choosing eco-friendly building materials and construction practices (Roy,2008).

Consideration for green building

Green building involves consideration in four main areas

- 1. site development.***
- 2. Material selection.***
- 3. Minimization energy efficiency.***
- 4. Indoor air quality***

Part One

General overview on applying “Green Architecture” as a concept of sustainability.

Consideration for green building

Green building involves consideration in four main areas

- 1. site development.*
- 2. Material selection.*
- 3. Minimization energy efficiency.*
- 4. Indoor air quality*

Consider site development to **reduce the impact** of development on the natural environment. For example, **orient** the buildings to take **advantage of** solar access, shading and wind patterns **that will** less in heating and cooling loads.

Part One

General overview on applying “Green Architecture” as a concept of sustainability.

Consideration for green building

Green building involves consideration in four main areas

- 1. site development.*
- 2. Material selection.*
- 3. Minimization energy efficiency.*
- 4. Indoor air quality*

Carefully select materials that are durable, contain recycled content, and are locally manufactured to reduce negative environmental impacts. A growing market exists of quality recycled products at affordable prices.

Part One

General overview on applying “Green Architecture” as a concept of sustainability.

Consideration for green building

Green building involves consideration in four main areas

- 1. site development.*
- 2. Material selection.*
- 3. Minimization energy efficiency.*
- 4. Indoor air quality*

Incorporate energy-efficient design into buildings to create an efficient and comfortable environment. Take advantage of the natural elements and technologies to conserve resources and increase occupant comfort/productivity while lowering long-term operational costs and pollutants (CBFEE, 1999).

Part One

General overview on applying “Green Architecture” as a concept of sustainability.

Consideration for green building

Green building involves consideration in four main areas

- 1. site development.*
- 2. Material selection.*
- 3. Minimization energy efficiency.*
- 4. Indoor air quality*

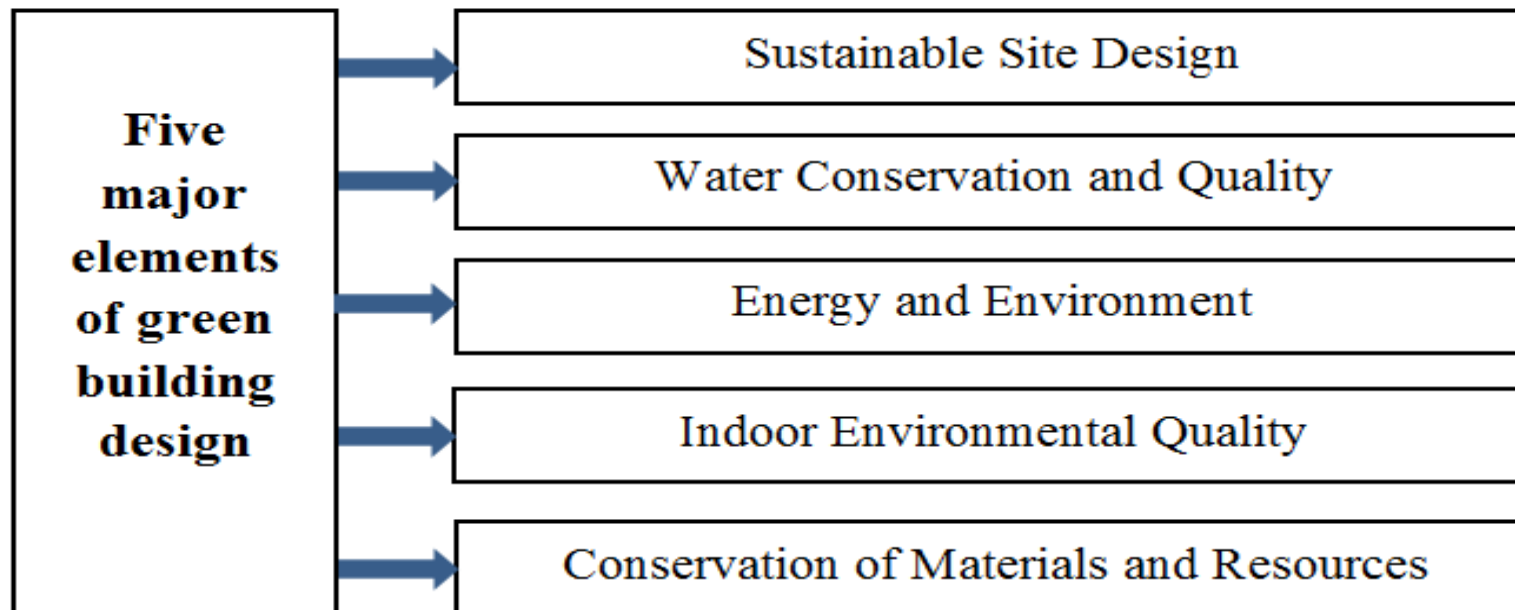
Design for high indoor air quality to promote occupant health and productivity.

Minimize the waste in construction and demolition processes by recovering materials and reusing or recycling those (CGB, 2009).

Part One

General overview on applying “Green Architecture” as a concept of sustainability.

The principles of green building design



- ❖ Water Systems
- ❖ Natural Building
- ❖ Passive Solar Design
- ❖ Green Building Materials
- ❖ Living Architecture

Part One

General overview on applying “Green Architecture” as a concept of sustainability.

The benefit of green building design

Green building is not a simple development trend; it is an approach to building suited to the demands of its time, whose relevance and importance will only continue to increase (USGBC)

1-Comfort.

Because a well-designed passive solar home or building is highly energy efficient, it is free of drafts. Extra sunlight from the south windows makes it more cheerful and pleasant in the winter than a conventional house (Kats, 2006)

2. Economy.

If addressed at the design stage, passive solar construction doesn't have to cost more than conventional construction, and it can save money on fuel bills (Kats, 2003)

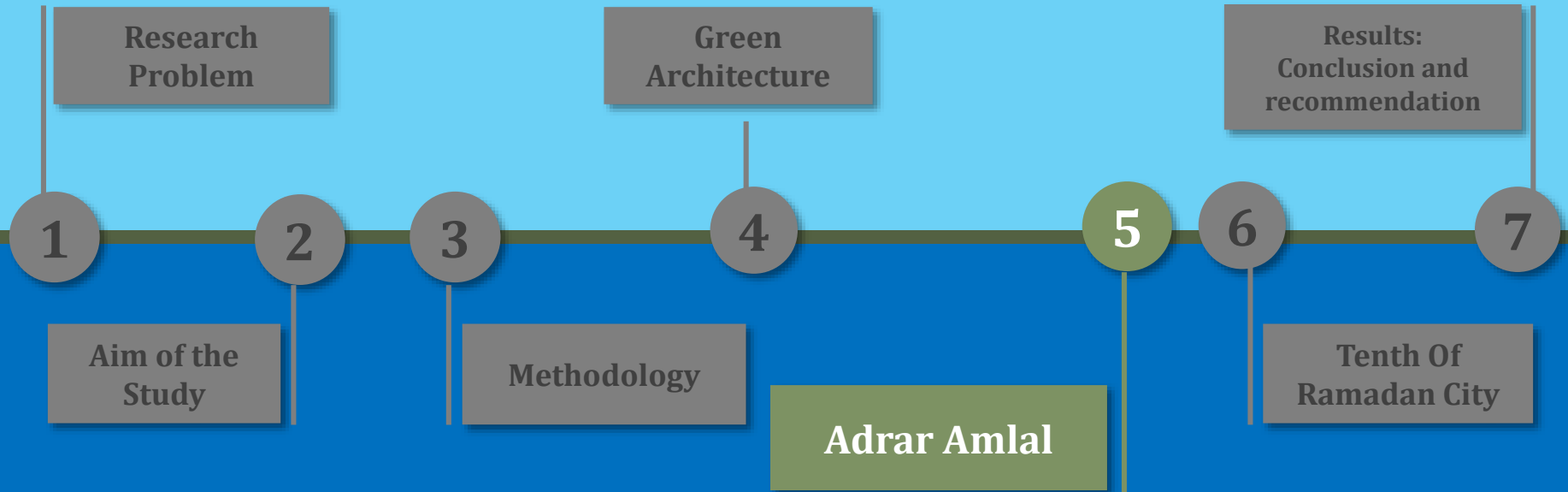
3. Aesthetics.

Passive solar buildings can have a conventional appearance on the outside, and the passive solar features make them bright and pleasant inside.

4. Environmentally responsible.

Passive solar homes can significantly cut use of heating fuel and electricity used for lighting. If passive cooling strategies are used in the design, summer air conditioning costs can be reduced as well (Woolley , 2006).

Contents of the presentation



Part two

Analytical Study to ecological project (Adrar Amlal)

An applied analytical study on a project of "Adrar Amlal" hotel in "Gaafar oasis"at Siwa in Egypt .

The mechanism of choosing the construction system is considered as an important stage in urban projects due to its relation with a group of limits forming the building technology , the mechanism of choice is related to the engineering method of decision support system used in construction system through building technical analysis and its application limits which pass through a group of consecutive stages related to the project nature and the surrounding environment specially in the distinguished sites environmentally to assure the environmental resource conservation for humanity secure in his environment which needs from him to know the Ecological dimensions (capacity-dependence-recycling).

The project aims to achieve a group of goals, the most important of them is to reach a mechanism to choose the suitable construction system matching with sustainable development forming harmony between the design and the construction system and the sustainable development to reach the best economical efficiency of the project encouraging the environment sustainability as one of affecting sustains for a balanced environmental urbanism.

Part two**Analytical Study to ecological project**
(Adrar Amlal)

The research is sequenced as follows

- 1-A study and analysis of the decision support system stages to choose the architectural project construction system as a primary stage.**
- 2- A study of factors and limits fuming the sustainable development and confirming it in an activated developed way.**
- 3-A study of the harmony relation between the construction system and the sustainable development and the exchangeable effects between them.**
- 4-A comparison and ordering the construction system priorities' and sustainable development priorities' .**
- 5-Concluding a mechanism of choosing the best construction system in harmony with the sustainable development.**

Part two

Analytical Study to ecological project
(Adrar Amlal)

Elements of construction technology

Components of the application Level Technology	Material	Man	Money	Machine	Market
Traditional technology	Natural materials	Large number of labor	Limited investments	Tools	Ordinary markets
Intermediate Technology	Industrialized	Smaller numbers of handy makers and more qualifications in operating machines	Appropriate investments	Machines	Planned marketing
Advanced technology	Light new materials	Qualified labor in operating system	Capital finances	Automations	High level of operating marketing

Part two

Analytical Study to ecological project
(Adrar Amlal)

Elements of construction technology

Consensual approach and style between
cross-environmental sustainability

Environmental sustainability

Distinct renewable environmental viability

Conservation and ecological fit.

Economy in the consumption of environmental resources

Built environment balanced with uncontaminated nature and environment

Basic possibilities and have faith communities for housing

Communities that have the capacity and economic efficiency that believes the housing needs of the population

Community rehabilitation to live and work now and in the future.

Sustainable design

Achieving

Study place

Achieving

Environmental connection

Achieving

Perceiving natural processes

Achieving

Environmental impact study

Achieving

Environmental integrity of design and operations support

Achieving

Study of human nature.

Influence of

Influence of

Influence of

Influence of

Influence of

Influence of

Execute method

Local materials

Construction materials available non-local

Provide operational real equipment and labor

The nature of the materials used and compatible with environmental

Local materials consumption

Local materials

Execute method operations noise

Coordinate the implementation

Employment skills

Part two

Analytical Study to ecological project (Adrar Amlal)

The research is sequenced as follows

The "Adrar Amlal" hotel in "Gaafar oasis" at Siwa in Egypt is considered the best example of applying the mechanism of choosing the construction system in harmony with sustainable development, the Oasis is a distinguished site environmentally at Siwa ,it is centralized around (the White mountain),the project criteria is there use of the old oasis method of construction again to build environmental houses of a new view using building technology by using building materials which are suitable for Siwa environment such as (Karsheef (salted masses)-clay-cured palm cores)



Part two

Analytical Study to ecological project (Adrar Amlal)

archite



Excavation work



The work Foundation



The work of external walls



Curved outer work



Work contracts and interr



Bishop's work

the opera

Stages of construction for sustainable implementation method user adrar hotel project financi

hotel project financing

Part two

Analytical Study to ecological project (Adrar Amlal)

Processor architectures applied ecological considerations for the study project method



For internal walls and ceiling River

Interior finishes



الزوايا

نسب الفتحات

الانحاء الفطرية



الشبابك الناحية

التفاعل بينة

التشكيل العضوي



لواجهات الخارجية

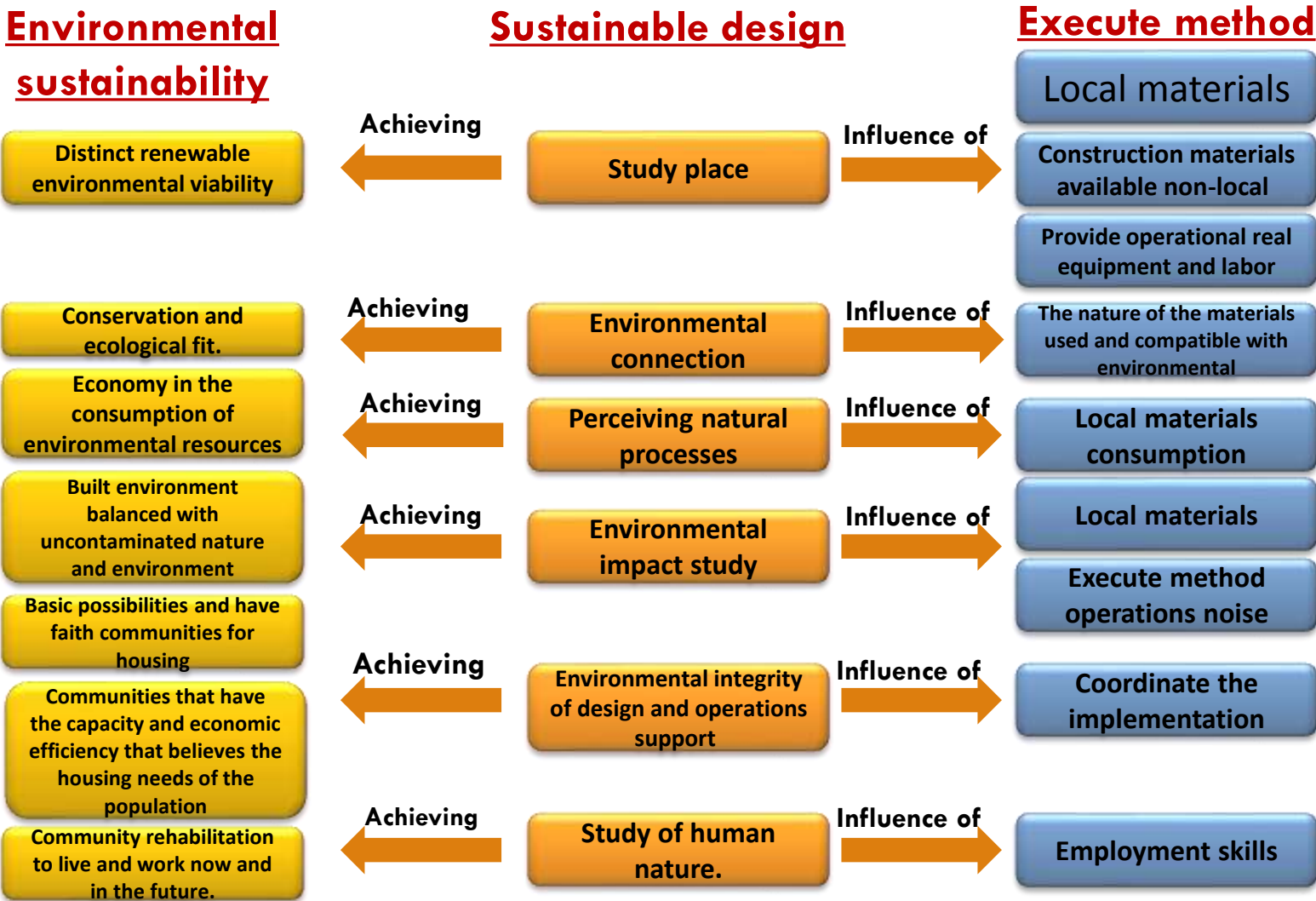
Design and climatic treatments

Part two

Analytical Study to ecological project
(Adrar Amlal)

Elements of construction technology

Consensual approach and style between
cross-environmental sustainability



Part two

Analytical Study to ecological project (Adrar Amlal)



run cross study project on harmonic method

Part two

Analytical Study to ecological project
(Adrar Amlal)*The project conclusions*

First: The choice of the best construction system suitable for the project environment is the first step to achieve sustainable development .

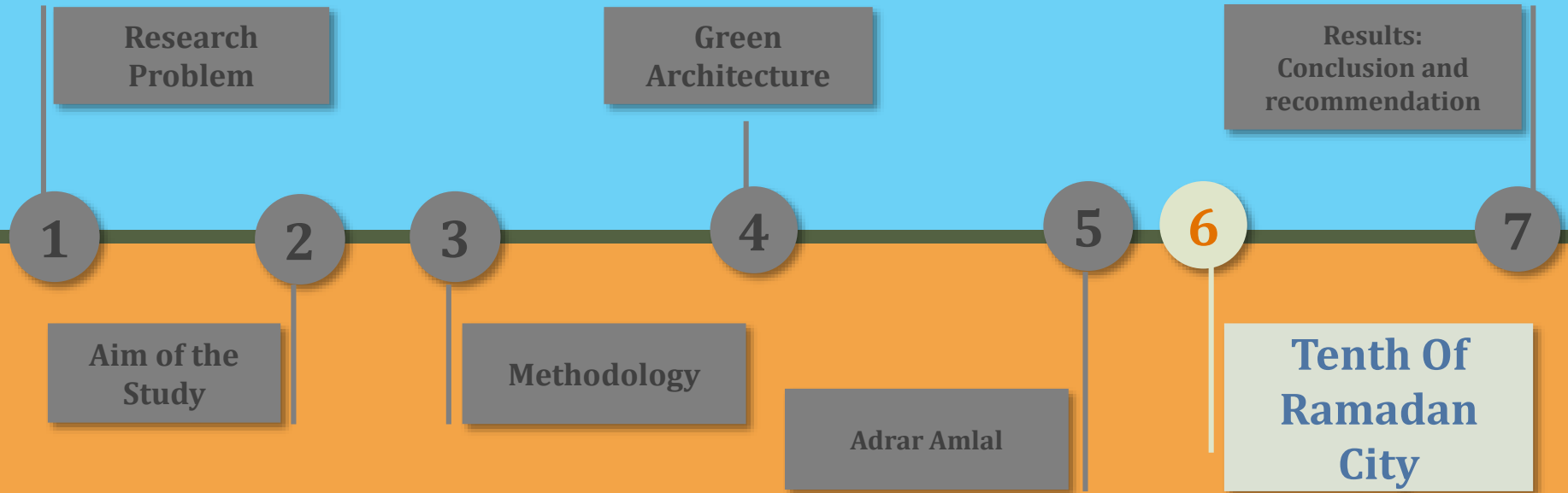
Second :The abundance of the environmental building materials is the most important factor to choose the environmental construction system.

Third: To make a relation between construction rates and "replacement and exchange "rates of projects in site to achieve the environmental sustainable development.

Fourth :Studying and developing the traditional construction systems of projects in sustainable sites which helps to make the project more economic efficient and in harmony with environmental sustainability

Fifth: The architectural integration together with knowlgment between different stages in study and construction helps to achieve the environmental sustainability for the built environment

Contents of the presentation



Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

This part has concentrated on the neighborhood sustainability evaluation and its efficiency in improving the decision-making for sustainable development, it plans to provide a better understanding of the sustainability assessment at the neighborhood level and provide a critical analysis of both the theory and practice of neighborhood sustainability evaluation.

This project aim to introduce a case study for new application of the microclimate of urban open spaces is affected by several factors such as the urban form and geometry, urban density, the vegetation, the water levels and the properties of surfaces (Shishegar, 2013). Both climatic and physical factors are combined in order to attain sustainable human thermal comfort conditions.

Part three

Analytical Study to advanced project
(Tenth Of Ramadan City)

MATERIALS & METHOD

***URBAN DESIGN IMPROVEMENT
METHODS FOR THERMAL COMFORT***

***SIMULATION TOOLS IN URBAN
DESIGN DECISIONS***

Part three

Analytical Study to advanced project
(Tenth Of Ramadan City)

MATERIALS & METHOD

URBAN DESIGN IMPROVEMENT
METHODS FOR THERMAL COMFORT

SIMULATION TOOLS IN URBAN
DESIGN DECISIONS

to design the form of a village, town or city, we should understand the outline design principles of the urban form.

The concept of sustainability in urban design to residential communities and housing.

Urban Microclimate

Human Comfort

Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

MATERIALS & METHOD

URBAN DESIGN IMPROVEMENT
METHODS FOR THERMAL COMFORT

SIMULATION TOOLS IN URBAN
DESIGN DECISIONS

to design the form of a village, town or city, we should understand the outline design principles of the urban form.

The concept of sustainability in urban design to residential communities and housing.

Urban Microclimate

Human Comfort

Several design concepts related to sustainable urban forms

1. Compactness
2. Sustainable transport
3. Density
4. Mixed land uses
5. Diversity
6. Passive solar design
7. Greening.

Principles sustainable neighborhood planning:

1. Suitable space for streets and an efficient street network
2. High density
3. Mixed land-use
4. Social mix.
5. Limited land-use specialization.

Part three**Analytical Study to advanced project**
(Tenth Of Ramadan City)**MATERIALS & METHOD***URBAN DESIGN IMPROVEMENT
METHODS FOR THERMAL COMFORT**SIMULATION TOOLS IN URBAN
DESIGN DECISIONS*

to design the form of a village, town or city, we should understand the outline design principles of the urban form.

The concept of sustainability in urban design to residential communities and housing.

Urban Microclimate**Human Comfort**

The main purpose of climatic design, on a macro (settlement) and micro (building) scale, is to reduce uncomfortable conditions created by an excess of heat and dryness. Buildings must be adapted to extreme summer and winter, day and night conditions to achieve a well-balanced indoor climate. Not only cooling is required; passive heating may also be required in winter and during cold nights. Protection is required from the intense radiation from the sun, ground and surrounding buildings, from dust, sandstorms and insects (flies). Glare has to be reduced and dust penetration prevented. Settlements and buildings, therefore, have to be compact, providing shade and controllable ventilation.

The urban microclimate plays an important role in building energy consumption and thermal comfort in outdoor spaces. Nowadays, cities need to increase energy efficiency, reduce pollutant emissions and mitigate the evident lack of sustainability (Ragheb G., El-Shimy H. and Ragheb A., 2015).

Part three**Analytical Study to advanced project**
(Tenth Of Ramadan City)**MATERIALS & METHOD**

URBAN DESIGN IMPROVEMENT
METHODS FOR THERMAL COMFORT

SIMULATION TOOLS IN URBAN
DESIGN DECISIONS

to design the form of a village, town or city, we should understand the outline design principles of the urban form.

The concept of sustainability in urban design to residential communities and housing.

Urban Microclimate

Human Comfort

Thermal comfort is the most important factor that Human comfort depends on. Thermal comfort is affected by six major factors which can be classified into two categories: personal factors - because they are characteristics of the occupants and environmental factors - that are related to the conditions of the thermal environment. The former consisting of clothing level and metabolic rate, while the latter is mean radiant temperature, air temperature , air speed and humidity. Even if all of these factors may change with time, standards usually refer to a steady state to study thermal comfort, just allowing a change in temperature by small scale (en.wikipedia.org, 2015). Air temperature is also governed by solar radiation.

Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

MATERIALS & METHOD

URBAN DESIGN IMPROVEMENT METHODS FOR THERMAL COMFORT

SIMULATION TOOLS IN URBAN DESIGN DECISIONS

There are a lot of urban microclimate moderation approaches Parameters like air temperature, relative humidity, mean radiant temperature, and wind velocity can be modified by the effect of urban interventions, which may improve the outdoor thermal comfort conditions (El-Darwish et al. 2015).

- 1. Cool Reflective Materials**
- 2. Water Surfaces**
- 3. Green Spaces and Vegetation**
- 4. Building Arrangements with Wind Movement**

Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

MATERIALS & METHOD

URBAN DESIGN IMPROVEMENT METHODS FOR THERMAL COMFORT

SIMULATION TOOLS IN URBAN DESIGN DECISIONS

There are a Few studies have indicated that a good neighborhood Sustainability Assessment Frameworks and Tools should have the following characteristics Sustainability coverage—consideration of the major themes of sustainability of neighborhoods based on which their performance to be measured in a comprehensive and integrated way (Yigitcanlar ,et al 2015).

Several simulation tools related to urban design such as **Ecotect, Urbanism, GIS, Envi-met and others**. Each simulation tool deals with a specific area for instance. Urbanism is concerned with transportation, environmental planning, and metropolitan land use; While Envi-met is concerned with surface-plant-air interaction inside urban environments. All simulation tools have an unlimited number of points from the model that can be analyzed, whereas, in a measurement study, only the results derived from the measured spots are reliable.

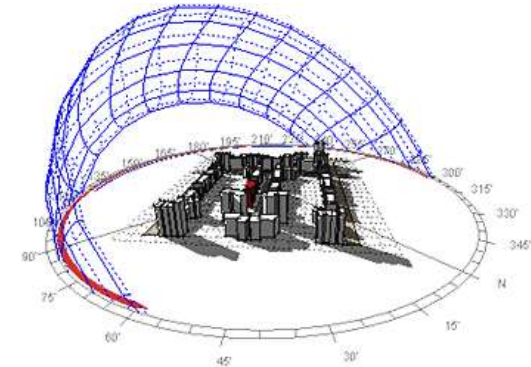
Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

MATERIALS & METHOD

URBAN DESIGN IMPROVEMENT METHODS FOR THERMAL COMFORT

SIMULATION TOOLS IN URBAN DESIGN DECISIONS



On the other hand **ECOTECH** software is designed to improve the analysis, simulation, and optimization of high-performance buildings and systems. By using this software architects and engineers can test, evaluate and respond to a variety of strategies because it has a special use in the design and delivery of sustainable 'green' projects. 3D spatial models are one of the most advantages of The design and performance analysis tools because of the property of cutting edge that helps users to visualize simulation output, smoothing the translation of simulation results into the project design. Using simulation software, design professionals are able to continuously study and predict how decisions will impact the performance of the building from the early phases of design through occupancy without significant investment in mockups or manual calculations. Simulation tools such as ECOTECH and other similar software can improve the building industry by giving architects and engineers the power to use performance-based criteria in the design of projects.

Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

Case study

El Asher City or Tenth of Ramadan City is located in the Sharqia governorate of Egypt close to the city of Cairo and follows the Urban Communities Authority. It is one of the first generation cities in Egypt, and also one of the largest new industrial cities. It was constructed to provide job opportunities for youths as well as to attract the population increase to the outside of Cairo and the narrow valley, its climate classified as hot desert as the rest of Egypt.

Design Concept of the project

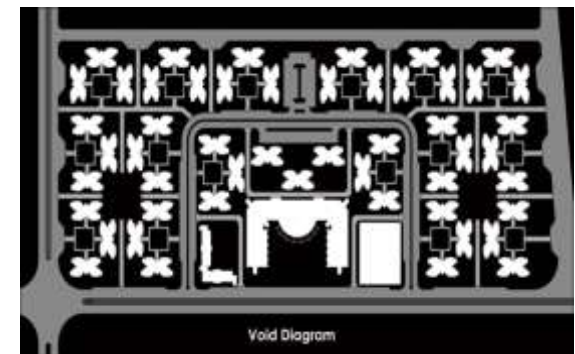
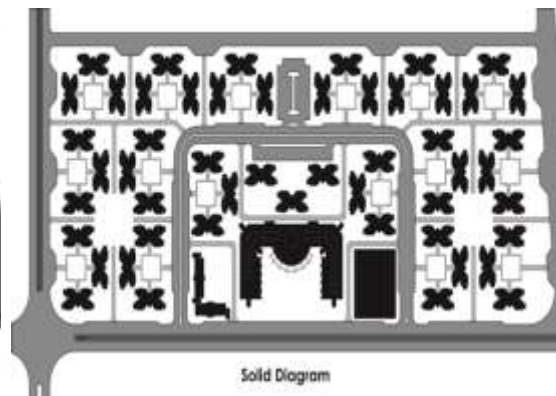
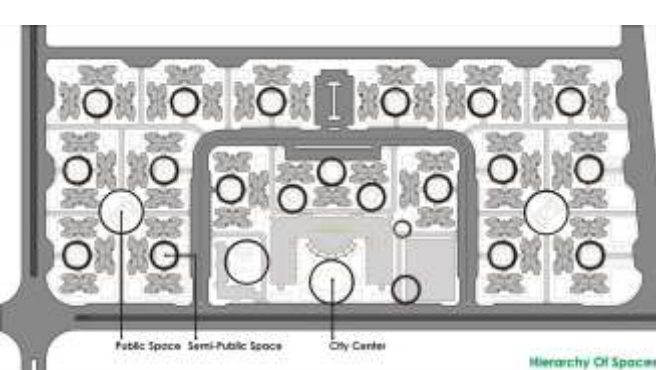
Design Concept of project (Figure 3) based on meeting the determinants architectural device "El Asher City or Tenth of Ramadan City" functional requirements in line with the Principles sustainable neighborhood planning to (Figures 4, 5):



Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

1. *Achieve the functional requirements of the project according to the structural and architectural determinants.*
2. *Reduce waste entrances of apartment buildings in the movement areas (roads) role habitation and what reduces the cost of the housing unit.*
3. *Designed Muscat approved symmetric to afflict balance in marketing and reduce differences to distinguish between the blanks in order to achieve special layers housing average and exterior distribution quality takes into account the non-typical after the concept of housing People's abhorrent to rush to*
4. *The Building was used major traffic battery different their positions to ensure optimal routing and compatibility with the gradient vacuum spaces planning (Figures 6,7).*
5. *The idea of assembling buildings to reduce the blanks rely on among themselves to provide spaces of the inner shadows.*

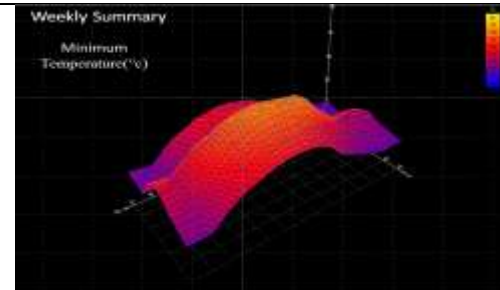
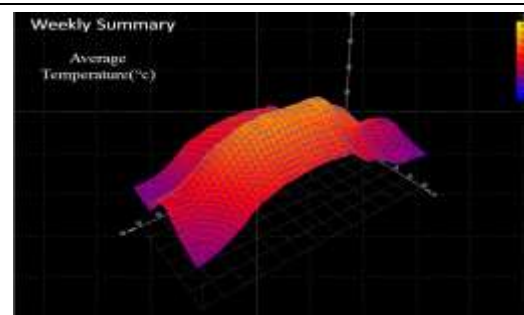
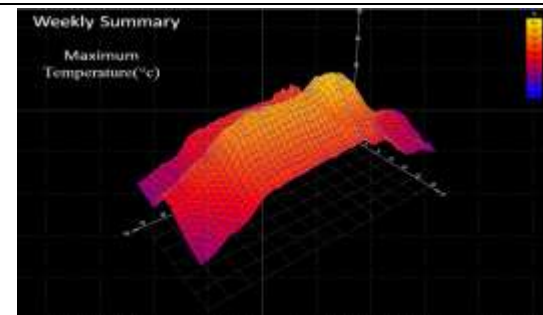
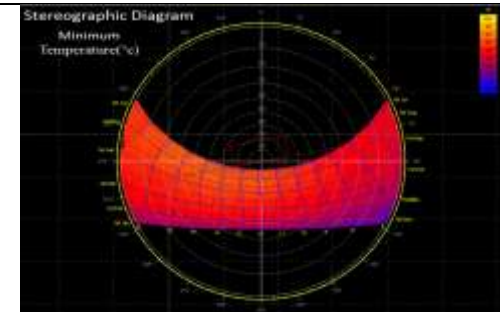
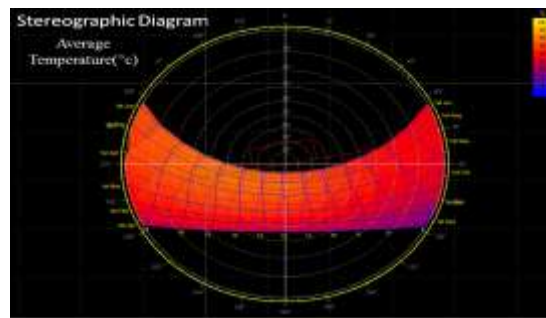
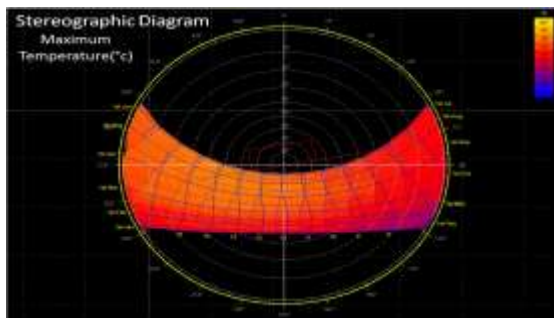


Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

Case study evaluation

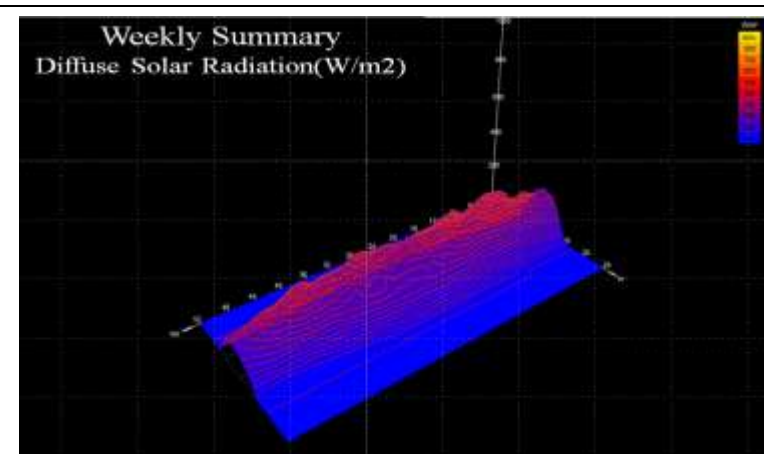
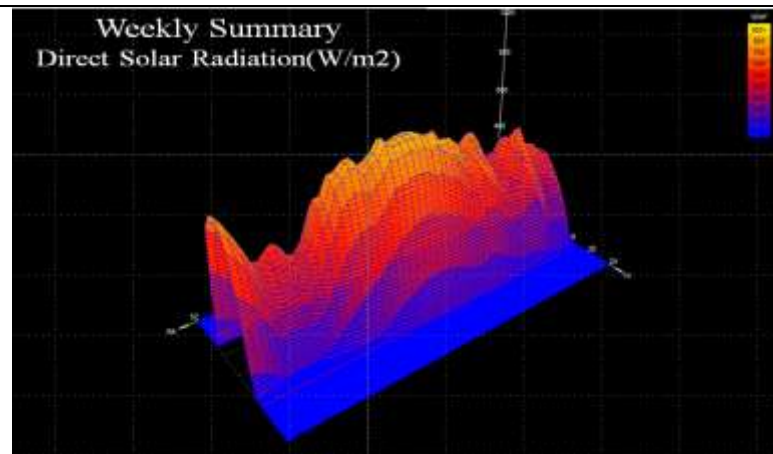
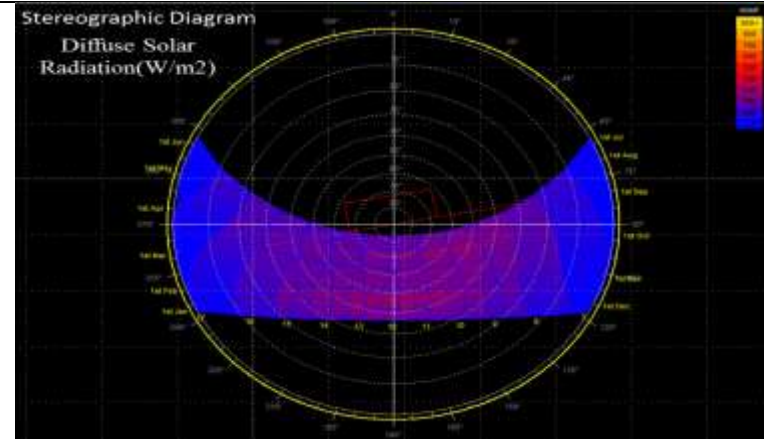
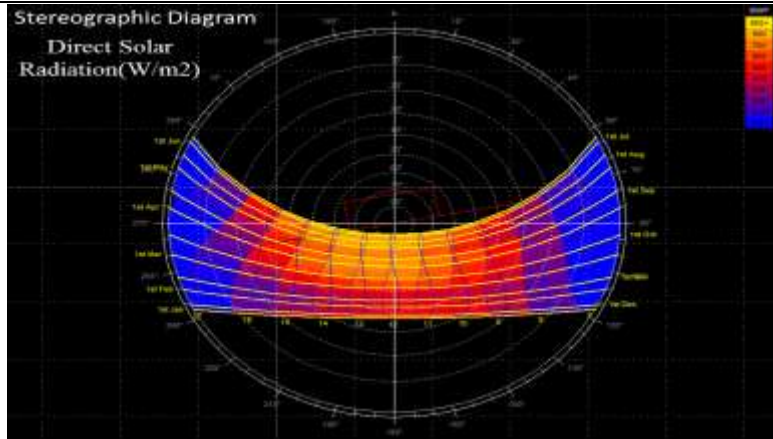
The simulation was run on Neighboring residential in Tenth of Ramadan City In order to investigate the local microclimate (Solar Radiation, air temperature, Relative humidity) in the climate of Egypt, Egypt as a proposed area. Readings of the microclimatic parameters were run consecutively currently, expected and proposed then compared on each indicator.(Figures 8, 9, 10 and 11).



Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

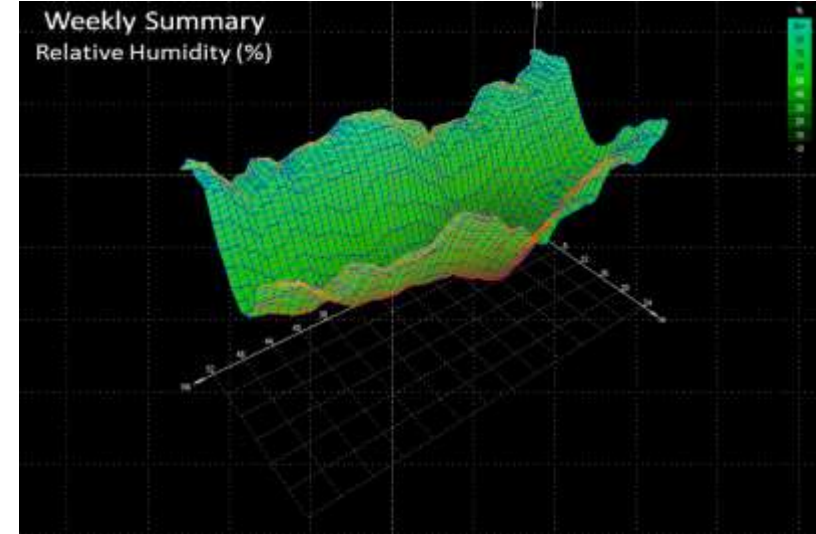
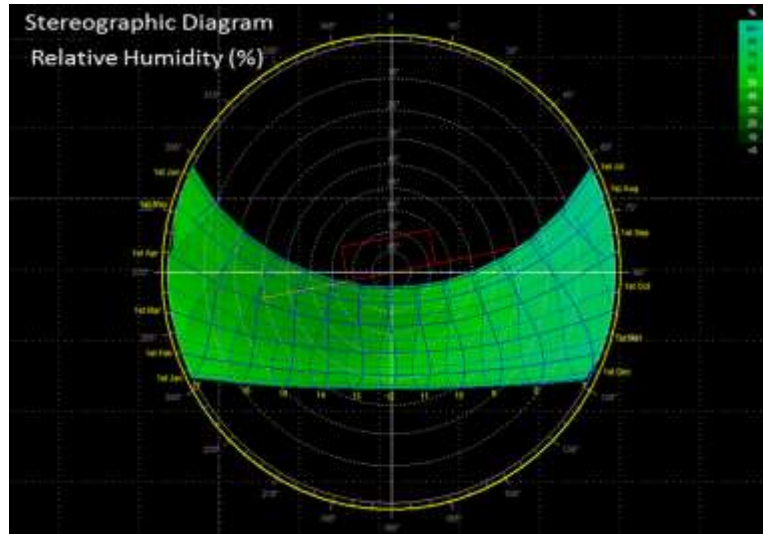
Case study evaluation



Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

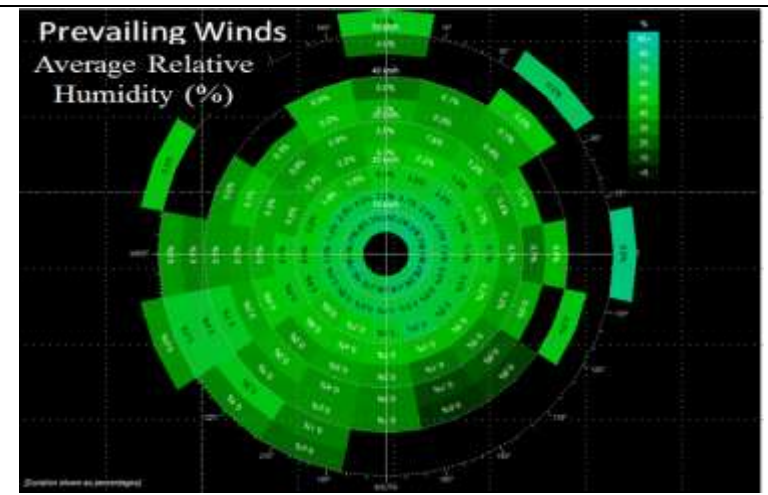
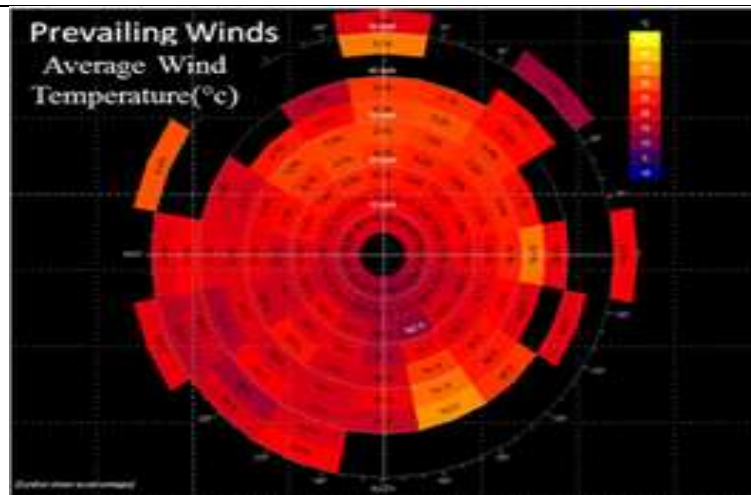
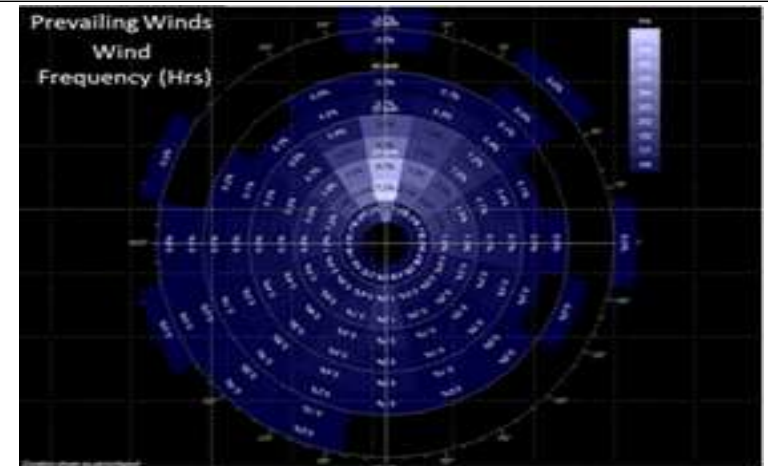
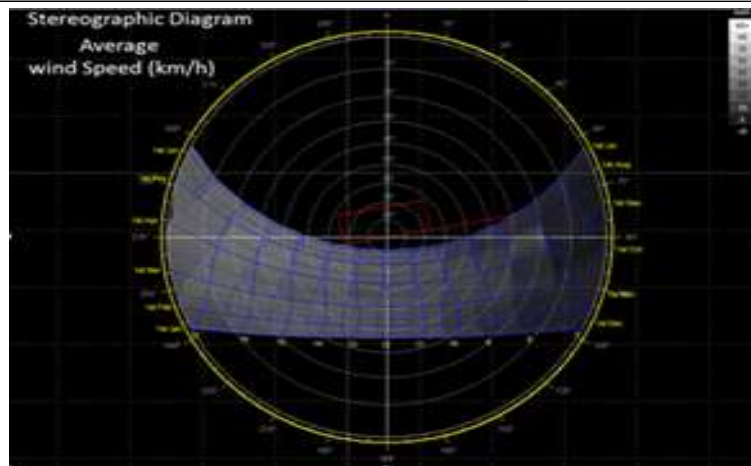
Case study evaluation



Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

Case study evaluation



Part three

Analytical Study to advanced project (Tenth Of Ramadan City)

CONCLUSION

This paper presents a review on urban sustainability with the aim of Understanding key technical principles to be considered while planning for new neighborhoods. Sustainable neighborhoods evolution and initiatives are described, several design concepts related to sustainable urban forms are defined and their sustainability characteristics investigated. (Focusing on sustainability concepts under the triple bottom line of environmental, economic, and social dimensions) and practitioners.

Rapid urbanization has brought environmentally, socially, and economically great challenges to cities and societies. To build a sustainable neighborhood, these challenges need to be faced efficiently and successfully. In this regard, the first step of action is to determine the sustainability levels of neighborhoods. From this perspective, the literature points to a number of NSA tools. However, as the critique of these tools suggests they have limitations in their indicator systems and adaptation in the developing country context is challenging.

There are many approaches that aim to achieve sustainable urban forms. Different approaches use different scales of concepts, as well as emphasizing some concepts over others. In practice, many local governments, planning consultants, landscape architects, and so on are grappling much more specifically with aspects of sustainable urban form through a variety of planning and design approaches and policies.

Different urban forms give differently to sustainability. Moreover, different planners and scholars may develop different combinations of design concepts to achieve sustainable development goals. They might come with different forms, where each form emphasizes different concepts. However, all should be forms that environmentally contribute beneficially to the planet for the present and future generations.

The ideal sustainable urban form according to the design concepts of sustainable urban form is that which has a high density and adequate diversity, compact with mixed land uses, and its design is based on sustainable transportation, greening, and passive solar energy. Ultimately, sustainable urban forms aim to achieve different objectives. The most prominent among them are decreased energy use, reduced waste and pollution, reduced automobile use, preservation of open space and sensitive ecosystems, and livable and community-oriented human environments.

The Five Principles are highly interrelated and support each other. High density provides the population and activity basis for a sustainable neighborhood; adequate street density is the material basis; mixed land-use and social mix shape the land use and social life in the neighborhood, and limited land use specialization is the first step towards mixed neighborhoods.

The Five Principles balance population growth, economic growth, rapid urbanization, sustainable urban development and other factors, and try to establish a new urban system. In this system, population and urban infrastructure accomplish economies of scale; diversified social networks and the diversity of land uses to support each other and develop together, and urban space and urban dwellers live and develop in harmony.

Besides good planning and design decisions, the application of these principles also requires supporting legal frameworks, an analysis of the local society and economy, appropriate infrastructure technology and capacity, and the institutional capacity to enforce decisions.

Contents of the presentation

