



Green Economy Themes: Pathway to Sustainable Urban Development

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Abstract

This century, the growth and development of many world cities are pushed by an economy that supports sustainable, liveable and wealthy communities through integrated ecological, and socio-economic agendas that encourage human and environmental well-being.

Governments nowadays seek efficient methods to manage their nations towards better, more sustainable cities, while also considering socio-ecological limits. A green economy has been proposed as a way to support sustainable development.

This paper focuses on the green economy idea and demonstrates how it is applied in urban planning through international case studies, suggests a framework for a green economy and concludes with a set of recommendations for application in Egyptian cities.

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Keywords

Green economy; sustainable urban planning; energy efficiency

1. Introduction

the most complex and crucial socio-economic phenomenon of the twenty-first century is the rapid urbanisation is arguably. It represents significant irreversible changes in production and consumption and in the manner in which people interact with nature. Only recently have cities and the urbanisation process been viewed through the lens of sustainability, with a focus on development and the green economy.

Our today's economy and our way of life today are based mainly on of fossil fuels, which not only threaten essential environmental and social problems through global warming but, at actual consumption rates, will run out within few decades, causing enormous industrial and economic disaster. [1].

A green economy can be one tool that manages social equity, human well-being, with an improved economy while reducing ecological and environmental risks. This paper will give a general idea for the green economy through international case studies that applied this concept to their urban environments. The research will then highlight a framework which integrates green economy concepts into the urban planning processes. Finally, the study offers recommendations in context for Egypt to improve city life and create a 'greener' image for Egyptian cities.

2. The Research Problem

Our today's world is becoming rapidly urbanised, with more than half of the global population existing in urban communities. Urban inhabitants number is expected to continue growing, particularly in developing countries. Such expansion will require a wide range of infrastructures, services, housing and employment programs, and land for development. The world's growth and development is expected that in the future it will be forced by an economy that supports sustainable, liveable and wealthy cities, by improving economic competitiveness and strategic urban planning. Cities need to apply green economy concepts. Therefore, this research aims to explore answers for the following main questions:

- Why a green economy?
- What strategy creates a green economy?
- Have green economies achieved sustainable development at the urban planning level?

3. Research Methodology

The paper explores the green economy idea from theoretical and analytical sides; the expected endpoint is sustainability in urban planning. It tries to identify the essential characters of a green economic strategy. Then, it analyses international case studies and examines how these cases applied the green economy concepts. Then, it constructs a framework for a green economy during the planning process. Finally, it suggests a set of recommendations for developing city planning from the perspective of a green economy and its application in urban planning.

4. Research Objectives

The primary objective of this paper is to explore the green economy concepts from an urban planning perspective.

5. The Green Economy And Urban Planning

5.1. Green Economy Definition

In general, the green economy has several common definitions (See Table 1). It is defined as a sustainable economy and society with a one-planet footprint where all energy is developed from renewable resources, which are naturally replenished with and has zero carbon emissions [1]. In its purest statement, a green economy is "one which is low carbon, resource efficient and socially inclusive". [2] Thus, substantially increased investments in economic levels that build on and reduce ecological scarcities and environmental risks are the central item in the green economy, and at the same time green economy enhances the earth's natural capital. Green economy sectors include, for example, clean technologies, improved freshwater infrastructure, sustainable energy, low-carbon transport, and energy-efficient design, waste management clean technologies, sustainable agriculture, and forestry. These investment sectors are supported by the international policy development and market infrastructure besides the national policy changes. [3]

Table 1. Some Green Economy Definitions

Source	Definition
UNEP's working definition, 2010	"...a system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities.."
Green Economy Coalition, 2010	"...a resilient economy that provides a better quality of life for all within the ecological limits of the planet .."

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Table 1 continued

The UNEP-led Green Economy Initiative, 2011 International Chamber of Commerce, 2012	the economy “that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It is low carbon, resource efficient, and socially inclusive.” “... an economy in which economic growth and environmental responsibility work together in a mutually reinforcing fashion while supporting progress on social development...”
Diyar et al., 2014	“... the economy where the growth of the people’s welfare and employment increase are provided owing to the state and social investments ensuring reduction of emissions and environmental pollution and stimulating effective use of energy and resources as well as preventing from any harm to biodiversity and ecosystem...”

According to the UN Economic Programme (2011), a green economy is an economy caused by significantly reducing environmental risks through improved human welfare and social equity. In such sort of economy, all types of investments that reduce pollution and carbon emissions, improve resource and energy efficiency beside stop loss of biodiversity and footprint impacts are main elements affected income and employment [4].

5.2. Green Economy Objectives

Kasztelan (2017) according to his paper titled “Green Growth, Green Economy And Sustainable Development” claimed that the term green economy was used for the first time within the paper “Blueprint for a Green Economy of 1989”, which has been prepared by a group of main environmental economists for the United Kingdom government. In 2011, the UNEP published the Report of Green Economy that enclosed a comment definition of “green economy. According to the report, the green economy is “economy that leads to improved human well being and social equity, side by side to reducing environmental footprint. It is also defined as low carbon, resource efficient, and socially inclusive”. Fedrigo-Fazio (2012) claimed that nowadays, according to the EU there is a need for global strategies to achieve green economy, which is an economy that produces real development, increases jobs and eliminates poverty to achieve “a long-term survival of our planet” through real investing in and conserving the natural capital offers upon. This transition can also present the needed international sustainable development governance reforms. Therefore, the green economy is the tool to sustain sustainability’. The green economy aims to improve the efficiency of natural resource use to decrease ecological footprint and environmental risk and to improve human welfare, as shown in Figure 1.

5.3. Principles of a Green Economy

According to the “UN-HABITAT” - Habitat Expert Group Meeting (2011), Seven operational principles can help cities to achieve a green economy. These essential items have proven to be successful globally [2]:

- Developing land development patterns assigned for more sustainable urban issues and green areas (e.g. Berlin and Medellin)
- Creating urban areas depending on compact-design cities development concepts (e.g. project of Stockholm’s Hammarby Sjoestad urban redevelopment, and Masdar City, UAE)
- Local economic chances with balance facilities (e.g. Holland’s Randstad Region where cities are somewhat specialised)
- Expand network infrastructure side by the side of improving the existing networks efficiency. (e.g. Bogota’s bus rapid transit system, and the addition of renewable energy sources)
- Enhancing the built environment by using efficient water and energy systems (e.g. Cape Town’s case. It solar water heaters has been integrated onto low-cost houses using a clean development mechanism funds.)

- Shield essential biodiversity areas and ecosystems side by the side of expanding resilience to natural disasters (e.g. Berlin’s Tiergarten Park, it is considered the city’s natural lung)
- Enhancing green industries clusters and jobs (e.g. Neom Project -KSA)

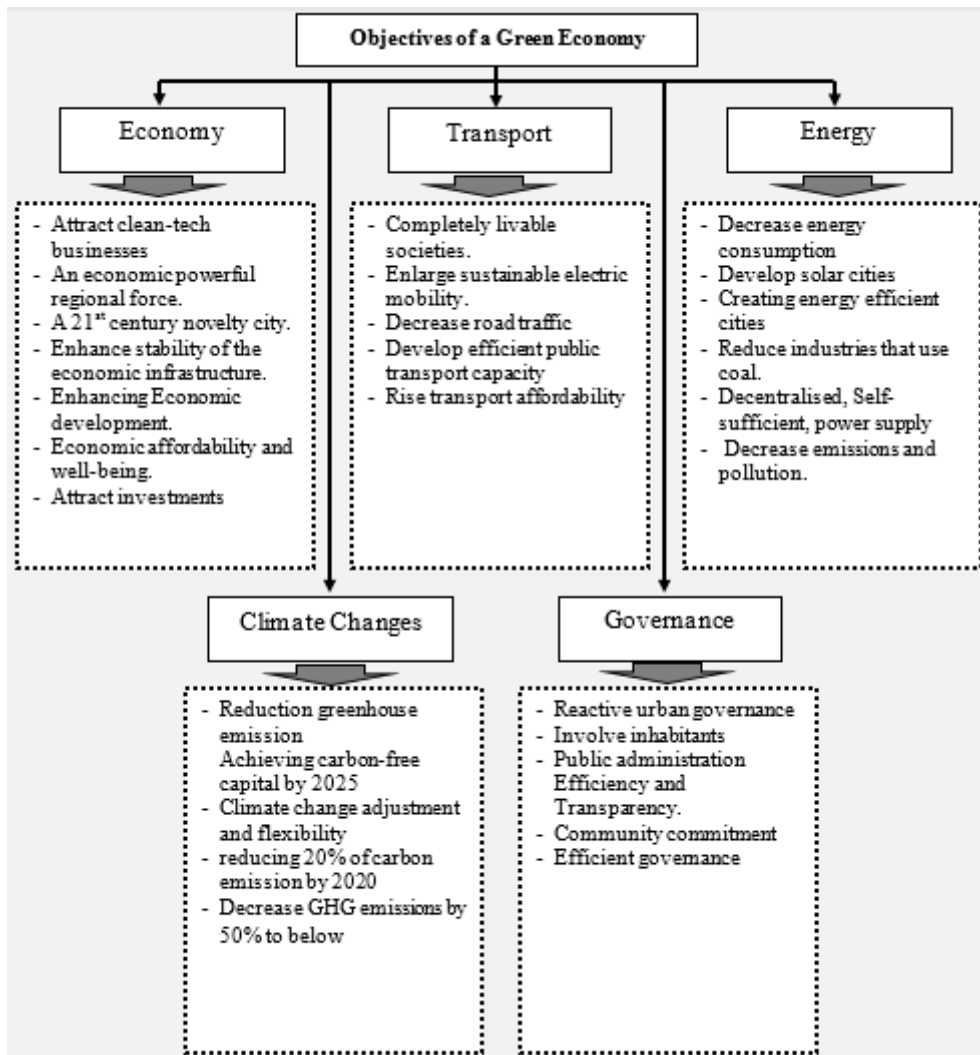


Figure 1. The objectives of a green economy Reference: The author after Kasztelan (2017), Fedrigo-Fazio(2012) and UNEP (2011).

5.4. Strategy for a Green Economy

“In Rio in 1992 different green economy strategy measures have been considered in international discussions, including UNCED”[5]. ‘A strategy for the green economy offers a hopeful vision of cities transforming challenges into opportunities’[6], “and this strategy for green economic growth may consider cluster development drives in non-traditional sectors to the economy’ [7]. “Thus, green development policies aim to identify the integration between economic, environmental challenges and urban planning. This is in a way, which stresses the chances for new sources of economic development, as green development emphasizes on the following:” [8]

- Land-use and transport (economic efficiency)
- Eco-urban areas and buildings (green buildings)
- Recycling, waste- management, and energy (energy efficiency, water efficiency, waste minimisation)
- Electric mobility and renewable energy (sustainable energy and transportation)

Therefore, there are a set of policies to achieve a green economy such as green buildings, sustainable transport, energy efficiency, water efficiency and waste minimisation. Buildings and urban development environmental rating

systems are examples of the need for such policies (e.g. LEED in the USA, or the green pyramid in Egypt).

6. Case Studies of a Green Economy

There is an agreement on the value of the relationship between sustainable urban development and green economy. This section focuses on two international case studies which applied the green economy concepts within the urban planning process.

6.1. City of Tshwane, South Africa

Green Economy Strategic Framework of Tshwane provides a guide towards a climate-resilient, low-carbon design, and resource-efficient development directions, which will increase the number of jobs and stimulates economic activity side by side to ensure sustainable development.

the Tshwane Vision 2055 was the primary guide for its “Green Economy Strategic Framework”, which has been extracted from and is outlined as follows, “By 2055, growth and development in Tshwane is integrating ecological, social, economic and spatial agendas that promote human and environmental well-being, in order to be an economy that supports a sustainable, vibrant, liveable and prosperous city.”[9]

The Strategic Framework of Tshwane is divided into mitigation and adaptation clusters as shown in figure 2

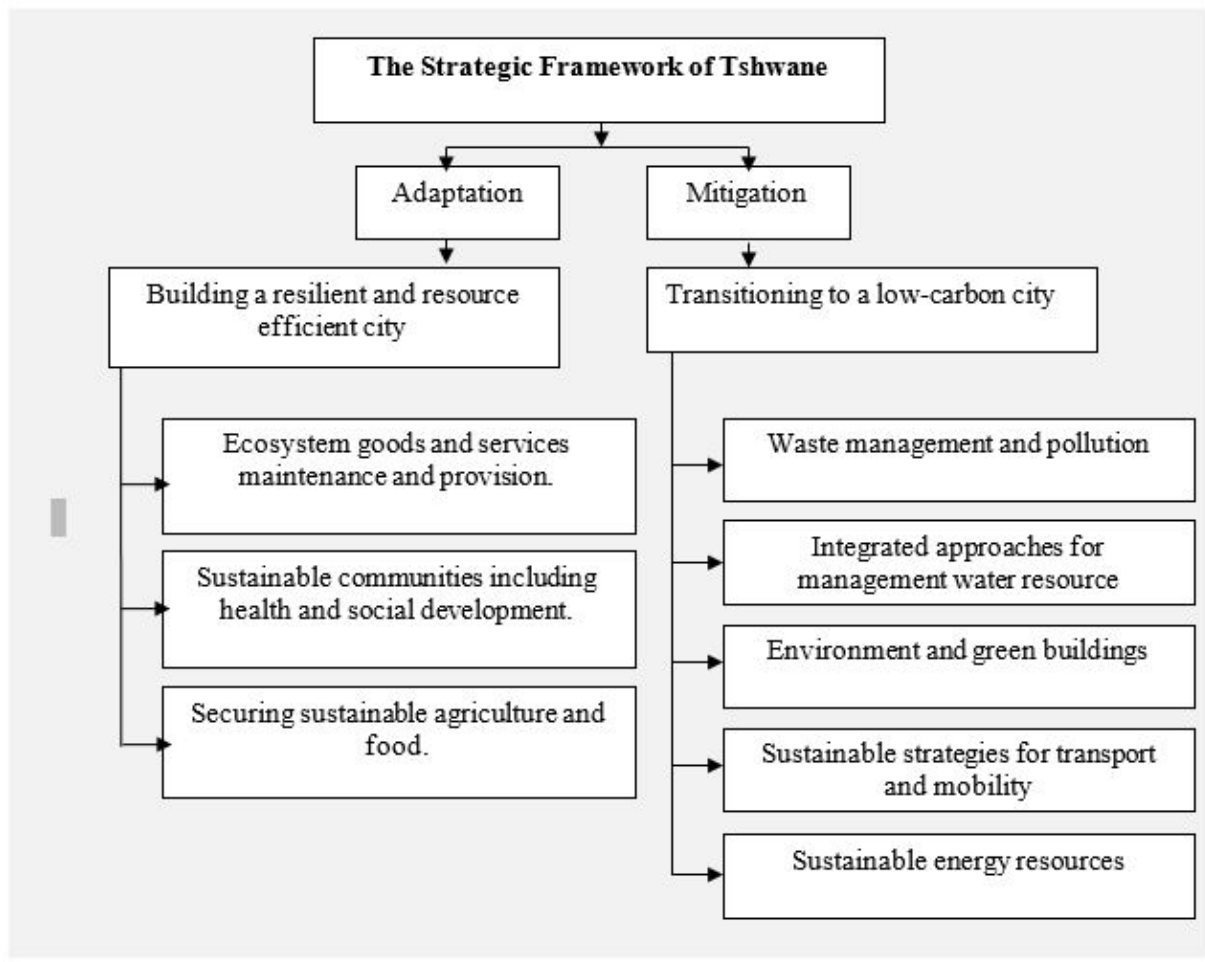


Figure 2. The strategic framework of Tshwane Reference: Framework for a Green Economy Transition, City of Tshwane, http://carbonn.org/uploads/tx_carbonndata/a1-tshwane%20enviro%20book-1.pdf

Mitigation: Transitioning to a low-carbon city

Waste management and Pollution: [10]

The city implemented an integrated system for waste management that generated converting landfill gas into electricity to ensure clean energy from waste. This applies the waste-management hierarchy through waste prevention, reduction, recycling, and recovery.

Integrated approaches for management water resource: [10]

Integrated methods for managing water resource has been achieved by developing and implementing a water demand management strategy. This is through many procedures for water monitoring and reporting to control water losses and to improve the natural areas conservation status.

*Green buildings and the built environment:*The term “green built environment” concerns with the application of the principles of green architecture and the urban spatial design in a way that minimises resource consumption and negative ecological footprint [10]. According to Tshwane greening the built environment can be achieved through many approaches, as compact urban design to improve mobility and reduce the carbon footprint, and through green spaces protection for decreasing the impact of pollution and waste on human health besides improving societal welfare by enhancing recreation and social interaction opportunities.

Sustainable strategies for transport and mobility:‘Transport systems and infrastructure have a main impact on the environment. It is accounting for 20% to 25% of world carbon emissions and energy consumption. Transportation greenhouse-gas emissions are rapidly increasing very fast than any other energy used by any other sectors, which increase air pollution levels both globally and locally [10]. According to Tshwane, the current approaches to greening the transportation sector including the following:

- reclaiming urban space for walking and non-motorised transport;
- expanding Tshwane’s mass public transportation systems and developing electric vehicles transportation systems;
- promote private residents and companies to use renewable energy-based and electric vehicles.

*Sustainable energy:*Sustainable energy approaches as Energy-efficiency procedures, renewable energy technologies, and integrated demand management are rapidly used internationally to decrease carbon emissions and to create a better sustainable renewable-based economy instead of the current fossil-fuel-based economy. Tshwane applied a set of actions as the following:

- expanding the City’s Solar Water Heater Programme to improve demand-side;
- sponsoring the intensive use of low-energy lighting systems;
- using smart meters with time-of-use tariffs and applying improved building insulation systems;
- developing the proposed AFRKO Solar Park in Tshwane that produces 20 MW of photovoltaic-based electricity;
- sponsoring producing renewable energy-based fuels from waste through the municipal waste-treatment facilities (i.e. landfill gas and biogas);
- supporting the use of transportation systems depending on low-carbon renewables. (as the using biofuels instead of petrol and diesel, and electricity-based vehicles).

Adaptation: Building a resilient and resource efficient city

Sustainable communities (health and social development)

The vision for a sustainable society is to sustains and restores ecological goods and services by depending on reintegration of parks, wetlands, municipal buildings, and roadsides. This will provides for shared and lively public spaces and enhances the service delivery efficiency and sustains good access to the public services (especially water, electricity, sanitation, health care and housing).

6.2. Sustainable Planning for a green economy in Curitiba, Brazil

Curitiba has established its own reputation as a main developing world leader in sustainable urban planning. “The city has depended mainly on developing solutions to address major livability concerns. Territory management has

played an important role in ensuring that the city’s functional zones support each other, and there are thus strong linkages between land use, densities, and transport” [11]. Also, another critical aspect of the design of the city’s has been adjusting its development around transport axes and changing the floor area ratios alongside them to promote higher densities in the city centre.

Curitiba has founded some state-of-the-art approaches, for example:

- “The city has developed a bus rapid transit (BRT) system, which branded by dedicated bus lanes” [11].
- Offering opportunities to reduce CO2 emissions by applying methods of emission reductions in both transportation and urban environment. “Curitiba has public transport highest rate in Brazil (45% of journeys) as a result of integrated approaches of urban planning, and it is one of the country’s lowest rates of urban air pollution” [3].
- In the 1990s the city started a successful home recycling separation program [8], and “the city has promoted public awareness of waste separation and recycling, besides waste management infrastructure” [3].
- The city has established many public-parks and conservation areas, which creates areas for recreation and it also helps to manage the stormwater to protect the city from flooding [11].
- Increasing the ratio the green per person. [3].

As a result, Curitiba considered as an example of how smart urban planning can avoid essential costs in the future and improve quality of life for its inhabitants at the level of efficiency, productivity.

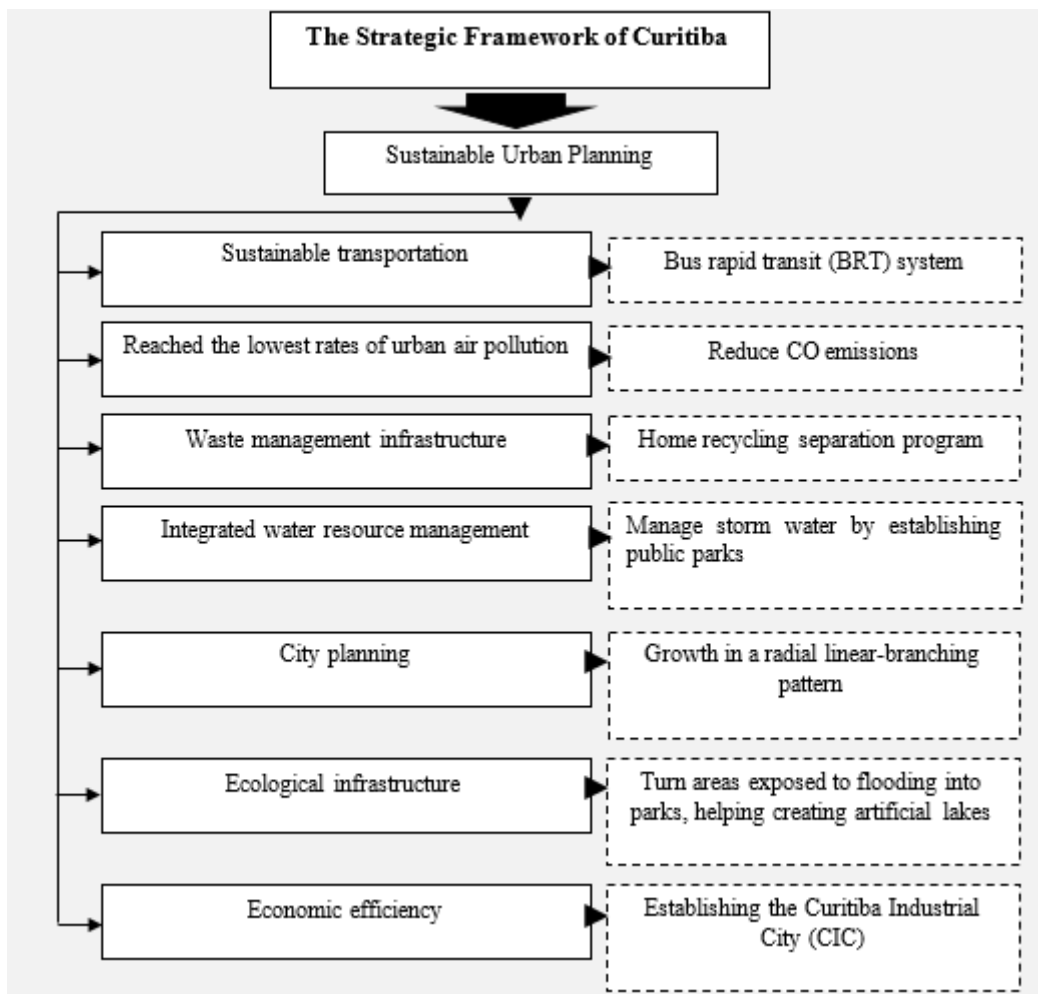


Figure 3. The strategic framework of Curitiba for a green economy Reference: The Author

7. Framework Towards a Green Economy

As mentioned before, Green economy is that economy, which can lead to improved social equity, human and economic well-being, while significantly reducing environmental and ecological footprint. It is a critical element in achieving sustainability. Many methods can be used to apply the green economy concepts of as a framework in urban planning, as demonstrated in international studies. The premise of the framework is based on five fundamental principles:

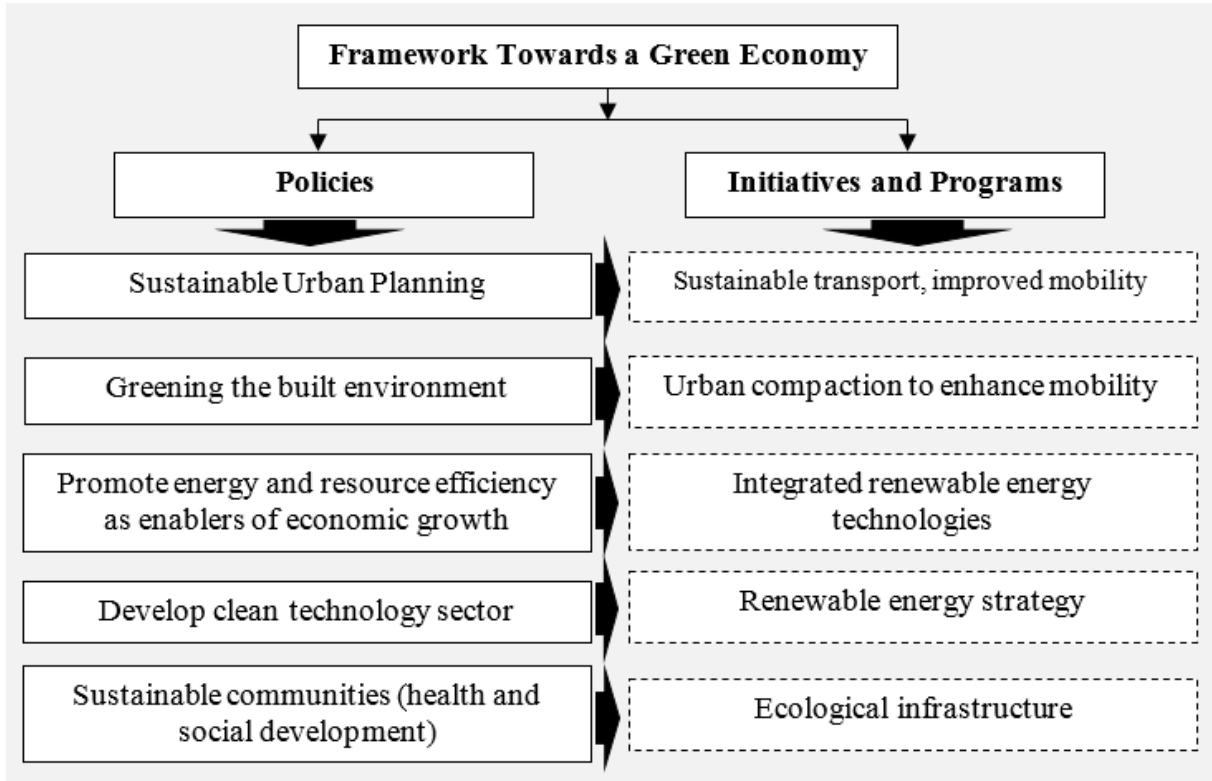


Figure 4. The strategic framework towards a green economy Reference: The author

To create an enabling setting for a green economy, a set of recommendations should be applied based on a framework constructed from the theoretical and analytical study. These recommendations are summarised as follows:

- Encourage creating compact-design-based cities and planned an extension development of urban areas
- depending on built environments that enhance the water and energy use efficiently
- Establish urban growth boundaries to limit urban sprawl
- Reduce Cairo's ecological footprint
- increase the use of sustainable modes of transport with the support of local government policies and workplace practices
- Promote the redevelopment of city areas over greenfield sites through land-use regulations
- Enable urban areas for a green economy through the application of ecological infrastructure
- Integrate renewable energy technologies in urban planning processes

8. Conclusions

The green economy can be considered a way to bring citizens a better life. The switch to a green economy will need the adoption of a different development approach. The present system of values and beliefs integrated into our consumer-motivated society are the primary challenge of building a green economy. Greening our current economy will require a transition to environmental behaviours from citizens using different approaches, which will include role-models, the prevailing culture, awareness, education, and infrastructure.

In conclusion, for a successful switch to a green economy, specific targets should be set to assist in achieving this strategic objective. This target should be based on overall green economy targets which include promoting renewable energy, low-carbon transport, clean technologies, energy-efficient buildings, green infrastructure, and enhanced waste management systems.

According to the central international organisation working concerning with the topic as UN, UNDP, some significant steps should be taken including;

- Integrated renewable energy technologies and application in both building and urban development sectors.
- Short- and long-term “renewable energy strategy” should be integrated into the development strategy, and it should be integrated into the urban development strategy.
- A real step towards achieving sustainable transport and improved mobility should be implemented. Many European cities can be taken as an example. Some of them reached 60-70% of its transportation systems, public and private, are sustainable systems.
- A good design integrated green infrastructure that can help to decrease the footprint of human activities.
- Applying urban compaction as a tool for both decreasing mobility footprint, and enhancing the urban environmental sustainability. MASDAR of Abu Dhabi is a good example.

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