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Appropriate Incentives Towards Urban Sustainability in Developing Countries "Comparative Study"

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Abstract: Rates of achieving Urban Sustainability vary between world countries, it is one of the United Nations Sustainable Development Goals (SDGs 20230). Sustainable urbanism could be achieved through some common basic mechanisms such as awareness, enacting binding laws and legislation, imposing taxes, and fees, or providing various fiscal and urban incentives. Developing countries often do not resort to using fiscal incentives to avoid its reduction effect on their limited financial resources, and they may also avoid imposing relevant taxes such as carbon tax, energy tax, and climate change tax to prevent its negative effect on the competitiveness of the developing industrial and economic sectors there. Therefore, the research aims to propose the most appropriate urban incentives for Egypt and developing countries in general, with minimum negative commercial effect, and as one of the most influential means towards sustainability to fulfill the Egyptian Housing Strategy and activate GPRS "Green Pyramid Rating System". The research follows comparative methodology, it compares the commonly used incentives in many countries globally and regionally. It identifies the incentives that may be more appropriate for Egypt and other developing countries in general.

1. Introduction

Egypt's Sustainable Development ranks 81st/166 globally and 6th/22 in the Arab world, according to "SDG Index and Dashboards Report 2023", with an index Score of 69.6 [1], so it is like other developing countries, seeks toward more sustainable development. UN-Habitat "United Nations Human Settlements Programme" established in 2020 the Egypt Housing Strategy; it consistent with the 11th goal, "sustainable cities and communities" of SDGs 2030 "United Nations Sustainable Development Goals", the New Urban Agenda, the Arab Strategy for Housing and Urban Development, the Sustainable Development Strategy (Egypt Vision 2030), and Egypt's National Strategic Plan for Urban Development 2052 [2],

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World countries vary in their rates of achieving sustainability in urbanism, as well as the methods and mechanisms for applying.

It has taken many steps toward this goal, but the level of implementation on the ground, whether for existing or new urban communities, is still below the expected level.

There are many successful experiences of regional and global countries towards a sustainable urban environment that have adopted specific mechanisms and methods towards this goal that can be summarized in five basic mechanisms [3], [4] **Fig.1**:

1. Awareness "Demonstration" of sustainability
2. laws and legislation Enactment
3. Develop sustainable building rating systems.
4. taxes and fees Imposition
5. Incentives

Most of these mechanisms are mentioned clearly in the Egyptian Housing Strategy towards sustainability by [2]:

- Upgrading building codes and establishing a legislative framework to legalize and implement green and sustainable building practices.
- Setting mechanisms and criteria for assessing the comprehensive environmental impacts of buildings.
- Issuing a law incorporating binding standards to ensure sustainable and environmentally friendly structures.

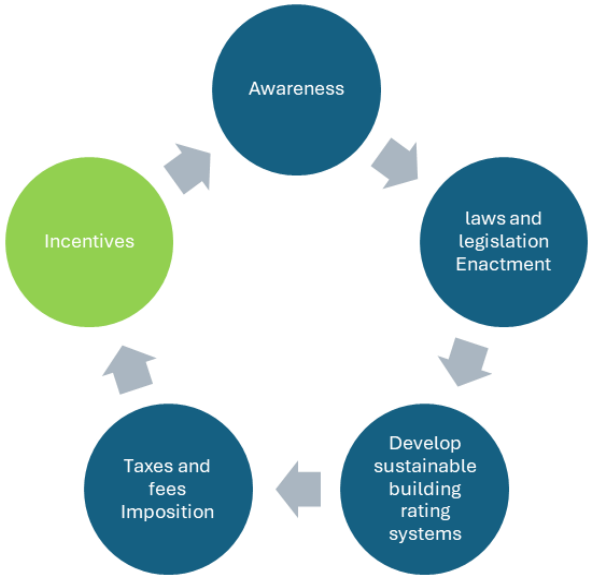

Fig.1: Common Urban Sustainability used Mechanisms, Author.

- Implementing incentive mechanisms to encourage the private sector to invest in green and sustainable buildings, such as subsidy programs and tax breaks.
- And develop financial and procedural incentives and facilitation policies for using alternatives to reduce energy consumption.

New Zealand councils, which has an advanced SDG index global rank (no. 27) in 2023 [1] identified Six main mechanisms being used to promote sustainable building and renovation, as follows: Using incentives such as [3]:

1. Rebates, fast-track permitting/consenting, reduced or nil fees for consents, and other incentives.
2. Providing eco-advice to home renovators when they come to the council for consent or using other guidelines.
3. Using regulations such as District Plan changes which specifically promote sustainability innovations.
4. Using other policy interventions such as development contributions, rates remissions, floor area ratio bonuses, or similar
5. Using rules within the subdivision Codes of Practice and/or other building standards, such as engineering standards
6. Through collaboration and support of other organizations, such as energy efficiency trusts that provide insulation retrofits or similar into homes.

Incentive mechanisms absence is one of the most important obstacles towards sustainable urbanism. Therefore, the research **aims to** present the most appropriate urban incentives for Egypt and other developing countries in general, with minimum negative commercial effect as one of the most important influential means towards sustainability and fulfill The Egyptian Housing Strategy and activating GPRS "Green Pyramid Rating System" in Egypt. And choose the most appropriate incentives for urban stakeholders focusing on the point of interest of each of them:

1. The user's interest priorities: Indoor and outdoor Environmental Quality [3], reduce utility bills value (such as electricity, water, etc.), Reduce operating and managing cost.
2. While the developer's main priorities are: Maximize investment return, Excellence in the real estate market, reduce operating and managing cost.
3. While the state's priorities are mostly achieving sustainable development as one of the national and global goals, optimize resource consumption, reduce running cost of public services, network, and utilities budgets, and reduce emissions and pollutants which is reflected in Positive impact on public health and thus saving budgets allocated for that.

2. Methods and tools

The research is following the comparative methodology; it compares the used incentives in many countries and identifies the incentives that may be more appropriate to the Egyptian urban situation and developing countries in general. Which is advocated in the Egyptian Housing Strategy by "conducting comparative studies to determine optimal and appropriate approaches for implementing green building in new development areas" [2]. It concludes the necessity of adopting motivational and incentive mechanisms in Egypt to urge the urban community to adopt sustainability standards, as they are one of the most important and influential mechanisms. Also, some incentives mechanisms incentive mechanisms are more appropriate than others for Egypt and similar developing countries.

3. Demonstration and Awareness of sustainability in urbanism

This part addresses the importance of awareness mechanisms and methods to adopt sustainability standards in urbanism. There are many target segments for awareness, such as society, architects, planners, and real-estate developers, whether from the private or governmental sectors, and this awareness is represented in, [2], [4], [5], [6], [7]:

- Media programs to increase awareness of sustainability concepts in general and their role in preserving the environment and resources, their impact on the national economy, and other benefits. However, there are no specialized programs that address these matters, and they are often done through government awareness announcements of the importance of electricity and water rationalizing. The societal response to it is mostly motivated by saving bills.
- As well as community awareness through seminars and public lectures or for employees in private and governmental institutions and departments, which has limited impact.
- Awareness through the integration of sustainable principles, concepts, and its role in preserving the environment and resources and its impact on the national economy in academic curricula, especially for the undergraduate and postgraduate levels, especially architects and other engineering disciplines,

Although there have been academic programs taught in architecture departments in Egypt for many years, such as environmental control, environmental design, energy, green architecture, sustainable urbanism, and other courses concerned with educating architects and planners about the importance of sustainability, as well as other means of awareness, this was not reflected in Egyptian urbanism during recent decades significantly.

Education for sustainable development should be included in student's curriculums in various grade levels and adopted by local governments such as "Hamburg is Learning Sustainability" Initiative through; Learning, Participation and Partnerships for change [4]

"The Sustainability Tracking, Assessment and Rating System" (STARS) is a self-reporting framework for high educational institutions to measure their sustainability performance through Main Categories [6]:

1) Academic, such as Courses, Learning Outcomes, programs, courses, scholarships, research …etc.
2) Engagement, such as student and employee educators' program, Orientation, Life.
3) Operations
4) Planning and Administration
5) Innovation and leadership

4. laws and legislation Enactment

4.1. International Laws:

There are many international laws and conferences concerned with the environment and sustainability, such as:

a) Multilateral environmental agreements, UN Conference on Environment and Development in June 1992, known as "the Earth Summit" or "Rio Conference". Here, governments across the globe acknowledged the interaction between society and ecological problems and began to recognize links between development and the environment. Recent multilateral environmental agreements fully concede these aspects [8]
b) Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997.
c) International Environmental Law of 2005, and Multilateral Environmental Agreements, by UNEP "United Nation Environmental Program", Hanoi, 2017, these multilateral environmental agreements are divided into the following eight areas [8]:
    1) Biodiversity conservation and sustainable use
    2) Land management.
    3) Management of international water courses.
    4) Marine environment protection.
    5) Ozone layer protection.
    6) Climate change response.
    7) Waste management.
    8) Chemical management.
d) In September 2015, the UN adopted a set of 17 goals – called the Sustainable Development Goals (SDGs) - as part of a new sustainable development agenda. Each of the goals has specific targets to be achieved over the next 15 years [9]

4.2. National Laws:

Egypt is one of the first Arab and Middle East countries to issued codes that address some of these aspects, such as

a) The Egyptian Code for Improving Energy Efficiency in Buildings, Part I: Residential buildings in 2005 [10], Part II: Commercial buildings in 2009 [11].
b) Then issued the Green Pyramid Rating System to assessment sustainability in buildings in 2019, but these codes have not had a tangible impact on urbanization because of the absence of specific mechanisms for implementing, obliging the community to them, or motivating to adopt it.
c) Egypt's New Administrative Capital codes, by Administrative Capital for Urban Development "ACUD" in 2019 [12]:
    1) The Smart City Guidelines for Administrative Capital for Urban Development, Version 2.3 - 2019
    2) Rooftop Photovoltaic System "for at least 50% of the roof area of the governmental, residential, administrative and commercial buildings located in the new capital".
    3) Solid Waste Management Code
    4) Building Construction Waste Management Code
    5) Public Transportation Code
    6) Advertising Code for Real-Estate Developers
d) Egypt has issued many additional laws and legislation that address the concept of sustainability and environmental preservation in general, such as:
    1) Egyptian Environmental Law No. 4 of 1994 and its executive regulations issued by Prime Minister's Resolution No. 338 of 1995 and amended by Resolution No. 1741 of 2005 [13], Which specifies the necessity of incentives, the permissible noise levels for different uses, the required ventilation rates, and the limits of thermal exposure (thermal stress) allowed in the work environment.
    2) Law No. 93 of 1962 and its executive regulations of liquid waste [14]Which explain the rules of sanitation and disposal of liquid waste, and penalties of violations. (p. 53-59)
    3) Minister of Health Resolution No. 108 of 1995, the standards and specifications of drinking and domestic water. (p. 148)
    4) Minister of Health Resolution No. 470 of 1971, atmospheric air pollution standards for institutions and their affiliated industrial units,
    5) Minister of Health Decision No. 240 of 1979, adding the average annual level of pollution in the general outdoor atmosphere from sulfur dioxide gas.

However, despite all these legislations, they have not affected the sustainability of Egyptian urbanism, especially in the absence of clear implementation and follow-up mechanisms.

5. Develop local sustainable building rating systems.

Many countries developed their own sustainable rating systems for buildings that include specific categories and criteria that guide architects and society in to achieve sustainable built environment, such as: "LEED, BREEAM, GREEN STAR, GREEN GLOPES, CASPE...etc.", as well as regional versions, such as

"ESTIDAMA" the UAE building sustainable rating system,

Qatar Sustainability Assessment System (QSAS)

Global Sustainability Assessment System (GSAS), for Gulf countries.
ARZ Building Rating System, Lebanon
The weight of Categories is different from each other to meet needs of each of them. Egypt was also placed its own national system for rating the green credentials of buildings, GPRS "Green Pyramid Rating System" for New Building and Major Renovation [15], It was issued by Minister of Housing, Utilities and Urban Communities Resolution No. (294) of 2017. It is based on seven categories/elements of evaluation, **Table 1**, each of them has a relative weight according to its importance, it has five Certification Levels, **Table 2**:

Table 1: Main Categories of GPRS, [15]

No.	Category	Category Weight
1	Sustainable Site (SS)	10%
2	Energy Efficiency (EE)	28%
3	Water Efficiency (WE)	30%
4	Materials and Resources (MR)	12%
5	Indoor Environmental Quality (IEO)	12%
6	Management Protocols (MP)	8%
7	Innovation and Added Value (IN)	5%

Table 2: Certification Levels of GPRS, [15]

Credit Weight	Certification Level
< 30%	Denied
≥ 30% – < 40%	▲ One Green Pyramid CERTIFIED
≥ 40% – < 50%	▲▲ Two Green Pyramid BRONZE
≥ 50% – < 65%	▲▲▲ Three Green Pyramid SILVER
≥ 65% – < 80%	▲▲▲▲ Four Green Pyramid GOLD
≥ 80%	▲▲▲▲▲ Five Green Pyramid BALTINUM

However, there are many obstacles to apply this system as a tool towards sustainable urbanization, such as [16]:

a) Lack of awareness about it between graduated engineers' community, not just undergraduate and postgraduate students
b) It depends on the American Leed sustainable rating system criteria which sometimes not suitable to the Egyptian situation, society, local culture, and the economical differences between the two countries.
c) Weak participation of the real-estate stakeholder in Egypt to recognize the priorities of each of them. The Following survey demonstrate their proposed relative weight of each category, **Table 3**, [16].
d) Lack of expertise and training
e) There is no validity period of the certificate, or follow-up mechanism.
f) Neglect user's economical potentials and doesn't present any direct or indirect financial incentives.
g) Difference in the importance of rating categories between Egypt regions.

Table 3: Relative proposed weight of GPRS Categories by users/developers, [16]

No.	Category	Proposed weight by %	
		Users	**Developers**
1	Sustainable Site (SS)	11.55	12.78
2	Energy Efficiency (EE)	20.125	20.42
3	Water Efficiency (WE)	21.672	24.72
4	Materials and Resources (MR)	8.05	7.86
5	Indoor Environmental Quality (IEO)	8.358	8.435
6	Management Protocols (MP)	7.46	8
7	Innovation and Added Value (IN)	NV*	NV

* NV (not available)

6. Taxes and fees Imposition

Taxes are one of the used mechanisms towards urban sustainability, it aims to push towards the use of clean, renewable energies and sustainable systems, it funds treatment process of pollution damage, exhausts, and environmentally polluting materials, but they constitute an economic burden on societies in developing countries, it already applied in many world countries, such as [17],:

1) Climate Change Levy (CCL) tax imposed by Britain on the public sector and energy-intensive companies, expecting Electrical Power Stations, transportation sector, residential sector, and renewable energy sector. The tax was 4.3 pounds/1000kw/hr. of industrial consumption in 2003.
2) Carbon tax, it is an additional percentage to the price of fossil fuels according to the carbon emission amount on burning this fuel.
3) Energy tax, which is imposed on production or consumption, for example, one dollar per one million British thermal units (1$/1000,000BTU) or per Kilowatt/Hr. of energy consumption, regardless of its carbon content, while the carbon tax depends on the percentage of carbon emissions from the fuel.
4) The European market has imposed a mixed tax "Carbon/Energy Tax".

The European Union has imposed Emissions Trading System (ETS) in 1995, to limit carbon emissions [17], [18]**.** The proceeds of these taxes are spent to combat global warming; however, these taxes increase production cost of energies, **Table 4**, reduce competition, and affect the poorest segments, [16].

Table 4: Production Cost Increase Ratio % because of Carbon tax 100$/Carbon Ton for Energy-intensive industries, [16]

Country	Production Cost Increase Ratio %
USA	2.8
Japan	1.2
Australia	5.2
Germany	1.6
Britain	1.6

7. Incentives

Incentives are one of the most influential mechanisms towards sustainable urbanization. There are several types of incentives, such as tax exemptions, discount rates on government bills, direct or indirect financial fund, incentives in construction proportions, building heights, and other motivations that target urban main stakeholders) users and developers). There are many used global and regional sustainable incentives, this part compares them to determine advantages and disadvantages to propose the most appropriate incentives for Egypt and other developing countries in general. UN environmental law recognized the necessity fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors, [8], [19], Article 20 CBD "Convention on Biological Diversity" of International Environmental Law: Multilateral Environmental Agreements, states that each Party is to provide financial support and incentives for national projects that implement the objectives of the Convention, as a Mechanisms to facilitate implementation, [8]
all States have common responsibilities to protect the environment and promote sustainable development, but the actions required from different States vary with their different social, economic and ecological situations, as shown in the Detailed review of implementation of the Rio Principles, by Stakeholder Forum for a Sustainable Future (SF) [20], it just mentioned that use market/financial incentives to reduce GHG emissions from deforestation and forest degradation, but it can constitute an economic obstacle developing countries, the incentives for sustainable development to ensure that they provide effective special priority and assistance to developing countries. These should include initiatives on climate change mitigation and adaptation [20]. The World Bank Present Incentives, Business Opportunities, and Challenges Opportunities in low-carbon investment have been estimated at $500 (€367) billion per year and rising, with clean energy investments in 2008 totalling $177 (€130) billion (UNEP and New Energy Finance 2010; see also Box 13) [21]. Operator incentives and recognition (awards) one of the Policies to Improve Building Energy Efficiency [21]. Incentives are the most effective mechanism of C40 "it is a global network of mayors of the world's leading cities that are united in action to confront the climate crisis", [24], to Reduce Emission with ratio (66%), **Fig.2**, [21].

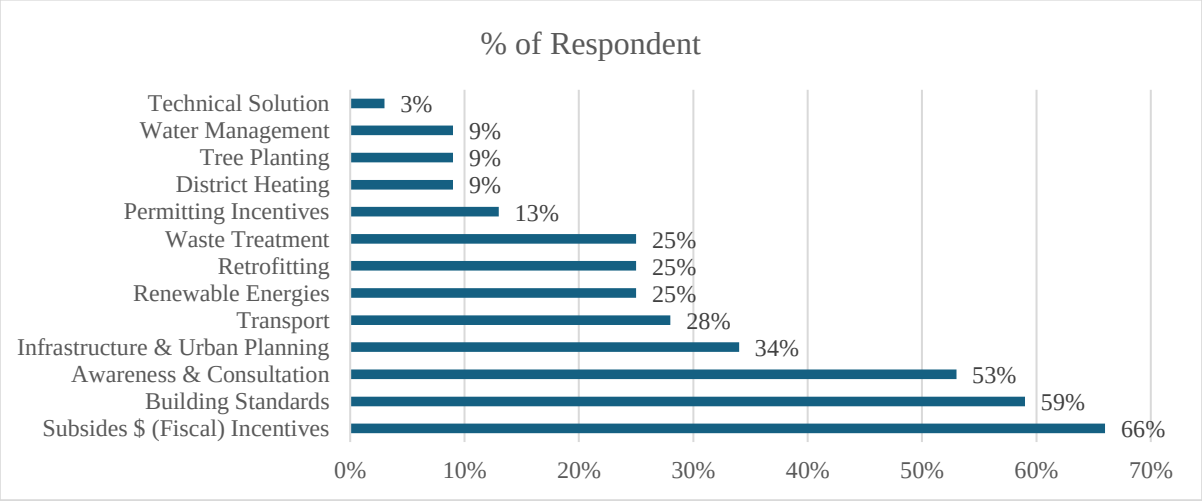

Fig. 2: How C40 Cities are Reducing Emission, [21].

Environmental Incentives (in general) can be classified into four categories [22]:

1) positive incentives: monetary or non-monetary inducements.

2) disincentives
3) indirect incentives
4) perverse incentives

And could be classified to three types [23]:

1) Material incentives: tangible rewards often monetary: wages, fringe benefits.
2) Solidary incentives: intangible rewards from the act of association: sociability, status, identification.
3) Purposive incentives: intangible rewards related to the goals of the organization.

7.1. Global Countries:

1) USA

Adoption of sustainable policies support for, energy, climate change and their incentives are one of the most important electoral tools used by local governments in USA [24]. The environmental "tax expenditure" was mispositioned in USA in 1967, it aims to provide a full or partial exemptions according to pollution reduction ratio [18]. Austin city in Texas, USA is a world-leading sustainable city, it has adopted sustainability principles from 2000. It has many non-charities and non-profit organizations, it provides technical facilities and tax incentives, especially in the energy sector. it reduces the construction Cost of sustainable buildings around 30% to 40% (the usual expensive difference than regular construction) [25]. in the U.S. state of South Carolina, to encourage affordable housing, these market-based incentives included density bonuses to promote densities higher than typically permitted; relaxed zoning regulations regarding lot area requirements, minimum setbacks, yard requirements, variances, parking requirements, and street layout; reduced or waived fees, including fees levied on new development; streamlining and expediting the permitting process [21]
The incentives are categorized into financial programs and technical assistance programs, financial incentives are monetary benefits offered by non-profit organizations and government agencies to compensate of sustainable development, it includes grants, tax credits, reduced development fees. Such as: Business Energy Tax Credit (BETC) program which is offered by the Oregon Department of Energy. The tax credit is 35 percent of the eligible project costs. The credit is typically taken over five years. Tax credits are also available for new construction. The sustainable building tax credit is based on the square footage. To be eligible for tax credits, a building must achieve a LEED-Silver rating. In addition, at least two credits must be earned for energy efficiency, and one credit must be earned under Energy and Atmosphere Credit 3, **Table 5**, the building's annual solar income must also be included to be eligible for the tax credit [26]

Table 5, Available Tax Credit per Square Foot for LEED certificate in USA, [26]

	Building Area	**Silver**	**Gold**	**Platinum**
New Construction: LEED-NC	First 10,000 sq. ft	$10.00	$13.57	$17.86
	Next 40,000 sq. ft.	$5.00	$5.71	$9.29
	> 50,000 sq. ft.	$2.00	$2.86	$5.71
Commercial Shell: LEED-CS	First 10,000 sq. ft	$7.00	$9.50	$12.50
	Next 40,000 sq. ft.	$3.50	$4.00	$6.50
	> 50,000 sq. ft.	$1.40	$2.00	$4.00
Commercial Interiors: LEED-CI	First 10,000 sq. ft	$3.00	$4.07	$5.76
	Next 40,000 sq. ft.	$1.50	$1.71	$2.79
	> 50,000 sq. ft.	$0.60	$0.86	$1.71

LEED-CS and LEED-CI are only available for projects in which the developer only has control over the commercial shell and interiors respectively. If the developer has control over both parts of the project, then LEED-NC must be used. P25 [26].

Energy Trust of Oregon - New Building Efficiency Program the New Building Efficiency program offers technical design assistance and financial incentives to help improve the energy efficiency of new construction. Assistance is provided through:

- Incentives to purchase high efficiency equipment
- Energy modelling and design assistance
- Commissioning oversight assistance
- Oregon BETC application assistance
- K-12 high-performance schools assistance

Assistance is offered through three different program tracks: (the standard track, the custom track, and the high-performance track [26].

1. The Standard Track The standard track provides incentives for equipment upgrades, including lighting and controls, motors, drives, HVAC, and gas equipment. Up to $25,000 is available through this track.
2. The Custom Track When a project is beyond the schematic design stages, the custom track is appropriate. It is also used in projects where a systems-based approach is appropriate. Financial incentives of up to $100,000 are available through this track. Incentives are available to purchase high efficiency equipment. To qualify for funding, the applicant must document the planned investments in energy saving equipment along with an estimate of energy savings.
3. The High-Performance Track When a project is still in the concept, schematic or early design stages, the high-performance track is appropriate. In this stage of the development process, equipment choices and building design Eco Spring Consulting Page 26 decisions can still be influenced through incentives. Unlike the custom track, which uses a systems-based approach, the high-performance track uses a whole building approach. Funding provided through this track, as in the custom track, is available for feasibility studies and building energy-use models. Up to $200,000 is available through the high-performance track [26].

2) UK

UK, Germany, and Scandinavian countries use stimulus strategy towards environmental aspects, to encourage the community to use environmental solutions which are usually more costly than using minimum aspects of traditional legal solution.

It uses tax exemptions to incite this polices, such as climate change levy (CCL) tax exemption for activities, equipment and buildings that use renewable energy, minimize carbon tax which is determined according to the amount of carbon in the fuel used to produce construction materials to push using of Eco-friendly raw materials [17].

Local governments in Kent (UK) and Nord/Pas de Calais (France) provide sustainable housing incentives to install PV cells such as [5]

- investment subsidies,
- low interest loans,
- and high ‘renewable energy feed tariffs’ (or ‘buyback rates’).

The government has also produced financial incentives to encourage investment in renewable energy since April 2002 by specifying a percentage of renewable shot generation for traditional power generation companies. But if the company does not comply, it pays 30 British pounds per 1,000 kilowatt-hours, and this commitment is known as Renewable Obligations (RO).

The British government has committed, under the British Energy White Paper, to reduce carbon dioxide emissions by about 60% in 20250, in accordance with the European Union Renewable Energy Directives.

A plan to trade emitted gases was announced in April 2002, with prices starting at about $4 to $6 per ton of carbon dioxide, and the government expressed its willingness to return 80% of the tax to companies that achieve satisfactory results in improving the efficiency of their energy use or reducing the gases they emit (E COAL June 2020) ....to participate in the European Emissions Trading Scheme (EUETS), which began in 2005 [17].

3) Australia

Local Government proposed Sustainable Building Incentives through Traditional development control regulations such as (height, yard, height-in-relation-to-boundary, building coverage, etc) [3]: But most of homeowners in Australia preferred financial incentives and discounts on products and services to Promote Sustainable Renovations, by surveying 200 homeowners who had applied for and been granted a Building Consent for Additions and Alterations in Waitakere City and North Shore City during 2006, Table 6, [3].

Table 6: council incentives preferring by home renovators, [3].

no	Preferred Council Incentives	%
1	Financial incentives	29%
2	Discount on products and services	26%
3	In-house advises	16%
4	Education	12%
5	Demonstration	10%
6	Regulation	7%
	Total	100%

4) New Zealand

It is possible to identify activities within the following six incentive areas [3]:

1) Regulation: district plan provisions (policies, rules, assessment criteria, height bonuses etc.)
2) Standards: Council Codes of Practice and Engineering Standards
3) Financial: development contributions, rates remissions, other funding, and grants
4) Process: officer training, process ‘smoothing’, guidelines, practice notes
5) Education: advice, assessment, guidelines, (i.e., education offered to the public)
6) Working with Others

Some councils Identified incentives focused on solar hot water and rainwater tanks and were offered as rebates, nil-fee consents and fast-track consents [3]:

- Auckland, Waitakere, and North Shore City Councils offer a rainwater tank rebate.
- Hamilton and Waitakere City Councils have waived consent fees for households wanting to install solar hot water heating and several other councils are also considering putting this in place as well as fast tracking consent applications for solar hot water systems.
- Waitakere is looking at fast track permitting and consents for larger developments that can demonstrate a sustainable focus using an online “Tool for Urban Sustainability Code of Practice” (TUSC).

- Christchurch City Council identified its heritage grants program as part of its sustainable building initiatives – supporting the continued use of existing building stock [3].

Almost all participants in the research Beacon have undertaken see themselves at the beginning of a transition pathway to improved building sustainability. That said, there is also an encouraging number and diversity of projects underway. However, most councils appear to focus on the regulation and education areas and there are a large range of initiatives which need to be developed to be widely adopted. This contrasts with the consumer view that regulation and education are less favoured forms of incentives. Perhaps one other key learning from the research to date is recognition of how little is still being done to incentivise people to go further with both new-build situations and renovations. Those councils that are trying are only managing to do so in a fragmented manner. For example, while EDA's play an essential role in terms of assisting homeowners and developers through the design phase, this service is generally not being supported at the other end of the building process with incentives that make consenting processes easier or provide financial recognition of the wider community benefits of individuals' sustainable choices [3].

5) France

At the national level the French government introduced the following incentives as part of its 2004 Climate Plan [27]:

- Fiscal measures: tax allowances for high performing equipment were raised from 25% to 40% for equipment using renewable energy, during the period of initial market development.
- An energy performance check, including the Energy Label for the building, will be obligatory from 2006 to identify the investment in energy still needed.
- Regulations on thermal efficiency were introduced for the major renovations in existing buildings.

One of the early sustainable projects in Marsilea in 1947 is Unite d' Habitation by Le Corbusier, following his five architectural design points (principles): Pilots (pillars), roof garden, open floor plan, long windows, and open facades, to design, which exempted by local council from some contemporary building legislation [28]

6) China

The Chinese economic system basically is a socialist system, so the government is the main urban developer in the country. The financial incentives are represented by the abundant tax revenue such as the levy of property tax, to present sustainable public services for new and existing urban housing projects, the local government refund them to users through sustainable urban services. Directly [29], [30].

7) Korea

It developed sustainable building standards focusing on new construction, renovation and adopted Tax and floor-to-area ratio (FAR) incentives often support the construction of high-rise housing complexes that achieve low-energy demand and green spaces as added investment value. So, Incentives relate to three main categories [31]:

1. Maximum building height,
2. Floor-to-area (FAR), Table 7.
    - Size and floor areas of existing buildings after vertical/horizontal extension in the framework of renovations.

- Size and floor areas of new buildings are on the same properties as existing buildings.

3. Tax discounts and financial support for energy-efficiency measures and/or renewable energy generation system installations.

Table 7: FAR (Floor-to-Area) incentives in Korea, [31].

Building Type	Villa	Apartment	Mixed-Use
Allowed max. FAR to increase through incentives	From 300 to 360% (+60%)	From 200 to 230% (+30%)	From 250 to 287.50% (+37.50%)
Vertical extension	Regulated by the DUP (Table 2-height and border limits)-cumulative number of above-ground stories must remain below 3 to maintain multiunit-type status; above 3 stories, the building type is changed to multihousehold, and follows the specific regulations; above 5 stories, the building type is changed to apartment, and follows specific regulations	+2 floors, within 25 floor and 250 m height limit per regulation	Regulated by the building regulations (Table 3-height and border limits)-no additional exemptions.
Horizontal extension		Up to 30% of unit floor usable area above 85 m²/40% below 85 m²	
Cumulative vertical and horizontal extensions cannot exceed the maximum allowed FAR through incentives.			

7.2. Regional and Arab Countries:

1) Algeria,

The article No. 58 of the "Environmental Protection and Reclamation Law" imposes a financial system and tax incentives to increase investment and finance projects that aimed to protect the environment, though [18]:

- Governmental Financial aid (such as the Environmental Protection and Reclamation Fund mentioned in Article 60).
- Partial or full exemptions from taxes and customs.
- Credit facilities: long-term credit loans and low interest.
-

2) Qatar

Lusail city is a leading sustainable project in Qatar, it offers building's footprint and heights bonuses incentives for sustainable buildings [32], [33].

Qatar General Electricity & water Corporation "Kahramaa" organized many competitions and awards recognizes the buildings that incorporate, support, and promote best practices in conservation of Energy, Water, and other natural resources, such as [32]:

- Tarsheed Conserving Building Competition
- Best Water Recycling Initiative
- Best School Project on Sustainability & Energy Efficiency
- Best District Cooling System Performance
- Best Smart Application in The Field of Sustainability
- Best Sustainable Building Design
- Best Sustainable Camping Facility

- Best Graduation Project for Energy Efficiency
- Best Building Retrofitting Competition
- Best Innovative Idea in Energy Efficiency

3) Kuwait

Article 2 of Law No. 20 of 2016 stipulates that "incentives can be granted to any citizen who contributes to rationalizing the consumption of electricity and water."
The Ministry of Electricity, Water and Renewable Energy in Kuwait established "Ehsemha" project, which provides many incentives to citizens up to 40% of the due electricity bill value, and 50% of the due water bill value to encourage them to rationalize consumption and use sustainable devices and systems in their buildings [34], [35].

4) Egypt

Articles No. 17 and 18 of "Egyptian Environment Law" No. 4 of 1994 and Article (9) of its executive regulations stipulate that the Environmental Affairs Agency, in conjunction with the Ministry of Finance shall develop incentives system provide to peoples, establishments, and others who implement projects that protect the environment [13]
However, the incentives are limited to some customs exemptions for some imported devices and equipment in projects related to the Ministry of Environment, and they are very limited. Many regulations in Egypt have stipulated the necessity of providing incentives for sustainability, such as Egypt Housing strategy [2] as previously mentioned previously, but there are no urban incentives.

8. Results

- There are five common Global and local basic mechanisms towards sustainable urbanism, Fig. 1.
- Incentives considered one the most important and effective mechanisms, Fig. 3, Table 6.
- Sustainable incentives should be targeting urban stakeholder's requirements, and focus their point of interest, Fig. 2.
- Categories weight of GPRS, may be needed to reevaluate to meet (users/developers) actual priorities, to be more applicable sustainable mechanism, Table 3
- Taxes imposition such as carbon tax, energy tax and climate change tax are one of the most effective, tested mechanisms, but it has negative effect on competitiveness of the developing industrial and economic sectors in the developing countries, Table 4.
- Incentives are the most effective mechanism, especially the fiscal incentives, but it has a reduction effect on the limited financial resources in the developing countries, Fig. 3.
- The research mentions many types of sustainable used incentives globally and regionally in many countries concluded in Table 8.
- Incentives should promote a wide range of stakeholders and participants of developers and building users, Table 3.
- The research presents many applicable sustainable urban incentives, Table 8, can be used in Egypt and other developing countries, such as:
    - Bonus in Density, Building Height, Footprint, open courts area and ratios.
    - Building Legislation exemption such as extend projects duration period,
    - Fast-track consents (expediting the permitting process for Building License and Permit

Drawings)

- Present Technical facilities program such as Design, training programs
- Providing facilities for paying the price of land plots without discount
- Conduct periodic competitions and awards for sustainable architecture at the level of architects, students, and graduation projects.
- Considering sustainable criteria, a priority element in allocating land plots
- Honouring sustainable buildings and designs that have obtained accreditation certificates, either can publish them on the webpages of the relevant ministries, such as the Ministry of Housing and the Ministry of Environment.

Table 8: Commonly Used Sustainable Urban Incentives Comparison and the proposed for Egypt, Author.

Countries \ Incentives	Financial incentives											Building Legislation					Others	
	Grants and direct financial programs	indirect financial programs such as rebates, refund, and Renewable Obligations (RO)	heritage grants program	reduced or nil fees for consents	Discount on products and services	reduced development fees	Customs exemptions	tax exemptions (Credits)	energy efficiency trusts	low interest loans and Credit facilities	renewable energy feed tariffs' (or ' buyback rates').	height bonuses (density bonuses)	Footprint bonuses (floor area ratio bonuses)	Yard (or Open Court Ratio, minimum area)	Building Legislation exemption " in general"	fast-track consents (for Building License and Permit Drawings) expediting the permitting	technical facilities program such as Design, training	Operator incentives and recognition (competitions,
USA	●	●				●		●	●	●	●	●	●	●	●	●	●	
UK	●	●						●		●	●							
Australia	●																	
New Zealand	●	●	●	●	●				●			●	●			●		
France								●							●			
China		●																
Korea	●							●				●	●					
Algeria	●	●					●	●		●								
Qatar												●	●					●
Kuit		●		●														
Proposed for **Egypt**												▲	▲	▲	▲	▲	▲	▲

Note: These incentives are exposed above but may be another used incentive in these countries.

9. Conclusions

The research meets one of the most important requirements of the Egyptian housing strategy which mentioned clearly; "conducting comparative studies to determine optimal and appropriate approaches for implementing green building" [2, p19] , as there are not enough local studies address this subject yet. It explains the importance of urban incentives as an important global mechanisms used towards sustainability, as well as the diversity, spread and effectiveness of these incentives in many countries globally and regionally, compared to many other common mechanisms, such as awareness programs on sustainability, enacting binding sustainable laws and legislation, develop local sustainable building rating systems, or imposing taxes and fees such as the carbon tax, energy tax, climate change and others. It concludes possibility of using many of urban incentives in Egypt and developing countries, that suits their economic "the main obstacle in developing countries" and social conditions. based on the above comparative study avoiding the governmental fiscal resourcess decrease, And prevent

impose more taxes or fees that represent undesirable burden on the competitiveness of these developing economies, according to GPRS certification level of building.

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المحفزات الأكثر ملائمة للدول النامية نحو عمران مستدام "دراسة مقارنة"

الملخص:

تتفاوت معدلات تحقيق الاستدامة في العمران بين العديد من دول العالم والتي تعد أحد أهداف التنمية المستدامة للأمم المتحدة "SDGs 20230". والتي تسعى إلى تحقيقها باستخدام العديد من الأساليب والآليات الشائعة، سواء بالتوعية أو سن القوانين والتشريعات الملزمة أو فرض ضرائب ورسوم أو تقديم حوافز مالية وعمرانية متنوعة، وغالبا لا تلجأ الدول النامية لاستخدام الحوافز المالية حتى لا تؤثر على مواردها المالية المحدودة، وكذلك قد تعزف عن تطبيق الضرائب ذات الصلة كضريبة الكربون وضريبة الطاقة وضريبة التغير المناخي حتى لا تؤثر على تنافسية القطاعات الصناعية والاقتصادية النامية فيها كذلك، لذا يهدف البحث إلى طرح الحوافز العمرانية الأكثر ملائمة لمصر و الدول النامية عموما وباعتبارها أحد أهم الوسائل تأثيرا نحو الاستدامة، وتفعيل نظام الهرم الأخضر لتقييم المباني المستدامة في مصر، ويتبع البحث المنهج المقارن حيث يقارن بين الحوافز المستخدمة في العديد من الدول ويحدد الحوافز التي ربما تكون أكثر ملائمة لمصر والدول النامية عموما.

الكلمات مفتاحية: آليات التحفيز، حوافز الاستدامة، محفزات العمران المستدام، الحوافز المادية للاستدامة، نظام الهرم الأخضر.