SUSTAINABILITY ENERGY AND ENVIRONMENTAL URBAN DESIGN

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Abstract

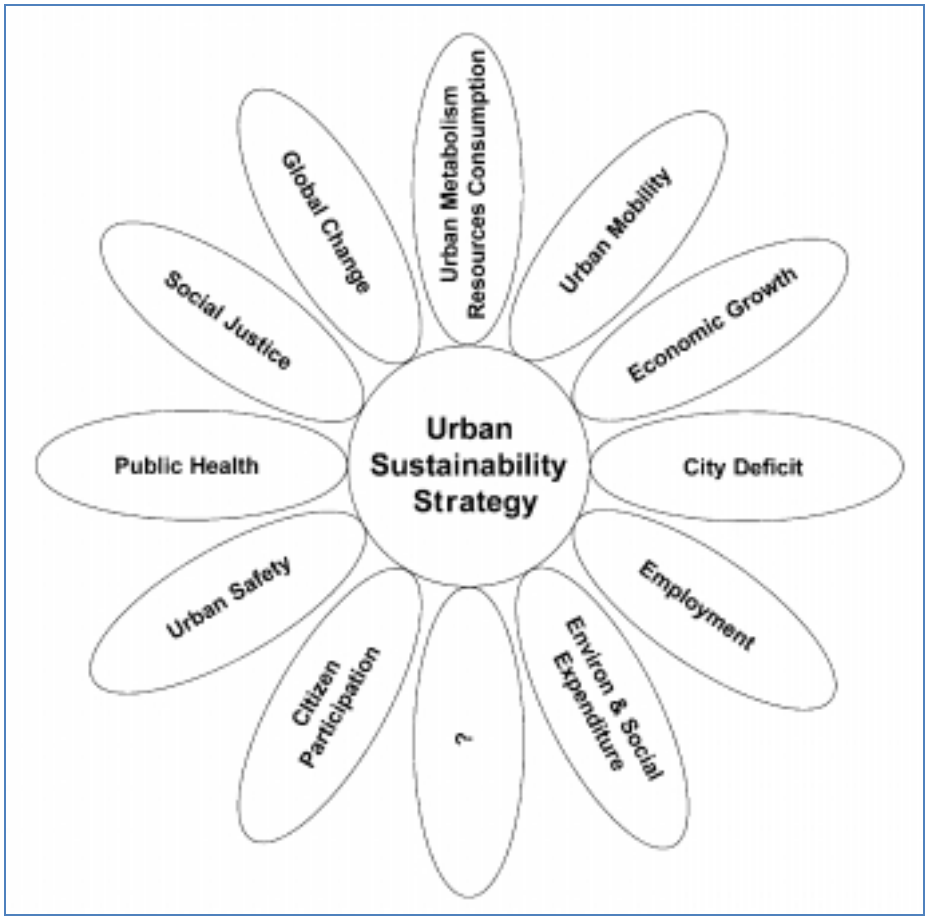
It's established fact that the pattern of development of modern civilization has long shown its limits, having determined on one hand, the depletion of primary resources, especially non-renewable resources necessary to produce energy, on the other hand, the serious environmental pollution and the consequent deterioration of the global climate that manifests in more and more extreme and damaging ways its phenomena.It also seems that the intention of replacing this model with that of sustainable development has became widespread on a global scale since the 1980s and materialized in Rio de Janeiro in 1992 with the signing by 183, of an "Agenda" of commitments in the twenty-first century. About 40% of all energy and natural resources of European countries, is used in the construction system, in relation to the stages of production of building materials, land use, construction, maintenance and use of buildings.Environmental sustainability and energy efficiency in urban planning claims necessarily attention of both the city makers and city users.In the urban field, the renewed interest in energy and environmental sustainability criteria is relatively recent, in so far as in this field scientific approaches to coding and logging procedures, parameters and sustainability indicators are recent. Is quite clear how essential is the alignment between the architectural design and sustainable urban design, as strategic decisions, planning and regulations not calibrated on sustainability, could make the specific achievements in the area ineffective, as modeled on principles of environmental sustainability and in teeping with the parameters of any protocol. The aim of the paper is the implementation of energy and environmental sustainability criteria in the processes of urban organization. It observe the presence of international codifications sustainability in the process of architectural and urban design, based on indicators shared in the processes of government of the territory, especially in urban planning.

***Keywords*:** *Sustainability, Urban Design, Energy, Architectural Design.*

Introduction

It's twenty years period about the sustainability, in particularly enviromental energetic and sustainable urban design, has entered to support the chosen political. With the uncontrollable rhythm of urbanisation and the consequent rise in energy the demand for private and public consumption and for economic activities, there is an urgent need for energy efficient, urban planning and construction. Sustainable construction is a way for the building industry to move towards achieving sustainable development, taking into account environmental, socio-economic and cultural issues. The international agenda on sustainable construction provides a conceptual framework for linking the global concept of sustainable development and the construction sector with other activities that are appropriately, issues and challenges for sustainable construction.

The urbanistic discipline, therefore, adapting the demands of the city, of the various professional figures, of the local corporate body themselves and, in general of all the stakeholderses involved in the urban inherent problems of use of the territory, to guarantee the primary objective of the comfort social.



A correct sustainable urbanistic planning owes necessarily to found on a careful preliminary analysis, to furnish a complete knowledge of the site, and on a series of decisions to be assumed in buildings design. The planning of a correct sustainable urbanistic needs to get some logical passages principals followings: to adopt a complete approach design of the site what of the buildings with attention to the thematic ones of sustainability; to complete a

careful analysis of the site considering the environmental, economic and social aspects; to define some specific objectives of sustainable planning and some guide lines for a sustainable planning of intervention and to verify its effectiveness through simulations.

The tendency in action involves the subdivision of the thematic one eco sustainable in five macros categories:
1) urban morphology and transformation of the grounds;
2) saving of the environmental resources;
3) ri-naturalization of the city;
4) mobility and services;
5) formation and share.

1. Urban Development and Eco-Efficiency

Continuing urbanisation reinforces the importance of creating a built environment that contributes to economic development and social wellbeing and is sustainable for future generations. Hence, the provision of adequate infrastructure, buildings and utilities, taking into account quality of life, urban governance, environmental quality and sustainability is essential. Sustainable approaches to urban development can help build healthy and safe communities and alleviate poverty while facilitating employment creation, human resources development and the realisation of financial benefits for the community. Successful strategies for promoting sustainable urban development must take into account socio-economic and cultural factors, building traditions, and environmental issues. Regulations, energy pricing, market demand and enabling approaches such as incentives and demonstration projects are some of the measures that need to be considered. This requires longer term perspective involving a number of challenges, as highlighted below.

1.1. Urban Eco-Efficiency

The term “eco-efficiency refers to the efficiency with which society uses environmental, natural and other resources to generate quality of life. Improving eco-efficiency is an important strategy for sustainable development and the provision of services within cities and communities. Important elements of an urban eco-efficiency strategy include:

- integrating building and infrastructure design in harmony with the characteristics and constraints of local ecosystems
- following best environmental practices in materials selection, recycling and reuse, and technology, taking into account life cycle environmental implications
- designing water flows to conserve resources, optimise efficiency and reduce pollution
- reducing pollution through prevention and source reduction practices, and ensuring maximum reuse and recycling of materials through integrated on-site waste treatment
- encouraging improvements in environmental performance for individual communities, companies and facilities throughout the city by operating a city-wide information system that informs citizens of local environmental conditions and provides feedback on environmental performance.

1.2. Urban Energy Efficiency

Given the magnitude of GHG emissions from cities, urban energy efficiency is a significant challenge that requires special consideration. Energy issues range from transportation to building planning and refurbishing, and from industrial production to household practices.

The role of city planners and the construction industry is essential as they create the necessary pre-conditions for energy savings opportunities to be realised. Some important aspects of energy efficient urban infrastructure include:

- maximising the energy efficiency of building and infrastructure operations through the use of renewable resources, decentralised co-generation and energy cascading techniques in a manner which optimises integrated energy flows and minimises potential global environmental impacts such as GHG emissions
- linking producers and consumers of energy and materials throughout the community, city and surrounding regions to facilitate resource exchanges and recycling networks.

1.3. Ecosystem Planning

It is clear that a new way of addressing urban problems is needed and that it will have to be more

efficiently integrated, more sensitive to ecology and community, more respectful of uncertainties, and more open to citizen involvement than what now prevails. This has led to an ecosystem approach to planning: "an approach that begins with an ecologically-bounded area, stresses the integration of social, economic, and environmental factors, and seeks to involve all the relevant interests and power-holders in identifying desirable futures, evaluating alternative pathways and implementing preferred solutions."

A number of basic principles reflect the characteristics of ecosystem planning, as follows:

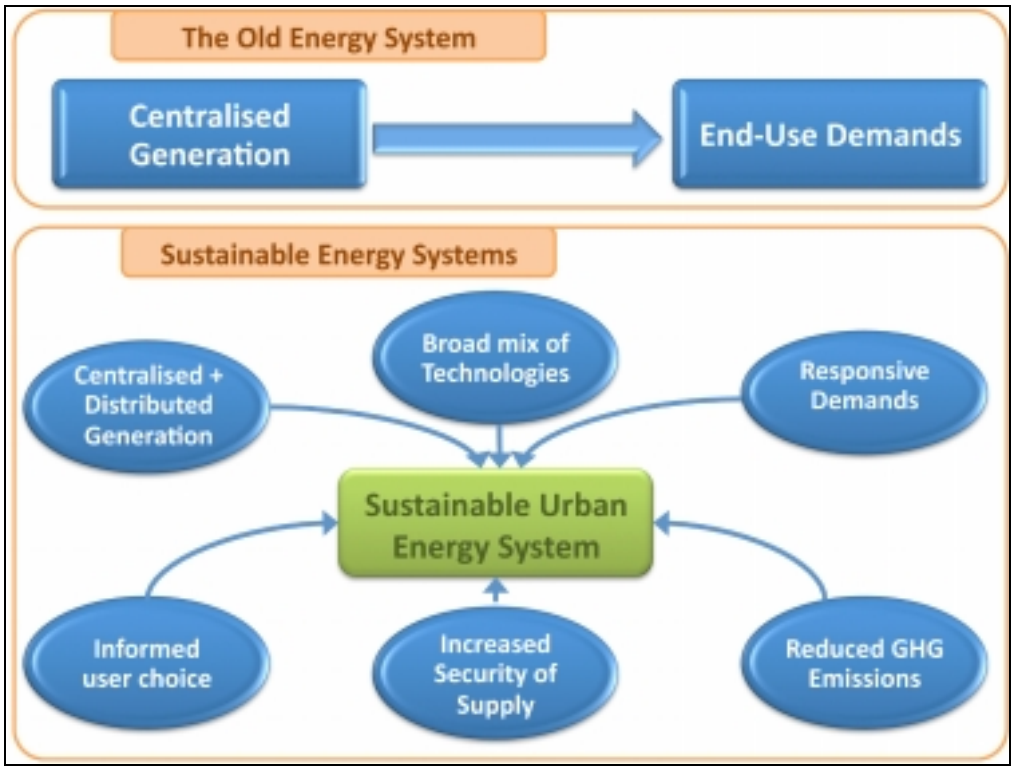
- Base planning units on natural boundaries, reflecting ecological functions while replacing a politically-oriented hierarchy of units.
- Design with nature, and respect human activity and its effect on the environment as well as the limits of resource availability and ecosystem resilience.
- Consider global and cumulative effects, because a much broader and longer perspective must be considered, like attention to off-site, cross-boundary, inter-generational, and cumulative effects.
- Encourage inter-jurisdictional decision-making, and overcome the present fragmentation and isolation with integrated planning and implementation.
- Ensure consultation and facilitate cooperation and partnering, involving the widest range of stakeholders effectively and openly in the planning process.
- Initiate long term monitoring, feedback, and adaptation of plans, to assess what happens to communities and ecosystems as plan implementation unfolds.

2. Defining sustainable urban energy planning

Sustainable urban energy planning integrates sustainable energy, clean energy technologies and responsible resources management strategies for the development of economically, socially and environmentally healthy communities. The ultimate aim is to bring about a

paradigm shift with respect to energy and resource use within all of the functions of a community and to change infrastructure parameters and development patterns by affecting "how and where we build" and "how we generate, deliver and use energy." Sustainable energy planning seeks to strike a new balance in the dynamics between energy and resource supply and demand, by fusing energy and resource efficiency with "smart growth," "smart grid," intelligent transportation system management" and similar urban strategies within the following framework of community planning and design principles:

Sustainable Use of Energy Resources: Planning and design should maximize the efficient use of energy resources across all end uses, while minimizing direct and indirect adverse impacts on the environment.



2.1. Ecological Community Form and Function:

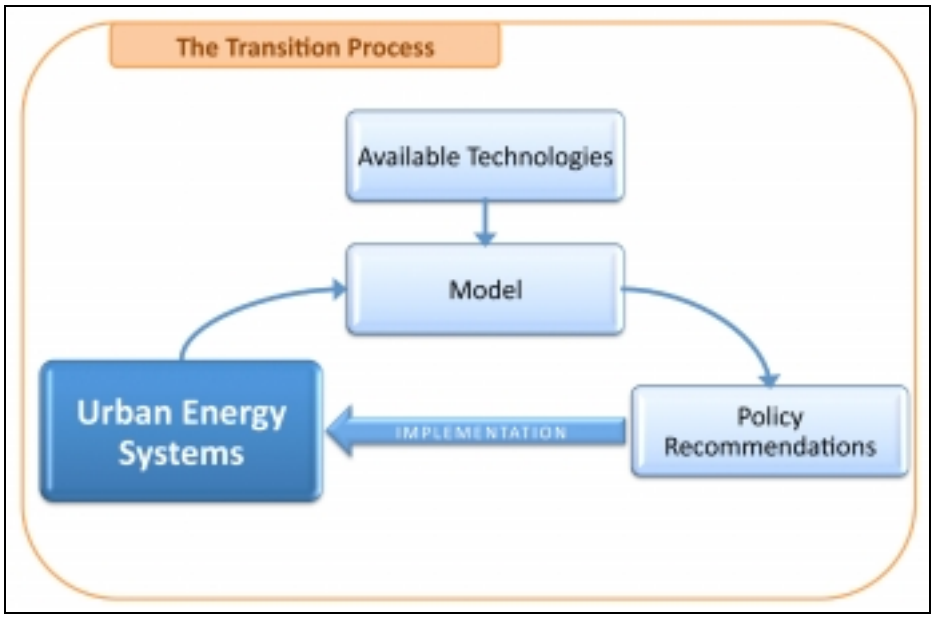
Planning and design should emulate nature to maximize the benefit of natural systems and preserve and restore the natural environment.

Urban functions should be managed to reinforce natural flows and characteristics, creating a balance and mutually supportive cycle of interaction between built and natural environments.

Environmentally Sound and Energy Efficient Land Use Optimization: Planning and design should seek to minimize the consumption of energy, material and natural resources by restructuring and more efficiently utilizing the existing urban footprint. In addition, compact, mixed-use development, along with the co-location of compatible uses and increasing proximate loads, can enable cost-effective distributed energy resource applications and urban mass transit systems.

2.2 Energy and Environmental Technology Integration:

Planning and design should integrate cleaner energy systems into development projects, using "whole building" and "community-scale" approaches to maximize energy performance and economic value, while minimizing adverse environmental impacts. Efforts should capitalize upon technology advancements, but promote integrated technical systems needed to expand the use of local renewable and recyclable energy resources, build sustainable local and regional energy networks, secure underground distribution systems for critical urban facilities, develop supply and demand network control systems, and establish more technology-ready infrastructure.



2.3. Community Resources Management:

Wherever possible, planning and design should engage community residents in the efficient use of energy and material resources by decentralizing resource management systems to the neighborhood level. Neighborhood-based systems should be designed to provide ongoing systemic management of community resources and promote shared energy resources and material and process efficiencies, based on town energy management plans.

Social Equity and Economic Vitality: Energy-efficient planning and design should increase access to affordable housing, public services and employment for lower-income populations and stimulate local economic opportunities.

3. Planning and Decision Making Processes

Building owners, developers and agencies are faced with the need to make decisions in the short term with the possibility of huge consequences, yet they lack a sound basis for making these decisions. Similarly, the design and engineering community lacks the basic principles and rules to help guide the selection of integrated, sustainable solutions. They need practical tools, techniques and training to promote awareness and to encourage sustainable urban planning and development.

To better equip decision makers to assess the environmental impacts of their technology choices, new integrative approaches to urban planning and development need to be evaluated using comprehensive models that can estimate mass and energy flows and their effects, as

well as life cycle costs. While researchers may understand these concepts, they are not yet well accepted by planners, system designers and decision makers. Furthermore, despite recent progress in modelling, we are still a long way from understanding the complex interrelationships between the various elements and flows that exist within the urban environment.

However, there also are significant obstacles to sustainable energy planning by local governments. Primary among these are significant financial constraints, competing priorities, lack of knowledge and technical expertise, no incentive to undertake energy-related activities outside of managing their own consumption. It is also a daunting challenge to integrate energy systems planning into local land use planning and development processes that have been structured to address other matters such as growth management, public infrastructure development (transportation, water supply and wastewater treatment, and solid waste management), affordable housing, etc.

Local governments have to be engaged in sustainable energy planning in three principal ways:

- Reducing energy consumption within their own facilities and operations;
- Promoting efficient energy use and alternative resources in the private sector through judicious use of incentives, regulations and demonstration projects; and
- Shaping local land use and development patterns to reduce per capita energy use and improve environmental quality.

To contribute to a future of both population growth and urban sustainability, local and regional governmental officials must better understand:

- How different development patterns, building and infrastructure design and materials, and clean energy technologies can increase energy and resource efficiency without compromising the quality of life;
- How decisions regarding private development projects affect long-term energy demand;
- How energy smart planning carried out as part of land use development and growth management processes can bring into better balance energy supply with demand, including by facilitating the orderly, capital efficient and environmentally sound application of distributed energy resources.

Developing the capacity for sustainable energy planning would enable local and regional governments to:

- Shape energy and resource-efficient community development patterns and land-use practices under the discipline of a “sustainable urban form,” significantly reducing energy consumption and greenhouse gas emissions, while also enhancing energy reliability and security and economic growth and development;
- Advance a “systems” approach for integrating and optimizing clean energy technologies within development projects to accelerate the combined use of renewable energy and advanced end-use and smart grid enabling technologies within a community’s built-environment and infrastructure; Help design market-changing public-private partnerships, policies, and business and financial models to overcome technical, market and institutional barriers to clean energy products, services and infrastructure.

Conclusions

Sustainable energy planning is a long-term oriented, evolutionary process and one that needs to arise from consensus-building among community leaders, businesses and residents and from well-coordinated institutional governance. Oftentimes, it is undertaken within the context of climate or sustainability planning and needs to arise from a "strategic vision" that helps to shape a community-wide energy action plan with milestones.

Integral to this planning is the development and application of modeling and analytical tools that can assess what changes are needed to foster energy and resource efficient community development, as well as to inform the structuring of public-private partnership arrangements to evaluate and implement cost-effective options.

Effective decision support tools and methods are needed to: Assess systematically the costs and benefits of alternative urban design and site planning scenarios; Enable city officials, development authorities and planners to formulate municipality-wide energy management plans that consider all energy sources and all end-uses; Structure and fund effective energy and environment-related programs, measures and partnerships to overcome technical, institutional, financial and other barriers to sustainable development.

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