URBAN PLANNING AND RENEWABLE ENERGY: A REVIEW

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ABSTRACT

In order to help meet our country's need for sustainable energy in the future, urban planners and practitioners will have to join together to explore many innovative approaches. A designer's view on the renewable energy future is the subject of the current article. In order to be able to understand and explore the relevant planning problems, the analyst starts with a framework. Both the technical environmental element and sustainable development are included in the framework. Designers that use these techniques may have the option of doing life cycle analysis and exergy analyses. According to past publications, the notion of an adapted trias energetica remains a viable design approach for renewable energy-based urban planning. When it comes to sustainable development, environmental evaluations should look at how the planning or decision process influences society, the economy, law, design, and ethics. It then gives some concepts for formulating designs which use renewable energy as a means of sustaining the built environment. The conceptual model in line with the modified trias energetica theory includes concepts of passive urban energy design, the exergaming of energy supply systems, and the use of renewable energy.

ABSTRACT: Urban Planning, Renewable Energy, Planning

INTRODUCTION

It offers a big challenge for research and practise since it is difficult to create a synergy between the transition to a renewable energy future and the transition to sustainable cities.

Sustainable construction measures, such as higher insulation levels or solar-based energy supply, are widely accepted as a step to adopt at the individual building level, but these measures must not be looked at in isolation from the wider energy infrastructure issues (i.e., macro-scale). Now, examine the meso-scale, which may need to be evaluated alongside the micro and macro-levels. Both of these concerns - providing for energy, and developing sustainable cities - are critically dependent on one other. Think about CHP or boiler plants for district heating and cooling, as well as geothermal applications servicing groups of buildings or grouped solar arrays when considering the issue of energy supply. Urban planning may impact energy consumption estimates in several ways, such as, for example, with concerns connected to compactness, morphology, and building orientation, and the exchange of waste heat. Because ‘energy' and the ‘built environment' are intricately interrelated, the two initiatives must work together to promote sustainability. I suppose that the energy characteristics of an urban fabric, both in terms of demand and supply, must be considered a "whole system" in conjunction with the surrounding environment. To be sure, we will deal with energy as well as environmental development.

These optimizations—we may conjecture from the start of this study—are sensitive to the size and situation of the task. For example, upgrading an existing compact urban district, and including related advantages in terms of combined energy consumption for buildings and mobility, is likely to be more effective in accomplishing our goal of getting the maximum benefit from building energy than creating a new passive housing district on a greenfield outside the city where residents may primarily rely on car traffic. The enhanced performance of each individual passive dwelling may be cancelled out by the greater energy consumption required to support more traffic volume. It has also been investigated by Stöglehner and Narodoslawsky that the new infrastructure networks required for low-density towns need a lot of energy.

Some observations of this kind may be made about how various energy technologies are included at different grid size levels, and in particular about how smart grids integrate them. Furthermore, creating a solar farm outside of an urban area might be more cost-effective as installation of PV panels or solar boilers on each building within the same district is not required. Given the context of the situation, other things include the following: location and land use pressure, spatial quality, orientation and shading, investments, maintenance, emissions, and nuisance control.

LIFE CYCLE ASSESEMENT

The influence of a building's construction, usage, and destruction on the environment may be assessed using the life cycle assessment (LCA). The following are regulations and established practises that are making their way into building design from single construction components all the way up to large metropolitan fragments. It is often measured in effect categories like climate change, depletion of natural resources, or threats to human health. Contested or optional: aggregating all of the affects into a single "score" or "environmental cost" is Additionally, this is because aggregation involves weighing of different environmental impacts, and thus involves normative decisions, such as deciding which environmental impact to prioritise (e.g., which one to focus on, whether human health is more important than ecosystem health, or the other way around). In this context, the LCA of energy systems, such in [12,14], is very relevant.

PRINCIPAL ENERGY VS EXERGY

Energy sustainability also focuses on efficiency. Better energy efficiency leads to lower primary energy consumption, which reduces environmental impact. Although it is important to look at primary energy use and exergetic efficiency to get accurate LCA results, doing separate studies of primary energy use and exergetic efficiency offers valuable insights.

On the other hand, doing so gives an accurate representation of the true amounts of energy required for a particular application. A passive home with a space heating and cooling energy need of 15 kWh/m² per year using the present mix of electricity will need a minimum of 40 kWh/m2 of primary energy. Thus, primary energy unit (PUU) measurement of consumption patterns should be given precedence over existing methods, where no PUU measurement is used.

For these types of investigations, energy usage is assessed using a qualitative method called exergy. It encourages an interrelated kind of optimization, considering the inherent qualities of various energy types in connection to their use. Under such conditions, creative breakthroughs are possible, especially with respect to the conception and design of constructed environments. Simply put, exergy is the amount of energy required to create work. The level of work depends not only on the energy source, but also on the environment in which it takes place. As such, an energy carrier's exergy (or work capability) is always represented relative to the surrounding environment.

CONCLUSION

This article includes a broad variety of research perspectives to arrive at a synthetic picture of the issues it considers. Therefore, interdisciplinary and transdisciplinary research is required to address urban challenges. Section 2.2 asserts that ecologically sustainable solutions cannot be accomplished without relating to all of the aforementioned domains. With relation to the energy transition, these domains have served as a battlefield for urban planners and designers for some time. It will be inescapable to take a systems-perspective and examine the unthinkably regular occurrences of business as usual. The conclusions reached by Wächter et al. with regard to a sustainable energy transition in Austria are comparable, when they state that "Societal transformations aimed at fostering a sustainable energy system are value-laden and goal-oriented, and they occur due to the necessity to abandon business-as-usual" ([59], p. 199). On the other hand, numerous exciting prospects await.

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