

# **The Benefits of Compact Urban Fabric As a Green Community**

**Dr. Mahmoud Ahmed Eissa**

Associ. Prof., College of Environmental Design,  
King Abdel Aziz University, Jeddah, KSA

## **Abstract:**

Rapid growth of urbanization all over the world, and machines commanding all daily activities have the massive negative effect to abandon the traditional urban fabric. The compact urban fabric is deep-rooted in our urban heritage. It was spontaneously inherited and fulfilled habitants' requirements, and was suitable for pursuing life activities without ignoring the local natural environment. The paper discusses and assesses the traditional compact urban fabric and investigates how that urban fabric was suitable to local natural environment. This paper aims at emphasizing the importance of adopting the compact urban fabric to achieve sustainability. Based on conservation of historic and cultural values of the traditional communities, compact urban fabric can be adopted to create well livable green communities.

## **1. Introduction**

Global warming, ozone layer depletion, air pollution, overpopulation, and acid rain, these are just few of the environmental crises, we have created in our global natural environment. The words "Green", "Ecological" and "Sustainable" are terms used by environmentalists to indicate modes of practice. These practices minimize our impact on the natural environment and produce healthier living environment. In Architecture there are many ways a building may be "green" and respond to the growing environmental problems of

our planet. This can be done while still maintaining efficiency, beauty, layouts and cost effectiveness.

During the last decade, knowledge about the impact of urban development on global natural environment and human health expanded significantly. Alternative techniques and products, designed to reduce these impacts, have developed in an arena known as ecological, sustainable, or green architecture. Urban fabric is always the most urban treatments that deal with natural environment. Energy efficiency is probably one of the most environmentally and economically effective choices can make by forming urban fabric. Compact urban fabric may contribute to a large extent in achieving or creating livable urban community. This paper considers the role of compact urban fabric in creating environment friendly or green community.

## **2. Concepts of Urban Fabric**

The urban fabric type is the reference or the base that describes the relations between building and open spaces in the built environment. The traditional urban fabric has evolved critical balances between inhabitants' requirement and economic conditions on the one hand and their environment and natural resources on the other hand. Premiers' experiences in dealing with natural environment and its resources had grown as many as long time spans through a chain of trial and error till these different inherited experiences unintentionally had formed all over the world.(Figure(1))

Richard Rogers believes that the only ecologically and socially sustainable way for London to grow is as a vital, compact, multi-centered, mixed-use city, designed on the base of easy human contact and creation of beautiful buildings and spaces. <sup>[1]</sup>

Figure (2) shows different concepts of urban fabric. Upper, display three diagrams show how very different forms of architecture – a series of blocks enclosing an open space, a terraced street layout, and a point block – can be built at the same density. Lower, a typical modern redevelopment scenario: first, traffic planning cuts the traditional compact urban fabric; then massive blocks are constructed along the easily accessible street edges. These comparisons clearly present the use of compact courtyard buildings advantage over the pavilion pattern buildings through using site area ability. This conclusion assured by "Green paper on the urban environment" a report issued by commission of the European communities (CEC) in the end of last century, called for returning to compact urban formation.<sup>[2]</sup>

Many countries have taken up strategies and programs connect between continuous development and urban fabric like Australia at early nineties last century by (Australia's Better Cities Program) and United Kingdom by (Sustainable Development Strategy).<sup>[3]</sup> The common divisor in these programs that sustainable city must take a dimension suitable for walking, riding bicycles, elevate public transportations' ability, and decrease using private cars.

### **3. Concept of Green Architecture**

The green approach to architecture is not a new one. It has existed since people first selected a south-facing cave rather than one facing north or any other direction in order to achieve comfort in a temperate climate. What is new is the realization that a green approach to the built environment involves a holistic approach to design of buildings.<sup>[5]</sup> The concept of green architecture, in recent years, has been the subject of much debate by architects and planners alike. Green architecture is a successful fusion of resources efficiency, natural environment sensitivity, attention to human well-being, and economic success.

Green Building Template project, of the Maryland Department of Natural Resources, clarifies that green building has many positive benefits and impacts. This project concludes that green buildings use only 2/3 of the energy and 1/2 the water of comparable standard construction. They use 20% less materials, 40% more recycled components, and send 35% less construction and demolition waste to the landfill. By saving energy, green buildings produce 30% less global warming emissions, use 40% less ozone depleting refrigerants in the heating and cooling equipment. Green buildings, built with durability in mind, typically have lower maintenance requirements and a longer useful life.<sup>[6]</sup>

A green building serves the needs of the people who inhabit it. It supports and nurtures their health, satisfaction, productivity, and spirit. It requires the careful application of the acknowledged strategies of sustainable architecture.<sup>[7]</sup> Green Buildings are really resource efficient buildings and are very energy efficient, utilize construction materials wisely are designed, constructed and commissioned to ensure they are healthy for their occupants, are typically more comfortable and easier to live with due to lower operating and owning costs, and are good for the planet. The overall environmental impact of new building and community development and the choices made when we either reuse or demolish existing structures is very important.

### **4. Green Community Design**

A green community is working towards a sustainable future with a healthy environment, a strong economy, and a high quality of life. Now more than ever, we are living in a world which is driven by economic facts. Creating green community is not a possibility unless it can be shown to be a more economical alternative. Green community design saves energy, water, waste disposal, and health costs. It is using technology in concert with the natural processes of nature is much more economical than using technology to overpower nature. Green community design is not about economics and saving money. It is about the survival of the human race as we know it. Too many aspects of conventional design contribute to the further degradation of our planet that must be stopped.

As urban designers of our built environment, we have the responsibility to lead society into a more sustainable lifestyle. Creating green community involves resolving many conflicting issues and requirements. Each design decision has environmental implications. Measures for green community can be divided into four areas: Reducing energy in use, minimizing external pollution and environmental damage, reducing embodied energy and resource depletion, and minimizing internal pollution and damage to health. The Principles for green community design that can be achieved by compact urban fabric may organize into: Site Planning and Development, Transportation, Urban Design, Architecture, and Energy Efficiency.

#### **4.1. Site Planning and Development**

The primary concern when selecting a site for development at urban planning scale is the suitability of the site for that particular development. The lack of respect and consideration for a region's local cultural and natural features not only creates lifeless communities, but also promotes unsustainable development. On the other hand, site development with sustainable design principles preserves and promotes regional identity, culture, ecology, and creates a sense of place. The basic premise of Green community development is the respect of the local environment and culture. By placing priority on the regional issues such as the site's natural features and ecology, the community will develop and preserve a distinct identity and sense of place.

In designing a project for East New York in 1996, Sorkin used a pluralistic approach by resisting what he calls the "homogenizations of global culture". As an alternative, he favors looking at the community as a "maximization of economic, social, cultural, and environmental self-sufficiency" that can draw on the collective advantages of greater New York without losing its identity. <sup>[8]</sup>(Figure(3))

## **4.2. Transportation**

Sustainable transportation strategies aim to reduce the dominance of the automobile in the streetscape. This results not only in more sustainable developments but also greater civic activity, street life, and sense of community. Reducing road widths and curb radii has several positive effects to the streetscape. It reduces traffic speeds which make the street safer and more pedestrian friendly. It helps bring the scale of the street to a more human scale, and allows more room for landscaping and greenery. It also reduces the amount of impervious surfaces in the development providing both economical and environmental benefits. Plants provide oxygen and act as air filters and can greatly improve the air quality on the street. Urban greenery is also useful to enhance the human scale of street sections. The presence of trees and plants in the streetscape offers a valuable connection to nature which is often lacking in the urban environment.

In the Shanghai master plan, Richard Rogers Partnership explored the concept of sustainable compact city for a community based society. Public transportation, which encourages face-to-face contact and a more engaged local culture, is central to this proposal for a diverse commercial and residential quarter enhanced by a network of green and public plazas. <sup>[9]</sup> (Figure (4))

## **4.3. Urban Fabric Design**

In urban design, the environmental revolution manifests itself as sustainable design and planning. This concept has been worded in many different ways: green architecture, environmentally-sensitive design, ecological design, and design with nature. Green community is not anti-technology; it simply calls for urban design which uses technology to augment the energy-efficiency of urban fabric instead of depending on technology alone. Green community, green architecture, or sustainable design, whatever the name, architects must relearn and revive some of these age old lessons and adapt them to our modern life style.

Figure (5) shows a development proposal for mixed use project at Jeddah. The proposal provides a major open space oriented to the sea front. The urban fabric and the enclosed public space was designed to be walk able, high-density mixed use development is an indispensable component of ecologically sound urban fabric. It also oriented to catch summer breezes. The traditional urban fabric of historical Jeddah has developed to create a green community that sensitive to the local environment and meet the modern lifestyle.

#### **4.4. Architecture**

Green building design involves three primary elements. These are: energy-efficient design, preservation of cultural and regional identity, and environmentally friendly building materials. The green architect must take all these elements into account at one level, as well as the overall context.(Figure (6)) Strategies for passive cooling include orienting the building to allow for maximum exposure to summer breezes. Place windows strategically to efficiently circulate these breezes. Use walls, overhangs and other built elements to assist in channeling breezes through the building. Providing vertical air shafts such as cupolas and roof monitors also serve to efficiently remove hot air through stack-effect ventilation. The green buildings places a high priority on health, environmental and resource conservation performance over its life-cycle. These new priorities expand and complement the classical building design concerns: economy, utility, durability, and delight. Green design emphasizes a number of new environmental, resource and occupant health concerns:

- Reduce human exposure to noxious materials.
- Conserve non-renewable energy.
- Minimize life-cycle ecological impact of energy and materials used.
- Use renewable energy and materials
- Protect and restore local air, water, soils, flora and fauna.
- Support pedestrians, bicycles, mass transit and other alternatives.

#### **4.5. Energy efficiency**

As a general rule, the more compact the shape, the greater the heating and cooling efficiency of the building. This is accomplished by minimizing the exterior wall and roof areas. The first premise for energy efficiency and conservation is to minimize the need for energy. Energy-efficient air conditioners and furnaces provide maximum benefits when used with passive systems such as building orientation, massing, color, and use of landscaping.(Figure(7)) The costs of outfitting a green building with energy-efficient devices will generally be higher than that of a standard building. However, over a period of time, these devices will almost always pay themselves back several times over. Additionally, the paybacks for green buildings will not only be economical, but will also be environmental.

Low urban densities impel the use of personal transport that can use much more energy than alternatives. Larger lots also encourage the construction of larger buildings, with greater surface areas, that require more energy per resident for heating and cooling. In 1993, ICLEI undertook a research project to establish the relationship between energy use and

urban density. The results are illustrated in Figure (8), which shows the direct correlation between urban density and urban energy use. The cities with higher densities were better able to finance public transit, energy-saving district heating and cooling, and to reduce transportation energy demand due to the shorter travel distances between home, work, and other services.

## **5. Conclusions**

The term green community is a simple concept with a multitude of complex definitions and interpretations. Green community design, an aspect of sustainability, is no exception. The broad nature of this study was an attempt to capture the complete scope of green community design into one succinct document. The true nature of green community design and sustainability itself has been made clearer. Compact urban fabric increases efficiency in the way people can use the community and the way in which the community is run. More people live in a smaller area in a compact urban fabric and this higher density allows for efficient provision of public transport, social and other services. Increase density and land use efficiency will effectively reduce infrastructure costs. Providing moderate densities encourages pedestrian focus and safety. Pedestrian connections are far more energy and cost-efficient than auto dependent access and suburban sprawl. Bike and walkways enhance a more personal pedestrian community. These walkways should connect to convenient transit stops and should have continuous pavement patterns across driveways and streets. Green areas, saving wetlands and creating urban forest can enhance recreation, livability and sustainability.

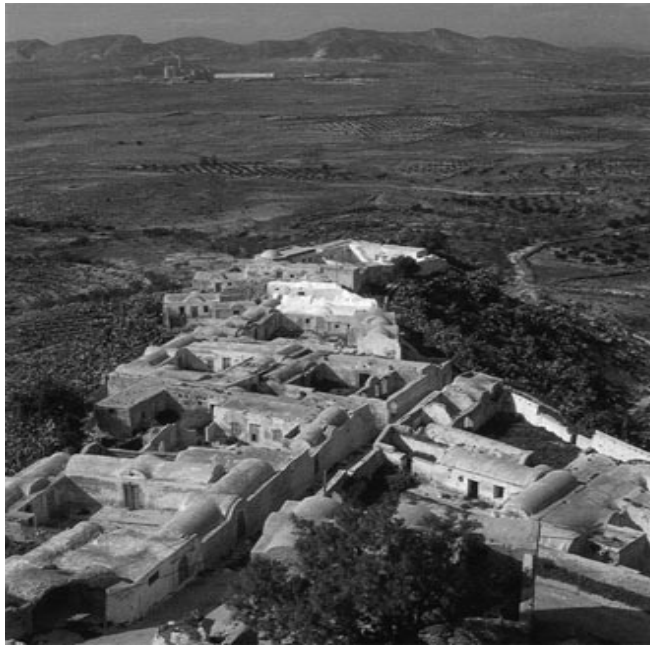
Architects, urban designer, planners, and all professions involved in the design and construction of our built environments must become aware of compact urban fabric as a green community. Compact urban fabric preserves regional identity, bolsters the local economy, and helps the environment by reducing the need for transportation and energy consumption. It is also important at preservation of precious heritage that is still a vital part of the contemporary city.

## **REFERENCES**

1. Rogers, Richard, "Housing for a Compact City", Greater London Authority, London, 2003.
2. Commission of the European Communities (CEC), "Green Paper on the Urban Environment", CEC, Brussels, Belgium, 1990.
3. Jenks, M., Burton, E. and Williams, K., "Compact Cities and Sustainability: An Introduction", In *The Compact City: A Sustainable Urban Form*, Edited by Jenks, M., Burton, E. and Williams, K., & FN Spon, London, UK, 1996.
4. Bianca, Stefano, "Urban Form in the Arab World: Past and Present", Thames & Hudson, ETH Zurich, Germany 2000.
5. Abdou, Osama, "Green Architecture: A Holistic Approach", *Ecological Approaches to Architecture*, medina, Issue11, Cairo, 2000.
6. TerraLogos, "GREEN BUILDING TEMPLATE A Guide to Sustainable Design Renovating for Baltimore Row Houses", The Maryland Department of Natural Resources, USA, 2001.
7. Coldham, B., "What is Green Architecture", [www.coldhamarch.com/green/what.htm](http://www.coldhamarch.com/green/what.htm)., 2001.
8. Wines, James, "Green Architecture", Edited by Philip Jodidio, Benedikt Taschen Verlag GmbH, Italy, 2000.
9. Gissen, David, "BIG & GREEN: Toward Sustainable Architecture in the 21<sup>st</sup> Century", National Building Museum, Washington, USA 2003.
10. Reda, T., Angawi, S., Eissa, M., A development proposal for mixed use project at Jeddah, KSA, 2003.
11. Boussaa, D., "Lessons from the Hafsia Quarter in Tunis, Rehabilitation and Affordable Housing", Symposium of Housing (2) (Affordable Dwelling), Arriyadh – KSA, 2004.
12. Torrie, Ralph, "Findings and Policy Implications from the Urban CO2 Reduction Project", prepared for the International Council for Local Environmental Initiatives (ICLEI), 1993.



Figures Appendix



Mud brick buildings, Berber Village, Tunisia<sup>[8]</sup>



Medieval Italian City of Siena<sup>[4]</sup>

Figure (1)  
Traditional Compact urban fabric examples

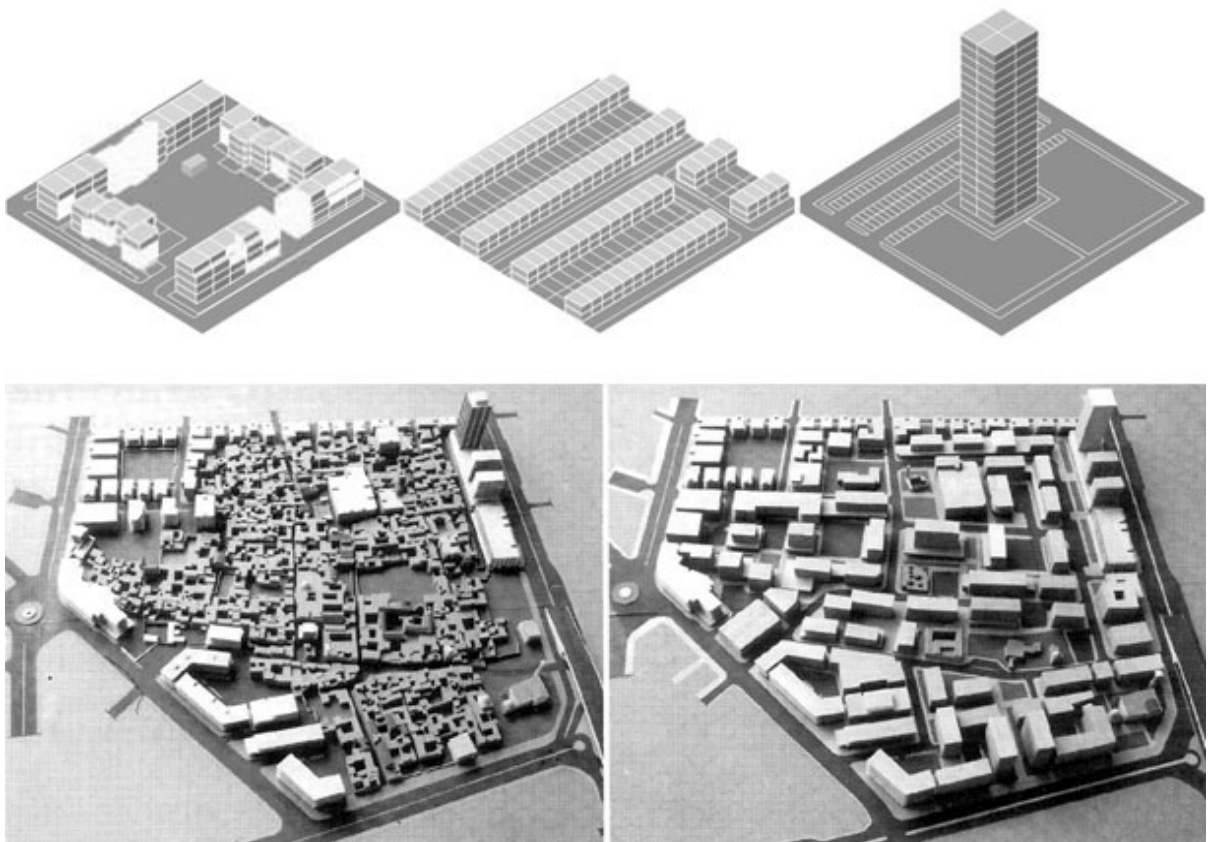


Figure (2)  
Upper: Diagrams of three different forms of architecture<sup>[1]</sup>  
Lower: Redevelopment proposal of Suq Sarouja distrect, Damascus, Syrea.<sup>[4]</sup>

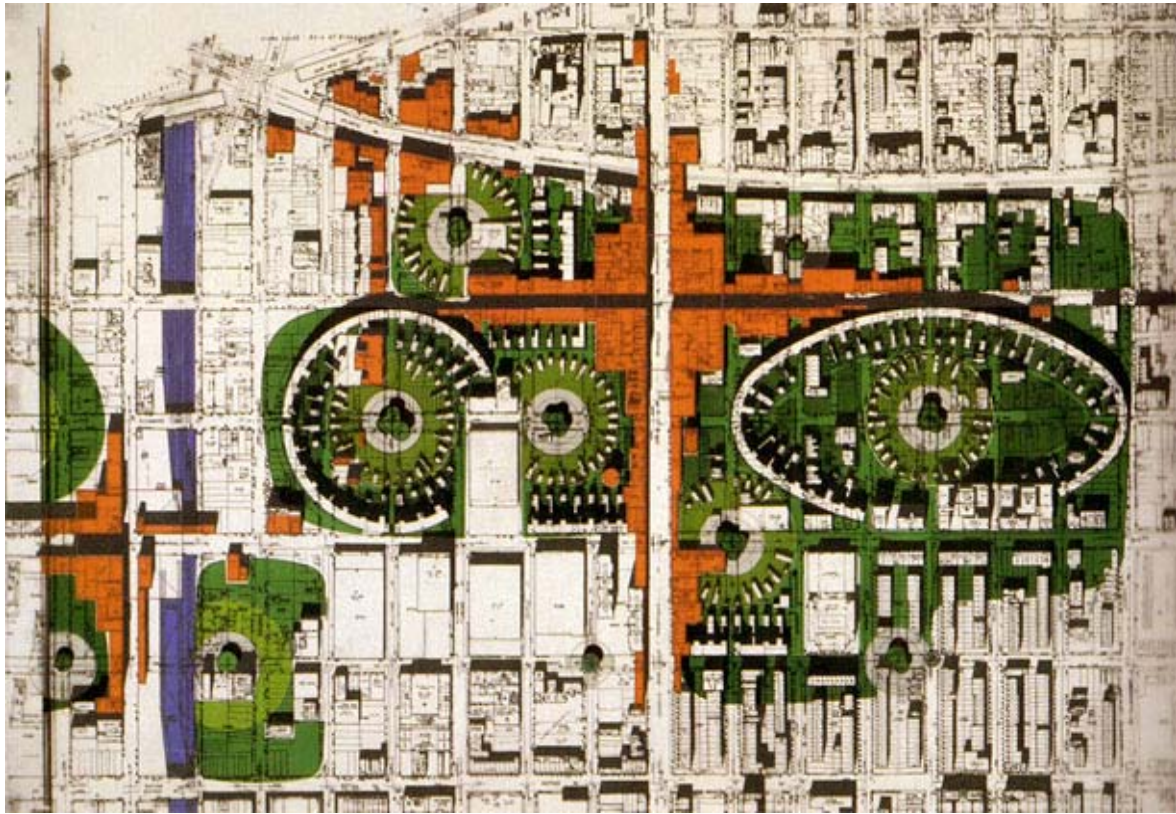


Figure (3)  
East New York development study by Michael Sorkin Studio, New York. [8]

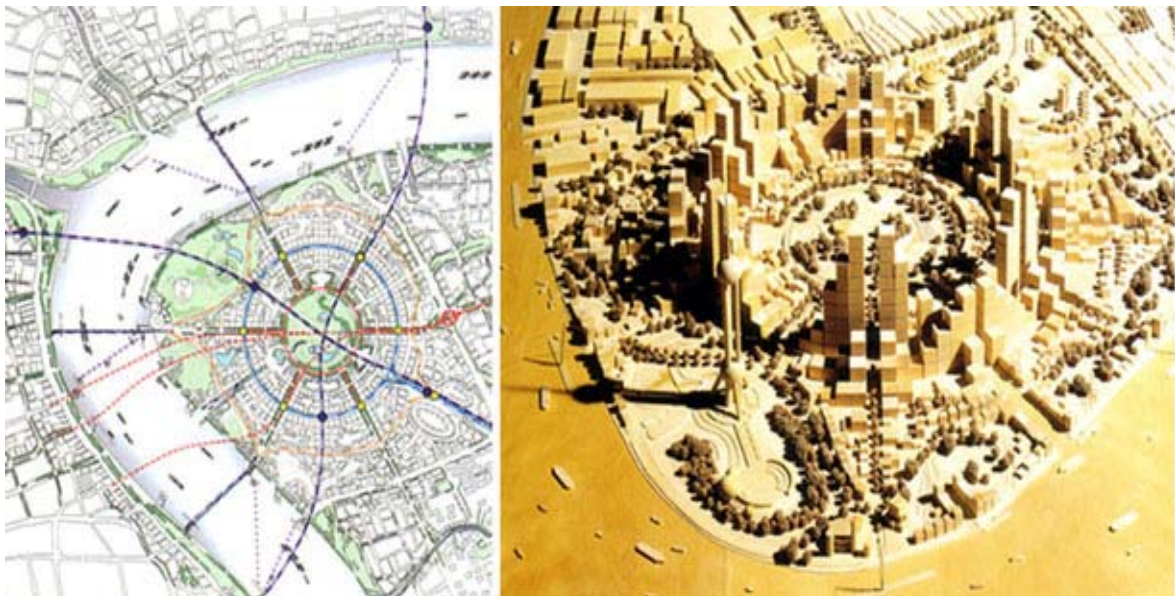


Figure (4)  
Model of Shanghai proposed master plan. [9]



Layout



Perspective



Ground level plan



First level plan

Figure (5)  
A development proposal for mixed use project at Jeddah <sup>[10]</sup>



Figure (6)  
New development with traditional style at Hafsia Quarter in Tunis. <sup>[11]</sup>



Figure (7)  
Habitat, Montreal, Canada, by Moshe Safdie 1967. <sup>[9]</sup>

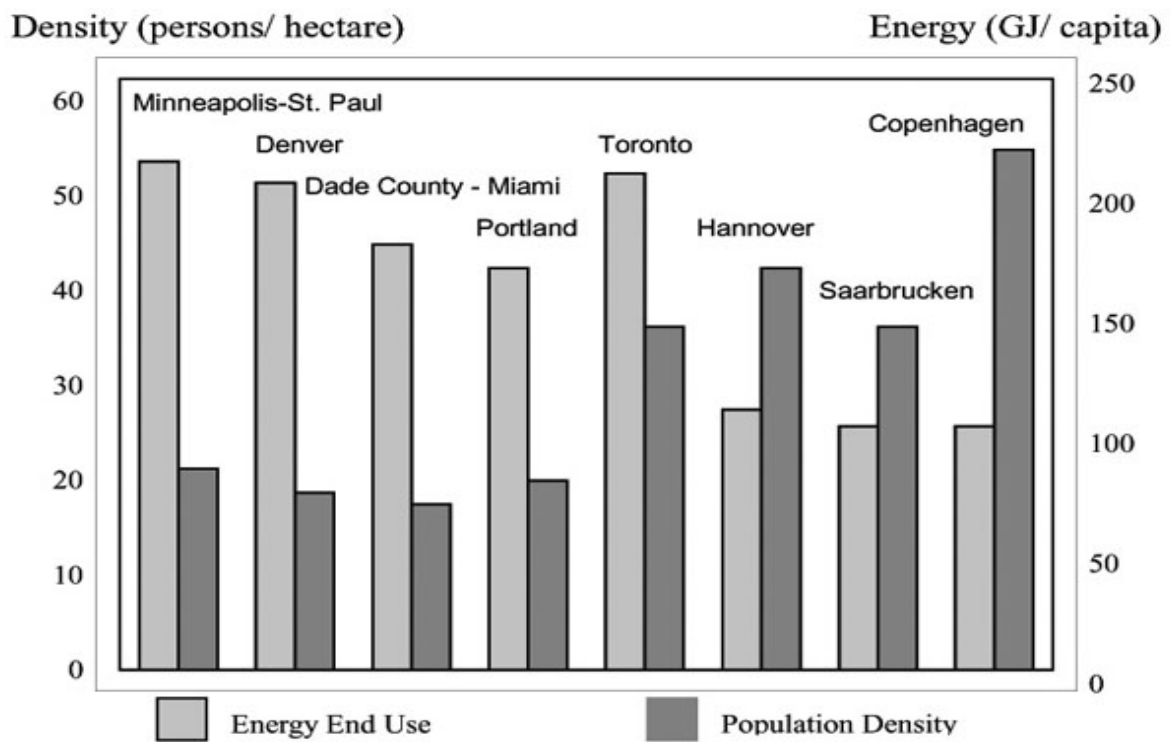


Figure (8)  
The relationship between population density and energy use. <sup>[12]</sup>