

**Economics of Environmental Design**  
**A Model for Economic Environmental Design and Its**  
**Impact on Buildings**

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## ABSTRACT

The main idea of taking shelter for the human being across time was his protection, and under this concept came all the kinds of dangers surrounding him. For example, way back in the old time, this idea was basically taking shelter from wild animals and cruel weather conditions which man can't deal with. This idea developed across time till nowadays where buildings arise not only as shelters but also as public functional buildings.

With human needs for creating a human comfort zone in the internal space, many modern building which cause a great thermal load on the user to the extent that it became a must to use technological and mechanical ways to achieve the thermal comfort needed. This increased the post-occupation cost, the same time money dominated nations.

With this great development in mechanical systems that needed for internal space, designers and engineers neglected all points and methods that considered as an environmental design and their theories. That makes buildings as a huge load in the total cost of buildings especially in the post-occupation time.

And with energy crisis in 1973 and its impact on energy consumption in building to use mechanical systems needed to achieve the thermal comfort in internal spaces. So in other hand mechanical designers look to use renewable energy in their mechanical systems as a method to protect energy sources.

And now many of environmental designers look to create a complete environmental system for buildings known as contemporary environmental trends in building.

Under these considerations we must not neglect economics in buildings as an important rule for construction of building, so the research discusses how to **make an environmental design for building under economic consideration and its impact on building economics.**

In order to reach its final conclusion the research is divided into parts:

**Theoretical Study:** (Three sections)

The 1<sup>st</sup> studies architecture and environmental planning and design, and contemporary environmental trend in buildings.

The 2<sup>nd</sup> studies energy and its economics, energy crisis after 1973, economics of consumption energy in building during life cycle of the building, renewable energy and its impact on building.

The 3<sup>rd</sup> studies economic evaluation for environmental design, how to determined optimum environmental solution in building as a simple economic method and its impact on building.

**Applied Field Study:** (Three sections)

The 1<sup>st</sup> studies applications of environmental design in building in four levels contain:

- In level of lay out.
- In level of building mass and plan.
- In level of building envelope.
- In level of building openings.

The 2<sup>nd</sup> moves to an applied model to calculate the cost of environmental design from its design and construction and during life cycle of building.

The 3<sup>rd</sup> studies the application of the model on administration building in Cairo, and studies alternatives of environmental design for the building and determined the optimum one in the building from studying its economics.

The research concludes that the economics of environmental design are important rule that determined the optimum environmental design solution for the building under economic considerations.