



# Investigating the Environmental Properties and Energy Consumption of Geopolymer Concrete as A Sustainable Material

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## ABSTRACT

*Concrete is the second most widely used material in the construction industry after water due to its special properties. But the Portland cement production process also has major drawbacks, with one ton of Portland cement producing about a ton of carbon dioxide. Hence the need to use an alternative to Portland cement seems necessary. On the other hand, the production of new materials with environmental impacts less than the priorities will be one of the goals of sustainable development in future cities. In recent years, geopolymer has emerged as a sustainable, environmentally friendly material and an alternative to Portland cement. Geopolymers are materials such as ceramics with multidimensional three-dimensional structures that consist of the chemical activation of solids containing aluminum and silica at relatively low temperatures. Industrial waste or by-products can be used to produce geopolymer concrete and use it in construction. The present paper examines the feasibility of using geopolymer technology in sustainable materials for sustainable urban development to reduce the emission of environmental pollutants. The findings and results of this article show that geopolymer concretes have superior mechanical and chemical properties compared to conventional concrete, consume much less energy than concrete made with conventional Portland cement, and also provide significant environmental benefits.*

## Keywords:

*Geopolymer, Sustainable Development; Life cycle assessment, Sustainable Materials.*