

Transitioning to Renewable Energy to Achieve Sustainability in Industrial Products

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Abstract:

Recently, the world has been adopting clean and green energy sources, focusing on environmental preservation and raising awareness about the impacts of climate change and carbon emissions from factories. Renewable energy helps eliminate carbon, a major contributor to climate change, while also reducing costs, especially with rising electricity prices. The transition to renewable energy has become more urgent than ever. There is assurance of continuous availability of renewable energy since it is inexhaustible, unlike traditional energy sources. The research problem lies in determining the extent to which the use of renewable energy in industrial product factories contributes to environmental preservation and cost reduction. The importance of this research is highlighted by focusing on renewable energy and its benefits, as well as reducing environmental pollution caused by traditional energy sources. This research aims to achieve sustainability through the use of renewable energy in a metal products factory and reduce electricity consumption costs in these factories. The research assumes the following: the use of renewable energy preserves the environment and reduces electricity costs in a metal products factory. This research uses a descriptive approach to describe and analyze renewable energy and its applicability in a metal products factory. Costs were calculated in three scenarios: electricity-only, on-grid, and off-grid. As mentioned in the theoretical framework, renewable energy offers numerous environmental benefits, such as reducing carbon emissions that cause global warming. It also provides economic advantages, including lower energy costs (electricity), job creation, and other benefits. A case study was conducted for a metal products factory, analyzing the electrical capacity of the factory under study. Solar energy was selected among renewable energy sources. Solar energy is widely available and accessible everywhere. To implement this, the surface area of the factory was calculated for the installation of solar panels, and it was found to be sufficient to cover the required electrical capacity. The energy cost calculation was analyzed in three cases: electricity-only, solar energy in two ways (on-grid and off-grid). If the priority is to save on long-term costs, the on-grid solar system is the most cost-effective option and the best for achieving sustainability. After implementing the proposed plan, it is expected that the factory will achieve significant long-term cost savings, along with reduced reliance on traditional electricity. This step will help enhance environmental sustainability and reduce the factory's ecological footprint. Therefore, a comprehensive plan was developed to select and implement the appropriate systems within the factory, analyzing all financial and technical aspects, in addition to continuous monitoring and evaluation of the results.

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