

PV Modules Life Cycle and Environmental Sustainability

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Abstract

Rapid population growth has exacerbated problems surrounding natural resource consumption, and environmental concerns have deteriorated in various parts of the world. Energy generation accounts for a significant share of overall greenhouse gas emissions in the United States. As a result, eliminating pollution from energy-generating is a viable and significant research topic in academia. It is essential to begin exploring alternatives to traditional electricity plant-based generation that use coal, oil, or natural gas as a source of raw materials. The development of alternative power sources is becoming a focal point of the electricity-generating business over the last few decades. In this review, Wind power, Solar panels, Biogas as well as fuel cells are examples of mature modern energy generation systems today. Among these, photovoltaic panels seem to be the most widely accepted and practical technology for usage in both residential as well as commercial buildings. The capability of photovoltaic panels in the US has already surpassed 14 GW in 2014. By 2030, the solar energy sector hopes to generate 10% of the nation's maximum amount of electricity. Systems using photovoltaic panels have become a new method to produce electricity. An abundant, limitless, cheap, and clean energy source is solar radiation. Because they use solar energy, solar panels are regarded as a clean and environmentally friendly method to produce electricity. Even though photovoltaic panels produce essentially no pollution (or) greenhouse gas emissions during operation, they do have an influence on the environment during the manufacturing and end-of-life processes. While these impurities are treated improperly and without safeguards in the recovery portion of the manufacturing process and then discharged into the environment, they constitute serious pollution risks. Researchers in Europe and Japan frequently use the term "Eco-balance" instead of "LCA", but the two terms have nearly identical meanings. Along with the LCA approach from 1993, this package also includes goal and scope definition, life-cycle inventories, life-cycle impact assessments, and life-cycle improvement analyses. "LCA is the examination and evaluation of a product system's inputs, outputs, as well as potential environmental implications for its life cycle. Limitations of Life Cycle Assessment as well as the importance of LCA study are also discussed in this review. A case study of the Lake Street Garage in Fort Collins, Colorado is also included in this research. According to the findings of the LCA study, a solar power system has some benefits in terms of lowering greenhouse gas emissions and gaseous toxic releases. On the other side, traditional power plants generate less toxic waste than solar panel systems. The Lake Street Parking Garage's solar panel system on its roof will not be able to recoup its expenses throughout its 25-year lifespan, according to the LCC result.

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