INTEGRATION OF PHOTOVOLTAICS TECHNOLOGY IN ARCHITECTURAL BUILDING DESIGN

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Abstract

As the world population increases and people ask for high standard of living, the amount of energy necessary to sustain our society is ever increasing. To avoid an energy crisis, it's necessary to find alternative solution to fulfill the amount of energy needed. Gas and oil have been highly effective drivers for the economic progress, but they have damaged the environment and human health. While the price of oil and gas continue to fluctuate, the potential of renewable energy sources is growing. One of achievement in the renewable energy technologies is Photovoltaics (PV) that produce electricity on site directly from the sun, without needing for energy supply or concerning for environmental harm. Building Integrated Photovoltaic (BIPV) system may represent a powerful tool for reaching this goal. The aim that seeks to comply this paper is to offer aesthetical solution in integrating PV technology into the architectural building design. The main research questions are: do Photovoltaics affect the architectural design of the building and how can they be integrated in the building design? The research methods are based first on theoretical investigation about the characteristics of Photovoltaic Panel. The methodology included case studies selected from around the world. Best practices that have integrated PV system are described. For a better understanding of the research design, the research question were materialized in variables, indicators, data collection methods and data analysis. Data collection consists on data based on literature and web survey of different websites. Case studies are selected form different countries and rely on multiple sources. Main results indicates that it is possible to integrate PV systems into the external building envelope as multifunctional elements, which will improve on the aesthetics. Conclusion. By examining examples three types of integration were analysed: integration into the roof, facade and in shading elements. During the analyses of PV features, it turned out that the modules, which are produced from crystalline silicon cells, are still most preferred on the market. PV affect the appearance of the building design but their impact depends on different factors like PV technology used, their shape, materials surface and form of the building.

Keywords*: architectural design, technology, photovoltaic, aesthetic, thin-film.*