

M.K. DIXIT, W. YAN. **BIPV prototype for the solar insolation calculation.** *Gerontechnology* 2012;11(2):162; doi:10.4017/gt.2012.11.02.539.00 **Purpose** Renewable energy components such as Building Integrated Photovoltaic (BIPV) often influence the aesthetic quality of a building adversely and hence need to be analyzed for their impact on building form and aesthetics¹. This becomes crucial especially in the case of a sun-tracking photovoltaic system. Moreover, there is a need to propose a reasonably accurate but quick system to estimate the amount of solar insolation received by a given location². Both the visualization of BIPV's movement and the solar insolation calculation can be integrated into a Building Information Model (BIM) to help design professionals to assess the feasibility of various solar photovoltaic options. **Method** A solar insolation model proposed by Kumar and Umananda² is used to develop a BIPV prototype in a BIM platform (Autodesk Revit). A graphical user interface is developed to input the time and location information. **Results & Discussion** A BIPV-prototype is developed to calculate solar position and determine the amount of solar insolation from given time and location information (*Figure 1*). The proposed model can be integrated into BIM to automatically calculate the solar position and the amount of solar insolation based on user inputs of time and location. We plan to compare this prototype with PV F-chart method. We will also research the use of Modelica for creating PV-component models and integrating the PV-modeling into thermal and daylight modeling.

References

1. NREL. Building Integrated Photovoltaics. Report: NREL/TP-472-7851. Golden, CO: National Renewable Energy Laboratory; 1993
2. Kumar R, Umananda L. Estimation of global radiation using clearness index model for sizing photovoltaic system. *Renewable Energy* 2005;30(15):2221-2233; doi:10.1016/j.renene.2005.02.009

Keywords: information technology, BIM, solar insolation, clearness index, BIPV

Affiliation: Texas A&M University, College Station, TX, USA; E: mandix72@neo.tamu.edu

Full paper: doi:10.4017/gt.2012.11.02.539.716

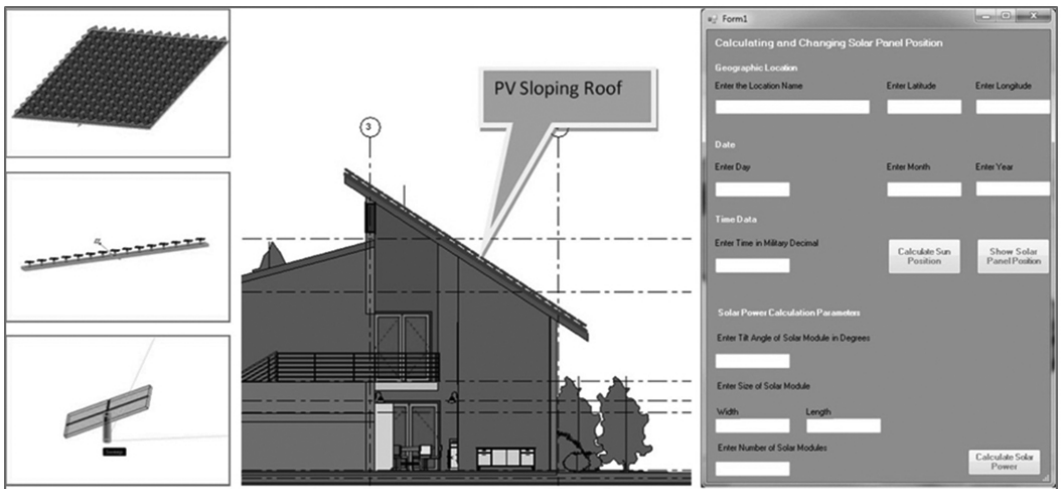


Figure 1. The proposed prototype in BIM-platform and graphical user interface