

Informing on Best Practices Using Design Builder and RET Screen to Calculate Energetic, Financial, and Environmental Impacts of Energy Systems for Buildings

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Abstract— Buildings represent 32% of total final energy consumption. In terms of primary energy consumption, buildings represent around 40% in most IEA countries (International Energy Agency). For such reason, strategies that lead to energy savings and greenhouse gases reduction are needed.

This research aims to provide a methodology able to identify the best system configuration from a technical, economic and environmental point of view by using at the same time two energy software: Design builder, which is able to calculate buildings energy needs under dynamic conditions, and RETScreen, which allows feasibility analysis of clean energy projects.

In order to assess the effectiveness of this operating procedure, a historical building has been modelled and a Combined Cooling, Heat and Power system based on an internal combustion engine has been chosen to ensure environmentally sound way.

In this study it shows the application of the procedure to a case study as an historical building located in Orte City which is near Rome in Italy; the methodology could get a real preliminary analysis for choose the best active or passive system for improve the energy efficiency and environmental sustainability of existing buildings, also allowing a cost-benefit analysis useful for the concrete realization of the interventions studied.

Index Terms—Model, Buildings, Energy, Efficiency, Sustainability