# Renewable energy technologies and its adaptation in an urban environment

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Integrating renewable sources of energy into living and transport sectors presents a daunting task. In spite of the fact that the earth and its atmosphere continually receive $1.7 \times 10^{17}$ watts of radiation from the sun, in the portfolio of sustainable and environment friendly energy options, which is about 16% of the world's energy consumption and mostly met by biomass, only a paltry 0.04% is accredited to solar.

First and second generation silicon and CdTe cells offer mature technologies typically achieving 12-18% electrical energy conversion efficiencies. The most important aspect with regards to integration with structures is not only the additional cost, but also the lack of sufficient knowledge in managing the available energy smartly and more efficiently. The incorporation of PV as a part of the building fabric greatly reduces the overall costs compared with retrofitting. In fact, solar PV façades are often cheaper to construct than ordinary façade.

BIPV (Building Integrated photovoltaic) is a critical technology for establishing aesthetically pleasing solar structures. Infusing PV and building elements is greatly simplified with second generation thin film technologies such as *Amorphous Silicon* (α-Si), *Cadmium Telluride* (CdTe), and *Copper Indium Gallium Selenide* (CIGS) all of which can be manufactured as flexible. The same holds true for 3rd generation technologies such as *Organic Photovoltaics* (OPVs) and *Dye- and Quantum dot-Sensitized Cells*. Additionally, these technologies can either be transparent or translucent for incorporation into windows and skylights. Amorphous silicon can be deposited onto glass substrates with layers less than one micron thick effectively making them transparent whereas DSCs and OPVs can be manufactured as translucent or coloured.

This talk deals with the present state of solar cells suitable for BIPV, on the status of BIPV applications and its future prospects.