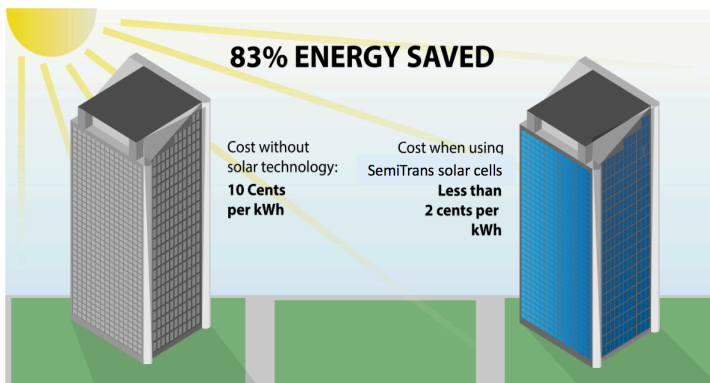


# Semi-transparent Organic and Perovskite Solar Cells for Window Applications

## What we do: Developing power generating windows from solar cells (UNSW Patent no. 2015 -041)

Semi-transparent (ST) perovskite and organic solar cells are highly attractive for a wide range of applications, notably as bifacial windows (where the solar cells can be illuminated either ways – daylight from outside and room-lit light from the inside), feasible for light harvesting even during the night times, making it suitable for sustainable building integrated photovoltaic applications (BIPV). The average visible transmissibility (AVT) of these ST devices can be varied from by tuning the material and interface properties.

### Illustration of energy saved with semitransparent solar cells on windows

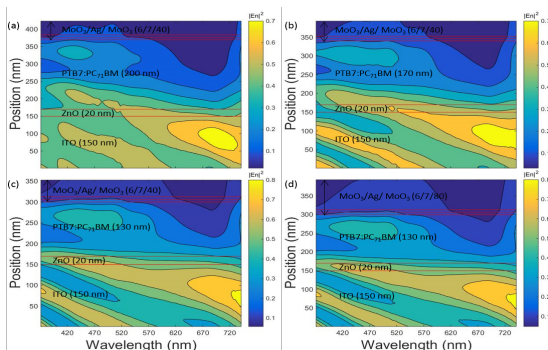


Example image source: <https://thesuffolkblog.com/2015/08/19/harnessing-solar-energy-with-windows/>



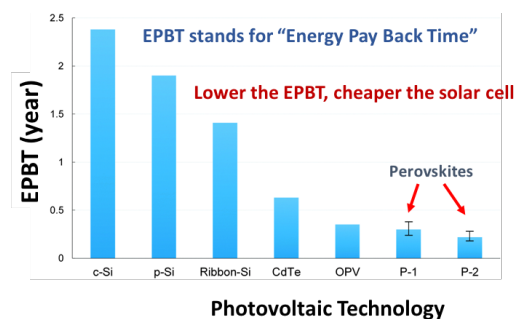
Photograph of a flower without and with semitransparent solar cells of various transmittance (AVT) developed at UNSW.

### Modelling of Semi-transparent Solar Cells



Contour plot of normalized modulus square of the optical electric field distribution,  $|E_n|^2$  of the semitransparent devices over the visible spectrum (370-740 nm). Modelling helps in device optimization for improving performance of semi-transparent solar cells.

### How Long Does it Take for PV modules To Produce the Energy Used in fabricating it?



Energy payback time for seven PV modules. P-1 and P-2 represents Perovskite module with different material systems. Organic and perovskite PV technology are the cheapest means of solar power. Source: Jian et al. Energy Environ. Sci., 2015, 8, 1953-1968