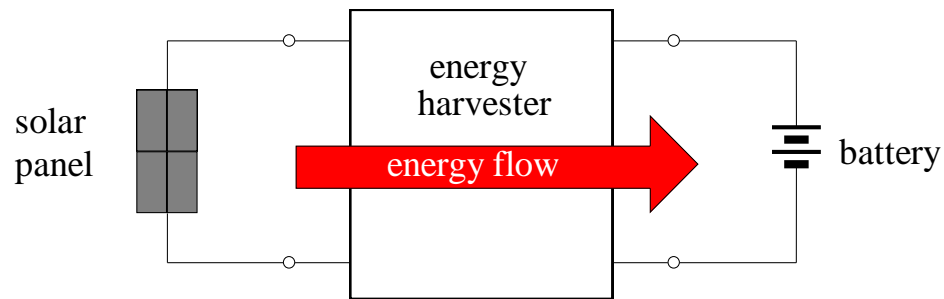# 5 Energy Harvester Design

A *Personal Solar Torch* has an energy harvester circuit whose job is to extract energy from a solar panel and deliver it to a battery. A "big picture" view of this is shown in the diagram below:

The idea is that the energy harvester will present itself as a "smart" or "active" load to the solar panel so that it can extract the maximum amount of power from it. Once it has extracted energy from the solar panel, it delivers the energy to the battery to be stored – but only if the battery is not "depleted" or "overcharged".

A detailed schematic of the above picture is available as a separate PDF.

Using information given in the energy harvester datasheet, design the following voltage dividers.

For $R < 10$ M Ω, use E96 resistors, otherwise use E24.

Use the *typical* "VBIAS" given on page 8 of the datasheet.

(a) Maximum power point tracking for the SLMD121H04L solar panel. (datasheet section 8.3.1)

(b) Battery undervoltage protection, by setting:

   $VBAT\_UV = 2.76$ V (datasheet section 8.3.2)

(c) Battery overvoltage protection, by setting:

   $VBAT\_OV = 4.15$ V (datasheet section 8.3.3)

(d) Battery voltage operating range, by setting:

   $VBAT\_OK\_PROG = 3.60$ V
   $VBAT\_OK\_HYST = 3.86$ V (datasheet section 8.3.4)

See the battery datasheet on why these thresholds were chosen.