

# **Solapodz justification - the markets, materials and functions**

## **1) Lower income / 'Developing world' market**

- a) The world market for affordable lighting powered by solar is clear and massive (appr 2 billion).
- b) Alternatives include kerosene lamps or traditional mains lighting powered by grid, generator or battery backup.
- c) At present this is fulfilled mainly by plastic moulded product manufactured in China and is cheap
- d) The amount of product supplying this sector continues to rise and is possibly reaching up to 5% of the potential market (50 -100 million)
- e) Over recent years the rise of the mobile phone has meant there is now a second market for a solar powered phone charger/power bank, the amount of product supplying this sector is relatively low (<1%) but rising.....
- f) Existing solar-powered power banks do exist but are encased in moulded plastic, made in China but not maintainable and similarly has a lifetime from 1-5 years.
- g) The cost of this product is very important and with local labour used for the various processes I feel it should be able to compete alongside taxed plastic alternatives.

## **2) Higher income / 'Developed' market**

- a) There is no real market for solar lighting due to the availability of grid electricity, but there is a market for portable solar phone charging (that doesn't require a mains connection) and specifically for an 'eco-friendly' product with a longer lifetime, made from recycled and repurposed materials, that can be maintained.
- b) The cost of this product is not so critical since there are no existing 'eco-friendly' products in this market space?
- c) There is also a small market for portable 'mood'/'candle' lighting, again that doesn't involve a mains connection and is 'eco-friendly'.
- d) There are cheap 'throw-away' battery powered 'candlelight' substitutes but there is a market for an 'eco-friendly' alternative.

## **3) Materials and manufacture**

- a) The underlying assumption here is replacing detailed moulded plastic with other materials, will involve processing and finishing which will only be cost effective if the labour rates are at a relatively low level.

- b) The major chassis components in Solapodz are wood and aluminium, these can be sourced and processed (cutting, drilling, bending & routing) easily in any medium sized town of a lower income country
- c) The '18650' Lithium Ion cells can be sourced from discarded or recycled laptop batteries (each laptop may contain between 4 and 8 individual cells) - technical knowledge is required to assess and test the individual cells, but for each laptop battery it would be possible to salvage between 50 and 80% of the cells, that still have some useable life left in them.
- d) Here it is important to be able to access the batteries in the Solapodz product so they can be easily replaced at a later date.
- e) If 'through-hole' electronic components are sourced carefully then the PCB could be assembled and programmed in-country without the need for expensive machinery or high level electronics knowledge.
- f) It is now possible to source a soluble 'eco-friendly' PCB base that would enable improved product recycling.
- g) The solar cells themselves are currently sourced from China but it is anticipated that if demand is high enough then 'off-cuts' from existing laminating plants in Nigeria or Kenya would enable the manufacture of smaller modules.

#### **4) Functions, features & costs**

- a) A solar-powered light with a basic on/off switch is a minimum requirement, with the following as additional features;-
  1. To know that the product is charging and ideally at what strength.
  2. To know the state of charge of the battery (various levels)
  3. To adjust the light level to prolong battery life and reduce glare
- b) A solar powered power bank with USB device charging capability;-
  1. To know that the product is charging and ideally at what strength.
  2. To know the state of charge of the battery (various levels)
  3. To switch the USB circuitry off to prolong battery life
  4. Note: This feature does require extra electronic components and processing
- c) A solar powered candlelight/mood effect light, with the features stated above.
  1. Note this feature adds only a small amount to the cost
- d) A product with all the above switchable functions in one unit, but at a higher cost or 2 or 3 models for the various markets.
- e) Regarding the costs and selling point, if the manufacturing and supply costs (outlined in 3) above) are low enough, then the selling price can be set to accommodate local markets.