- **To develop and market low cost solar (Photovoltaic) energy devices in Western Africa**
- **The business is (at least in the first instance) to be family run.**
- **It will (at least in the first instance) be small scale**

- Most solar panels are either made of polycrystalline or monocrystalline silicon
- The standard solar panel (under a clear sky in low latitudes, e.g 12° N/S) has an input rate of around 1500 Watts per square meter, and the majority of solar panels available have around 15-20%. Therefore, if your solar panel were 1 square meter in dimension, then it would likely produce around 225-300W in direct sunlight.

- Power yield or consumption is measured in Watts
- In a DC circuit, power (W) = voltage (V) x Current (A)
- 200W will power a small television
- 10W is a standard USB charge output (5V, 2A)
- 200W will charge 20 USB devices on fast charge simultanuously
- Heating applications (rated in kW) are not required in Africa!

Maximum Power(Pmax)	520W	525W	530W
Open-circuit Voltage (Voc)	49.0V	49.2V	49.4V
Maximum Power Voltage(Vmp)	41.2V	41.4V	41.6V
Short-circuit Current (Isc)	13.42A	13.48A	13.54A
Maximum Power Current (Imp)	12.62A	12.68A	12.74A
Solar Panel Efficiency	20.12%	20.31%	20.51%
Power Tolerance	0~+5W		
Standard Test Environment	Irradiance 1000w/m2, Ambient temperature 25°C, Spectrum AM 1.5		

Maximum Power(Pmax)	535W	540W	545W	550W
Open-circuit Voltage (Voc)	49.6V	49.8V	50.0V	50.2V
Maximum Power Voltage(Vmp)	41.8V	42.0V	42.2V	42.4V
Short-circuit Current (Isc)	13.60A	13.66A	13.72A	13.78A
Maximum Power Current (Imp)	12.80A	12.86A	12.91A	12.97A
Solar Panel Efficiency	20.70%	20.89%	21.09%	21.28%
Power Tolerance	0~+5W			
Standard Test Environment	Irradiance 1000w/m2, Ambient temperature 25°C, Spectrum AM 1.5			

- Reduced living costs
- Improved quality of life
- Facilitating participation in modern society
- Improved opportunities for education
- Improved communications
- Improved disaster resilience
- Education in renewable technologies

- Keeping costs to an absolute minimim is a key concern
- Link the product attributes to customer needs
- With current solar panel costs running at around $0.25/watt, small scale deployment is a practical solution for most
- China currently most cost effective source
- However large scale communal facilities (multi-home) can divide initial cost.
- Most designs are independent of mains supplies.

- **Indicate the long financial advantages for the customer**
- **Indicate the timescale for return on initial outlay**
- **Promote education and awareness**
- **Monitor changing customer requirements**
- **Take advantage of evolving technologies**

- **Well known and established existing infrastructure - where any infrastructure exists**
- **No others at all!!!!**

- **High initial cost**
- **High onging cost**
- **Local air polution (can lead to many health issues)**
- **Constant CO2 emissions add to climate change**
- **Prices highly vulnerable to events elsewhere in the world!**

- New technology which is unfamiliar to local residents - will have to be demonstrated and promoted
- High initial cost may be a problem - keeping it to a minumum is key (Sourcing PV panels from the Pacific Rim e.g China) is most cost effective at around $0.25/W so smaller scales are affordable on a per customer basis; I have larger scale "communal" designs taking advantage of economies of scale

Overall Conclusion

Advantages of solar power clearly far outweigh the disadvantages in the longer term;

High initial cost is an obstacle which needs to be overcome;

Training will require much thought and planning due to the demographics of the local population – details to be announced

Logistics may present occasional challenges