Efficiency for Access Design Challenge
Technology Week:
Webinar 1: Space Cooling
Ulysses De Waegemaeker
- Mechanical engineer at Solaris Offgrid HQ in Valencia Spain
- Industrial Designer originally from Argentina
- Develops new products through the Pay as you go (PAYGO) method.

Richard Atwal
Director of the PSH Group
- Leading design and manufacturing company head-quartered in Hong Kong
- Manufacturing facilities in China and offices in London
- Renewit (within PSH Group) designs and manufacturers a range of solar power and lighting solutions
Ulysses De Waegemaeker
Mechanical engineer at Solaris Offgrid
Space Cooling Market Insights

Industrial Designer: Ulysses De Waegemaeker
Space Cooling in Sub-Saharan Africa

State Of Market
- Market Demand
- Current Solutions
- Current Problems
- SDG’s
- Market Direction
- Past Lessons
- Cost

Designing For People
- Users Need
- Product Look
- Good Practices
- Product Sharing & Portability
- Income Generation
State Of Market
Market Demand

- Solaris Tanzania Portfolio:
  - 20% use their SHS to plug cooling appliances
  - 70% of SHS deployed have the capacity to run DC fans
- Normally fans are not sold under the SHS package
- Standing fans require +50w systems
- Mostly acquired outside PAYG distribution channels
Current Solutions

• Most affordable options range between 5 and 15 USD (small fans).

• Price can go up to 35 USD for more powerful standing fans.

• Distributors avoid appliances which require extra installations.
Current Problems

- Efficiency (Energy consumption)
- Lack of innovation
- Reselling conventional appliances thought for other markets
- Unnecessary features
- System upscale to meet appliances demand
SDG’s

- Goal 7: Affordable & Clean Energy
  - Solar powered lifestyle

- Goal 4: Quality Education
  - Comfort at school
  - Digital tools
Market Direction

- +1 million SHS units sold last year
- Market growth up to 70% annually
- Smart & PAYG appliances
- P2P energy sharing (micro-grids)
- Upscalable systems
- Bigger systems (+200W)
Past Lessons

- Lifespan of products deployed
- Accurate follow up of leased product status
- Distributors covering the after sales cost of low quality products
- No refurbish strategy
- Client economic limitations
Cost

- Competitive Price
- Bet on economies of scale (success of PICO products)
- Stages till last-mile delivery
- External tools that enable organised distribution & follow up (PAYG/ GSM connectivity)
Designing For People
Users Need

- Indoor: “Insulated shed with active cooling to adjust room temperature at a comfortable point”
- Outdoor: “Efficient way to obtain as much airflow as possible, to directly decrease body temperature”
Product Look

- Familiar
- Take into account “status builders”
- White branding
Good Practices

- Unhackable
- Modular
- Minimal Enclosing
- Prepare for local refurbish and recycling
- Provide education & graphic descriptions
- Inclusive
Product Sharing & Portability

- Sharing requires same connector & current output (distributors risk)
- Cultural tolerance against heat
- Portability as a selling feature
Income Generation

- Cooling is mainly a comfort asset
- Technology as a service differentiator
- Indirect marketing
- Access alternative markets
“From rooster call till moonshine, empathize with users. Local experience is the biggest step towards positive energy access design..”

Ulysses De Waegemaeker, Solaris Offgrid
Any questions?
Richard Atwal
Director of the PSH Group
The Market Demand

- Benefits of space cooling
  - Better living conditions
  - Health benefits
  - Reduced risk of mortality in heat wave conditions.
  - Better productivity – not only working conditions but think small shop/bar with fan.
  - Allow humanity to live in areas otherwise difficult not only say Africa but think of Dubai or California without A/C

- The market
  - 800 million people completely off grid and number growing. Population growth outstripping electricity access off grid and on grid.
  - Further 1+ billion people live without good quality electricity provision.
  - If global temperature rises continue most of humanity will be living with severe heat as the norm.
What is the aim of this challenge?

- Design a fan for some of the lowest income homes on the planet. Price is an issue.
- To be as energy efficient as possible to work from the smallest DC power supply. Cost is not just cost of the fan but also associated power supply.
- This is a mass market challenge it needs to appeal to a wide range of customers.
- How are we going to design the next generation of fans for this market.
- To be hardworking and hardwearing fans have a poor reputation.
Who are Renewit?

- We are a leading manufacturer of solar off grid products.
- We own factory and do in house development, engineering, tooling and manufacturing.
- We have 8 plastic injection machines, PCBA machines and in house testing capabilities.
- We manufacture for international brands in off grid space as well as local companies in Africa.
- We have been in this industry for 12 years sold over 4 million products and developed over 80 sku’s.
Our Design Process

Our Design Process

Our Design process is focused on delivering results. Clients have the option of using our services from any part of this process.

Strategy
- Competitive research
- Evaluation
- Design benchmarks
- Strategic mapping
- Design drivers
- Consumer targets
- Brainstorm sessions
- Design brief

Ideation
- Concept generation
- Sketch exploration
- Initial CAD
- Design Specs
- Style drivers
- Trend drivers
- Product language

Design
- CAD work
- Reference drawings
- Engineering
- Prototyping
- Design specs
- Client reviews

Engineering
- Mechanical design
- Design evaluation
- 2D reference drawings
- Prototyping
- Final Product spec
- Factory quotations
- Project handover

Suppliers
- Supplier liaison
- Production engineering
- Tooling drawing review
- Engineering sample
- Tooling release
- Tooling debug
- Production samples
- Production reviews
Our customers

To drive volume and the most impact, we need to sell to a wide range of customers that will send to end consumers.

These customers include:

- Off grid solar companies (PAYG)
- Distributors
- Telecom companies
- Farming co-operatives
- International brands
Our customers issues with current solutions

- Quality and performance against price. How can a consumer tell a good fan?
- Of a 50W home system the fan can be the cheaper of the main components compared to battery box or solar panel. If the fan fails the whole system gets returned or customers stops paying.
- AC fans with DC power management
- Toy like in look – colour/plastic quality
- Looking for three solutions:
  - Standing fan
  - Desk fan
  - Wall fan
  - Ceiling fan
Design for Manufacturing

- Manufacturing cost is a key driver:
- Keep to low cost materials. As nice as it is to have alluminium buttons it will drive up cost.
- Adaptable product. Can the same product be a stand fan, table fan and wall fan.
- Ceiling fan much overlooked in DC market but can be very low cost. ..But must be able to be self installed and plug and play..Safety?
Questions we will get asked?

- **Customer/Consumer questions**
  - How much does it cost?
  - What is the warranty?
  - Can it be easily fixed? Can we supply spare parts?
  - Does it have its own battery? Can we put in other rooms away from main solar box?
  - Can solar panel be connected directly to fan. Is there a standalone fan option?
  - Can we run more than one fan from our solar kit?
  - Does it work on PAYG?
  - Can you have handshake connector so only works on PAYG? ......... Cost?

- **Manufacturers questions:**
  - How many tools do we need to design?
  - Material make up plastic / metal
  - Is it easy to assemble?
  - How many separate PCBA required?
  - Will it pass drop testing / water ingress etc.
  - Can we leverage on some existing technologies I,e brushless motors
Contact

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Any questions?