Affordable Energy Solutions for Developing Communities

Presented by
Dr. Robin Podmore
Co-Chair IEEE PES Community Solutions Initiative
To
IEEE Global Humanitarian Technology Conference
Seattle, WA
October 30th, 2011
Agenda

• Introduction – Robin Podmore
• Women of Hope International Sierra Leone – Anne-marie Trombold
• CSI LightCycle – Robin Podmore and Peter Dauenhauer
• CSI Wind Turbine – Henry Louie
• CSI Solar Ice Maker – Gary Villanueva, Jacob Buehn, Adam Hudspeth
• CSI Solar Trailer – Robin Podmore
World Poverty Statistics

• Roughly 1.6 billion people, one out of every four people on the planet, do not have regular access to electricity.

• In sub-Saharan Africa, excluding South Africa, 75% of households or 550 million people have no access to network electricity.

• In South Asia places like India, Pakistan and Bangladesh, 700 million people or 50% of the overall population and 90% of the rural population are not on the grid.

• Based on the business as usual scenarios, the International Energy Agency predicts that 1.4 billion people will still lack access to electricity in 2030.
IEEE CSI Mission Statement

• To develop extremely affordable open-source electric energy solutions for developing country communities

• To support locally owned micro-business development

• To reach a significant portion of the un-served electricity population in each country of deployment.

• Sponsored by IEEE:
  – Humanitarian Technology Challenge (HTC)
  – Power and Energy Society (PES)
  – Nuclear and Plasma Sciences Society (NPSS)

• Co-Chairs:
  – Robin Podmore; robin@incsys.com
  – Ray Larsen; larsen@slac.stanford.edu
How CSI Got Started

Humanitarian Technology Challenge

Reliable Electricity
Availability of electric power for lighting and other electronic devices in resource-constrained environments. Read more...

Data Connectivity
Capability of exchanging data among remote field offices and central health facilities. Read more...

Individual ID
Consistent availability of patient medical records. Read more...
The Plan

• The technology exists to fix the world energy crisis

• By scaling down, adapting and integrating the technologies used in the world’s richest nations we can solve problems in the poorest

• Open source design, strategic delivery and training of local entrepreneurs is the answer
CSI Services

• Identify, Promote Open Source Designs for renewable energy systems.
• Develop commercialization and deployment plans
• Respond to humanitarian requests of IEEE members
• Assist entrepreneurs and businesses with marketing and technical plans
• Lobby with NGOs and Governments
• Provide documentation on customer requirements
• Mentor researchers and developers
Summary of Projects

- CSI LightCycle
- CSI LightStick
- CSI Wind Turbine
- CSI Solar Trailer
- CSI Solar Refrigerator and Icemaker
- CSI Scheffler Reflector
- CSI Heat Storage System
CSI 1500 KW Solar Trailer
Paul Polak’s Rules (Author: “Out of Poverty”)  

• Aim for people who earn less than $1 per day  
• Affordability isn’t everything. It’s the only thing.  
• Need a breakthrough in affordability  
• Need a breakthrough in miniaturization  
• Must be Infinitely expandable  
• Results must be attainable in Three Years  
• Support income generation  
• Scale to reach millions of poor people
Sustainable Energy Reference Architecture (SERA)

- Template solutions for distributed generation.
- Common vocabulary to discuss implementations.
- Standard electrical interfaces
- Standard communication protocols for monitoring and controlling CSI systems.
- Common components used across all CSI products.
- Different CSI generation sources can be integrated
- Ensure CSI systems can be upgraded and expanded over time with maximum re-use of earlier generation components.
Summary

- CSI is a virtual community of over 100 engineers, entrepreneurs and craftsmen.
- Products have been designed, developed and deployed.
- The ONLY family of products that starts small is extremely affordable and is infinitely scalable.
www.CommunitySolutionsInitiative.org

Community Solutions Initiative
Energy Solutions for the World's Poorest Communities

BUILD COMMUNITIES » GIVE HOPE » SAVE LIVES

The IEEE PES Community Solutions Initiative seeks to develop extremely affordable open-source electric energy solutions for developing-country communities and to support locally owned micro-business development to reach a significant portion of the unserved electricity population in each country of deployment.

The Need

Over 2 billion people worldwide live with no access to electricity.
The use of ad-hoc alternatives is not working and millions are losing their lives because of ineffective solutions to light their homes, cook their meals, and run their medical clinics.

Learn more

The Plan

The technology exists to fix the world electricity crisis.
Simply scaling the same technologies we use in the world’s richest nations can solve the problems in the poorest.
Open source design, strategic delivery and training of local entreprenuers is the answer.

Learn more

The Tools

CSI is bringing the best and brightest minds from across all disciplines of engineering to build the tools necessary to deliver sustainable energy solutions to developing communities.

Wind, solar, Stirling engines and human powered generation options.

Learn more