Solar Energy X-Prize

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Agenda:

- Purpose
- Prize Parameters
- Prize Logistics
- Prize Marketing
- Potential Market
- Potential Breakthroughs

Purpose:

Develop an easily scalable, economical solar technology that can span the widest range of applications in developing nations

Increased Accessibility for Residential Use

- Customizable System - Customer Choice
- Requires No Existing Infrastructure
- Ease of Installation and Maintenance

Develop a **modular photovoltaic system** that supplies **30 kWh for 5 days**.

Less than **1 kg** for the smallest unit

- Provides 15 W per hour over 24 hours

Functional after being **dropped from a one-story height**

Installation time of one hour for the smallest unit

- Requiring no special knowledge or tools.

Demonstrate production scalability

- Produce 30,000 unit (approximately 1% of Malawi's population without electricity)

Prize Implementation

7 years to successfully complete all parameters

Output assessed under standard laboratory conditions

- Unit and system power output tested under conditions mimicking summer and winter (sunlight incident angle)

Installation demonstrated on site

- Malawi appointed resident to assemble within 1 hour
- No special tools or knowledge

Prize Marketing

Malawi: The Beginning of a New Light
Malawi builds its own solar power system.

Prize Marketing

magazines

Professional associations

AIChE®

IEEE®

universities

USC

X PRIZE FOUNDATION

Prize Marketing

Key marketing points

- innovation
- Fame
- LARGE MARKET SIZE

Motivation for Participation: Large Market Size

Country	% households **without** Electric Lighting	**Total number of Households without** Electric Lighting
Germany	0.0%	0.0
Uganda	90.1%	5,971,197.3
Rwanda	90.8%	2,451,509.2
Malawi	**94.3%**	**3,092,474.2**
India	34.0%	75,532,054
Bangladesh	53.3%	14,315,260.7

Motivation for Participation: Large Market Size

Equates to 539,075,529.95 people within just six counties

Motivation for Participation: Non-Governmental Organizations

Partnerships with NGOs

- First buyers already secured

Potential NGOs Partners

- United Nations
- Gates Foundation

Power Efficiency	• Achieving required output necessitates more efficient use of space
Storage	• Continuous output assures system reliability in case of bad weather
Durability	• Allows for lower cost and greater ease of installation
Versatility	• Potential applications include all areas of the world. Compatible with variable energy demands

Eyes on the X-Prize [1-1-1]

Efficiency	• Weight: 1 kg/Unit • 15 W for 12 hours per day • Scale up to 30 kWh
Durability	• 1-Story Shock Test
User-Friendliness	• 1-Hour to Install • No Specialized Training, Knowledge, Tools

Questions?

Base unit is to provide enough electricity to power a outdoor lantern rated at 15 W for 12 hours per day. Assuming that the unit only has 5 peak hours to produce the necessary power, the base unit should output 36 W.

According to the DOE Energy Information Administration, the average American household uses **29.19 kWh per day**.

To achieve this would require **167 modular units**. At ten dollars a unit, the total cost to power an average household with solar would be **1,670 dollars**.

Other Challenge Considerations

- Size/Weight Restrictions
- Toxic Material Restriction
- Recycled Material Bonus
- Ability to Feed Back to Grid
- Ability to sell storage and solar panel separately for an even more customizable system
- Installation Manual

- Uses 8 D-size batteries, 15-watt output
- Operates up to 14 hrs. on high setting or up to 30 hrs. on low setting
- Spiral U-tube 15-watt fluorescent bulb
- Light intensity: 405 lumens
- $29.95 at REI

- Rechargeable from either 12V or 110V outlets
- Operates up to 6 hrs. on high setting or up to 9 hrs. on low setting
- Spiral U-tube 11-watt fluorescent bulb
- Light intensity: 280 lumens
- $44.95 at REI

GSE SUNLINQ SP-12 12.5 Watt Portable Solar Panel

From CampingLanterns.net

- Chargerechargeable flash lights, lanterns, cell phones, GPS units, satellite phones, MP3 players and portable games.
- CIGS
- Output 12 V
  Power 300 mA
- Price: $163.99 at CampingLanterns.net

PowerUp's BSP20

- Power output: 20 W
- Voltage: 17.3 V
- Amperage: 1.2 A
- Dimensions (inches): 19x16.7x1.31
- Weight: 4.8 lb
- Multi-crystalline cells
- $152 at WholesaleSolar.com

- Solar Pebble by Plus Minus Design
- Easy to Angle/Install (some assembly required)
- Integrated storage
- £5 per unit desired price

- Is not modular or expandable
- Does not have the same power requirements

- Tough Stuff Solar Panel
- Flexible, water resistant
- Resilient to 80 °C
- Easy to Install

- Does not meet power requirements
- No price listed yet

- Power in Developing Worlds
  - One estimate currently has consumers paying $15 kWh through the use of C batteries in Ghana
  - Kerosene can be very dangerous