



**EMPOWER**  
A BILLION LIVES

# Global Competition

IEEE – Power Electronics Society Initiative

[www.empowerabillionlives.org](http://www.empowerabillionlives.org)



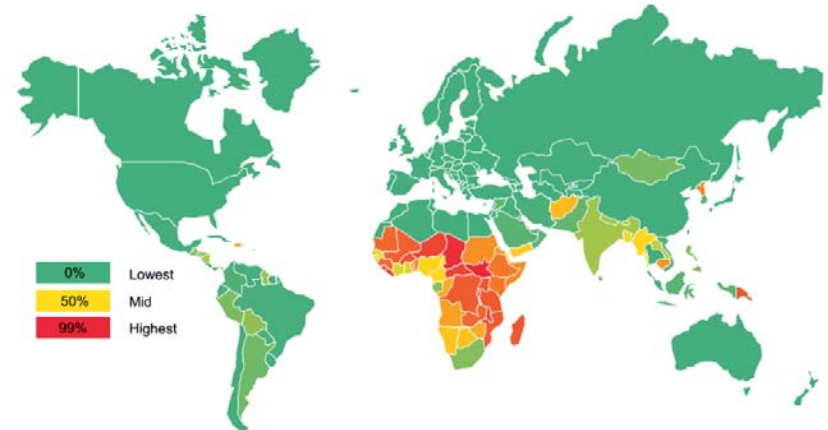
# The Grand Scaling Challenge

- **3 Billion** people live in energy poverty, including **1.1 Billion** people without any access to electricity [1]
- **95% of utilities** in the Sub-Saharan Africa cannot recover their operational and capital costs [2]
- Only **1.8 million** people have tier 2 access (200 Wh<) using off-grid electric services [3]



**More of the same may not be the answer;  
new strategies are required to scale deployment a  
~ 1000-fold!**

Share of population without grid access (percentage)



Source: Bloomberg New Energy Finance. Figures refer to 2012 data [1]



## Who Is this Competition for?



This is a completely open competition:

- Student teams
- Small and medium-sized companies
- Research laboratories
- International corporations
- Nonprofit organizations



Registration Is Open! – [empowerabillionlives.org](https://empowerabillionlives.org)



EMPOWER  
A BILLION LIVES

A \$1 million global  
competition to develop  
scalable solutions to  
energy poverty.

[Register your team](#)

[Join the community](#)





## Target Customer Group

The competition is agnostic to energy sources, technologies, business models, and will primarily evaluate potential impact and ability to rapidly and sustainably scale the solutions to a Billion customers.

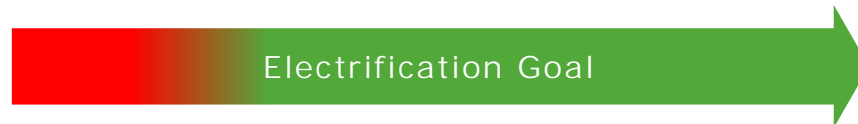
- Must be **OFF-GRID** or have grid access **LESS THAN 4 HOURS A DAY** (SE4All tier 0-1)
- Purchasing power: below the global poverty line: **<\$1.90/DAY**
- Living in rural areas: **>90%**
- Access to bank accounts: **<50%**
- Access to smart phones: **<40%**







# Targeted Electricity Needs



		TIER 0	TIER 1	TIER 2	TIER 3	TIER 4	TIER 5
1. Peak Capacity	Power capacity ratings <sup>28</sup> (in W or daily Wh)		Min 3 W	Min 50 W	Min 200 W	Min 800 W	Min 2 kW
			Min 12 Wh	Min 200 Wh	Min 1.0 kWh	Min 3.4 kWh	Min 8.2 kWh
	OR Services		Lighting of 1,000 lmhr/day	Electrical lighting, air circulation, television, and phone charging are possible			
2. Availability (Duration)	Hours per day		Min 4 hrs	Min 4 hrs	Min 8 hrs	Min 16 hrs	Min 23 hrs
	Hours per evening		Min 1 hr	Min 2 hrs	Min 3 hrs	Min 4 hrs	Min 4 hrs

Source: SE4All Energy Access Tiers [4]



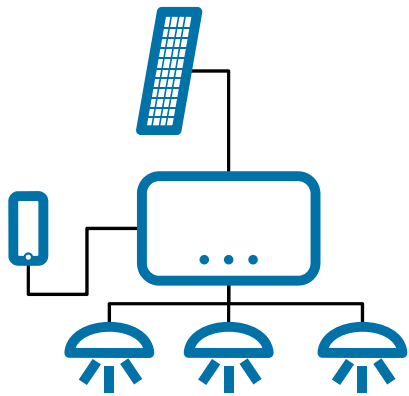
## Targeted Electricity Needs

What are the targeted electricity needs? Tier 2 electricity access (200 Wh/day) and above including

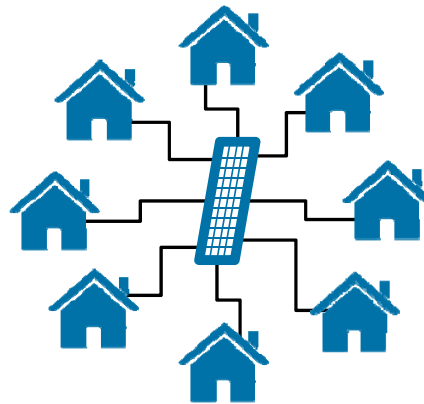
- **HOUSEHOLD USES:** lighting and phone charging (must have), telecommunication, entertainment, air circulation, refrigeration, water pumping, etc.
- **COMMUNITY USES:** Public lighting, water pumping & purification, etc.
- **PRODUCTIVE USES:** agricultural manufacturing, light manufacturing, commerce, etc.



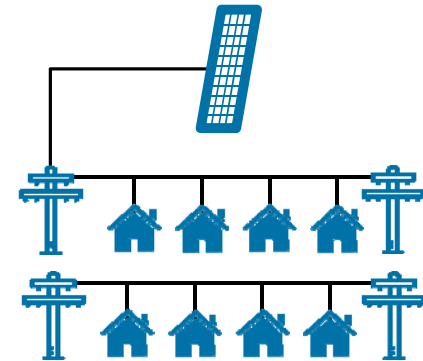
## Expected Solutions



Solar Home Systems



Microgrids



Minigrids



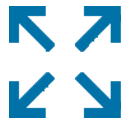


## Innovation Opportunities



### NEW BUSINESS MODELS

New service, lease, billing, and microfinance models



### SCALABILITY

Deployment across multiple regions with minor customization



### CARBON NEUTRAL

or low carbon footprint solutions



### EXPANDABILITY

Systems grow with growing needs



### DISTRIBUTION DESIGNED FOR THE 'LAST MILE'

Supply chain, distribution, installation, commissioning, servicing costs



### DATA ANALYTICS

Value to external stakeholders (e.g. credit risk monitoring)



### ENABLING DIGITAL AND FINANCIAL INCLUSION

New customer income opportunities & new revenue streams for the provider



### DEVICE MONITORING

Diagnostics, upsell, asset tracking, managing end-of-life



### REGIONAL EMPOWERMENT

Support local business development



### WOW! FACTOR

Disruptive game-changers



## Competition Rounds

May - Aug 2018

Nov 2018 – Jan 2019

Nov 2019



**South-Asia:** Chennai, India, IEEE PEDES

**Pacific Asia:** Shenzhen, China, IEEE PEAC

**Africa:** Johannesburg, South Africa

**Europe:** Delft, Netherlands

**Americas:** Puerto Rico

Baltimore, USA

**More than 200 IEEE volunteers participating in organizing**



## Competition Tracks

- **EXISTING SOLUTIONS:** Solutions that are already commercially available, meeting the electricity needs of the target customer group, and have radical scaling potential.
- **EMERGING SINGLE-USER SOLUTIONS:** New solutions that meet the needs of a single household in the target customer group. They provide lighting and cell-phone charging as a basic service, but any other value streams are highly desirable, such as:  
*telecommunication, TV, radio, refrigeration, fans, water pumping and purification, etc.*
- **EMERGING MULTI-USER SOLUTIONS:** Solutions that meet the needs of multiple users as well as extends out to meet the needs of the community. These devices are expected to be able to create, interconnect and manage a grid (including market functions) from the bottom up. They provide lighting and cell-phone charging as a basic service, but meeting complex energy demand is highly desirable, such as:  
*public lighting, public water works, sanitation, milling, welding, sewing, construction, light manufacturing, electric bike and tuktuk charging, cooking, air conditioning, etc.*

COMMERCIALY  
AVAILABLE

COMMERCIALY NOT YET  
AVAILABLE



# Judging Process

Minimum requirement on all levels: The solution must tackle a real and pressing electrical energy need of the target customer group and provide them at least Tier 2 access

1

## ONLINE ROUND

- Present solution concept: 5 minute pitch video
- Business evaluation: Estimate value and costs
- Technical evaluation: Present high-level technology approach

2

## REGIONAL ROUND

- Competition Expo (poster presentation, demonstrating product system is not required)
- Business evaluation: present business plan and scaling roadmap
- Technical evaluation: Demonstrate prototype system and core function with novel features and reasonable robustness
- Present field test plan

3

## FIELD ASSESSMENT

- Judges travel to field test site and validate field test results

## GLOBAL ROUND

- Business evaluation: Show function at scale in real locations
- Technical evaluation: Demonstration of ruggedized solution
- Robustness testing: Potentially with Lighting Global
- Show economic viability, cyber & financial security





# Judging Process

Three separate scores:

## MEETING LIFE ASPIRATIONS – CUSTOMER PERSPECTIVE

Category	Details	Points
Basic Energy Generation and Delivery System	Energy Source	50
	Energy storage (if needed)	50
	Basic power conditioning and delivery system	50
	Overall system	50
Meets Family Needs	Low Use – Lighting and cell phones	50
	High Use – Digital inclusion and basic comfort	50
	High Use – Expanded system capabilities	50
	Productive Uses	50
Supports Life Aspirations	Simple to connect and use	50
	Flexible pricing/payments and use agreement	50
	Helps family become more productive	50
	Customer investment provides long-term value	50
	WOW FACTOR	100
<b>TOTAL CUSTOMER PERSPECTIVE</b>		<b>700</b>

## TECHNICAL NOVELTY TO ENABLE FAST SCALING

Category	Details	Points
Technical Solution	Hardware	50
	Expandable solution	50
	Distribution, install, commissioning and field support	50
	Fleet management	50
	Advanced features	50
	System optimization	50
	WOW FACTOR – Exceeds expectations	100
	<b>TOTAL ON TECHNICAL NOVELTY</b>	

## BUSINESS MODEL SHOWING ECONOMIC VIABILITY

Category	Details	Points
Business Model	Bill of Materials	50
	Estimated annual cost for customer	50
	Proposed business model – show it meets target customer needs	50
	Distribution model and associated costs	50
	Value for external stakeholders	50
	Novel funding models to help scaling	50
	Show economic viability without ongoing subsidies	100
	WOW FACTOR – Exceed expectations	100
	<b>TOTAL ON BUSINESS MODEL</b>	



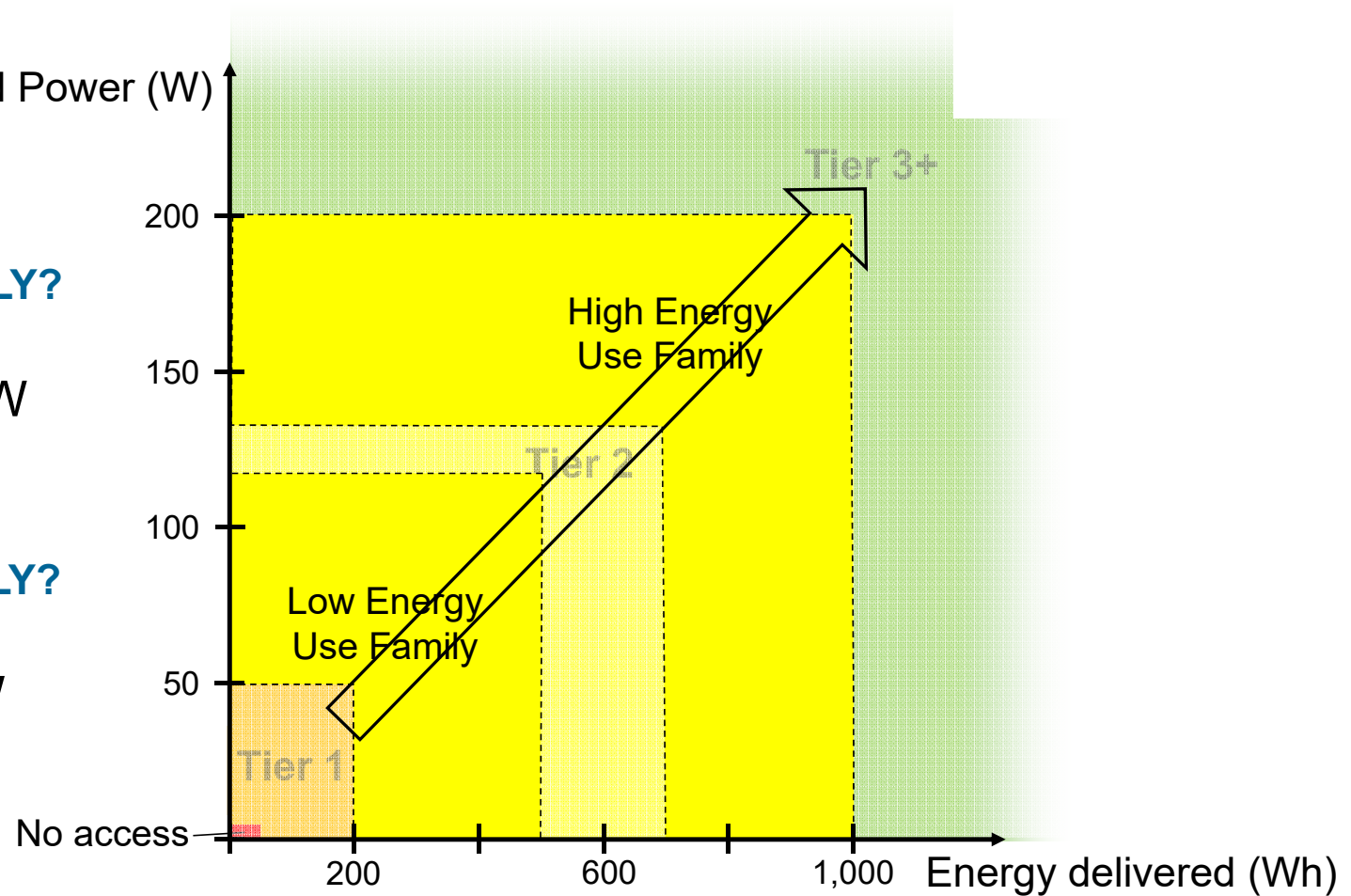
## Low Energy Use and High Energy Use Families

### HIGH ENERGY USE FAMILY?

min. 700 Wh or 130 W  
max. 1000 Wh or 200 W

### LOW ENERGY USE FAMILY?

min. 200 Wh or 50 W  
max. 500 Wh or 120 W

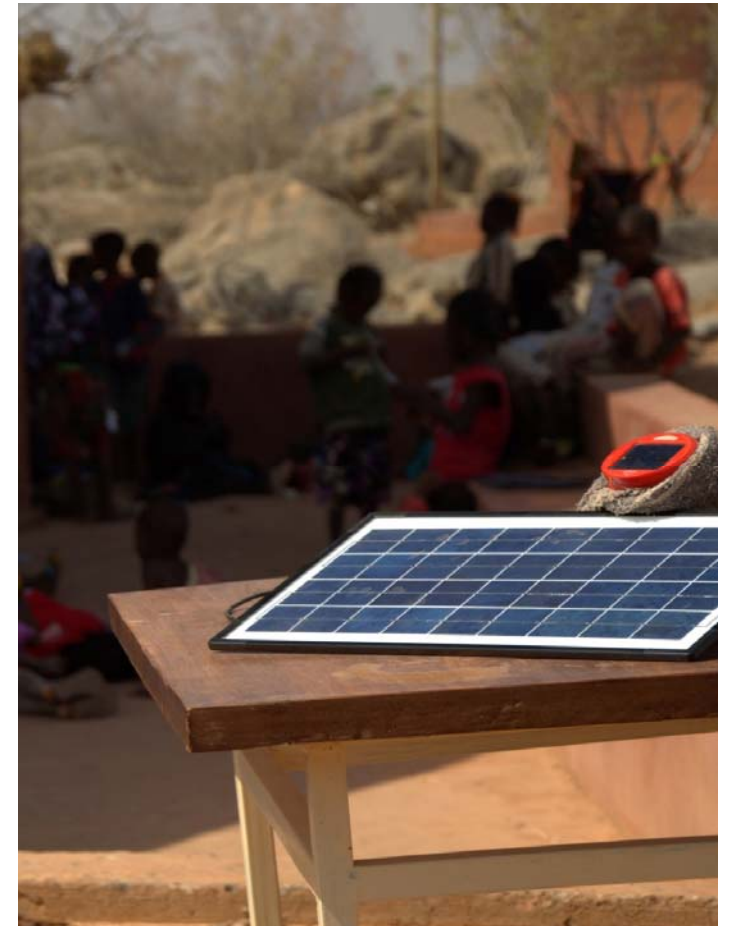




## Expertise matching platform

Matching people with the right skillset to create holistic teams with cross-disciplinary expertise

- Electronics
- Business
- Communications
- Computing
- Cloud architecture
- Big Data analytics
- IOT platforms







## Building the EBL community



IEEE Power Electronics Society and IEEE have already committed around 30% of the total expected funding need

- **PARTNERS:** 25% of contributions go to event administration, 75% to prizes
  - Four levels: Diamond, Platinum, Gold, and Silver
- **SUPPORTING ORGANIZATIONS:** in-kind contribution with time and effort towards the competition objectives
- **VOLUNTEERS & JUDGES:** Individuals contributing time to meeting competition goals