IEEE EMPOWER A BILLION LIVES

# Empower a Billion Lives – II

## *EBL II Full Proposal Webinar on Guidance and Evaluation*

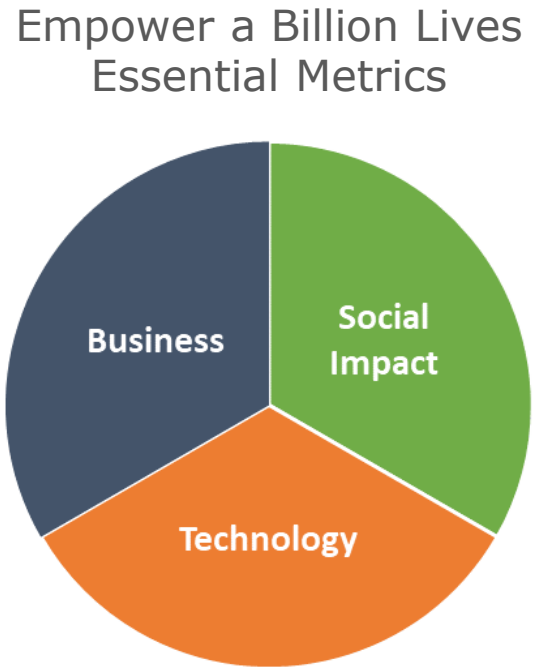
June 24, 2022

# Agenda

- Empower a Bilion Lives Introduction
- Full proposal submission guidance
- Field testing plan guidance
- Q&A

# EBL: A Global Competition to Crowdsource Innovation

**IEEE EMPOWER A BILLION LIVES** is a biennial competition to foster interdisciplinary innovation in the global community to develop and demonstrate solutions to electricity access that are designed to scale, regionally relevant, holistic, and leverage 21st century technologies that feature exponentially declining prices.




Ongoing competition cycles will drive a continuous learning process that allows successive generations of competitors to leverage past learnings, adopt fast-moving new emerging technologies, and demonstrate these capabilities and impact in realistic environments.

# EBL-I Innovation Highlights





## Innovation Highlights from the 23 Global Finalists

**Training Locals to Construct, Operate & Profit from DC Nanogrids**
Madagascar | Africa Grand Winner

**Peer-to-Peer Community Microgrids Serving the Last Mile**
Cambodia | Pacific Asia Grand Winner

**Open Source Technology Empowering Women Entrepreneurs**
India | South Asia Grand Winner

**Affordable, Mobile Agricultural Processing As A Service**
Nepal | South Asia 1A Track Winner

**AC+DC Hybrid Extends Reach & Productivity of DC Microgrids**
Rwanda | America Grand Winner

**Frugal Approach to Battery Management Enabling Longer Life**
Tanzania | Europe 1B Track Winner

**Pay-As-You-Go Solar 2.0 with the Power of Microfinance**
Ivory Coast | Europe 1A Track Winner

**Stackable, Expandable Solar Home Systems that are Easy to Use**
Tanzania | Europe 2B Track Winner

# EBL-I Winning Teams Impact

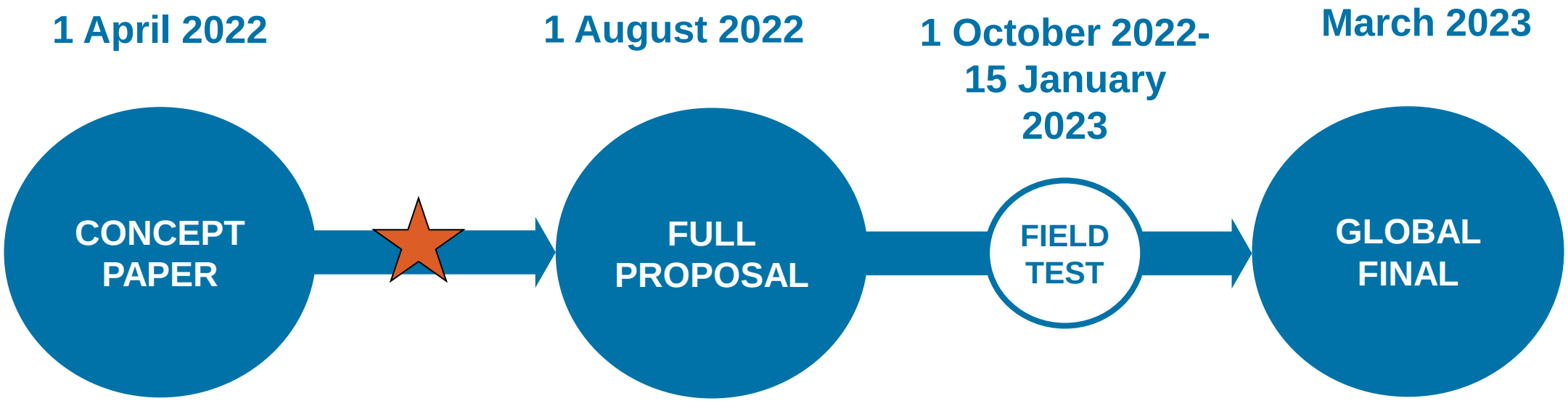
- Reached over 9 million beneficiaries, providing them with access to energy, energy education, open-source supply chains, and hardware and technical training.
- Provided technology training to over 9,000 women resulting in 1,000 women-owned solar shops.
- Increased 97% of customers' income while reducing costs of energy expenditure
- Reacted to Covid by providing energy to health structures through over 100 projects in 25 countries
- Increased food security through mini-grid value chains
- Increased the safety of 94% of customers
- Increased study time for households with students by 75%.
- Reduced many hundreds of thousands of tons of CO2

# EBL-II Snapshot

- Builds on EBL-I success and learnings
- Tracks sector developments (productive use, digitization, interoperability) – new competition tracks, updated evaluation criteria

- Over 200 Teams registered, 100 Teams completed a Concept Paper for expert feedback
- 25% are Student Teams
- Teams are from 43 Nations, 59 Teams are from 18 Countries in Africa
- **Full Proposals are due 1 August 2022.**

# EBL-II Competition Timeline




Orlando, Florida, USA

## Important Dates:

- Full Proposal Submission Deadline: August 1, 2022
- Potential Interview with Judges: September 2022
- Field Testing: October 1, 2022 – January 15, 2023
- Global Final: March 18-21, 2023

## Prizes:

Prizes at the Global Final will include a Global Grand Prize Winner, Student Team Award, and may include Regional Awards and Global winners in each of the tracks, as well as additional prizes.

# Target Solutions

- Holistic solutions — technically, economically, environmentally and socially viable and appropriate
- A proposed solution could address:
  - Entire power generation, storage, delivery and management systems;
  - End-use energy solutions such as productive energy use appliances, cooling solutions, clean cooking solutions, transport;
  - Enabling technology solutions that address some of the key challenges in energy access (scalability, automation, interoperability, sustainability, affordability

# Examples of Desirable Features

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 large number of customers (overall scaling to a Billion).

- Holistic sustainable technology-based solutions that are designed to scale
- Enables economically viable electricity access for small communities
- Enables new income generating opportunities for target customer group
- Enables health and well-being improvements, is gender-inclusive
- Includes a business plan designed for the Base of the Pyramid
- Creates additional value streams for external stakeholders
- Integrates communications, PAYGO, cybersecurity, microfinance as needed
- Addresses challenge of managing a fleet of large number of devices
- Utilizes carbon neutral technologies

# Competition Tracks *(See EBL-II Competition Guidelines Doc)*

- **TRACK D: DECENTRALIZED MODEL(TrD)**

  Single household solution without creating an entire distribution infrastructure in advance. May be expanded and interconnected as needed.

- **TRACK C: CENTRALIZED UTILITY MODEL(TrC)**

  The proposed solution is a centrally planned and implemented power generation and distribution model serving a community and individual customers.

- **TRACK P: END-USE ENERGY (PRODUCTIVE USE OF ENERGY, CLEAN COOKING)(TrP)**

  Solutions may include appliances enabling productive use of energy, clean cooking solutions, cooling solutions, agri-food processing hubs, commercial activities. Can be a single user (solar powered appliances) or community solution (cold storage rooms)

- **TRACK A: AUTOMATION-CENTRIC SOLUTION (TrA)**

  Solutions that are enabled by automation, with the underlying advantage of autonomous operations demonstrated via increased scale, resilience, simplicity, or a combination thereof.

# Competition Tracks *(See EBL-II Competition Guidelines Doc)*

- **TRACK E: ENABLING TECHNOLOGIES (TrE)**

  Solutions enable solving some of the key challenges of energy access solutions such as scaling, affordability, sustainability, interoperability

- **TRACK S: STUDENT TEAMS(TrS)**

  Open only for teams from higher education institutions. Solutions can fit in any of above four categories (decentralized model, centralized model, Automation-centric, end-use energy and enabling technologies). Less stringent requirements for field testing, can be done in a suitable environment

# Competition Tracks *(See EBL-II Competition Guidelines Doc)*

## General Remarks:

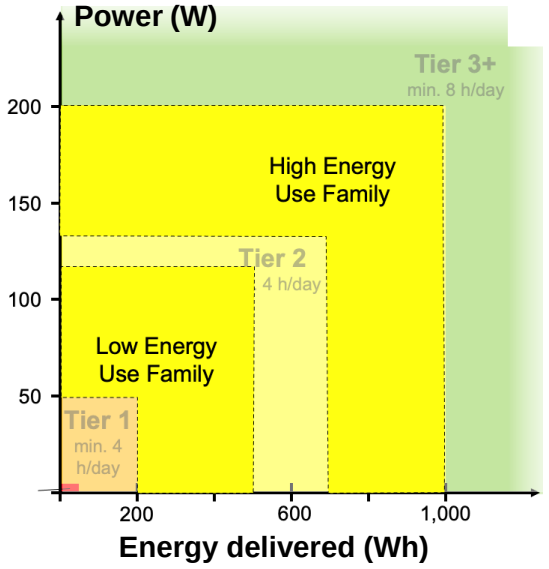
- Even though teams can compete along the above 6 tracks, some solutions may fit into more than one track. However, the track decision of the EBL Rules and Judging Committee will be final.
- Successful solutions will show technical viability, the business model needed to reach scale and demonstrate the social and environmental impact of the solution.
- Best performers will provide the highest level of technical performance and functionality at the lowest cost with a viable business model and the ability to rapidly scale in this market segment.

# Target Customer

**Target Household:**

- A typical target household is five people including two parents under forty years of age, with three children under the age of 10
- Parents typically have no formal education or crafts training
- The family's primary language is a regional language
- Their average income is $1.90 per person per day or $1,500 per year for the whole household. (Calculated on a purchasing power parity basis.)
- Child labor is not allowed.

| **LOW ENERGY USE FAMILY:** Minimal System Performance with Proposed Solution | **HIGH ENERGY USE FAMILY:** Expanded System Performance as Family Situation Improves |
|---|---|
| ▪ Min 200 Wh/day and min 50 W peak power<br>▪ Max 500Wh/day or min 120 W peak power<br>▪ Available min of 4 hrs/day, and 2 hrs/night<br>▪ Lighting and phone charging are high priority<br>▪ Digital inclusion & productivity enhancement<br>▪ Family is financially constrained, using services when funds are available | ▪ Min 700Wh/day, Max 1,000 Wh/day or min 200 W peak power<br>▪ Minimum of 6 hrs/day, and 4 hrs/night<br>▪ Lighting and phone charging are high priority<br>▪ Appliances and productivity are important<br>▪ Family aspires to grow, productivity and community services increasingly important |



# Target Community

**Qualification Requirement:** The proposed set of products or services have to meet customer's growing needs. Anticipate that a target family may start below a Tier 2 level, but may grow over several years to Tier 2 or higher. The solution should be able to meet the energy needs of the Target Household and the Target Community through this journey.

**Target Community:**

- 20-1000 homes per community with low population density
- Average purchasing power $1500/year per household
- Currently off-grid with little to no penetration of solar lanterns (Tier 0-1)
- Possibility of a poor grid on a 7-10 year horizon for some locations
- Mostly residential and agricultural, some small commercial, light manufacturing activities present – seeking to transition to a community with much higher income earning potential
- Less than 50% of households have bank accounts, and less than 30% have smart phones

# PROPOSAL SUBMISSION PROCESS

**TEAM REGISTRATION:**
The online registration and submission website is open:
https://empowerabillionlives.org/compete/resources/
Fill out an online form indicating the team's 'Intent to Participate' in the competition as soon as possible.

**ONLINE ROUND: Full Proposal submission – Deadline August 1, 2022**
Each team must submit a full proposal must not exceed 10 pages in length **Plus** 1 page Field-Testing plan. Full proposal decision will be made in September 2022 and may include an interview with EBL reviewers.

**FIELD TESTING: Between October 1, 2022– January 15, 2023**
Selected teams from the Online Round will be invited to participate in Field Testing.

**GLOBAL FINAL: Orlando, Florida, USA – March 18 – 21, 2023**
The teams who complete Field Evaluation will be eligible to participate in the Global Final at IEEE-APEC'23 in Orlando, Florida, USA.

# Full Proposal - Template

## Full Proposal Requirements:

- The Full Proposal must not exceed 10 pages including graphics, figures and/or tables plus 1 page Field Testing Plan.
- The Full Proposal must be written in English.
- All pages must be formatted to fit on a 8-1/2 by 11 inch (or A4) paper in font size 12.
- The Full Proposal is to be registered on the EBL submission platform and the EBL Identification Number should be included on the right-side header of every page.

## Main Body of the Full Proposal:

- Page 1 – Cover and Summary page

  Title, Targeted Track(s), Project Summary, Alignment with EBL Goals , Team Organization and Capabilities.
- Pages 2 -10 is the main body of the Full Proposal that must address the following key elements:
  - Technical Solution
  - Impact
  - Business Model
- Page 11 - Field-Testing Plan

For completing the main body sections, the participants are advised to consult the judging rubrics in Appendix II, Competition Guidelines.

# Full Proposal Evaluation Criteria

Here are some of the factors judges will consider when evaluating your Full Proposal:

## 1) Impact Score – *The following key features what determines the impact score:*

- ✓ **Creates Value for Family and Community**
- ✓ **Ease of Use**
- ✓ **Affordable**
- ✓ **Creates Positive Social Impact**
- ✓ **Environmental Impact**
- ✓ **Resiliency**
- ✓ **WOW! Factor**

## 2) Technology Score - *Key features of the Tech score:*

- ✓ **System Specification**
- ✓ **Scalability**
- ✓ **Expandability**
- ✓ **Operation and sustainability**
- ✓ **Interoperability**
- ✓ **Cloud Connectivity**
- ✓ **Advanced Features**
- ✓ **WOW! Factor**

## 3) Business Score

- ✓ **Business Model**
- ✓ **Scaling**
- ✓ **Resiliency**
- ✓ **External Funding**
- ✓ **WOW! Factor**

# Full Proposal Evaluation Criteria - Impact Score

- ✓ **Creates Value for Family and Community:**
  - *Meets at least MTF Tier 2 household residential needs*
  - *Meets critical community needs*
  - *Allows household community to affordably and flexibly meet increasing energy needs*
  - *Improves livelihood and enhances income earning potential for single household/community*
- ✓ **Ease of Use:**
  - *Simple to deploy, use and maintain for target household/community*
- ✓ **Affordable:**
  - *Meets household/community cost and service targets and expandability*
  - *Flexible pricing/payments options, PAYG, subsidized payments*
  - *Enables productive use that increases income to meet a reasonable energy expenditure against overall income*
  - *Leave No One Behind - Targets households/communities within global poverty line (less than $2.15/day)*
- ✓ **Creates Positive Social Impact:**
  - *Enables health and well-being improvements*
  - *Contributes to education opportunities*
  - *Takes into account gender perspective and advances gender equality*
  - *Contributes to just and inclusive energy transition*

# Full Proposal Evaluation Criteria - Impact Score

- ✓ **Environmental Impact:**
  - *Reduces or avoids GHG emissions, reduces e-waste, enables circular design.*
- ✓ **Resiliency:**
  - *Suitable for providing energy access in vulnerable communities impacted by climate change, political and social instabilities.*
  - *Increases food resiliency (increasing yield, reducing food loss and waste, strengthening value chains)*
  - *Enables Water-Energy-Food nexus solutions*
- ✓ **WOW! Factor:**
  - *Solves one of the key impact challenges in an innovative, game-changing way*

# Full Proposal Evaluation Criteria - Technology Score

- ✓ **System Specification:**
  - *Generation and energy storage, meets Tier 2 requirements*
  - *Power delivery, control, and monitoring*
  - *Environmental footprint of system*
- ✓ **Scalability:**
  - *Technology enables rapid scaling and large device fleet management across contexts.*
- ✓ **Expandability:**
  - *System expands as need grows without large upfront investment.*
- ✓ **Operational Factors:**
  - *Operation is reliable (targeting MTF Tier 5 reliability)*
  - *Installation, commissioning, maintenance, servicing is easy, and requires no or minimal technical training.*
  - *Operation is largely automated and requires minimal technical support.*
- ✓ **Interoperability:**
  - *Enables use of solutions from different vendors and different types at the end-user level; stimulates standardization of hardware, software, and architectures; enables integrated power system of the future.*
- ✓ **Cloud Connectivity:**
  - *Novel low-cost communications backbone (or similar function without connectivity).*

# Full Proposal Evaluation Criteria - Technology Score

- ✓ **Advanced Features:**
  - *use of solutions from different vendors and different types at the end-user level; stimulates standardization of hardware, software, and architectures; enables integrated power system of the future.*
- ✓ **WOW! Factor:**
  - *Solves one of the key impact challenges in an innovative, game-changing way*

# Full Proposal Evaluation Criteria – Business Model Score

- ✓ **Business Model:**
  - *Simple financial model, including key assumptions.*
  - *Target is to serve two representative communities of 100 homes, 1000 homes , where consumption grows from LOW-USE to HIGH-USE in 5 years.*
  - *Business model enables last-mile distribution for serving communities of different size (e.g. 100 households, 1000 households) and geographic location (rural, peri-urban)*
  - *Economic viability.*
- ✓ **Scaling:**
  - *Billing and collection model.*
  - *Supply chain considerations*
- ✓ **Resiliency:**
  - *Dropping prices*
  - *Sporadic income streams*
  - *Regulatory resilience*
- ✓ **External Funding:**
  - *Subsidies*
  - *Novel funding models to help scaling*
  - *Value for external stakeholders*
- ✓ **WOW! Factor:**
  - *Solves one of the key impact challenges in an innovative, game-changing way*

# Full Proposal - Template

## Field Testing Plan

**The goal of the field test is to demonstrate functioning of your solution in a real-life situation, and to reduce technology and market risks.**

- Address field-testing readiness
  - Include ability to demonstrate a working solution
  - Include identification of Target Community
- Describe your field testing plan
  - Please provide a testable hypothesis.
  - What will you be testing? How will you test it?
  - How will you know if you have been successful?
  - What risks might you encounter and how you are going to mitigate them?

Note: If Teams encounter insurmountable problems related to Covid, political instability, natural disasters, etc., In executing the Field Test please contact the EBL Steering Committee, the EBL judges reserve the right to discuss alternative arrangement.

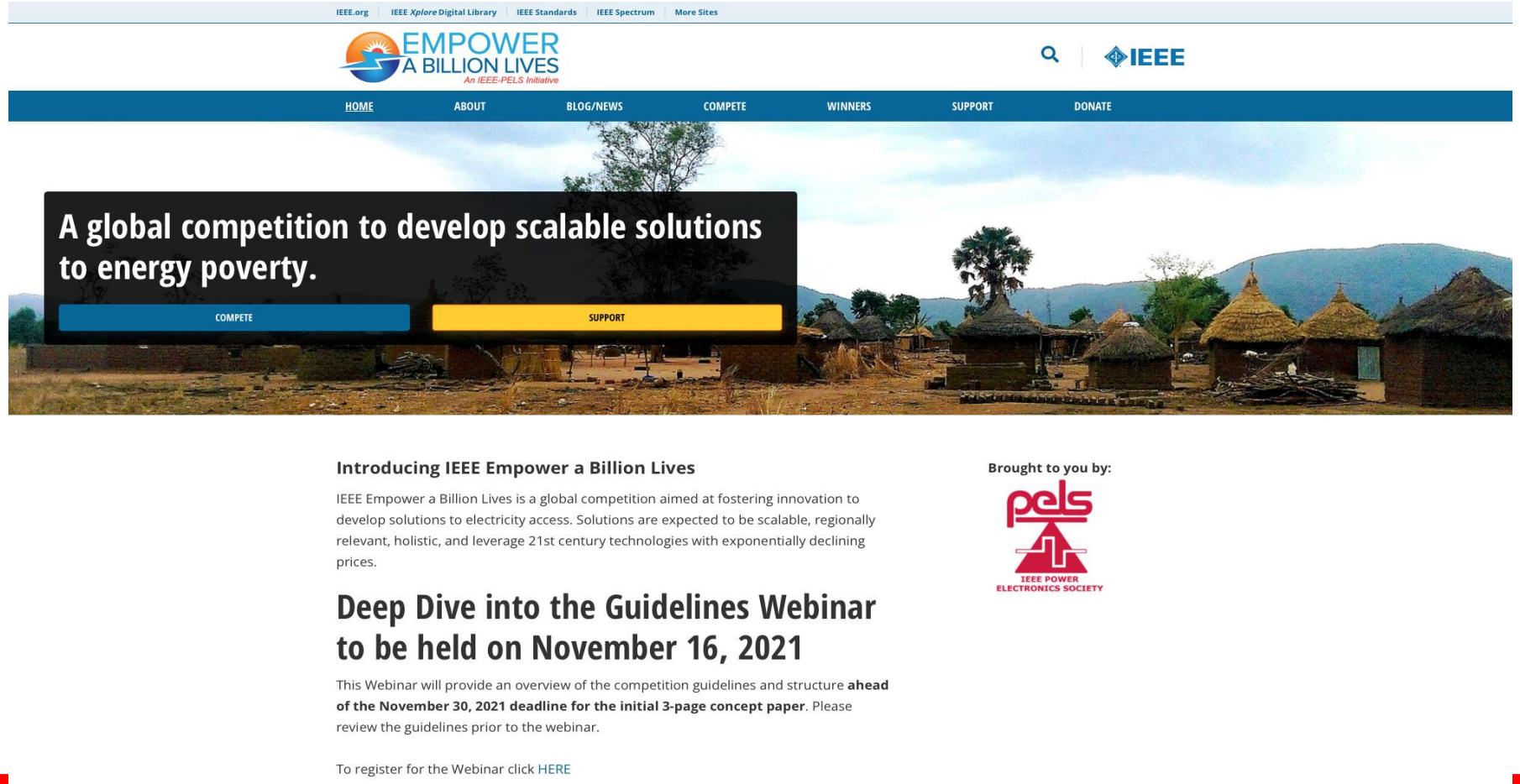
# Funding Background and Future Considerations

- EBL I awarded $225,000 in Global Final Prizes ($100,000 Global Grand Prize, $30K for Track Prizes, $20K for Student Prize and a few honorable mentions).
- **All the funds raised by EBL II go directly to supporting teams in Field Testing and for Global Final Prizes.**
- Our intention is to raise the level of prizes for EBL II.
- All teams invited to Field Test will be awarded $1,500 to help offset costs and provided a letter of acceptance that can be used to help teams raise funding on their own.

Following a successful Field Test Teams will submit a 15-slide power point presentation and a 5-minute video from their Field-test by 1 March 2023, along with a 3 page summary report.

# Please visit the EBL-II website for more information and a copy of today's material

***https://empowerabillionlives.org***



# Accessing the EBL II Full Proposal Platform

## Steps to create an account and submit your Full Proposal

6/27/2022


empowerabillionlives.org
IEEE.org
IEEE Xplore Digital Library
IEEE Standards
IEEE Spectrum
More Sites
EMPOWER A BILLION LIVES
An IEEE-PELS Initiative
IEEE
HOME
ABOUT
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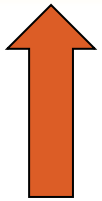
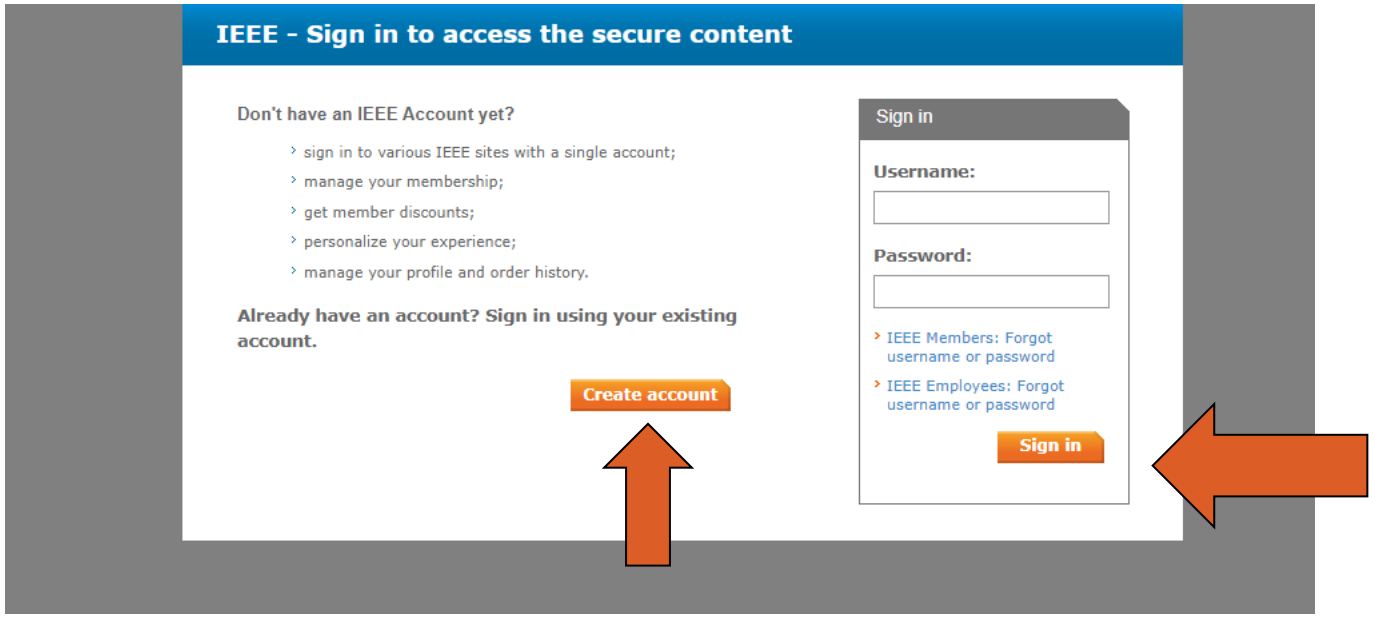
COMPETE
WINNERS
SUPPORT
DONATE
A global competition to develop scalable solutions to energy poverty.
COMPETE
SUPPORT

# Join the Competition

To register a Team for the EBL II competition. The Team Leader is required to complete the registration form. IEEE Membership is not required to set up this account. This registration form can be reaccessed for the team leader to update through this link.

JOIN THE COMPETITION

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Already have an account? Sign in using your existing account.
Create account
Sign in
Username:
Password:
IEEE Members: Forgot username or password
IEEE Employees: Forgot username or password
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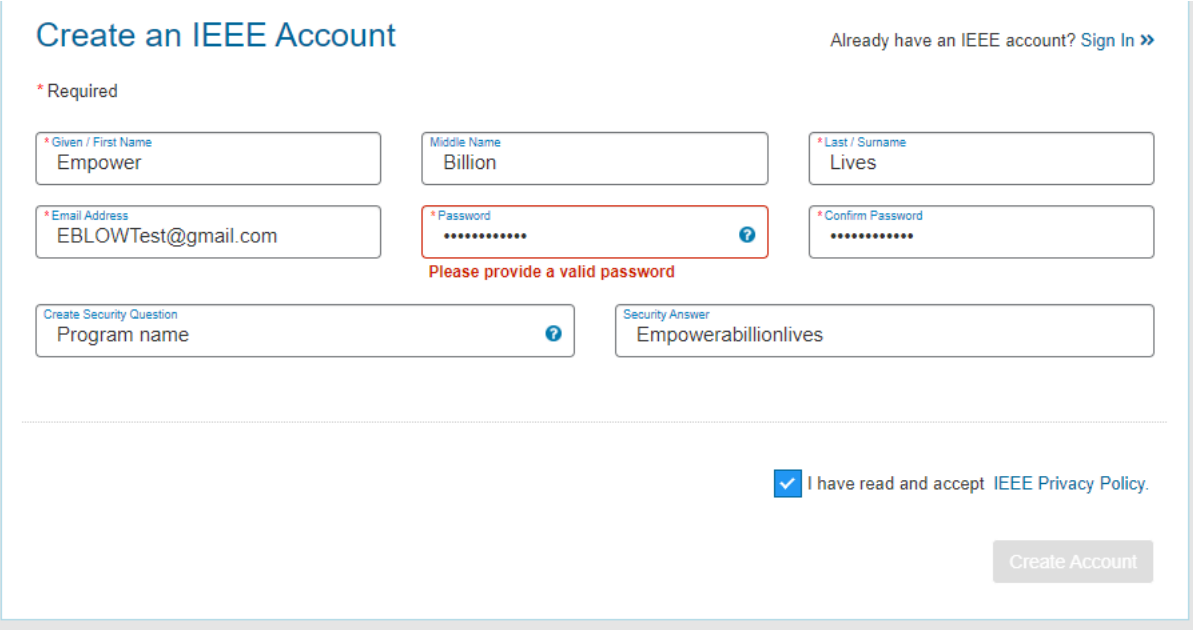
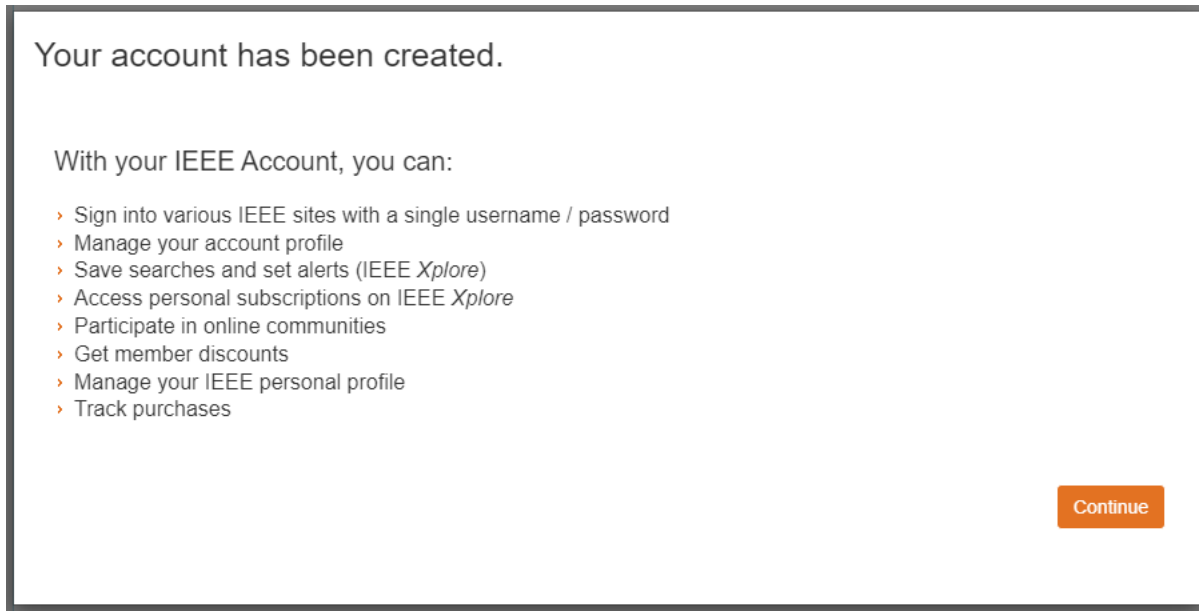



Remember your username and password – you will use it again.

You will get a verification code sent to your email – enter this code -




When creating a new account – clicking continue will take you to a general IEEE website page – you will need to go back to the website and click Join the Competition to get to the Nominations page.

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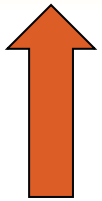

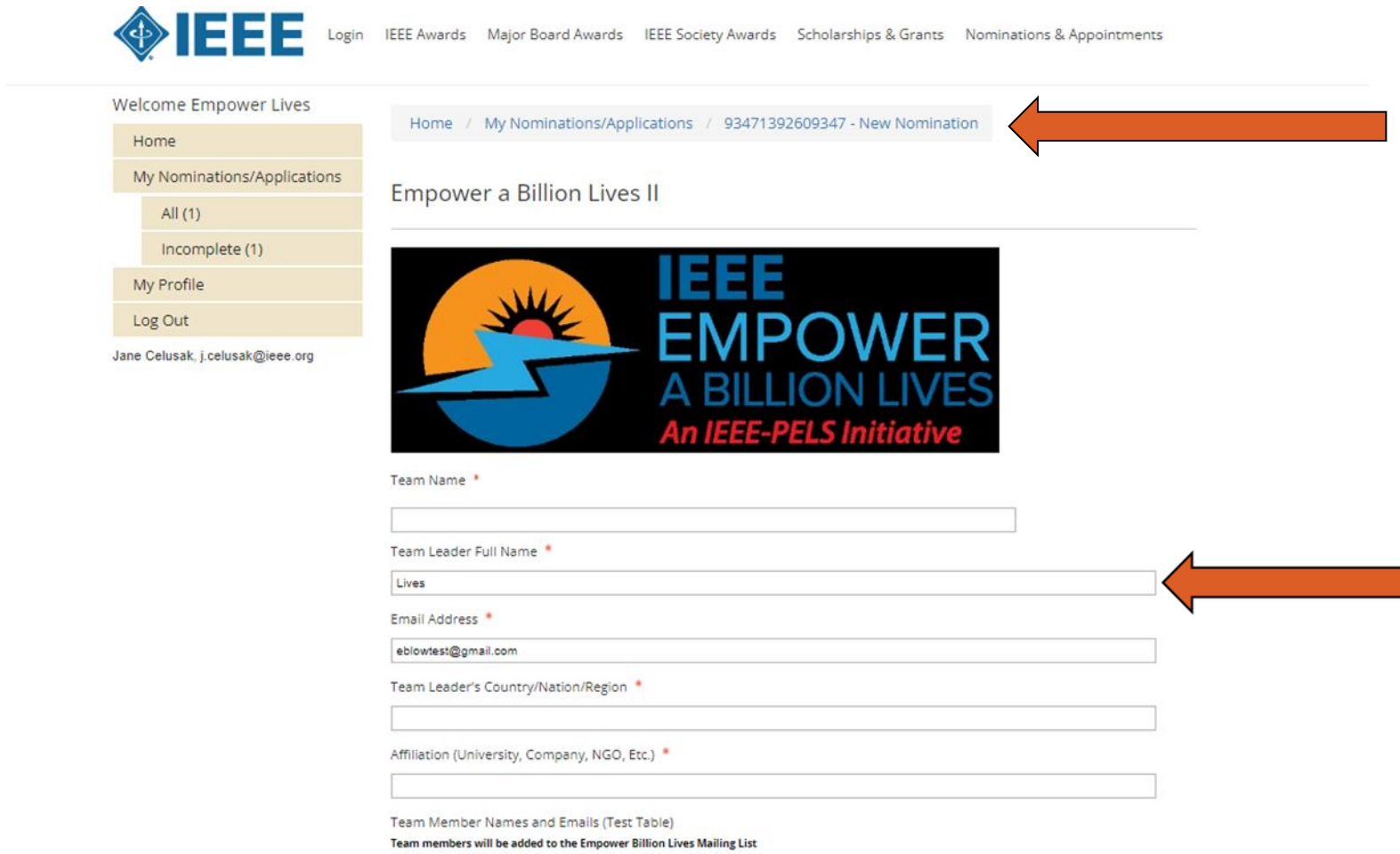


Ensure any auto-completed information is accurate

Your Nomination Number is at the top – you will need this for your final proposal and to ensure you are not creating new nominations when you enter the platform to edit or add information.

# Thank You!