

IEEE EMPOWER A BILLION LIVES COMPETITION GUIDE

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EMPOWER
A BILLION LIVES



OVERVIEW



The Challenge: To Accelerate Scale in Energy Access

IEEE Empower a Billion Lives (EBL) is expected to be a biennial global competition, which challenges teams from around the world to develop innovative solutions that can bring cost-effective energy, and its life transforming impact, to billions of unserved and underserved people. The competition encourages a holistic approach by evaluating technology, social impact, and business models of competing solutions. Winning teams will demonstrate success through field-testing and a path to rapid scaling of their solutions. For more info, visit: www.empowerabillionlives.org.

Need for the Competition

Grand Challenge:

Three billion people around the world live in severe energy poverty, including 1.1 billion who live completely off-grid. Providing affordable energy access to them can dramatically impact their living standard, health, education, productivity and ability to be a part of modern society. Many programs and initiatives have been doing stellar work in tackling energy poverty, but much remains to be done. Solving energy poverty using mature and proven 20th century solutions, an obvious path forward, could result in an additional 3.8 gigatons per year of carbon emissions - an environmental catastrophe! New solutions that can scale are clearly needed!

Our Approach:

IEEE Empower a Billion Lives (EBL) is a recurring global competition organized by the IEEE Power Electronics Society¹, to crowdsource regionally relevant innovation to accelerate deployment of energy access solutions in the affected areas.

It is anticipated that fast moving 21st century technologies with rapidly declining prices² can allow a holistic approach to the design of energy solutions to address the needs of families and communities living completely off-grid or suffering from a severe lack of energy access. Effective solutions should be economically viable today, and should be able to provide continuing value to the families and communities as they improve their lives.

A primary focus for EBL is to help develop new energy access solutions with reduced technology and market risk. Another is to prove out new business models that show impact and scale can be achieved with solutions that are economically viable and environmentally sustainable.

The EBL Competition:

Competing teams will develop and demonstrate in target communities, technically innovative solutions to address the needs of the rapidly growing global energy access market of 3 billion people. These solutions also have to show business viability and the potential for rapid scaling.

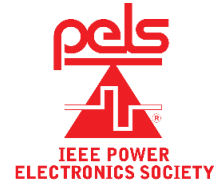
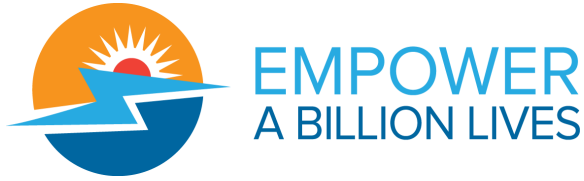
- **Online Round:** Teams will submit proposals online. Teams meeting the requirements as noted by judges will be able to compete in one of five Regional Rounds.
- **Regional Round:** Each Regional Round will have winners in each track. There will be additional special prizes, including prizes for student teams. Winning teams will have to participate in a field evaluation to be eligible to participate in the Global Final.
- **Global Final:** All succeeding teams will compete in the Global Final. The total anticipated prize purse is \$1 Million.

Impact:

Ongoing competition cycles will drive a continuous learning process leveraging past learnings and rapid technology advances to deliver tremendously impactful solutions. EBL believes that rapidly changing technologies offer a unique opportunity to crowdsource innovation globally with cross-disciplinary teams, to spark creativity that can generate unexpected outcomes – the heart of the competition is this WOW factor. Teams offering affordable and innovative solutions to energy access can win recognition on a global stage and also see financial success.

The impact of affordable energy access on families and communities can be profound, providing positive outcomes in areas of health, food security, education, increased productivity, digital and financial inclusion, and livelihood and lifestyle changes.

1-Institute of Electrical and Electronics Engineers (IEEE) is the world's largest technical organization with over 420,000 volunteers in 160 countries. 2-'Exponential' technologies may include PV solar, energy storage, power electronics, internet of things, decentralized control, communications, edge computing, pay-as-you-go, mobile wallets, block-chain, data analytics, etc.



IEEE EMPOWER A BILLION LIVES COMPETITION

Accelerating Scale in Energy Access

COMPETITION PARTICIPATION GUIDELINES & METRICS

EBL 1 – COMPETITION SCHEDULE:

The inaugural Empower a Billion Lives Competition (EBL 1) will consist of three competition rounds in four stages – Online Round, Regional Rounds, Field Evaluation, and a Global Final Round. Field performance will be evaluated between the regional and final competition. The EBL final round for EBL 1 will be held in Baltimore in 2019. The EBL competition will operate on a two-year cycle, with online rounds and regional rounds in the first year, followed by field tests and a global final in the second year.

Competition	Location	Date	Co-Located IEEE Event
Online Round	N/A	May 1 – Aug 31, 2018	N/A
Regional	Asia Pacific	Shenzhen, China	Nov 4-7, 2018
	South Asia	Chennai, India	Dec 18 – 22, 2018
	Africa	Johannesburg, South Africa	Jan 16-18, 2019
	Europe	TBD	Jan 21-23, 2019
	Americas	Puerto Rico, USA	Jan 31 – Feb 1, 2019
Global Final	Baltimore, USA	Sep 29 – Oct 3, 2019	IEEE ECCE Conference

COMMON REQUIREMENTS:

The Empower a Billion Lives competition invites teams to submit proposals addressing key challenges in the scaling of energy access solutions. A proposed solution should address the entire power generation, delivery and management system, including the physical, technical, social and business elements needed to operate the system sustainably. The competition does not cover design of new generation sources or appliances, although those can be a part of an overall system design. A key EBL objective for energy impoverished families and communities is to facilitate their digital and financial inclusion in society and to stimulate productive uses of energy to support assimilation into the global economy.

From a technical viewpoint, proposed solutions are likely to address key issues such as real-time control and operation of the system, load management and system optimization, and should meet both current and future customer needs. However, EBL is really seeking innovative (WOW!) ideas that fulfill the basic energy access needs of the families and communities, but maybe in a completely different manner –

such as using a services model. Solutions do however need to address business issues such as capital and operating costs, and show a business model that is economically viable. Solutions should provide the equivalent of ESMAP Tier 2 access in terms of functionality enabled, which is a minimum of 50 watts (for 30 minutes), or more than 200 watt-hours per day.

COMPETITION TRACKS:

EBL specifically targets two groups as consumers of energy access solutions – the single family and the community. The typical family earns less than \$1500 per year and lives in a low population density rural community, which has 20-1000 homes (see Appendix I for more details). Successful EBL solutions will solve energy access problems for both groups – some in a decentralized bottom-up manner, and some in a centralized top-down manner. The traditional approach has been through electricity generation and delivery, but there may be other solutions that take a completely different approach, and still achieve the desired objectives. EBL would like to encourage teams to focus on the broad goals, and to offer solutions that solve the technology and business issues, and are able to demonstrate impact.

The two categories for competitors are:

Decentralized Model: The proposed solution will serve single homes at the Tier 2 or equivalent level without creating an entire distribution infrastructure in advance of when it is needed. A distribution network may be built and expanded whenever needed by interconnecting smaller systems on an ad-hoc basis to share resources, improve reliability, provide community level services and to realize operational and cost efficiencies. A successful solution will show technical viability and the business model needed to reach scale.

Centralized Utility Model: The proposed solution is a centrally planned and implemented power generation and distribution model offering the core service at the community level. Individual families are served as customers from the centralized service. Operations and billing follow traditional utility models, and may include some level of customer-owned generation and storage. The proposed solutions will address physical and transactive elements needed for sustainable operation and economic viability, and will show the solution's potential for scaling.

In each track, there will be two sub-tracks – for established companies offering commercial products in the market, and for new technologies and solutions that are not currently commercially available. The overall competition categories are:

- **Track 1: Decentralized Model (Tr1)**
 - Track 1 a): Commercially available solution (Tr1A)
 - Track 1 b): Emerging solution (Tr1B)
- **Track 2: Centralized Utility Model (Tr2)**
 - Track 2 a): Commercially available solution (Tr2A)
 - Track 2 b): Emerging solution (Tr2B)

The expectation is that solutions will target different levels of energy access with different levels of technical and business sophistication. Best performers will provide the highest level of performance and functionality at the lowest cost with a viable business model and the ability to rapidly scale in this market segment. The same metrics will apply throughout the competition, but with increasing rigor

through the field evaluation and the global final. A team may state their participation category, however, the category decision of the EBL Rules and Judging Committee will be final.

Judging for teams in both tracks depends on the ability to provide value, both at a single-family level and at the community level. Decentralized Track 1 solutions have traditionally served a single family's needs with higher capital efficiency, but cost-effectively expanding system capacity and service levels to serve community needs has been challenging. Centralized Track 2 solutions are traditionally better able to provide community level services, but with much higher capital and operating costs, normally requiring oversized infrastructure. Achieving economic viability for smaller communities, or for communities where the needs grow rapidly, has also been challenging. Winning solutions are likely to use technology and new business models to offer the best features of both – low capital cost, good asset utilization, flexibility, economic viability and system expansion ability as needed.

ASSESSING SUCCESS:

Participating teams using the process outlined in the next section will submit entries to the EBL competition. The review and judging process will reflect the goals and objectives of the EBL competition. A basic Judging Rubric is shown in Appendix II. Judges will be using this rubric to guide their scoring of the proposed solutions. The rubric is available for competitors so they can ensure they have addressed relevant criteria in their proposals.

The Online Round will have a simple submission format. Judges will review the online submissions and provide an assessment and feedback to the team. Teams should use the guide in Appendix I and II for preparing solutions and presentations, as judges will use the guide in the selection process.

Existing solutions and strategies may not be enough, and that new thinking is required. The judges will be actively looking for the **WOW** factor in each topic area that shows novel cross-disciplinary thinking, which may provide new strategies for solving the scaling problem. These approaches include, but are not limited to, frugal engineering (ultra-low-cost but fully featured solutions), use of technologies such as PV solar, batteries, power electronics, decentralized control, cybersecurity, communications, IoT, cloud, machine learning, edge-computing, block-chain, pay-go, mobile wallets, data analytics, etc., and new business models.

HOW DO WE BUILD A TEAM – AND WHO CAN PARTICIPATE:

EBL teams can include individuals from academic institutions, start-ups, research labs, NGOs, large corporations or interested individuals. Appendix I provides details on how to participate in EBL.

EBL invites companies that commercially offer products meeting the competition criteria to participate. The simplified process for such companies is to provide product details and specifications, evidence of operation and impact in the field, financial data as appropriate, and a review of the scaling potential. The Judging Rubric in Appendix II provides further details.

EBL specifically invites people who are currently involved with energy-access efforts in the target communities (see Appendix I and II) to become involved, and to bring their first-hand knowledge of the needs and aspirations of people in these communities to EBL teams. EBL also invites student teams from across the globe to participate. There will be special prizes for teams that consist only of students. Faculty support in an advisory role is permitted but must be declared and should not trigger conflict of

interest or intellectual property (IP) ownership issues as defined in the Official Contest Rules. EBL is also interested in fostering the development of 'open platforms' and 'open-source' software to enhance collaboration and promote creativity.

Solving complex problems can appear challenging for small teams with limited access to resources or newer technologies. EBL is establishing collaboration mechanisms so individuals and organizations seeking to partner can connect and collaborate.

People not allowed to participate in or to contribute directly to the solutions proposed or implemented by an EBL team include IEEE employees, members of the EBL Rules and Judging Committee, and individuals who have a direct role in enforcing the metrics and rules for the competition. Individuals who cannot participate in EBL may provide financial support for a team. The team must declare this support and it must be approved, in writing, by the EBL Rules and Judging Committee. Review of submitted proposals will follow IEEE guidelines, typically used for review of technical papers, for conflict of interest management. In case there are questions regarding eligibility of an individual to be a part of an EBL team, the decision of the EBL Rules and Judging Committee will be final.

Please visit the EBL website at www.empowerabillionlives.org to review the Official Contest Rules for teams submitting entries into the competition.

APPENDIX I

DETAILED INSTRUCTIONS FOR SUBMISSION OF EBL ONLINE PROPOSAL

INSTRUCTIONS FOR PROPOSAL SUBMISSION

ONLINE ROUND: May 1 – Aug 31, 2018

Teams will submit their proposals online at www.empowerabillionlives.org/competitors/. The process is as follows.

Team Registration –

- Fill out an online form indicating the team's 'Intent to Participate' in the competition as soon as possible after the May 1 start date.
- Upon receipt of this 'Intent to Participate', EBL will assign the team appropriate identification which allows the team to fully access EBL collaboration resources as they build a team and proposal.
- A Team Leader can only submit one proposal.

Online Proposal Submission -

- EBL review leaders will review the 'Intent to Participate', primarily to see alignment with EBL goals and objectives, and may provide guidance to the team
- The Online Round requires submission of an Online Proposal, on the same website above, with the following key elements:
 - A main proposal, with a total of up to five pages, with one additional page for additional references, figures, financial tables etc. (total of six pages)
 - It is suggested that two pages be used for the general proposal, with one page each to address issues related to Impact Score, Tech Score, and Business Score. One page can also be used for figures, tables etc. (see Appendix II for details)
 - The document will be in English in font size 11 or larger on an A4 or 8.5"x11" page with 1 inch margins, and will be uploaded in PDF format.
 - The team may upload a short video (less than 3 minutes) if they desire to explain and summarize their innovations, business models, and reasons they believe they will succeed in solving the challenge of achieving scale in the energy access area. EBL is not responsible for technology compatibility issues with the uploaded recording.
 - Team information may be updated at this time, if needed
 - Online Round submissions require a Letter of Support from an appropriate authorized official of the team's hosting organization or school/college/university to be uploaded during the Online Round submission. If there is no hosting organization, the team needs to provide a declaration that they have obtained all permissions needed to participate in the EBL competition.
 - The Online Round submission must be uploaded anytime starting on May 1, 2018. Submissions will not be accepted after 5 pm EDT (US) on Aug 31, 2018.

Online Round Decision Process -

- EBL will review the submission according to the established review process. Within a period of 15-30 days from receipt of a valid submission, EBL will provide feedback and comments to the proposing team.
- The judging/review process will provide an 'Accept', 'Improve', 'Discourage' or 'Reject' status for the submitted proposals. Proposals that do not have a 'Reject' status will be allowed to participate in the Regional Round.
- If time permits and if the Team desires, the Team can use EBL reviewer's feedback and resubmit a modified proposal to the Online Round until Aug 31st.
- Teams are encouraged to study the Judging Rubric (Appendix II) as they formulate their entry.
- The reviewers will score the entries with guidance from the Judging Rubric shown in Appendix I.

REGIONAL ROUND: Nov 2018 – Feb 2019

Each team is required to compete in a Regional Round in order to win any awards or prizes in the EBL competition. Teams that received an 'Accept', 'Improve' or 'Discourage' status in the online round will be qualified to submit an application to compete in the Regional Round at the location decided during the Online Round.

Final details on the process for the Regional Round will be released prior to the close of the Online Round, but are expected to include the following elements.

- Submission of a Regional Round proposal by qualified teams by October 15, 2018.
- Participation of team representatives in the Regional Round is mandatory, including a presentation to a panel of judges, demonstration of a working solution, participation in a poster session, and possible presentation to a broader audience.

Winners will be announced in the four tracks identified above at the end of the collocated IEEE event (see Table 1 in the main document) with the top qualifying two teams in the four Tracks receiving prizes and the authorization to participate in the field demonstration and final Global Round. Special prizes are also targeted for student teams.

Winners will receive prizes with the understanding that the funds may be used by the Team to:

- cover costs associated with travelling to the global final
- fabricating devices needed for the Field Evaluation stage
- deploying and demonstrating the solution in a target community of at least ten homes, in a location proposed by the team and agreed to by the Judges panel.

The teams can utilize their own funds or declared funds from other sources, as noted in the proposal.

Devices in the field will use independent third-party data acquisition to obtain data on device and system performance. This data will be shared with the Teams.

One additional team from each Track may be allowed to participate in the Field Evaluation and Global Final. These teams will be selected based on their ranking, and will not receive any funding to meet their field-testing and travel costs.

GLOBAL FINAL ROUND: Sept 2019

The teams that win in the Regional Rounds, and successfully go through the Field Evaluation process, will be eligible to participate in the Global Final Round in Baltimore in Sept 2019.

Final details on the Field Evaluation and Global Final will be released prior to the close of the Online Round, but will follow a process similar to the Regional Rounds.

APPENDIX II

JUDGING RUBRIC

INFORMATION FOR COMPETITORS AND JUDGES/REVIEWERS:

Proposals will be judged on the quality of plans presented in the proposal, the likelihood that a team will be successful in meeting the EBL objectives, technical and production feasibility, degree of innovation, and meeting the “WOW!” factors that will generate community excitement and acceptance. Other key criteria are evidence of each team's commitment, capability, experience, and resources to implement their solution in alignment with the metrics provided, over the duration of the entire competition.

Proposals instructions are outlined in Appendix I. Teams invited to participate in an EBL Regional Round are expected to adhere to the basic plans described in their proposals. Only one proposal per team.

This Judging Rubric provides guidance for reviewers and judges who will be evaluating proposals submitted by competing teams in the Empower a Billion Lives competition. It also provides transparency and alignment between competitors and reviewers/judges. The team's success will be assessed using three factors –

- **Impact Score:** measures the impact that the solution has on the family and the community,
- **Technology Score:** measures how technology is used to solve key challenges including scaling,
- **Business Score:** assesses the business model including economic viability, scaling & sustainability

Each factor has various sub-factors, with examples provided herein to guide the competitors and judges. It should be understood that these are examples and teams can use other criteria that they feel are compelling for their proposed solution. The total score will be the sum of the three individual scores, and will be a key factor the judges consider in making their final determination of the Teams moving forward in the Online Round and the competition winners in the Regional Round and the Global Final Round.

BROAD SOLUTION REQUIREMENTS:

Qualification Requirement: The proposed set of products or services have to meet customer's growing needs. Proposed solutions should provide Tier 2 electricity access (Tier 2 is defined by the [ESMAP Multi-Tier Framework](#) for household electricity supply to be min 50 W peak for 30 minutes or min 200 Wh daily supply capacity). Anticipate that a target family may start below a Tier 2 level, but may grow over several years to Tier 2 levels of consumption. 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

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
<ul style="list-style-type: none"> ▪ Min 200 Wh/day <u>or</u> min 50 W peak power ▪ Available min of 4 hrs/day, and 2 hrs/night ▪ Lighting and phone charging are high priority ▪ Digital inclusion & productivity enhancement ▪ Family is financially constrained, using services when funds are available 	<ul style="list-style-type: none"> ▪ Min 1,000 Wh/day <u>or</u> min 200 W peak power ▪ Minimum of 6 hrs/day, and 4 hrs/night ▪ Lighting and phone charging are high priority ▪ Appliances and productivity are important ▪ Family aspires to grow, productivity and community services increasingly important

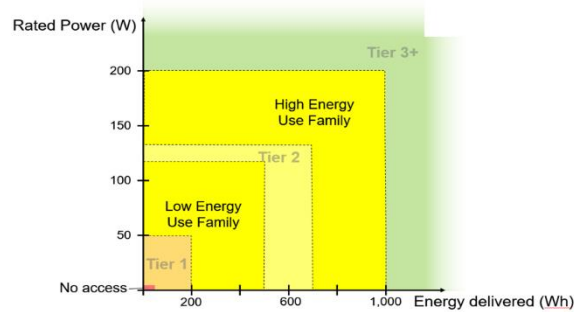


Fig 1: Tier 1 and Tier 2 usage as defined by ESMAP multi-tier framework

Impact Score

It is anticipated that many teams will not have fully informed answers on the Impact Score section during the Online Round. Judges/reviewers expect the teams to show an understanding of the problem, a pathway to a proposed solution, and preliminary results that show that the team has a viable approach and knowledge of the technology areas they intend to use. The Regional Round and Global Final will take an increasingly rigorous assessment on the factors shown below.

Table 1.1 below shows the various factors that judges will consider in assessing a team’s Impact Score.

The IMPACT SCORE is worth a total of 800 points.

Table 1.1 – Impact Score

	Key Factors to Consider
Creates Value for Family and Community	Meets basic LOW-ENERGY USE family residential needs <i>Begin transition to Tier 2 family</i>
	Expands to meet HIGH ENERGY USE family needs <i>Digital inclusion and basic comforts in an energy constrained world</i>
	Enhances income earning potential for single family <i>Improves livelihood and earning capacity for the family</i>
	Meets critical community needs <i>Tr1: <u>Interconnected</u> single home solutions meet community needs</i> <i>Tr2: Utility system meets community needs</i>
Easy for Target Family to Use	Simple to deploy and use for target family
	Allows family to affordably meet increasing energy needs
Affordable	Meets family cost and service targets and expandability
	Flexible pricing/payments options, PAYG, subsidized payments
WOW factor	WOW factor

As an illustrative example, here are some possible impact issues competitors can consider. Competitors are encouraged and free to use metrics that are consistent with their solution and storyline.

- **Creating Value for Family:**
 - **Basic Low-Energy Use examples:** Space lighting, cell phone charging, radio, television, etc.
 - **High-Energy use examples:** Digital access (laptop or tablet), fan, refrigerator, smart cooking
 - **Enhances single family income earning potential:** Enhances existing non-electrical occupations (dairy, pottery, masonry, weaving, agriculture, sewing, food packaging, etc.); new income from activities requiring electricity (advanced sewing, power looms, food stalls, refrigeration, printing, internet café, etc.); new income from energy infrastructure (sharing energy resources, technical and non-technical support jobs)
 - **Meeting critical community needs examples:** Public lighting. water pumping & purification; education including digital access, lighting, water purification; health facilities (Doctors clinic, telemedicine); job creation through light manufacturing
- **Easy for Target Family to use:**
 - **Simple to deploy and use:** No local technical support needed; Suitable for users with no education (including illiterate users); Rugged in typical use scenarios

- **Allows Target Family to affordably meet increasing energy needs (example):** Building blocks allow growth to high-use whenever family needs and can afford; Simple to use wiring and connectors to interconnect discrete elements; Allows use of energy and resources from others in the network to minimize family investments and costs
- **Affordable examples:**
 - **Meeting Target Family cost, level of service & expandability objectives:** Estimate cost per year for family at minimum use level; Show affordable pathway to grow as family needs and ability to pay increase; Is it easy for family to transition from low-use to high-use in 5 years; Preserves value of investment as grid (finally) arrives
 - **Flexible Pricing/PAYG:** Allows pay-as-you-go billing or equivalent functionality; No bank account needed, mobile payments, micro-finance, credit history; Supports electronic wallets – e.g. PayTM, or use of cryptocurrencies; Reduces family cost by providing value to external stakeholders
- **WOW factor:**
 - Provides new and unexpected insight and novel way of creating value for target customers

Tech Score

It is anticipated that many teams will not have fully informed answers on the Tech Score section during the Online Round. Judges/reviewers expect the teams to show an understanding of the problem, a pathway to a proposed solution, and preliminary results that show that the team has a viable approach and knowledge of the technology areas they intend to use. The Regional Round and Global Final will take an increasingly rigorous assessment on the factors shown below.

Table 1.2 below shows the various factors that judges will consider in assessing a team's Tech Score.

The TECH SCORE is worth a total of 800 points.

Table 1.2 – Tech Score

	Key Factors to Consider
System Specification	Generation and energy storage <i>Meets Tier 2 requirements</i>
	Power delivery, control and monitoring
	Environmental footprint of system
Scalable	Technology enables rapid scaling and large device fleet management
Expandable	System expands as need grows without large upfront investment
Operations	Ease of installing, commissioning, maintaining and servicing system and fleet of devices and wires (if needed)
Cloud Connectivity	Novel low-cost communications backbone (or similar function without connectivity)
Advanced Features	System optimization and analytics
WOW factor	WOW factor

As an illustrative example, here are some possible impact issues competitors can consider. Competitors are encouraged and free to use metrics that are consistent with their solution and storyline.

- **System Specification examples:**
 - **Generation and energy storage:** Peak watts; watt-hours per day; availability on-demand; cycle efficiency, life, charge-discharge cycles, size, safety
 - **Environmental system footprint:** Delivers Tier 2 power and energy with low carbon footprint; compact and light weight; easy and intuitive to install, commission, & operate; operates in target environment; fully recyclable at the end of life
- **Scalability examples:**
 - Measurement, bill delivery and dues collection in target community; minimizing cost of managing fleet of energy devices in multiple regions; remote stop and start service upon theft, non-payment or non-compliance; Not dependent on region-specific service providers
- **Expandability examples:**
 - **[Track 1a, 2a]:** Ability to expand with family/market growth and need.

- **[Track 1b, 2b]:** Easy interconnection of single-family home sources and storage to create a higher capacity system to meet community needs
- Fully plug and play, modular, easy in-field upgrades, expand loads/sources
- **Operational factors:**
 - Easy install & commission process without need for trained field personnel; Servicing/maintenance by local people with minimal technical training; automated fleet management process, including remote diagnostics; managing regional compliance needs
- **Cloud Connectivity examples:**
 - Benefits of cloud and internet connectivity, asset tracking, fleet management, additional value delivery from external stakeholders, ability to realize these functions without Cloud Connectivity
- **Advanced Features examples:**
 - **System optimization & Data Analytics:** estimate energy availability over week, learn profiles; Cloud connectivity and fleet data access for superior optimization; Advanced data analytics across device fleet, allows 'sharing economy' model
- **WOW Factor:**
 - Uses technology in novel ways to provide exciting new value and has game changing potential

Business Score

It is anticipated that many teams will not have fully informed answers on the Business Score section during the Online Round. For the Online Round, the judging metrics are intended to guide the teams and the judges on factors that are considered important and to have the teams express how they are thinking about these issues.

The total Business Score is 800 points. However, for the Online Round, the Business Score will be valued at 50% (maximum score of 400 points).

Table 1.3 below shows the various factors that judges will consider in assessing a team's Tech Score.

Table 1.3: Business Score

	Key Factors to Consider
Financial 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
	Economic viability
Scaling	Billing and Collection Model
Resilient	Dropping prices
	Sporadic income streams
External Funding	Subsidies
	Novel funding models to help scaling
	Value for external stakeholders
WOW factor	WOW factor

As an illustrative example, here are some possible impact issues competitors can consider. Competitors are encouraged and free to use metrics that are consistent with their solution and storyline.

Business Score Factor Examples:

- **Financial Model examples:** Estimate of cumulative capital expenses needed through Year 1 and Year 3 (includes total product, plant, poles, meters, civil works and other costs); total operating and financing costs estimated through Year 1 and Year 3 (includes distribution, sale, commissioning, maintenance, servicing, fuel, etc.); Total revenues expected through Year 1 and Year 3, and assumptions on price of energy and customer billing model
- *Teams are expected to have increasingly complete business models and information as they get closer to the Global Final competition.*
- **Economic Viability examples:** Price of energy delivered to customers to reach breakeven for 100 home LOW-USE community; Price of energy delivered to customers to reach breakeven for 1000 home HIGH-USE community; show when breakeven occurs

- **Scaling example:**
 - Purchase or service/lease model with Pay-Go and remote disconnect; mobile wallet, bank-less transactions, microfinance, credit; ability to bill and compensate prosumers who own generation and storage; automated to enable scaling to 1 million total customers
- **Resiliency example:**
 - **Dropping prices:** Impact of rapidly dropping prices of PV solar, batteries and other technologies on the economic viability of the business model
 - **Sporadic income streams:** Ability of business model to handle a customer base whose income can be sporadic and unreliable (pay when they can)
- **External Funding factors:**
 - **Subsidies:** Subsidies or grants used, and plan for economic viability without subsidies
 - **Novel funding models for scaling:** Novel funding and operational models (e.g. peer-peer funding, crowdsourcing) for rapid scaling & economic viability
 - **Value for external stakeholders:** Value generated for external stakeholders (financial institutions, credit monitoring, digital inclusion, other), and the impact on the financial model.
- **WOW factors:**
 - Uses business model innovations to provide unexpected value and improve chances to reach scale