Competition Tracks: LML-2024

Track 1: Green Light Technology

The Technical Challenge: In keeping with a global need to greatly reduce energy and materials usage, we seek novel light source technologies or modified existing devices whose design and manufacturing process fit within a circular economy. Amongst the principal attributes to be satisfied are: preferable use of easily accessible, local materials; local manufacture; fabrication processes that do not require high levels of expertise or specialized equipment; devices that exhibit extreme mechanical and electrical reliability when operated in harsh environments; devices that provide the “right” light quality, are intuitive to operate and satisfy end-user needs. Submissions in this track should also support the vision of Track 2.

Submission Format:

Submissions for the Green Light Technology track may comprise:
• A typed document (minimum four pages text)—graphics and images do not contribute to the page count; or:
• A handwritten document (minimum 8 pages text)—graphics and images do not contribute to the page count. The complete document should be scanned/photographed and submitted electronically.
Where useful and accessible, submissions should include descriptive graphics, images, and tables that may incorporate:
• Drawings or sketches that illustrate a physical design, process, sequence of actions, connectivity/dependence between different activities.
• Simulation results.
• Manufacturing equipment and process.
• Functional prototypes with analytical results.
• Photos or videos of the light in use.

Judging Considerations:

Submissions to Track 1 will be evaluated based on the following criteria, where applicable:

1. Customer Interaction
How much did end-users contribute, through interviews or other means, to the design and fabrication process of the product?
2. Sustainability
How well does the product, to the extent possible, utilize local manufacturing and locally sourced components? How well does the product fit into a circular economy in terms of its CO_2 footprint, energy use during fabrication and usage, materials usage and reuse, manufacturing waste, shipping, repairability, single use materials and recycling—evaluated through a straightforward LCA (Lifecycle Analysis)?
3. Accessibility and Affordability
Is the product easily available? Is the light source affordable for populations with incomes $\leq$ 1.00 USD/day?
4. Light Quality
Is the illumination the “right” light? How well does the quality of the light satisfy the needs of color rendering, color temperature, flicker, glare, and circadian rhythm (human wake/sleep cycle)? Does the light adversely affect Gaia?
5. Usability
How easily can the light source be adapted to meet specific customer needs? Is it aesthetic, desirable, and intuitive to use? How resistant is it to wear and tear, corrosion, misuse, or other physical damage? Are the outcomes of any field trials reported?
6. Functionality
Which customer needs do you fulfill and how? For example, can you control the illumination to provide a reading light, illuminate a larger space, or other needs?

7. Energy Efficiency
Is the light able to provide illumination for 3 days (20 hours) on a single charge? Is it energy efficient? Can it be powered from an individual or shared renewable source of energy?
8. Manufacturing Attributes
How easily can the materials be locally sourced and how easily can the light source be locally manufactured? How well does the manufacturing process envisioned adhere to the requirements of low levels of technical expertise and non-specialized equipment? What capital outlay does the envisioned production facility and process require? Can the facility be powered by renewable energy? How easy is it to replicate the facility in different places/countries?
9. Innovation
What is the novelty? What use is made of emerging technologies to increase efficiency, reduce size and cost?

Track 2: Sustainable and Scalable Business

The Business Challenge:

We seek business models able to deliver these devices into the hands of the target communities. Amongst the principal attributes to be satisfied are: affordability; availability to the end-user through national and local distribution systems; connectivity to target communities that match environment, country and culture; payment and collection plans that accommodate very limited, seasonal income; availability of local training programs for system installation, operation and maintenance—and for device usage, maintenance and repair. For these lighting systems to thrive in local environments, a real, self-sustaining business model that accommodates the actual value chain is aimed for. Submissions should support the vision of Track 1.

Submission Format:

Submissions for a sustainable business may comprise:
• Typed document (minimum four pages text)—graphics and images do not contribute to the page count; or:
• A handwritten document (minimum 8 pages text)—graphics and images do not contribute to the page count. The complete document should be scanned/photographed and submitted electronically.
Where useful, either document should include descriptive graphics and tables as needed:
• Drawings or sketches that illustrate a process, sequence of actions, value chain, connectivity/dependence between different activities.
• Financial models.
• Financial simulation results.
• Distribution and sales network.
Submissions can include, but are not limited to the following business areas:
• Routes to advertise, distribute, and sell product to intended customers.
• Routes to identify, connect, engage, and work with customers.
• Routes for payment strategies for those with limited, seasonal incomes.
• Routes for payment collection from those with limited, seasonal incomes.
• Routes to local sourcing, manufacture, and repair of devices in required quantities.
• Opportunities that arise from building, selling, repairing, and recycling these light sources.
• Generation of material or subcomponents for local production by recycling other products.
• Training operatives and target communities to install the lighting system.
• Training target communities to operate and maintain product without external intervention.
• Training target communities or local sales representatives for product repair and recycling.
• Tiered pricing structures to ensure that the light is accessible to, and

affordable by all.
• Light access enabled local income generation through working after dark.
• Device charging (e.g., cell phones) through sale of unused light source battery capacity.
• Identification of market challenges and how they were or can be overcome.
• Large area distribution, sales, spares, repair, and storage.
• National distribution—local sales interface: community connection, training and payment.

Judging Considerations:

Submissions to Track 2 will be evaluated based on the following criteria, where applicable:

1. Marketing
How well does the proposal demonstrate a framework to identify, connect, engage, and work with potential customers? How well does the proposal demonstrate a proven route to the advertisement, distribution, and sale of the product where needed? Are past or potential market challenges identified, and how are, or were, they overcome to create new markets? How did potential end-users contribute, through interviews or other means, to the distribution, training, sales, repair, and payment plans for the product?
2. Reliable Business
How well does the economic model submitted support the formation of a self-sustaining and scalable business? How well does the submission describe customer contribution, by interviews or other means, to shaping the business model?
3. Sustainability
How well does the proposal demonstrate that the product fits into a circular economy, can be manufactured, repaired, and recycled without burdening the environment?
4. Community Connection
How well explained are the idiosyncrasies of local community, culture,

accessibility, and engagement? Are the means and process of communication well documented? Is there a network that engages local federal, state, and traditional leadership?

5. Operability

How well does the proposal demonstrate that customers can operate and maintain the lighting system, and light source without external intervention?

6. Calculation of Breakeven Point

How convincing is the breakeven point presented? With sustainability having a higher priority over low cost, submissions should include (in USD): fixed costs; estimated sales volume; bill of materials; manufacturing costs; transportation costs; cost of sales; cost of training for end-user sales and repair; profit margin.

7. Sales

How convincing is the proposed interface between national distribution and local sales network? How convincing are the plans for training local sales representatives in the sale, repair, and recycling of the product with respect to community engagement?

8. Value Chain

How convincing are the payment and collection plans? Are they proven? How detailed are the plans for local sourcing, manufacture, and repair of the product? How convincing are the arguments for satisfying the constraint of extreme affordability? Have all avenues for cost reduction been explored?