The Team

Introduce your team members:

- Country
- University
- Name of each team member, what you're studying & role in the project
- Any other information you would like to share!

Institute of Engineering and Technology

JK Lakshmipat University, India

Photon Pioneers

Devashish Nagpal

B.Tech (CSE)

Vivek Pareek

B.Tech (CSE)

Sunandini Bansal

B.Tech (CSE)

Circular Innovation Overview

Insert an overview of your circular economy project/startup, for example:

- What is the waste problem you've identified?
- What is your solution?
- Where are you based and what community are you serving?
- What is the current progress that you have made?

Waste Problem:

- Issue: Improper disposal of optical media (CD-ROMs) leads to a significant plastic waste problem on campus.
- Impact: Contributes to environmental concerns and exacerbates plastic pollution.

Solution:

- Approach: Repurposing discarded CD-ROMs by fabricating organic solar cells.
- Benefits: Promotes sustainability, generates renewable energy, and addresses plastic waste issues.

Community Served (Location: Jaipur, Rajasthan, India):

- Outdoor Market Vendors
- Eco-conscious Retreat Centres
- Professionals Eager to Make Sustainable Choices
- Remote Workspaces

Current Progress:

- CD-ROM Separator Layers: Successfully separated layers for fabrication.
- Thickness Profilometer Scans: Conducted for detailed analysis.
- Scanning Electron Microscopy: Utilized for in-depth examination.

Project Goals

Provide an overview of:

- Short and long term goals that you have set for the project
- Any milestones or deliverables that your team has set for the project

Short-Term Goals:

- Spin coat PEDOT:PSS for CD-ROM surface smoothening.
- Spin coat PTB7:C60 at 1000 rpm for a 70 nm layer.
- Utilize UV Microscope to assess photon absorption in the module.

Long-Term Goals:

- Commercialize the developed solar panel product.
- Diversify production to fabricate solar panels on various materials, expanding the product range.

Impact & Results

Give an overview of the achievements and impact so far. For example:

- Any initial goals you have achieved
- Partnerships you have developed
- Product development achievements
- Any milestones you have achieved on the road to implementation of your project
- Any impact your project may have already had
- The environmental or social impact measures that you hope to report on once you have implemented your project

Partnerships:

- *Established Collaboration with IIT Kanpur for Solar Panel Fabrication*

Environmental and Social Impact:

- **Access to Sustainable Energy:** Benefiting Small Power Applications
- **Carbon Footprint Reduction:** Contributing to Environmental Sustainability
- **Affordability and Cost-Effectiveness:** Offering Low-Cost Solutions for Renewable Energy
- **Low Maintenance:** Cost-Effective and Easily Maintained
- **High Circularity:** Repurposing Used Optical Media, Reducing Waste in Manufacturing

Incubation Funding

Give us an overview of what you have achieved with the funding from Circular Cities Asia and The Regional Project Energy Security and Climate Change Asia-Pacific (RECAP) of the Konrad-Adenauer-Stiftung

Acknowledgment of Funding Support

- With the generous funding of $2500 provided by the Circular Cities Asia team and The Regional Project Energy Security and Climate Change Asia-Pacific (RECAP) of the Konrad-Adenauer-Stiftung, we embarked on a crucial phase of our project.

Project Milestone: IIT Kanpur Collaboration

- This funding allowed us to collaborate with one of the finest institutes in our country, IIT Kanpur. Here, we conducted profilometer scans and Scanning Electron Microscopy on five sample CD-ROMs and DVDs. These scans provided real-time insights into the condition of our samples, informing us about the feasibility of our fabrication process.

Analysis and Planning for Next Steps

- The results from these scans are instrumental in determining whether our fabrication process can proceed seamlessly or if intermediate steps are required. The funding covered the costs of these scans and experiments in our initial phase.

Next Phase and Utilization of Funds

- Moving forward, the next phase involves ordering our intermediate substance, PEDOT:PSS, crucial for smoothing the surface of our samples. Additionally, the funding will support the acquisition of PTB7, an expensive yet essential photovoltaic material that forms the foundation of our entire concept.
- This financial support has been pivotal in propelling our project forward, enabling critical analyses and setting the stage for the next steps in our innovative journey. We express our sincere gratitude to Circular Cities Asia and RECAP for their invaluable support.

Lessons Learnt

- Tell us more about what you have learnt from this project and any unforeseen circumstances or challenges you have faced
- What learning experiences helped you to improve your project?
- What skills have you learnt as a result of working on this project?

Learning and Challenges:

- **Material Characteristics:** Gained insights into material nuances like surface roughness and thickness, emphasizing the critical role of material science.
- **Problem-Solving:** Developed adaptive problem-solving skills, particularly in overcoming challenges such as surface roughness through the strategic introduction of a PEDOT:PSS layer.
- **Interdisciplinary Collaboration:** Enhanced teamwork through collaboration with professionals from diverse disciplines, broadening both project scope and individual knowledge.
- **Iterative Improvement:** Embraced an iterative approach, adjusting and enhancing the project based on initial results, a common practice in experimental research.

Skills Acquired:

- **Material Science:** Deepened understanding of materials, including their properties and interactions in specific contexts.
- **Research and Development:** Acquired skills in systematic research, result interpretation, and informed decision-making for continual project improvement.
- **Technical Proficiency:** Developed hands-on expertise in handling and analyzing data, utilizing specialized tools, and employing techniques like spin coating and layering in material fabrication.
- **Problem-Solving and Adaptability:** Honed the ability to identify challenges, think critically, and adapt strategies to overcome unexpected obstacles in the research process.
- **Collaboration:** Improved effective communication and collaboration skills, fostering teamwork with diverse team members, mentors, and professionals.

Stories

If there are any stories, testimonials, quotes or feedback that you would like to give us about your experience of any of the following, please share them here.

- Your experience of the Circular Campus Programme
- Your experience of working on a circular economy innovation project
- Any other outcomes that you or your customers have experienced that you would like to share

- **Commendation to Circular Cities Asia:**
  - ➢ Flawless Learning Experience
  - ➢ Demonstrated Depth of Knowledge, Dedication, and Passion

- **Acknowledgment of Incubation Funding:**
  - ➢ Pivotal Role in Project Journey
  - ➢ Sign of Belief in Our Endeavors

- **Circular Campus Programme Impact:**
  - ➢ Testament to the Importance of Circular Economy Innovation
  - ➢ Catalyst for Positive Change in Communities

- **Appreciation for Execution:**
  - ➢ Well-Executed by Team Circular Cities Asia and Konrad-Adenauer-Stiftung

- **Call to Action:**
  - ➢ Motivation to Encourage Peers for Societal Contribution.
  - ➢ Building a Legacy at Circular Campus Programme (CCP)

Next Steps

Tell us what's next for your project and what your plans are for the future!

You can also write any questions you have for us, or tell us if you're seeking support or connections to help progress your project.

Profilometer Scans at IIT Kanpur:

- Identified Need for Surface Smoothening
- Next Step: Spin Coating with PEDOT:PSS

Fabrication Process:

- Spin Coating PEDOT:PSS for Surface Smoothing
- Subsequent Coating with PTB7:C60 at 1000rpm
- Targeting a Thin Layer of Approximately 70nm
- Heterojunction Fabrication for Solar Cell Module

Testing Phase:

- UV Microscopy at IIT Delhi
- Assess Photon Absorption in Organic Solar Cell Module
- Measure Power Generation, Determining Efficiency
- Critical Step in Evaluating the Viability of the Concept