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ANNUAL REPORT [24-25]

Hoshang Patel Tech Center

Hoshang Patel

TECH CENTER

Submitted to

GHARDA FOUNDATION

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Introduction

Hoshang Patel Tech Center (HPTC) acts as a beacon of innovation, sustainability, and community engagement, striving to serve the greater good. We are incredibly proud to present the 2025 Annual Report for HPTC, located in the Gharda Institute of Technology campus in Lavel. This Report will recount some of our accomplishments of the year, covering Internal and External Engagements our Solar-Agri Research and Product Development projects, Advocacy for Energy-Saving Projects, and Ongoing Development of the Smart Solar Streetlight. We would like to acknowledge the incredible work that the HPTC staff has put in to making the Center's work a success. The people at HPTC are passionate, enthusiastic, and highly skilled. Their eagerness to share this with the larger community has played a large role in our success. Our shareholder, Mrs. Almitra Patel, has contributed significantly both monetarily and by placing her faith in our abilities. Her contributions have aided us in providing lighting in schools.

As we recount these accomplishments, we want to express our heartfelt gratitude to the Trustees of the Gharda Foundation for their unwavering support. We look forward to continued collaboration in carrying forward our shared mission.

Ranaganayakulu Bodavala, PhD

Founder, CEO

I. External Engagement

a. Partnerships in the Ratnagiri District

The New Education Policy (2020), prescribes that Industrial Training Institutes (ITIs) must provide practical training in the solar and other ancillary subjects for students in the electrical and electronics fields of study. The district of Ratnagiri, the district that houses GIT, has a total of 11 it is that were in need of industrial partners that were able to provide their students with 20 – 30 days of practical training in each calendar year.

In the last year, 9 it is have partnered with HPTC for their students to receive two full weeks of residential training on the assembly, production, installation and maintenance of various solar products. In what we consider a sign of progress, 30% of the students enrolled were female. The Lavel ITI sent two cohorts of students, with one cohort comprised entirely of female students.

In collaboration with the Pritam Shetye "Additional Incharge" we organized online meetings to extend this opportunity to all ITIs in the district. Among the ITIs in attendance were Government ITI Chiplun and a private training institute, Shree Rameshwar Sikshan Sanstha. We also had students who attended from the Kolhapur district, from Government ITI Gargoti, 11 of whom underwent solar training, empowering them to crack the MSEDCL Interview, and now working as apprentices in Kolhapur. Aside from practical training, the trainees also attended guest lectures that provided them ample motivation and a lesson on applications of their training.

The Dapoli Agricultural University sent four students for a four-month long internship with GIT, where they underwent similar solar-related training over a longer period of time.

Given these successful endeavors and India's new leaning toward renewable and solar technologies, the Maharashtra Department of Technical Education has requested that HPTC help support its students in learning the solar trade and prepare students for the surge in the demand for solar technicians.

b. Solar Streetlight CSR Project in the North-East

As a Corporate Social Responsibility (CSR) project, Gharda Chemical supported the installation of 500 streetlights along the external borders of Manipur and Nagaland. To achieve this, two local partners were used: the Assam Rifles and the Sun Bird Trust. Training was offered to both partners, with the Sun Bird staff being trained at HPTC and the Assam Rifles staff trained at the installation sites.

The project was had an incredible impact by providing lighting solutions to this remote region and drastically improved the tense relationship between the Assam Rifles, a paramilitary group, and the villages at the North-East border. This project served to improve HPTC's assembly, installation and maintenance processes for solar streetlights, laying the foundation for a more streamlined process down the line. The Sun Bird Trust, to thank the Gharda Foundation, published a short video on their social media page.


LIGHTING UP THE
LIVES OF THE
FAMILIES LIVING IN
REMOTE HILLY
VILLAGES OF
NAGALAND
Village: SOWA
GHARDA
FOUNDATION
Sunbird Trust

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55547/VS/DO/24/

14 Nov 2024

Col Christopher Rego (Retd)
Founder, Sunbird Trust
Mantripukhri
Imphal - 795002

Dear Sir,

1. I am writing to express my heartfelt appreciation for the generous donation of 235 high-quality solar street lights for 16 remote and underserved villages in Eastern Nagaland within my Area of Responsibility. These lights have been a great relief to the residents, providing a basic necessity in areas with little or no electricity.

2. It is with profound sorrow that I have learned of the passing of Dr. Keki Gharda. The nation has lost a remarkable individual whose contributions to agrochemicals and philanthropy have significantly impacted the lives of tens of thousands of underprivileged individuals. The donation of solar street lights to marginalized communities, long affected by insurgency here in Nagaland, is a direct contribution to national integration.

3. The Assam Rifles is honoured to be part of this noble initiative by facilitating the logistics and distribution of the street lights. This effort has helped us win hearts and minds, and has humanized us in the eyes of the simple villagers who have endured significant turbulence in their lifetimes. In particular, I would like to mention your great deed of providing solar street lights to Oting village which has witnessed unfortunate incident and loss of lives in Dec 2021. The installation of the street lights for Oting village sponsored By Gharda Foundation has profoundly helped the healing process.

4. I wish to commend the young Sunbrid team members for their meticulous planning, coordination, and organization of the solar street light distribution. Their passion and professionalism reflect the strong organizational culture of Sunbrid Trust.

5. Given the urgent need for similar outreach efforts, especially here in Nagaland, please be assured of the fullest support of 7 Sector Assam Rifles. If possible, I would request you to kindly take up provisions of another 250 street lights to be installed in other extremely remote villages in Eastern Nagaland. We extend a warm welcome to your donors or their representatives to visit us and witness first-hand the impact of their contribution. Kindly convey our deepest gratitude to the Gharda Foundation for their generosity.

Best wishes & profound regards.

Yours Sincerely

c. Partnerships with NGOs

The State of Maharashtra has well established NGOs working in agriculture and other adjacent fields. In the past year, HPTC has partnered with and supported the efforts of these NGOs to provide solar pumps, solar streetlights and related services. Where relevant, young NGO members are trained on the HPTC campus on servicing these essential solar systems. They are even provided kits to ensure that they are well equipped. Some of the NGOs that we have partnered with are:

- *Manavlok*
- *Solar Energy Society of India*
- *Dang Foundation*
- *Prakruti Prerna Foundation*
- *Benjon desai foundation.*

- *Ram Krishna Hari Old Age Home*
- *Jeevan Vidya Trust*
- *Deolali High School*
- *Baif.org*
- *Rotary Club of Khed*
- *Yek Asha Trust*

d. **Solar Power Systems in Schools**

Seven local schools were provided off-grid solar power systems with the capability to completely power their schools. They were given solar batteries and inverters as well. These serve to meet all of their electricity needs, including running computers and powering pumps. They are used as back-ups primarily, but in 2 schools, they are serving as the main sources of electricity. The teachers and administrators of these schools were trained at HPTC on the installation of these systems, and did so successfully. The funds were raised by the HPTC shareholders, given that it is an incredible cause. In addition, three schools were provided lightly used computers to support student learning.

e. Provision of Lighting Solutions to Local Community

In an effort to better engage with the local community of the Khed area around GIT, HPTC has provided streetlights and study lights, free of cost, to the community over a period of time, spanning the entire region. From temples, to local roadways, to flood-prone areas, HPTC has supported the local people and made off-grid lighting a priority, ensuring their safety and fostering a better relationship with them. Approximately 150 streetlights have been installed in the area.

In addition to solar streetlights, we have also provided certain members of the community with Assendo lights, and Mini Pocket lights. It has made a very positive impact on the lives of the community members, giving them safety from wild animals and empowering them to roam freely. We also encouraged community members to avail of the Prime Minister's Suryagarh Scheme to reap its benefits and reduce their carbon footprint.

- A total number of 568 lights were installed around the time for the society.

    1. Lights installed for the NGOs and trust are **480** which includes Manavlok sunbird trust ,etc.
    2. Lights installed in local villages last year were 75 which involved at most an area of 50 kms radius.
    3. Lights installed in schools and institutions are 35.
    4. Lights installed in mandirs and devotional places are 8.

f. Industrial Visits and Training Programs

We have engaged with various schools, junior colleges and educational institutions in our capacity as an industry. Last year, we hosted a Solar Youth Training Program, open to students from any field, aimed at equipping them with solar knowledge and encouraging its practical application. We also established internships for students from institutions nearby, enabling them to gain on-the-job training.

We also ensured the inclusion of expert guest lecturers from industry experts in the students' training curriculum, enriching their learning experience. Notably, in support of solar installations for lighting in Manipur's terrains, we conducted specialized training sessions for a team comprised of eight representatives from different villages in the Manipur district, covering assembly, installation, and maintenance of solar lights.

g. Industry Interactions

HPTC has actively engaged with prominent industrial players such as Gharda Chemicals, Excel Industries, Dhaka Industries, and Ken Chemicals to foster the adoption and enhancement of solar power technologies. Excel Industries has committed to a joint venture focusing on battery technologies, recycling, and other chemical processes, with a plan to achieve net-zero energy imports. This partnership not only addresses the energy demands of industries but also promotes innovative ideas for sustainable energy solutions. Regular interactions with industry representatives, who share their thoughts, ideas, and visions with students, provide invaluable insights into real-world challenges and innovations. Additionally, HPTC actively motivates and supports upcoming startups in managing and accelerating their growth, providing resources and guidance to nurture entrepreneurial ventures. By doing so, the HPTC is making significant strides in advocating for and implementing solar power solutions while enhancing educational and professional opportunities for students and industry professionals alike. We receive industry guests, visiting professors, and guests of GIT on a regular basis. They are given a tour of our facilities, introduced to our work, and are given a primer on the future of solar adoption.

II. Internal Engagement

a. Education and Training Programs for GIT Students

HPTC is proud to provide a training ground for GIT students to have their practical skills. In the past year, Hptc has trained 10+ GIT students for a 15 vocational training program and two specialized training programs of experiential training programs for electronics students.

Total of 138 trainees were trained in various aspects .

1. Students from our institution : 11
2. Students for 4 months deputations from other institutions : 4
3. Students from Industrial Training institutions : 90 students.
4. Non educational trainees :. 37 students.

Aside from training, HPTC has guided more than 15 student projects, from lending technical expertise to helping source electronic components to fulfill project needs.

b. Opportunities for DIY Projects for GIT students

In another effort to encourage hands-on building, we offered various "DIY Kits" as well as guidance on completing the kits to GIT students. In some cases, where students have innovative ideas and are able to procure their own material, we help them procure the rest, and guide them on completing the project. Some of the following are completed projects:

- NFC Attendance System (ESP 32)
- Collision Avoidance Technology
- Home Automation
- Increased Efficiency of Brushless DC motor fans
- Solar Panel Cleaning Robot
- Solar Cargo Bike.
- EV Solar Charger.

c. Ongoing Maintenance Projects

We have endeavored to not only build solar systems, but ensure their maintenance for the remainder of their lifecycle. Sustainability doesn't end at installation. A few of our steps to carry this out over the past year have been:

- Routine maintenance of solar power systems installed in Bhai Ratan Bhai Gardha Hospital (BRGH).
- Routine maintenance of solar power systems installed at GIT, upgradation of batteries and circuits, and removal and replacing of panels on the roof during the waterproofing of the roof.
- Replacing old, faulty streetlights with new ones at GIT, BRGH and villages where lights were installed.

- Refurbishment of failing water pumps in villages.
- Maintenance of solar power systems installed in schools and provision of new batteries. There are currently 28 schools on our maintenance roster.

d. Workshop Machinery Procurement

With the rate at which HPTC is progressing with product research and development, there was a need for the acquisition of new machinery, which have contributed to the Center's capability immensely. Some of them are:

- MIG Welding Machine
- Plasma Cutting Machine
- Pick and Place Machine for Printed Circuit Board (PCB) Machine
- Reflow Machine for PCB Assembly Completion
- Hilux Pick-up Truck

In the next year, to support HPTC's growth, we intend to procure the following machinery:

- Plastic/Paper Extraction Machine from plastic/paper waste products
- Plastic Injection Machine
- Milling Machine for the GIT Workshop

To reiterate, procurement of all machinery is done at the lowest possible cost while remaining steadfast on the quality and efficiency of the machinery.

III. Solar-Agri Research and Product Development

a. Solar Grow LED Lights (under development)

b. Soil and Moisture Temperature Sensor (under development)

c. Solar Pest Trap

Solar Pest Traps offer an alternative to traditional pesticide-based pest prevention. HPTC has developed an organic, alternate approach that minimizes synthetic chemical inputs and contributes to a healthier and more sustainable agricultural system. It involves using advanced UV light as a pest attractant. This method is effective in various applications, including insect traps, agricultural settings, monitoring and detection, biological pest control, precision agriculture, and indoor pest control. We have developed, prototyped and tested the product and it is in the plastic mould making stage now. In the upcoming year, we intend to produce 1000 testing units, tested by partner farmers. This will be done in collaboration with the Center for Sustainable Agriculture, Hyderabad, which is has spearheaded organic farming in India.

IV. Advocacy and Activism for Energy-Saving Projects

In a world that is increasingly moving toward solar power as a primary source of electricity, our CEO, Dr. Ranganayakulu Bodavala, has strived to encourage state governments and international organizations to support this movement. He has travelled to the World Bank in DC, USAID and other state governments to develop a vision and action plan. Notably, he met with the Chief Minister, Deputy Chief Minister, and Minister of Energy of Orissa, the Deputy Chief Minister and Minister of Energy of Andhra Pradesh, the Deputy Chief Minister of Telangana, and the Chief Secretary and Minister of Energy of Maharashtra.

Through these interactions, and gauging the needs of these various entities, he has developed tailored solar policy and action plans that aim to equip 1 million existing agriculture pumps in Orissa with solar capabilities, 2.5 million agriculture pumps in Telangana, and 2.5 million agriculture pumps in Andhra Pradesh. The project envisions a “Pay As You Go” model, with zero capital investment for governments, and a mere monthly lease for investors.

The project also explores the viability of converting all existing rural and semi-urban streetlights in these states to solar smart streetlights on a monthly lease payment model. These plans have been presented to the state governments of Andhra Pradesh, Telangana, Maharashtra, and Orissa. Similar plans have been enacted, at a much higher cost than we envisioned, by the government of Andhra Pradesh. In contrast, our model offers a far more sustainable, affordable and efficient delivery of processes.

V. Ongoing Development of the Smart Solar Streetlight

This product is the result of five years of technical and design development, experimentation over the creation, assembly, installation, logistics and maintenance of over 4000 smart solar streetlights. While technical, HPTC's incredible work deserves recognition in the following breakdown of some of the various components and aspects of the development of this light. In an addendum to this report, you will find for your perusal, a more in-depth review of the solar smart streetlight.

- *Smart Street Light Operating System (SSL)***:** Unlike basic firmware used in conventional solar lights, the SSL is a full-fledged operating system custom-built to control all functions of the smart light. It handles a wide range of inputs from various sensors, adapts to environmental changes, and executes energy-saving lighting profiles. The OS can isolate faulty components and reroute power intelligently, ensuring continued operation despite individual failures. It also manages LED temperature, ambient moisture, and power routing with advanced logic. This brings unparalleled resilience and adaptability to the system.

- *Wireless Communication and Cloud Integration*: The lights are equipped with wireless modules that enable them to communicate with each other and with a central cloud server. Using a store-and-pass protocol, data can be relayed across multiple units, ensuring reliable transmission even in low-signal zones. This allows real-time monitoring, diagnostics, and remote updates, greatly reducing the need for on-site maintenance. The system can also collect usage and environmental data to improve future deployments. Overall, this feature enhances both scalability and intelligence of the lighting network.

- *Innovative Pole Design:* The pole, made of high-grade Jindal steel, is designed with a folding mechanism that allows easy servicing without the need for specialized equipment. It features an adjustable head that can be oriented for optimal road illumination based on site-specific requirements. The pole is both lightweight and robust, allowing quick

installation and secure anchoring. Anti-corrosion treatments ensure long life even in coastal or high-humidity environments. The pole is square-shaped to maximize stability. The modular structure supports both permanent and temporary installations. The installation of the pole is done based on a custom specification, that lays out the particular diameter and depth of the pit in which the pole is to be installed.

- *Pre-Fabricated Concrete Base or Fast-Cement Anchoring:* For easy deployment, a specially developed, transportable concrete base is used that simplifies field installation. Where transport is a challenge, the system includes a fast-setting cement mix and iron anchoring fixtures that stabilize the pole within hours. This eliminates the need for prolonged curing times and expensive foundation work. The base ensures structural stability and safety in various soil and weather conditions. Both solutions are engineered for speed, strength, and minimal disruption to the installation site.

At Hoshang Patel Tech Centre, we're proud to share the remarkable performance of our solar installation. In a world where power consumption is ever-increasing, our solar system has consistently delivered — operating at 100% of its designed capacity and often exceeding expectations.

While energy providers continue to raise costs under various charges and demands, our solar system stands resilient. It not only covers our own energy needs but also generates surplus power. We are proud to report an average daily generation of over **1,200 units**, helping us significantly reduce dependency on the grid.

Since the plant began operation in **May 2023**, we have generated more than **345.4 megawatt-hours (MWh)** of clean energy. This achievement is more than just numbers — it's a step forward in sustainability and a living demonstration of how solar power can transform our energy future.

We believe our journey will inspire the next generation to explore, learn, and lead with renewable energy. At Hoshang Patel Tech Centre.

With Soalr , we've reduced 470 tons of CO_2 emissions, saved 188.6 tons of coal, and prevented 25,929 units of deforestation—making a real difference for our planet. 🌱

Conclusion

The work that the Hoshang Patel Tech Center has done in the last year has empowered over 300 students and community members. Our community outreach has illuminated villages, schools, and community spaces, enhanced safety, and heightened the quality of life. Our collaboration with other academic institutions and industries has only enriched our environment and strengthened our relationships with the broader community.

The work that the Center has done over the past five years has positioned us to carry out large-scale deployment, advocacy and production of the smart solar streetlight, lighting up the lives of millions, at an affordable rate. We have reimagined what solar streetlights are capable of, completely transforming and elevating their capabilities, and have pioneered a new era of cost-effective, maintenance free lighting for all. We have navigated various geographical, climactic, and sustainable maintenance challenges to create the most accessible smart solar streetlight currently available in the market.

With the continued support of our various Trustees and Partners, we hope to develop a social exchange project within the next year that will sponsor 1,00,000 smart solar streetlights to light up the borders of North-East India. We thank our Trustees and Partners for their unwavering support and look forward to advancing our mission of innovation and community development, together.

Dr.Ranganayakulu Bodavala,

CEO, Founder, Hoshang Patel Tech Center