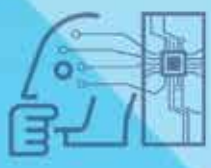
Compendium of Low Carbon Technology Innovations

Selected & Mentored under Low Carbon Technology Accelerator

FLCTD

Promoting Innovation and Deployment of Low Carbon Technologies



Facility for Low Carbon Technology Deployment

DISCLAIMER

The document has been prepared to provide basic information about the project. The information has been compiled by Sangam Capital Advisors taking into consideration the information and the feedback received from the innovators and private stakeholders who were part of the programme.

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FLCTD

Promoting Innovation and Deployment of
Low Carbon Technologies

MENTORING AND CAPACITY BUILDING FOR TAKING INNOVATIONS FROM LAB TO MARKET

अभय बाकरे, आईआरएसईई
महानिदेशक
ABHAY BAKRE, IRSEE
Director General

सत्यमेव जयते

ऊर्जा दक्षता ब्यूरो
(भारत सरकार, विद्युत मंत्रालय)
BUREAU OF ENERGY EFFICIENCY
(Government of India, Ministry of Power)

Message

The Government of India set up Bureau of Energy Efficiency (BEE). on 1st March 2002 under the provisions of the Energy Conservation Act, 2001. The mission of the Bureau of Energy Efficiency is to assist in developing policies and strategies with a thrust on self-regulation and market principles, within the overall framework of the Energy Conservation Act, 2001 with the primary objective of reducing energy intensity of the Indian economy. Some of the notable work includes Perform, Achieve and Trade (PAT) Scheme, Energy Conservations in the SMEs, Star labelling of appliances, Energy Conservation Building Codes (ECBC), and other Demand Side Management (DSM) initiatives to enhance energy efficiency.

In November 2021, India has laid claim on climate leadership by being the only large emerging economy to respond to the call for increased ambitions by announcing the goal to achieve NetZero emissions by 2070. Both renewable energy and energy efficiency are necessary for decarbonization efforts, innovation assumes a greater role to bring out low carbon technologies which present benefits such as reduction in greenhouse gas emissions, reducing demand for energy imports.

It is known that clean technology-based start-ups face various challenges in promoting their innovations in the market and therefore require mentoring, guidance, and financing support for commercial operations. It will help them to grow and sustain their businesses so that society in general and industrial and commercial sectors are benefitted.

With encouraging outcomes from the project Facility for Low Carbon Technology Deployment (FLCTD), the Bureau of Energy Efficiency is interested to see that the innovations are commercialized and adopted by the end-users.

I understand that in collaboration with the Government of India's Start-up India initiative, the FLCTD project is running an Accelerator programme which has identified and built the capacity of 48 start-ups with innovations in the areas of Industry 4.0., Agriculture, Energy Storage, Industrial resource efficiency. The training and mentoring support enable the start-ups to bring indigenously developed products and solutions to the market and provide tangible benefits while addressing the energy and environmental issues. These innovations help to advance the government's key initiatives such as "Start-up India", "Make in India", and assist the government to meet domestic and international commitments.

I would like to take this opportunity to congratulate all the winners and others who have successfully completed the accelerator programme.

Abhay Bakre
(Abhay Bakre)
Director General.

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René Van Berkel
UNIDO Representative

UNIDO
Regional Office in India

Foreword

Over the past decades, the partnership between the Government of India and the United Nations Industrial Development Organisation (UNIDO) has evolved to develop and improve the country's industry, energy and agriculture sectors. The adoption of the Sustainable Development Goals by the global community in 2015, specifically SDG9 (industry, infrastructure and innovation) entrusted UNIDO to assist India and its developing country member states with the transition towards Inclusive and Sustainable Industrial Development.

In 2016, UNIDO started, with the support of the Global Environment Facility, a project with the Bureau of Energy Efficiency (BEE), titled Facility for Low Carbon Technology Deployment (FLCTD). This aims to identify, demonstrate and validate innovative low-carbon technologies for application and commercialization in industrial, commercial and agriculture sectors. The project conducts innovation challenges in six technology areas and identifies the winning innovations which have a replication potential while delivering energy savings and emissions reduction. The winners receive financial support and industry-connect for field trials and independent validation while the subject experts provide mentoring support to improve the efficacy of the innovation. The FLCTD support aids the innovators to 'de-risk' their innovations before commercialization.

In 2019, FLCTD launched its Accelerator which provides mentoring to low-carbon technology start-ups and build their capacity to take their innovations from laboratory to market. The Accelerator helped the development of the business plan and strategy for market entry, and in turn, prepared innovators to raise financing and also to access FLCTD support for technology validation.

India has joined the international community by committing to a zero carbon future. This will not be possible just with solutions that are already proven and feasible. Innovation in technology and production and consumption systems is necessary to achieve the necessary deep decarbonisation across all sectors. Innovations in clean and low-carbon technologies and systems are required that are able to provide tangible benefits to end-users. Increased innovation and commercialization of innovative technologies will enable end-users to meet their own decarbonization targets and will encourage young entrepreneurs to develop low-carbon solutions.

The active interest taken by the Bureau of Energy Efficiency in the implementation of the FLCTD project demonstrates the Government of India's continued support to innovation and development of low-carbon technology solutions which will be required to meet the revised target of emissions intensity of India's GDP by 2030, and for the overarching sustainable energy transition.

This compendium reflects on the learnings of the starts-up in the three cohorts who received training and mentoring support from the Accelerator programme under FLCTD implemented by Sangam Capital Advisors Pvt. Ltd. It contains profiles of 48 entrepreneurs who are ready with clean and low-carbon technology solutions to enter the market. Many of these innovations can also help to advance other Sustainable Development Goals.

(René Van Berkel)

Acknowledgement

The Low Carbon Technology Accelerator Programme - implemented by Sangam Capital Advisors is a part of Facility For Low Carbon Technology Deployment (FLCTD) project which is funded by Global Environment Facility (GEF), and jointly implemented by UNIDO and Bureau of Energy Efficiency (BEE).

We would like to express our profound gratitude to various stakeholders who have contributed towards developing this compendium by providing us with information, observations and suggestions.

Our special thanks goes to FLCTD Project Management Unit for guidance in implementation of the Accelerator programme.

Contents

Industrial Low Carbon Technology

Resource Efficiency

Storage Technologies

Stakeholders

Abbreviations and Acronyms

AI	Artificial Intelligence
B2B	Business to Business
B2C	Business to Consumer
BIRAC	Biotechnology Industry Research Assistance Council
BLDC	Brushless DC motor
CAPEX	Capital Expenditures
CGAR	Compound Annual Growth Rate
CIN	Corporate Identification Number
DFM	Design for Manufacturability
DIPP	Department of Industrial Policy and Promotion
ESCo	Energy Service Company
EV	Electric Vehicle
FLCTD	Facility for Low Carbon Technology Deployment
FPC	Farmer Producer Companies
FPO	Farmer Producer Organization
GCIP	Global Cleantech Innovation Programme
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOI	Government of India
ICE	Internal Combustion Engine
ICT	Information and Communication Technologies
IOT	Internet of Things
LDP	Low Density Polyethylene
MCA	Ministry of Corporate Affairs
ML	Machine Learning
MVP	Minimum Viable Product
NIESBUD	National Institute of Entrepreneurship and Small Business Development
OEM	Original Equipment Manufacturer
Opex	Operating Expenditure
POC	Proof of Concept
PV	Photo-voltaics
R&D	Research and Development
RE	Renewable Energy
ROI	Return on Investment
SME	Small and Medium Sized Enterprises
UNIDO	United Nations Industrial Development Organisation
USP	Unique Selling Proposition

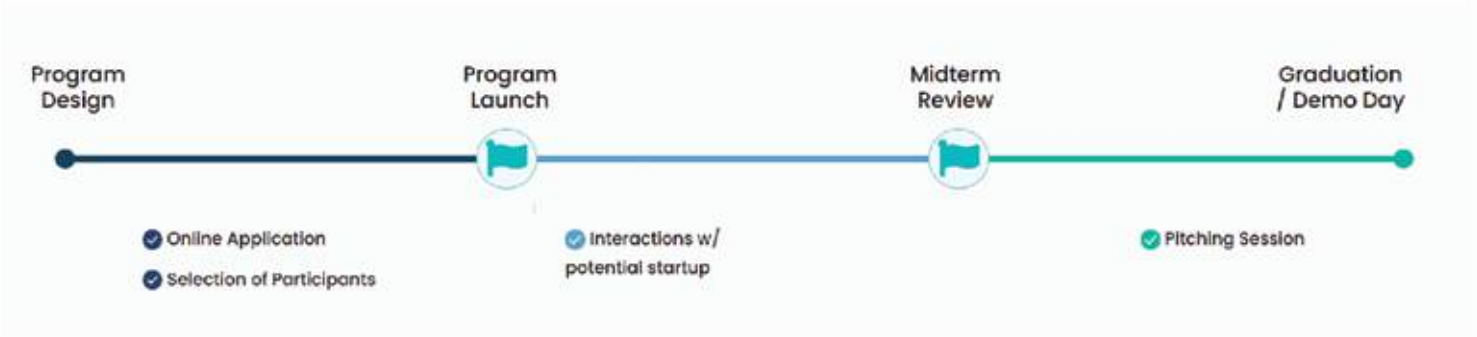
Executive Summary

The Low Carbon Technology Accelerator programme, under Facility for Low Carbon Technology Deployment (FLCTD) - a project funded by the Global Environment Facility (GEF) and jointly implemented by United Nations Industrial Development Organization (UNIDO) and Bureau of Energy Efficiency (BEE) and was launched in 2019. The Accelerator is implemented by Sangam Capital Advisors Pvt. Ltd.

The Accelerator is designed to provide training and mentoring to startups with promising innovations who could not be shortlisted to the final round of the challenge as their application lacked understanding of the market and readiness of the innovation for commercialization.

The accelerator focuses on building 'softer' skills of the entrepreneurs and start-ups in the areas such as business model development, market segmentation, and financial projections. It helps participants to recognize and address critical barriers to the commercialization of their products while strengthening their intellectual property and technology portfolio.

The Accelerator is completing three cohorts and has provided training and mentoring to 47 participants. The participants provided positive feedback on the programme content and design which has been found to be highly relevant to the needs of cleantech start-ups. The programme's emphasis on market research, business development, and financial modelling is considered valuable by the participants. Some entrepreneurs reported major, tangible results (investments, discovery of new markets) that would not have been attained if they hadn't participated in the programme.



The training sessions of the Accelerator were supplemented by the mentors, who coached the start-up on various topics covered under the programme. The mentors are drawn from industry associations, financial institutions, winners of FLCTD innovation challenges, and individuals with long professional and business experience.

This compendium provides a brief introduction to each of the start-ups that have successfully completed the training and mentoring provided under the Accelerator program. Information is organized as per their innovation category and is presented as a one-page information sheet which provides innovation summary, current status level of technology readiness, future plans, and contact information of the Start-up.

Five start-ups from 1st and 2nd cohorts, who completed the training were selected in the 4th annual innovation challenge of FLCTD project is a testimony of the effectiveness of the accelerator. These start-ups are receiving funding and industry connections to validate their innovation for commercial launch. These start-ups will bring forth potential solutions that can help the stakeholders to reduce the energy need and associated greenhouse gas emissions.

About Low Carbon Technology Accelerator

The Low Carbon Technology Accelerator programme has been designed to work with emerging cleantech start-ups through which the selected innovators are trained, mentored, introduced to potential investors, customers and partners. It thus helps start-ups "de-risk" their businesses and become market-ready to gain the confidence of potential clients and investors. Start-ups are then encouraged to apply to the FLCTD Innovation Challenge to avail further support to 'de-risk' their innovation and take it forward towards commercialization.

Three categories of applicants who brought promising technologies to the innovation challenge but could not be selected to the final round are:

- Entrepreneurs who already have an established presence in the market, but have not been able to make a dent in the cleantech/climate technology market;
- Start-ups and entrepreneurs without prior business experience;
- Start-ups and student-entrepreneurs/researchers whose technologies are at the ideation phase or are only prototyped in a laboratory.

It was envisaged that the start-ups could benefit from a business mentoring support programme such that their chances would improve in the future cycles of FLCTD innovation challenges.

Currently, the accelerator programme accepts applications in six categories, which are mentioned in the infographic below.

More than 75 stakeholders of the low carbon innovation ecosystem in the country are directly associated with the programme as mentors; screening committee members; judges; jury; and investors. Promotion and outreach activities are conducted in collaboration with Government of India organizations such as Start-up India, AGNIi, Invest India, Office of the Principal Scientific Advisor. The programme design follows a 'customized support for each start-up' approach since each start up is in a different stage of product development and commercialization. This keeps the start-ups engaged in the various topics of training.

Key features of the program design are as follows:

- Workshops at the beginning, mid-term, and end of the programme – so that the cohort members, Sangam team, UNIDO team, mentors, investors, influencers and others can network and get to know each other.
- Weekly online webinars – interactive webinars delivered by specialists.
- Weekly post-webinar discussion sessions – organized each week after the webinar. This is specifically included to let the founders test their learnings while the programme is going on.
- Mentor-mentee calls – one-on-one calls with deep discussions around challenges faced by the start-up teams.

The alumni have always appreciated and acknowledged that mentoring is the most effective and greatly valued the attention and guidance they have received on their business. Mentors have been selected based on their expertise in venture building and technologies relevant to the FLCTD theme – mentors from other UNIDO programs, FLCTD innovation challenge mentor pool and winners of the innovation challenge are also part of the mentor pool.

The mentors were mapped to a particular innovator depending on the mentor's expertise and mutual interest to set the top priorities for each innovator. Thus, each innovator had to chance to interact with multiple mentors and receive targeted inputs to overcome their business-building challenges. Using this customized support for each start-up', early stage cleantech entrepreneurs equipped with strong technical skills and impressive academic qualifications, are trained and mentored over 4 months to develop a clear business strategy to avoid the common pitfalls which the start-ups otherwise are susceptible to.

The experts and mentors associated with the programme appreciate the programme as an opportunity to stay updated with the developments in the sector and scout for curated opportunities for investments.

A total of 400 start-ups have applied to the programme, out of which 65 start-ups have been selected to the acceleration programme, out of which 48 clean-tech and agri-tech start-ups have successfully completed and graduated out of the program.

The announcement of India's Net zero emissions goal and increased energy-intensity target from 35% to 45%, requires a number of technologies and business solutions to help the energy transition. Innovations such as those supported under the Accelerator for market launch will provide plausible solutions to the end-users to adopt clean / low-carbon technologies to lower energy consumption and reduce greenhouse gas emissions.

AI, ML, IoT & DEEP TECH

Citygen Technology, Jhansi

Innovation: Digitizing Waste Supply Chain for Municipalities

Product Information

Citygen has developed a full stack waste management operating system to bring data driven accountability for all the stakeholders i.e 4000+ urban local bodies, 256 M+ urban households, 6M+ ragpickers, 30K+ recyclers, and 1M+ brand owners.

Category

AI, ML, IoT & Deep Tech

Industry, Innovation Area

Waste Management Supply Chain

Patent/IPR

Patent Application Number: 202211003971

Startup Registration Information

Registered with DPIIT, Reg No: DIPP 85804
Udayam Registration No: UDAYAM- UP-39-0007116

SDG Goals

Wearable Hardware for Waste Segregation

Competitive Advantage

Full stack integration across the waste value chain increases the overall waste collection efficiency.

Market Penetration

GTM strategy is to first plug the problem of urban local body by deploying Citygen Lite Model through public private partnerships which we have developed through our channel partners.

Potential Customers

- Urban Local Bodies
- Banking Partners
- Kabadiwallahs
- Recyclers
- Consultancy Projects

Growth Plans

- Build the final prototype and conducting pilot testing across urban local bodies
- Expanding to 20 urban local bodies in Jharkhand throughout public private partnerships in the next one year
- Manufacturing the hardware device with a sample of 100 units and deploying across all the urban local bodies

About the Company

Citygen technology is a waste management company which acts as a technology enabler for the complete waste management ecosystem.

About the Founder

Saurabh Kumar and Kapil Suhane are the co- founders. They are both graduates from IIT and ISM Dhanbad. Saurabh has been working with waste management sector for the past 5 years and Kapil prior to building his entrepreneurial journey, was working with Schlumberger.

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https://www.linkedin.com/Citygen-Technology

Datamatrix Infotech, Pune

Innovation: Technology Platform to optimize Energy & Water usage

Product Information

Datamatrix is a technology platform for remote monitoring, audit and optimization of energy, water management and asset performance. The technology is built on Digital Twins and AI. It can drastically bring down the cost of instrumentation with significantly enhanced capabilities for improved performance.

Category

AI, ML, IoT & Deep Tech

Industry, Innovation Area

Industrial, Energy & Water Efficiency

Patent/IPR

Patent No: 236496

Startup Registration Information

Registered with DPIIT, Reg No: DIPP28358

SDG Goals

Dashboard for Pump Performance Monitoring

Competitive Advantage

The technology can be remotely deployed across a wide spectrum of industries ranging from manufacturing industries, utilities, agriculture & commercial buildings, at a fraction of the conventional technology cost. The technology platform will help to remotely manage engineering services for industrial utilities.

Potential Customers

- Automobile Companies
- Government Bodies
- Real Estate
- IT Companies

Market Penetration

Technology Readiness Level (TRL) – 9.
Technology is being scaled up.

Growth Plans

- Platform delivery service centre at Kochi
- Setup office at Toronto
- Fund raising for commercialisation

About the Company

A comprehensive technology platform for sustainable energy & water management.

About the Founder

R. Thomas is an electrical engineer with over 25 years of experience in large energy and water projects.

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Impensus Electronics, Madurai

Innovation: Post Harvest Storage Solutions for Fruits & Vegetables

Product Information

IMPact Fresh – an automated filter-based solution for cold storage that not only controls temperature and humidity but also analyses the respiration and hormonal activity of the commodity and controls the gas concentration inside the cold room to elongate its shelf life.

Category

AI, ML, IoT & Deep Tech

Industry, Innovation Area

Agri - tech

Patent/IPR

N/A

Startup Registration Information

Registered with DPIIT, Reg No: DIPP29102

SDG Goals

Smart Controller

Integrated Sensor Module

Competitive Advantage

Unlike conventional storage solutions which only monitors and controls temperature and humidity, IMPact fresh goes a step further to monitor and control parameters like ethylene, carbon dioxide, ammonia and oxygen that helps to preserve the freshness of the commodity and increase its shelf life.

Market Penetration

Impensus has installed systems in Tamil Nadu and Bangalore for farmer producing organizations and direct-to-home grocery suppliers. The company has also exported the systems to Egypt and Qatar.

Potential Customers

- Cold storage & warehouses
- Grocery delivery companies
- FPOs

Growth Plans

- Provide solutions to reduce wastage for fruits & vegetables in transit, then for dairy and meat industry
- Finally, provide end – to – end storage solution for all commodities across the globe

About the Company

Impensus Electronics provide technologically driven modular solutions for post-harvest processes. With the plug–and–play modular approach, the company decentralizes storage infrastructure and elongates the shelf life of the stored items by 1.5 to 2 times.

About the Founder

a) Dinesh Narayanan, B.E. with 8 years of experience in the post-harvest sector.
b) Guru Vignesh V, Electrical & Electronics Engineer and MBA graduate with experience in KPO, and Agri Tech industries.

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Intech Harness, Pune

Innovation: IoT Enabled, Farmer Obedient Pump Controller

Product Information

For farmers facing erratic power & water conditions, this controller automates farm irrigation with an ability to respond to power & water disruption without human intervention, unlike GSM-based controllers.

Category

AI, ML, IoT & Deep Tech

Industry, Innovation Area

Agritech Irrigation

Patent/IPR

Patent No: 309927

Startup Registration Information

Registered with DPIIT, Reg No: DIPP25257

SDG Goals

Competitive Advantage

- The product does not require any human intervention and has the ability to cover up the lost time and respond to disruptions on its own
- The uniqueness of the product is its simplicity. People tend to confuse it with the existing auto starters (lower end of the spectrum) and GSM based controllers that require human intervention

Jalaparayah Autotech Pump Controller

Potential Customers

The end user is the farmer and the company is aquiring new customer through FPO's.

Market Penetration

- The company has signed up 2 dealership agreements with FPO's
- Completed 2 technical evaluations with 2 pump OEMs
- Selected by Afro Asian Rural Development Organisation for accelerating the technology to 30 African nations
- 2 LOI from Agri-tech IoT firms for last-mile delivery of the irrigation schedule

Growth Plans

- Scale-up inventory for sale
- Increase the dealerships
- Fund Raising for scaling
- Hiring the right team
- Streamlining of operations

About the Company

Intech Harness Pvt Ltd is an Agri-tech irrigation company offering a combination of hardware and IoT services. They have developed a solution that addresses the current issues in farm irrigation and handholding the farmer into the future through the modular offering of digital agriculture.

About the Founder

a) Tarang Patel , Co-founder & CEO with 27 years of experience in sales & marketing.
b) Priya Patel, Co-founder - Technical with 17 years of experience in electronics industry.

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Irasus Technologies, Gurgaon

Innovation: Digital twins for Solar PV and Battery Storage

Product Information

Irasus has launched its flagship product Preksha™.
A platform for creating digital twins of physical infrastructure namely solar PV and battery storage. The platform enables data visualization, data analytics and software services.

Category

AI, ML, IoT & Deep Tech

Industry, Innovation Area

Data Analytics For Clean Energy Generation, Storage And Consumption

Patent/IPR

N/A

Company Registration Information

CIN Number: U74999DL2018PTC339203

SDG Goals

Dashboard for Battery Performance monitoring

Competitive Advantage

Irasus is quite modular in terms of the product offering and the benefits for customers begin right at this level. Preksha™ helps to understand the cell & battery pack behavior and the platform builds predictive models that helps to understand more about the battery.

Market Penetration

Technology Readiness Level (TRL) – 6.
Prototype (Minimum Viable Product) ready at a low level.

Potential Customers

- Battery Storage Companies
- EV manufacturing units

Growth Plans

- Scale the current assembly set-up from 150 to 6000 batteries under management
- Increase the amount of processing of batteries from 200 to 500 per month

About the Company

Irasus innovation is a data infrastructure for clean-tech equipment and modular analytical software offering built for acquiring & consuming electricity data to augment the safety, reliability, durability & affordability of low-carbon technologies.

About the Founder

a) Arjun Sinha Roy, MSc (Hons) in Mechanical Engineer & Economics, BITS Pilani.
b) Anirudh Ramesh, B.E. in Electrical & Electronics Engineering, BITS Pilani.

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Living Things, Mumbai

Innovation: Retrofit for Airconditioners to improve efficiency by 15%

Product Information

Living Things Aircon helps to save a minimum of 15% on split/ window air conditioners' energy consumption. The product can be retrofitted easily on the external side of the AC unit that displays the energy usage of the unit.

Category

AI, MT, IoT & Deep tech

Industry, Innovation Area

An IoT Platform to save energy consumption

Patent/IPR

Yet to file Patent for our Proprietary Algorithm

Startup Registration Information

Registered with DPIIT, Reg No: DIPP42687

SDG Goals

Living Things Aircon Module

Competitive Advantage

The product improves the air conditioning efficiency by 15% than 5 star rated air conditioners. It doesn't compromise on human comfort. Living Things is compatible with any brand, make or model of the ACs. It provides real-time quantified data to validate energy savings through active / inactive energy modes.

Aircon Module Fitted on the top of the AC

Market Penetration

Currently installed 150+ devices on ground for over 35 customers. Pipeline of 3,500 devices to be installed over the next 12 months. Technology is at pilot demonstration stage.

Potential Customers

- Chemical Fertilizers
- Glass Industry
- Government Bodies
- PSUs

Growth Plans

- Dashboard improvement as per customer usercase
- Quality Testing Certification
- Patent to be filed
- Scale to 10,000 units in next 18 months to achieve Product Market fit

About the Company

Living Things is a SINE IIT Bombay incubated company with a mission to save on split/window AC's energy consumption to reduce carbon emissions.

About the Founder

a) Madhusudhan Naik, a VNIT Nagpur Alumnus, 2017, in Electronics and Communications Engineering with prior experience of 3 years in an IoT startup.
b) Salil Rana, a VNIT Nagpur Alumnus, 2016, in Electrical Engineering, has 5 years of experience in Marketing.

Contact Information

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https://livingthings.in/

https://www.linkedin.com/in/madhusudhan-naik/

LivNSense Technologies, Bengaluru

Innovation: Decarbonizing the Manufacturing Sector using Real Time Energy Balancing AI

Product Information

GreenOps is a technology platform that provides real-time energy balancing by creating digital twins and harnessing the power of artificial intelligence to decarbonize the manufacturing sector.

Category

AI, ML, IoT & Deep Tech

Industry, Innovation Area

Manufacturing

Patent/IPR

Greenops™

Company Registration Information

CIN NUMBER: U72900KA2018PTC11028

SDG Goals

GreenOPS - Real time SAAS Energy Balance Platform

Competitive Advantage

- Plug and play platform for heterogeneous process data aquisition
- ROI of 20-25%
- Real time predictive actionable insights for rapid response
- Unified digital view of plant operations in real time
- Cloud agnostic platform to improve operational bottom-line and reduce emissions

Potential Customers

- Chemical Mfg Plant in US
- Petrochemical Plants in India, US
- AL Smelters in India
- API Mfg. Companies in India

Market Penetration

Presently, paid pilots are being conducted with 5 customers in India and abroad. With a revenue of US$ 400k in 2020, the company is looking to target both national and international markets.

Growth Plans

The company is planning revenue target of the following:

- FY22: $3M
- FY26: $81M

About the Company

LivNSense is a pioneering industrial AI platform venture that aims at maximizing the profitability of the process manufacturing industry with key focus on process efficiency, energy optimization and GHG reductions.
GreenOps™ is a Digital Twins platform that enables cognitive functions for a cleaner, optimized and streamlined production process to create the factory of the future.

About the Founder

Mr. Avnish Kumar, ounder and CEO with 25+ years experience in the engineering and information technology (IT) industry. He is an alumnus of NIT-Durgapur and MBA from University of Melbourne.

Contact Information

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COMMERCIAL AND RESIDENTIAL LOW GHG TECH

Ant Studio, New Delhi

Innovation: Evaporative Natural Air Cooling Structure for Outdoors

Product Information

Beehive is a natural cooling system that is made of natural materials like terracotta and uses evaporative cooling instead of CFCs. It is a more sustainable alternative to air cooling, especially for outdoor areas. Also the products are locally handmade, which helps in creating employment.

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

HVAC, Evaporative Cooling

Patent/IPR

N/A

Company Registration Information

CIN Number: LLP - AAI - 4731

SDG Goals

Competitive Advantage

The cooling systems are using minimal plastic for production, promoting eco-friendly materials for construction like terracotta. No CFCs are used for cooling, causing negligible harm to the atmosphere. The system is customizable as well as aesthetic and has decorative value.

Market Penetration

The product is at Technology Readiness Level (TRL) 9. The system was installed and tested successfully by a few customers. It has been demonstrated to cool effectively at a few exhibitions and sites.

Growth Plans

- Standardization and mass production of Beehive
- Make product smarter and efficient
- Develop a smaller cooling system (Ether)
- Generate funds for new product development and launch

Beehive: Natural Air Conditioner for outdoors

Potential Customers

- Cafes
- Restaurants
- Farmhouses (outdoor cooling)
- Residencies

About the Company

ANT Studio is an organization working in the intersection of art, nature, and technology. Currently working on providing novel architectural solutions and developing sustainable cooling systems based on terracotta, while engaging with local craftsmen.

About the Founder

a) Monish Siripurapu, B.Arch, SPA Delhi, PG Diploma in Robotic Fabrication at IAAC, Barcelona
b) Brahmi Kavuri, Master of Information Systems from Carnegie Mellon University Experienced Product Manager

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Aproposdrive Technologies, Pune

Innovation: Energy Efficient, Magnet Free SRM Technology for Ceiling Fans

Product Information

Aproposdrive has successfully realized low wattage switched reluctance motor (SRM) technology-based ceiling fan which consumes only 35 watts compared to 75 watts of a conventional ceiling fan. It saves more than 50% of energy at all speeds. The SRM motor is a rare earth permanent magnet free, indigenous technology, that mitigates inherent motor noise, and it is easy to manufacture.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP11533

SDG Goals

Competitive Advantage

The company has developed its efficient SR motor for ceiling fans globally. The company can solve key challenges like power density, inherent motor noise & complex control. Compared to BLDC motor-based fans, this motor is completely magnet-free & easy to manufacture.

Market Penetration

The product is at TRL 7. Prototype (Minimum Viable Product) is ready. Pilot validation was done at IIT Bombay. Currently the company is working with a manufacturing partner for pilot assembly line.

Growth Plans

- Collaboration with industry partners
- Reach TRL 9 through various pilot deployments
- Fund raising for scaling up

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

Electric Motor Drives

Patent/IPR

Patent Granted, No: 331672

SRM technology for ceiling fans

Potential Customers

- Ceiling fan companies
- Consumer appliance companies
- Motor drive companies.

About the Company

Aproposdrive Technologies is a motor technology company that designs motor architecture & develops electronic controller solutions. The company also develops core energy-efficient technology for consumer appliance and e-mobility industry.

About the Founder

a) Dr. Saurabh Nikam, M.Tech + Ph.D. in Electric Machines from IIT Bombay leads Motor Development
b) Nimish Kothari, M.Tech in Power Electronics from IIT Bombay leads Electronic Development.

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Diffuson Coatech, Chennai

Innovation: High Temp. Resistant Low Friction Diffusion Coating for Corrosive and Acidic Environments

Product Information

MetaBoid is a reactive diffuson technology that can provide high hardness of over 1700 HV and a low friction coefficient. MetaBoid is highly wearing resistant even at high temperatures in abrasive and corrosive environments. MetaBoid is up to 50x superior compared to processes like nitriding and carburizing.

Category
Commercial and Residential Low GHG Tech

Industry, Innovation Area
Mechanical, Materials, Surface Engineering

Patent/IPR
N/A

Startup Registration Information
Registered with DPIIT, Reg No: DIPP57276

SDG Goals

Competitive Advantage
MetaBoid can provide the highest wear protection compared to any commercially available coating in its market. MetaBoid protects products from abrasion even at high temperatures and corrosive acidic environments. Diffuson's technology can perform 20% longer than (HVOF WC) material and costs less by 40%. MetaBoid offers a high production rate and flexible batch sizes.

Hardness & friction measurement of MetaBoid

Market Penetration
The product is at TRL 7. Prototype (Minimum Viable Product) is ready. Pilot validation was done with industrial customer. Currently working with the food & beverages industries of Gujarat for pre-commercial deployments.

Potential Customers
- Oil and gas industry
- Aerospace industries

Growth Plans
- Set up large scale manufacturing plant
- Acquire additional customers
- Fund raising for commercialization

About the Company
Diffuson Coatech is a manufacturer of high-performance surface protection coatings for OEMs who wants to enhance the durability of machine elements.

About the Founder
a) Mr. Atul is an M.S. graduate in surface engineering with 4 years of industrial R&D experience.
b) Mr. Chandra Shekar is a Mechanical Engineer with 20+ years of experience in domestic and foreign manufacturing industries.

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ENRECOVER Energy Recovery Solutions, Pune

Innovation: Low Grade Waste Heat to Electricity Solutions for the Industry

Product Information

Enrecover system helps to recover the industrial/geothermal un-used or waste heat at a lower temp (700°C to 2500°C) and converts into electricity. It is a binary system in which the waste heat from the source(temp 700°C to 2500°C) is extracted by the fluid and is allowed to expand through a radial outflow

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

Manufacturing (Energy)

Patent/IPR

Patent Application No: 20202101889

Startup Registration Information

Registered with DPIIT, Reg No: DIPP4810

SDG Goals

Competitive Advantage

Enrecover's innovation in Turbo genset (Radial outflow) and cost effectiveness in overall technology, meets international standards. Enrecover also offers modular (50 kW), cost effective and customer centric solutions.

ERP sytem for power generation

Market Penetration

The product is at TRL 7. MVP is completed. Pilot validation done with Industrial customer. Currently working with dairy, pharmaceutical, steel & paper industries in India for commercial deployments.

Potential Customers

- Geothermal industries
- Marine & steel industries
- Chemical refineries
- Petrochemical industries
- Tyre & rubber, Pharmaceutical, Paper & pulp, distilleries, etc.

Growth Plans

- Targeting OPEX (BOOT) model for expansion
- Set up a fully automatic manufacturing & testing facility
- Fund raising for intensive R&D and ESCO Model

About the Company

Enrecover technology generates clean electricity through waste heat & pressure sources from the geothermal and industrial waste sources by using binary fluids and optimum system. It helps to reduce carbon emission from the environment which enables industries to gain carbon credit.

About the Founder

a) Abhijeet Chaudhari (M. Tech in Energy from VIT University, Vellore).
b) Prajyot Singh Bisen (M. Tech in Power Electronics from VIT University, Vellore).
c) Sagar Shelot (M.B.A in Marketing)
d) Nikhil Chougale ((M. Tech in Energy from VIT University, Vellore).

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Integrative Design Solutions, New Delhi

Innovation: IoT solutions for optimising Building Energy Resources

Product Information

ISEE is an IOT based operational energy efficiency solution, using machine learning & artificial Intelligence based controls for the optimization of energy resources in buildings. ISEE-Opta is an on-field cloud-based controller which is supported by a software platform.

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

Built environment, IOT & AI

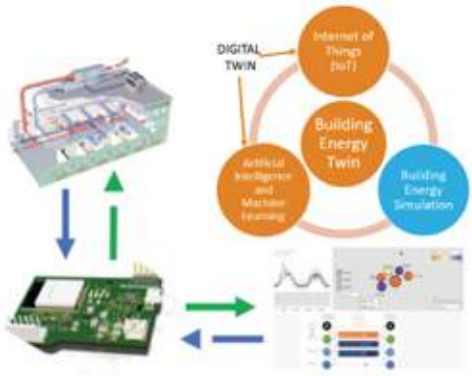
Patent/IPR

N/A

Startup Registration Information

Registered with DPIIT, Reg No: DIPP44200

SDG Goals



Cycle of buiding energy twin

Competitive Advantage

ISEE provides instant intelligence on the building energy through field sensor devices and helps reduce the building energy consumption by 10- 35% using on-field cloud-based controllers. Unlike competitors, ISEE uses Building Energy Twin (BET) for predicting accurate energy-saving actions. ISEE aims to 0.2 MnT-CO2 emission reduction in the next 5 years.

Potential Customers

- Hospitals
- Hotels
- Airports
- IT parks
- Shopping malls
- Retail stores.

Market Penetration

The product is at TRL 6. Prototype (Minimum Viable Product) ready. Pilot validation done with UN Office building, New Delhi. Currently working with shopping malls and retail stores for installations.

Growth Plans

- Set up field devices manufacturing unit
- Reach TRL 9 through large scale pilot deployments in commercial buildings
- Fund raising for commercialization

About the Company

IDSPL is a cleantech start-up working on the development of innovative products and processes to augment sustainability and human comfort in the built environment. This is done through the development and deployment of innovative and cutting-edge scalable solutions to address energy,

About the Founder

a) Kanagaraj Ganesan, 13+ years experience in building energy efficiency sector
b) Roopa Nair, 12+ years experience in architectural design.

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IX Energy, Noida

Innovation: Converting Existing HEV to Partial/Full electric

Product Information

The kit converts existing vehicles into hyrbid electric or battery electric. The kit can be installed on to diesel/CNG vehicles of any make. The kit has been certified at ICAT and improves fuel economy by 25%. The two products are Electric Synergy Drive (ESD) for partial electrification and Electric Energy Drive (EED) for full electrification.

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

Automotive, E-mobility

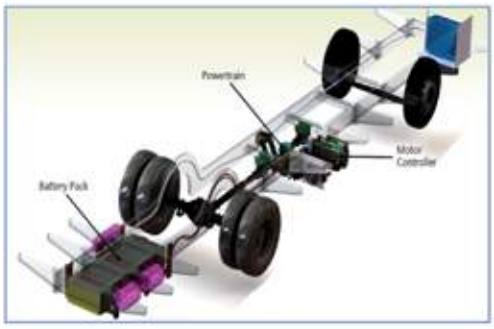
Patent/IPR

N/A

Startup Registration Information

Registered with DPIIT, Reg No: DIPP14169

SDG Goals



Electric Synergy Drive System

Competitive Advantage

- Most competition has moved towards full electrification
- IX Energy is one of the only ones in the heavy commercial vehicle category
- Unlike other solutions, IX kit is removable and the vehicle can be restored back if and when needed allowing the kit to be used for a new vehicle base

Potential Customers

- State transport corporations
- Private fleet operators
- Logistics companies.

Market Penetration

The product is at TRL 7. Prototype (Minimum Viable Product) ready and certified with ICAT. Pilot validation is in progress with customers.

Growth Plans

- Scale our current assembly setup
- Scale deployment with fleet owners
- Increase tech and sales team

About the Company

IX energy converts conventional heavy ICE vehicles into hybrid or fully electric vehicles through kits that are commercially viable allowing faster adoption of electric vehicles on Indian roads.

About the Founder

Anshu Dewan, Bachelor's in Electrical Engineering from Illinois Tech, Chicago, MSc. in Computer Science from the University of Chicago. He has over 23 years of experience in software, sales & business development.

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NewGen Cleantech, New Delhi

Innovation: Thermal Energy Storage & Delivery System for Cooling Commercial Building

Product Information

NewGen COOL (NGC) is a patent-pending hydrate technology in which proprietary solution changes phase to ice-like compounds and releases heat. NGC utilizes this phenomenon to produce and store a chilled slurry during off-peak hours for thermal energy storage (TES). NGC slurry is then utilized during peak hours to deliver the desired cooling in commercial buildings.

Category

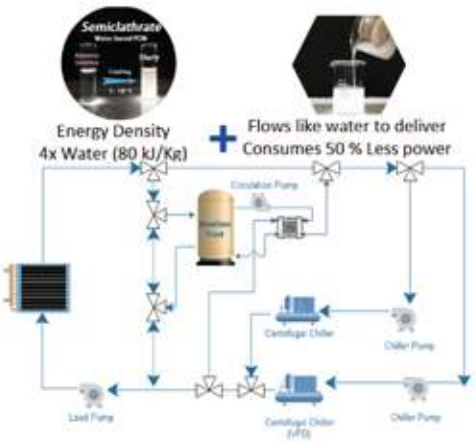
Commercial and Residential Low GHG Tech

Industry, Innovation Area

Commercial, Process Engineering

Patent/IPR

Patent Application No(s): WO2020117129A1, 10202013036T



Thermal Enegy Storage & Delivery (TES+D)

SDG Goals

Competitive Advantage

Newgen COOL can store 4x energy vs chilled water at 7-100°C, unlike other TES systems, can flow to deliver the cooling across building. NGC slurry consumes 50 % less pumping power, and can increase building efficiency up to 30 %, and save 50% CAPEX for new installations. The potential to mitigate CO2 in next 5 years is up to 35,000 Mnt.

Market Penetration

The product is at TRL 6. Prototype (Minimum Viable Product) ready. Pilot validation was completed with an urban farming partner for 2 RT systems.

Potential Customers

- IT parks
- Office buildings
- Shopping malls
- Hotels
- CA buildings.

Growth Plans

- Commercial scale pilot deployment to increase TRL > 8
- System integration with building management system for wider commercialization
- Fund raising for commercialization

About the Company

NewGen COOL is a technology initially developed by NewGen Gas Pvt. Ltd. A National University of Singapore spin-off, NewGen Cleantech - the Indian Subsidiary, is currently seeking pilot collaborators.

About the Founder

a) Dr. Maninder Khurana, Ph.D. in Chemical Engineer, Management of Tech., Black Belt LSS
b) Prof. Linga (NUS), Hydrate technology expert, › 18 years R&D.

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Nettoyer Automotives, Pune

Innovation: Hybrid Electric Retrofit kit for Two Wheelers

Product Information

The company has developed a hybrid electric retrofitting kit which can convert a conventional petrol engine scooter into a plug in hybrid electric vehicle. By using the technology, users can reduce the cost of operation by 90% and reduce the emissions emitted from the vehicle by 72.46%. The user can travel on electricity as well as on petrol whenever they are out of electricity.

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

Automotive Powertrain Design, Hybrid electric

Patent/IPR

Patent pending.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP43610

SDG Goals

PHEV Kit and Motor controller with wiring connection

Competitive Advantage

This technology eliminates the worry of range anxiety on the vehicle. It is unique, economical and saves cost of travelling by using a hybrid (electric + petrol) powertrain on the same vehicle.

Potential Customers

- Vehicle OEMs
- Last mile delivery and fleet operators
- Sales executives and traders

Market Penetration

The product is at TRL 5. The company has completed 25 paid pilots projects with customers. Currently, the company plans to develop an optimized design of motors to provide high efficiency and performance.

Growth Plans

- Development of optimized designs by computer-aided engineering analysis
- Development of dyes
- Development of testing facility
- Initiating sales

About the Company

The company develops hybrid electric and full electric powertrain systems for vehicles.

About the Founder

Ravindra Joshi, completed his B.E. in Mechanical Engineering, He has a prior experience in developing P3 and P4 based powertrains for two wheelers, three wheelers and four wheelers.

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Panjurli Labs Panjurli Labs, Udupi

Innovation: Portable Dust Collector for Construction Sites

Product Information

The Dust Collector is a portable device, capable of purifying air in construction sites. The device uses thin film air filtration technology to trap construction dust. 85% of escaped raw materials can be recovered and can be reused using materials retention system in the device.

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

Air Pollution Control, Dust Collectors

Patent/IPR

Patent pending.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP89129

SDG Goals

Competitive Advantage

- Thin film filters developed by Panjurli Labs never clog during operations and have a self-cleaning mechanism.
- The device consumes 40 W power, requires less maintenance and is customizable as per the needs of the customer.

Dust Collector

Market Penetration

The product is at TRL 5. They have completed the prototype in the month of January of 2022 and currently are working on the MVP.

Growth Plans

- MVP of dust collector
- R&D of indoor and outdoor air purifier
- Clean room and clean air ecosystem
- Dust collector for other segments
- HVAC and IAC filters

Potential Customers

- Construction companies
- Civil contractors
- Renovation contractors
- Interior decorators

About the Company

Panjurli Labs is a startup aiming to reduce global air pollution levels using newly invented thin film air filtration technology.

About the Founder

Ashik S V, TEDx speaker ,an automobile engineering graduate from Bangalore has invented a patent pending thin film air filtration technology. His invention has been published in more than 20 media articles. Winner of Climathon 2021.

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Prayogik Technologies, Bhopal

Innovation: Thermoelectric Module Static generator for converting Heat Energy to Electricity

Product Information

TMSG is a highly reliable remote power supply unit working with natural gas or propane. TMSG generates electrical power by converting heat energy directly into electricity. It does not contain moving parts, has an extremely long lifetime, and requires minimal service.

Category

Commercial and Residential Low GHG Tech

Industry, Innovation Area

Industrial, Military Services, Oil and Gas

Patent/IPR

Patent Application No(s):
E- 106/545/2018/MUM

Startup Registration Information

Registered with DPIIT, Reg No: DIPP36732

SDG Goals

Competitive Advantage

- More efficient (9%) as compared to existing solutions
- Specially designed TMSG-DC in concern with Indian weather (High Humidity, Warmer Country +50 deg, Rain, Storm
- Smaller in size, weight and No separate GCS(Gas Conditioning System) in TMSG –DC
- Commercially 40% cheaper than existing competing products

Market Penetration

The company has successfully tested the product TMSG-DC-200 at Siachen Indian Army Base Camp for military purposes which we want to expand to US military services as well including the Oil & Gas Market.

Thermoelectric module static generator (TMSG-DC-200)

Growth Plans

- Set up large scale manufacturing plant
- Large scale pilot deployment with industrial clients
- Fund raising for commercialization

Potential Customers

- Defence Sector
- Oil and Gas Industry

About the Company

M/s Prayogik Technologies is working towards power management solutions and has partners like GAIL India which has supported them in field pilot in oil & gas for cathodic protection of pipelines.

About the Founder

Mr. Vijay Mamtani MBA in Oil & Gas from UPES Dehradun and B.Tech in electrical engineering from MANIT Bhopal.

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FOOD AND AGRICULTURE

Agpharm Bioinnovations, Patiala

Innovation: Bio-Based Shelf-Life Enhancer for Reducing Post Harvest Loss

Product Information

Agpharm Bioinnovations has developed a novel microbial bioformulation, which is maximizing the post-harvest shelf life of fruits and vegetables (F&V) by creating a modular atmosphere in the F&V storage container thus reducing microbial decay and deterioration.

Category

Food and Agriculture

Industry, Innovation Area

Agri-Biotech, Industrial Biotechnology

Patent/IPR

Patent Application No. 202011041628

Startup Registration Information

Registered with DPIIT, Reg No: DIPP34172

SDG Goals

Microbial bioformulation for maximizing shelf life of fruits and vegetables

Competitive Advantage

A novel bioformulation that drastically reduces the post harvest wastage and loss of F&V by 30-40%. It can extend the post-harvest shelf life by 1-3 weeks. Unlike expensive, hazardous chemical-based interventions, the novel bioformulation (VOLAFRESH™) is sterile, non- residual, eco-friendly, cost-effective, end-user-friendly. It has the potential to mitigate 5000 Mnt CO2 in next 5 years.

Market Penetration

The product is at Technology Readiness Level (TRL) 4. The product is ready for pilot trials with farmers and corporate clients to reach its MVP for commercialization.

Potential Customers

- B2C and B2B players in agri business Supply Chain
- Government organizations and cooperatives
- NGOs

Growth Plans

- To achieve TRL7
- Piloting with different stakeholders and simultaneously explore strategic partners for large scale manufacturing and licensing.

About the Company

A biotech start-up providing affordable biotechnology-based solutions in the area of agriculture, food and health. The company's portfolio entails cost effective products to enhance the post-harvest shelf life of grains, fruits and vegetables from farm to fork.

About the Founder

Dr. Sanjai Saxena, M.Sc. In Biological Sciences, Ph.D. in Biotechnology, 20+ years leadership experience in the interface of Biotechnology and Pharma.

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Crop Domain, Bengaluru

Innovation: Microbial Solutions to Reduce Insect & Pest attack

Product Information

Crop Domain has developed novel strains of the bacterium which are proved to be highly effective against agriculturally important insect pests. They have developed innovative cutting-edge solutions using new knowledge of the root-associated micro biome to create novel products.

Category

Food and Agriculture

Industry, Innovation Area

Agribiotech; Industrial Biotechnology

Patent/IPR

N/A

Company Registration Information

CIN Number: U74999KA2017PTC102649

SDG Goals

Fermenter setup for the microbial production

Competitive Advantage

- Continuous innovations create the next wave of bio agricultural products via discovery and development of biopesticides as well as combination products to overcome growing pest resistance and active ingredient dosage issues.
- Fast and accurate – eliminates pests within 48 to72 hours
- Cost effective – 60% reduction in pest managementcosts
- Biodiversity restoration and conservation

Potential Customers

- Smallholder farmers,organic crop growers, urban farming community
- Seed industries, nurseries & agriculture research institutions.

Market Penetration

The product is at TRL 7. Pilot scale demonstration of the technology (100 L or 100 Kg Scale) and technology demonstration in an actual environment is done.

Growth Plans

- Certifications - CIBR & International
- Set up a large-scale manufacturing plant
- Reach TRL 9 through large scale pilot deployment with industrial clients
- Fund raising for certifications, commercialization and global expansion

About the Company

A bio-tech start-up working with a vision to unlock the secrets of the root microbiome of immortal plants, thus increasing farm productivity through innovative, cutting-edge and cost-effective solutions.

About the Founder

a) Dr. Mahadeva, 12 years of experience in Industry & Research Institute exploring molecular biology, protein engineering, DNA barcoding and microbial biotechnology.
b) Lavanya, 11 years of experience in industrial biotechnology.

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Farm-Hand, Bengaluru

Innovation: Farm Digitizing Solutions for Connecting Farming Organizations

Product Information

The Farm-Hand Platform democratizes farm digitization and solution connectivity for farming organizations. The platform is a data-driven farm survey/management and agri-solution marketplace platform, allowing farming organizations to digitize and manage their farmers and filter market solutions based on farm characteristics and operation needs.

Category
Food and Agriculture

Industry, Innovation Area
Agri., E-commerce, Data Analytics

Patent/IPR
International Patent No:
PCT/EP2020/082742

Company Registration Information
CIN Number: U72900KA2020FTC135445

SDG Goals

Dashboard for farm management system

Competitive Advantage

Farm-Hand Platform provides a one-stop farm data management visualization platform for the aggregator and uses forecasting and community review approach to increase transparency, trust & quality control in selecting agri-tech solutions & services.

Market Penetration

Farm- Hand Platform is at TRL 7 and pilots are currently being conducted. Farm-Hand has agreements for 1000+ farms and is working with 5+ agri-solution companies for platform integration.

Potential Customers

Farming aggregators growing high-value crops in Karnataka, Gujarat, Tamil Nadu and Andhra Pradesh and agri-solution companies.

Growth Plans

- Reach TRL 9 of the Farm-Hand Platform
- Integrate 40 agri-solutions onto the platform
- Fundraising for commercialization and scale-up with partners

About the Company

Farm-Hand is an agri-tech solution provider, turned solution broker. The company has also developed Water-Hand (TRL 9, focusing on crop specific precision irrigation). To accelerate the transition to sustainable and productive farming practices, farming organizations and farmers,the company is focusing on an ecosystem approach.

About the Founder

a) Abhimanyu Bhargava (MA Hons), Development Economist
b) Dr. Andrew Peacock (Ph.D.) – Domain expert in the energy system and irrigation modeling.

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Green Cross Agritech, Ahmedabad

Innovation: Multipurpose Waste Decomposer to stop Stubble Burning

Product Information

Green Cross Agritech has developed a multipurpose waste decomposer Trinetra, made from microbial consortia and enzymes. Trinetra is for all small and marginal farmers who are suffering from degrading land or who resort to crop residue burning due to problems in land preparation or decomposing farm waste.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP43436

SDG Goals

Competitive Advantage

Trinetra application is simple as compared to other decomposers. Its fast in action with low cost. Time taken for manure preparation is as low as 30-45 days with very less cost. Trinetra can be applied for farm residue burning prevention, farm yard manure preparation, land reclamation & reviving soil microflora, zero-budget natural farming etc. The decomposed manure from Trinetra is rich in carbon and other micro nutrients that is used as a fertilizer for the succeeding crop.

Market Penetration

The company has already generated Rs 91 lakhs in revenue through its dealer network in Gujarat. The company will be now expanding to online channels and B2B / Govt. sales

Category

Food and Agriculture

Industry, Innovation Area

Organic Agriculture, New generation Waste decomposer.

Patent/IPR

Green Cross Trinetra – Trademark reg.

Trinetra: multipurpose waste decomposer

Key Clientele

- Farmers & food factories
- Government bodies providing subsidy for organic farming

Growth Plans

- POC validation from reputed ICAR bodies for further growth (DMAPR)
- After fund raising, scaling up of sales to 2000 MT in next 2-3 years. The estimated revenue will be 170 crores
- Carbon credit capturing (additional revenue model)
- Green funding for project expansion

About the Company

Green Cross Agritech is a bootstrapped DMAPR incubated startup based at Ahmedabad Gujarat aiming to provide approved organic agri inputs for framers at low cost.

About the Founder

Jayesh Raninga, an M.Sc. in Agri-Plant Pathology, 2003 from Junagadh Agri University with 13 years of experience in agrochemical marketing and development.

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Healventure Biosciences, New Delhi

Innovation: Insect Protein based Poultry & Aquaculture Feed

Product Information

"Buggy" is an Insect protein based aquaculture and poultry feed which is rich in antimicrobial peptides to enhance immunity and survival rate of livestock animal. Unlike other animal or plant protein based feeds, Buggy doesn't require any growth promoter or antibiotic as an additive.

Category

Food and Agriculture

Industry, Innovation Area

Agri- Biotech

Patent/IPR

Patent Application No: 202011010000

Startup Registration Information

Registered with DPIIT, Reg No: DIPP54795

SDG Goals

Competitive Advantage

Healventure utilises organic waste to rear insects and are also working on a zero waste policy. Through their patent-pending technology, they are utilizing all by-products produced in bioconversion. This is helping to reduce expenses on antibiotics and growth promoters and also save feedcost by 20-30%. A single bio-convesion unit can mitigate upto 1500 tons of CO_2 in next 5 years.

Aquaculture feed for fish

Market Penetration

The product is at TRL 7. Prototype (Minimum Viable Product) ready. Currently working with early adopters in U.P. and Odisha.

Potential Customers

Poultry & Aquaculture farms.

Growth Plans

- Set up bioconversion unit with feed mills in U.P. East, M.P and Odisha
- Fund raising for further R&D and establishment of bioconversion units in other states

About the Company

Healventure Biosciences is a biotechnology start-up developing nature's solutions for chemical-free agriculture and replacing antibiotics from livestock farming.

About the Founder

a) Dr. Sumit Saxena, 10+ years' experience in the healthcare industry
b) Dr. Megha Saxena, Alumni of AIIMS New Delhi, former faculty at Government Medical College, expertise in antimicrobial peptides.

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Oscillo Machines, Mysore

Innovation: Electric Farm Machinery for Small and Medium Farmers

Product Information

Oscillo machines has developed a new age electric farm machinery implements and tools for small and marginal farmers. Their products include:

1. Root washed paddy transplanter
2. Electric paddy weeder
3. Electric poultry racking machine
4. E-DSR (Direct Seeded Rice)

Category

Food and Agriculture

Industry, Innovation Area

Farm Machinery. Farm Mechanization

Patent/IPR

Patents applied and published in 2021

Startup Registration Information

Registered with DPIIT, Reg No: DIPP46783

SDG Goals

SRI Single Row
Electric Paddy Weeder

Electric Polutry
Raking Machine

Competitive Advantage

The farm machines are operated by integrating the traditional practices, easy to adapt, affordable and require low maintenance. These machines are durable and lightweight for women farmers use and can be repaired locally.

Market Penetration

Electric weeder and poultry racking machines are commercially sold across the country. For transplanter and E-DSR, the company is validating with field trail partner in upcoming kharif season.

Potential Customers

- Small and marginal farmers
- CHC's, SHG's and FPO's

Growth Plans

- Completing piloting with field trail partner
- Marketing and production of 180 units per year
- Promoting through demo camps and expo's
- Certification from Central Farm Machinery Training and Testing Institute

About the Company

Oscillo Machines tries to address the problem about adaptation mechanization for any crop cultivation. Keeping both traditional approach and modern technologies integrated in their products, the company tries to bring out complete solutions for the Indian farmers.

About the Founder

a) Prajwal M, MSc. in Physics from University of Mysore.
b) Shivanand S, M.Tech in Machine Design,VVCE Mysore.

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Pelican Thermogenics, Alappuzha

Innovation: Microwave based Systems for Dehydrating Food

Product Information

Pelican's MuMah (Multiple Magnatron Heating System) is a microwave based dehydration system with multiple low capacity magnetrons in a central rotating shaft. It does rapid dehydration of food, keeping it from decaying and also keeping the nutritional value intact. The present unit is a 3kW system capable to dry 100 kg in 4 hours.

Category

Food and Agriculture

Industry, Innovation Area

Industrial Machines, Energy Efficiency

Patent/IPR

Patented Technology in China & Australia.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP54017

SDG Goals

Competitive Advantage

The MuMah system is affordable (6o-7o%), cheaper than present MW systems and with low-temperature drying (~60-65°C) using a vacuum. It is faster, modular, and scalable from 100 kg to 1000 kg / batch of drying. The patented technology is easy to operate and takes less space compared to other conventional and solar dryers.

Market Penetration

The product is at TRL 5. The company has completed its first working prototype of a 3kW system (100 kg). Testing & certifications are ongoing. Customer trials will begin soon.

Growth Plans

- Build MVP and conduct testing at the customer site
- Testing & certification
- Design for manufacturing units
- Set up a manufacturing unit for MuMah

Pelican's MuMah: Multiple Magnatron Heating System

Potential Customers

- Food processors
- Farmers
- Farmer cooperatives

About the Company

Pelican is building the most efficient heating system using microwave technology. Their heating system is going to be in every waste management system, agriculture industry and food industries.

About the Founder

a) Dr. Priya, in Chemistry of Natural Products has 25 research papers & 11 International patents.
b) Dr. Manoj, Ph.D. in Natural Products Chemistry, has experience in the process industry, organic agriculture & waste management.

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Sand Bird, Chennai

Innovation: Smart Electric Tiller for Farm Application

Product Information

Sand-Bird has developed a smart electric tiller - Magma, a semi-automated system that can be remotely controlled and also offers GPS-enabled tracking, swappable battery, and retrofittable Agri- attachments. The 10kW version has a run-time of 4hrs with a remote operation range of 2km and a maximum speed of 15 kmph.

Category

Food and Agriculture

Industry, Innovation Area

Electric Vehicle, Agri-Equipments, Automotive Drivetrain

Patent/IPR

Design Patent filed in 2019. Yet to be granted.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP56686

SDG Goals

MAGMA: Smart electric tiller

Competitive Advantage

Magma offers 2x higher power and torque than conventional tillers. It reduces the operational cost by 10x and 3x lower lifetime expense for a rental agency. It also reduces operational cost by 25%. The rental model makes this product affordable for smallholder farmers. The Electric tiller has the potential to reduce 60 Mnt Co2 in next 5 years.

Potential Customers

- Large farmers
- Machinery Rental Agencies

Market Penetration

The product is at TRL 6. They are currently conducting pilots of their 3rd prototype with FPCs, rental agencies. They have LOIs from FPCs interested in buying the product.

Growth Plans

- Certification done
- Sell 8000 units and reach out to 5 lakhs farmers
- Upgrade to a fully autonomous vehicle by 2026

About the Company

SandBird is a tech organization to analyze problems, design and develop new products for agriculture and farm mechanization units.

About the Founder

a) S. Bala Surya comes with a farming background with 4 patents in product development with a passion to interact with farmers to solve their problems.
b) Ajith Kannan, B.E. Mechanical Engineer with 3+ years of experience in off-road vehicles and bikes product development.

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Saptkrishi Scientific, Kanpur

Innovation: Micro-Climate based Transportable Storage Solutions for Fruits & Vegetables

Product Information

Saptkrishi has developed a Preservator/ Sabjikothi that is a wheel mountable storage for transportation of fresh fruits and vegetables. It is a cost-effective, microclimate-based, portable storage that extends the shelf-life and preserves the freshness of fruits and vegetables anywhere between 5 to 30 days. It requires 20 watts of power and 1 litre of water every day to store up to 300 kg of fruits and vegetables.

Category

Food and Agriculture

Industry, Innovation Area

Post – harvest Agriculture

Patent/IPR

N/A

Sabjikothi: wheel mountable storage solution

Startup Registration Information

Registered with DPIIT, Reg No: DIPP35516

SDG Goals

Competitive Advantage

- First-mover advantage
- An alternative solution to this product can be small cold-storage units but they require high installation and maintenance costs
- Sabjikothi/ Preservator is a cost-effective, high-tech, and eco-friendly solution

Potential Customers

- Small & medium farmers
- Vendors & traders in the agri-supply chain

Market Penetration

Minimum Viable Product tested, third-party validation completed and pilot ongoing at Bhagalpur Bihar. Partnering up with structure of trusted NGOs, self-help groups, and micro finance institutions.

Growth Plans

Raise venture capital for commercialization and setting up own manufacturing unit for production.

About the Company

Saptkrishi is a young agri-tech startup incubated at IIT Kanpur, with youth in decisive roles who are determined to work towards agricultural innovation and transformation of rural South-East Asia. It addresses the issue of the perishability of horticultural commodities and works on reducing food wastage.

About the Founder

a) Nikky Jha: B.Tech in Electronics & Communications Engineering and M.Sc in Environmental Sciences
b) Rashmi Jha: Biotechnologist

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Satyukt Analytics, Bengaluru

Innovation: Satellite-based Crop Advisory Solutions at Farm Level

Product Information

Satyukt has developed a unique in-house built algorithm that combines multiple satellite data along with the big data analytics, machine language, and physical algorithms in order to provide dynamic crop advisory solutions at farm scale.

Category

Food and Agriculture

Industry, Innovation Area

Satellite Remote Sensing, Agriculture

Patent/IPR

N/A

Startup Registration Information

Registered with DPIIT, Reg No: DIPP27702

SDG Goals

Sat2Farm mobile application

Competitive Advantage

- Satellite data within 1 day
- Forecasts risks 1-2 weeks prior
- Analysis based on 100% coverage
- Crop classification at any level globally
- Remote monitoring of the field saves 70% of the time

Market Penetration

The product is at TRL 9. Product Mobile application "Sat2Farm", and web application "MICRO Sensing" are ready for giving crop advisory to farmers as well as other stakeholders, government & research organisations.

Potential Customers

- Agri-input & agri-output companies
- Water resource
- Crop insurance

Growth Plans

- Development of web and mobile applications
- Reach to 5,00,000 farmers by 2024
- Fundraising for commercialisation

About the Company

Satyukt Analytics is a B2B Agritech company which uses its inhouse developed algorithms for processing data from multiple sources (multiple satellites, physical data) to provide farm level solutions to B2B stakeholders in agriculture through their unique platform.

About the Founder

a) Dr. Sat Kumar Tomar, Ph.D. in water resource under Dept. of Civil Engineering from IISC Bangalore. 10+ years of experience in this field.
b) Dr. Yukti Gill: Ph.D. from B.H.U. having 8+ years of experience.

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Terracarb, Coimbatore

Terracarb
Disruption through sustainable innovation

Innovation: Graphene based Barrier Additive Solutions for Food Packaging

Product Information

Terracarb has developed a Graphene-based additive for high barrier packaging films manufactured using LDPE, PP and PLA. This is a sustainable alternative to reduce the use of plastic in multilayer packaging and could also be used to make biopolymers as competitive as multilayer packaging films.

Category

Food and Agriculture

Industry, Innovation Area

Nanotechnology

Patent/IPR

Patent Application No: 202041004340

Startup Registration Information

Registered with DPIIT, Reg No: DIPP42536

SDG Goals

Competitive Advantage

- Patent-pending Graphene production technology at 1/5 of the global production cost
- Utilization of high-volume production chemicals and standard industrial processes for production of Graphene
- Potential for scalable production of Graphene (5000 MT/ annum)
- Sustainable circular-economy driven production process

Graphene based food packaging material

Potential Customers

- Multilayer packaging companies

Market Penetration

The product is at TRL 7. Prototype (Minimum Viable Product) is ready. Pilot validation was done with an industrial customer based in Netherlands. Currently, the company is building a 1 Kg per day pilot plant.

Growth Plans

- Reach TRL 9 through large scale pilot deployment with industrial clients
- Validate barrier additive product with Polyplex
- Build 5 new use cases in the next 1 year

About the Company

Terracarb is an Indian deep-tech startup, working on manufacturing Graphene. By utilizing high volume production chemicals and conventional chemical processes, Terracarb strives to democratize the use of Graphene in paints, coatings and composites.

About the Founder

Mr. Solomon Jones, 4+ years of cross-functional experience in nanomaterials, 11+ international research publications, 5 commercial products developed using nanomaterials.

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zerocircle Zerocircle, Gurgaon

Innovation: Sea Weed based Bioplastics for Food Packaging

Product Information

Zerocircle has developed a carbon-efficient and hyper compostable flexible packaging material from farmed sea weed. The packaging material slows down the fast ripening process of fresh food. The formulations are toxin-free and can even be consumed by animals and humans.

Category

Food and Agriculture

Industry, Innovation Area

Clean Tech, Material Science, Waste and Environment

Patent/IPR

Provisional Patent filed

Startup Registration Information

Registered with DPIIT, Reg No: DIPP84277

SDG Goals

Packaging material based on sea weed

Competitive Advantage

Their products have low carbon footprint unlike other agri-based products that rely on feedstocks which competes with food.

Market Penetration

The company is presently testing their product prototype with a multinational consumer brand. Their target customers ranges from various FMCG companies to high end retail stores who are looking for affordable and sustainable packaging solutions.

Potential Customers

- Global Food Companies like Nestle
- Packaging Industies
- Clothing brands

Growth Plans

- Pilot scale-up of 500 kg of thin-films in Q2,2022
- Complete food safety compliances and receive relevant certification in Q3 and Q4, 2022

About the Company

Zerocircle creates low-carbon materials from restorative ocean-based resources. It aims to mitigate environmental impact at every stage of a single-use product's lifecycle.

About the Founder

Neha has worked for 15 years in the technology space scaling up tech-enabled businesses while working with companies like Google. The gap between automation and prevalent production methodologies pushed her to innovate with bio-materials.

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INDUSTRIAL LOW GHG TECHNOLOGY

Aerostrovilos, Chennai

Innovation: Micro Gas Turbine for Heavy Vehicles

Product Information

Aerostrovilos has developed a single shaft micro gas turbine (MGT) with a lean direct injection burner which allows low turbine temperature. The system is modular (15kW – 100kW) and fuel agnostic that can run on any liquid fuel or gaseous fuel. The system can be retrofitted to any existing ICE trucks and act as an onboard power source for hybrid electric trucks.

Startup Registration Information

Registered with DPIIT., Reg No: DIPP12660

SDG Goals

Competitive Advantage

The MGT requires less expensive exhaust treatment systems due to low temperature. 25% economical savings for truck operators and improved life of up to 2x. Cleaner fuel with 75% less tailpipe carbon emissions will help leapfrog CAFE & BS-VI++ in advance.

Market Penetration

The product is at Technology Readiness Level (TRL) 5. Aerostrovilos completed its POC in December 2020. Currently, they are in the process of building their 50kW MGT to do pilots along with customers. They have already received an LOI to build a Turbine Electric Vehicle.

Growth Plans

- Build MVP and conduct testing at customer site
- Testing & certification of 20 units
- Road trials & product launch with 100 units
- Scale upto 5000 units

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Automotive Drive-train, Industrial Machines

Patent/IPR

Patented Technology in India, US, EU & Australia. Indian Patent published in 2018.

Micro Gas Turbine

Heavy truck with MGT Engine

Potential Customers

- Auto OEMs
- Truck fleet operators
- Logistics companies

About the Company

Aerostrovilos is an IIT-Madras based startup, manufacturing indigenous micro gas turbines for power generation.

About the Founder

a) Rohit, an IIT-Madras alumnus 2016, from Aerospace Engineering, with prior experience working with Industrial jet engines.
b) Pradeep, BE.Mech Engineering, and 10 yrs experience in operations. sales & supply chain, in manufacturing business and operations.

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AFECO Heating Systems, Kolhapur

Innovation: Energy Efficient Aluminium Melting Furnaces

Product Information

AL-THERMOS is an aluminium molten metal holding furnace which holds the molten aluminium at 680°C in the die casting process where metal temperature plays an important role. The USP of AL-THERMOS is that it consumes 75% less power and requires zero to low maintenance.

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Industrial Efficiency

Patent/IPR

In patent filing process

Company Registration Information

CIN Number: U27320PN2004PTC018814

SDG Goals

Heat Treatment Furnace

Competitive Advantage

The major competitors manufacture regular crucible type holding furnace which consumes 72 KW/Hr to hold 1ton molten aluminium, while AL-THERMOS consumes only 15 kW/hr to hold the same quantity. Also, the regular furnaces have a huge maintenance cost, while AL-THERMOS is maintenance-free.

Market Penetration

The product is at TRL 7. Product is in the manufacturing stage. It will be demonstrated and compared to the existing baseline products soon.

Potential Customers

- Aluminium processing industries
- Aluminium die casting foundries

Growth Plans

- Set up a dedicated manufacturing line for the production of AL-THERMOS
- Replacing the existing holding furnaces with AL-THERMOS

About the Company

AFECO HEATING SYSTEM manufacturers heat treatment furnaces, melting furnaces, drying ovens, systems required in hot material handling up to 1200°C. All the furnace designing and controlling software development activities are done in-house at AFECO.

About the Founder

Mr. Prakash Maladkar has a vast 30 years of experience in the Aluminium processing field and furnace manufacturing.

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Birds Eye Energy, Hyderabad

Innovation: 2-in-1 Solar Modules to Generate Electricity and Hot Water

Product Information

2-in-1 solar modules which generate both electricity and hot water simultaneously as compared to a standard solar PV module of the same size. The company provides multiple systems from 3 kW-500 litres to 100 kW-20,000 litres per day systems for different customer segments.

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Commercial and Industrial Segments

Patent/IPR

Patent Application No(s):
201941010297, 201941010296

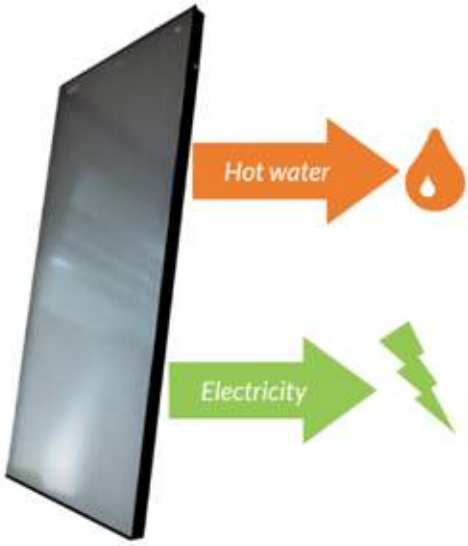
Company Registration Information

CIN Number: U27320PN2004PTC018814

SDG Goals

Competitive Advantage

- Saves rooftop space
- Double the energy from same available rooftop space
- 25 years design life and 20-year warranty.
- 3x more life compared to an ordinary hot water system
- 66% lower maintenance costs.
- Shorter payback period and better ROI



India's first 2-in-1 Solar Panel

Market Penetration

The product was successfully launched in the market in 2019 after prototype testing and pilot projects executed in 6 Indian states.

Potential Customers

- Hotels
- Railways
- Real Estate

Growth Plans

- Fund raising for scaling up and new market entry
- Expansion through energy as a service (EaaS) model
- Establish a third-party reseller network through white labelling

About the Company

Birds Eye Energy is an innovation-based energy company that is disrupting the rooftop solar industry with indigenous, first of its kind, patented, 2-in-1 solar technology (PV-T solar technology).

About the Founder

a) Praneeth Pillarisetti, B.Tech (IIT Madras) and MS in Renewable Energy (Univ. of Florida) with 8+ years of R&D experience in Cummins, USA
b) Harshavardhan, B.Tech (IIT Madras) and MBA (IIM Ahmedabad) with 8+ years experience with TATA Group (TAS).

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BNG Spray Solutions, Bengaluru

Innovation: Smart Furnace Burners that Optimize Air Fuel Ratio for Complete Combustion

Product Information

BnG's oil and gas-fired furnace burners include fuel injection systems that help mix fuel and air more effectively thereby requiring lesser excess air for complete combustion.

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Energy efficiency in boilers, furnaces, process heaters

Patent/IPR

3 product patents pending in India

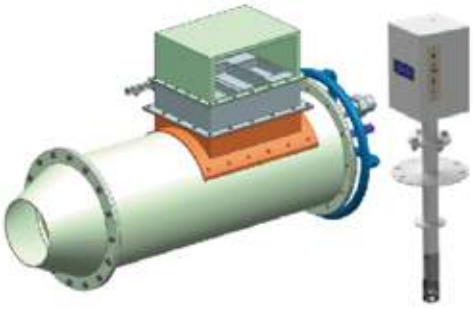
Startup Registration Information

Registered with DPIIT. Reg No: DIPP29309

SDG Goals

Competitive Advantage

The furnace burners employ liquid fuel atomization techniques to spray liquid droplets that are up to 4 times smaller in diameter, thereby enabling better fuel-air mixing and more efficient combustion. The oxygen analyzers are at least 1/3rd the cost of imported gas analyzers, thereby reducing the payback time. The burners, AFR controllers, and oxygen analyzers used together deliver up to 10% better furnace efficiency.



Furnace burner

Market Penetration

The company is currently conducting pilots with Hindalco and has developed India's first in-situ oxygen analyzer for flu-gases for natural gas and coal-fired boilers of Cipla and Raymond.

Potential Customers

- Manufacturers of furnaces, boilers kilns, etc.
- Furnace end-users such as power plants and manufacturing mills for metals, glass, ceramics, refractory materials, cement, petroleum products, chemicals and fertilizers

Growth Plans

- To complete pilot testing of 20 MW burner at Hindalco by June 2022
- To complete testing of air-fuel control system at Indian Naval ship boilers by August 2022
- To complete CE and ATEX certification of O2 analyzer by the end of 2023

About the Company

BnG Spray Solutions is a Bengaluru based startup that builds combustion and control systems for industrial furnaces with the aim of making them more energy efficient and smart, reducing GHG emissions and the capita cost associated with it.

About the Founder

Arindam Ghatak is a mechanical engineer from IIT-KGP and MS from the Ohio State University, with over 15 years of industry experience including 10 years in upstream oil and gas industry in Houston, Texas.

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EnvoProtect, Pune

Innovation: Conversion of Unrecyclable Paper Waste into Biofuel and Biochar Briquettes

Product Information

Industrial biofuel & biochar briquettes are made out of unrecyclable paper waste through the thermocracking process. Climate-conscious products EnvoFuel and EnvoBRIQ made out of waste used for heating applications.

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Biofuels, Biomass Briquettes, Renewable Energy

Patent/IPR

5 Patents Applied

Startup Registration Information

Registered with DPIIT. Reg No: DIPP84168

SDG Goals

EnvoFUEL and EnvoBRIQ

Competitive Advantage

Climate-conscious products with better technical parameters; competitive rates; patented unique technology; high processing capacity; easy availability; smart envoPROTECT App.

Market Penetration

The product is at TRL 7. Pilot plant setup is near Pune in a recycled paper mill premises.

Potential Customers

- Industries using boilers and furnaces & coal
- Agricultural industries

Growth Plans

- Key partnerships with paper mills
- Strong customer base
- Aim to install 80+ plants by 2028

About the Company

EnvoProtect is a solid waste management startup based in Pune providing the most sustainable solution for processing the plastic waste emerging out of recycled paper mills which is otherwise dumped or burned and converting it to climate-conscious products made out of waste that can be used for heating applications .

About the Founder

Karishma Shah, CEO & Co-founder, Computer Engineering, MIT Pune; Msc (EBM) University of Warwick, UK.

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Grassroots Energy, Bengaluru

Innovation: Low Cost Distributed Efficient Biogas Generation & Storage

Product Information

Grassroots Energy has developed a low-cost modular decentralized biogas production process. Additionally, the slurry is converted to transportable value-added products using proprietary technology.

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Industrial, Waste to Energy

Patent/IPR

Patent Application No (s):

Startup Registration Information

Registered with DPIIT. Reg No: DIPP9053

SDG Goals

Competitive Advantage

The upgradation technology from Grassroots is modular, distributed and closer to the waste generation site. The system is 30% lower in CAPEX and 50% lower in OPEX per cubic meter of operation compared to its alternatives. Their innovative absorbed gas cylinder storage helps store gas at up to 3x lower pressure thus reducing the overall transportation cost.

Bio-Methane enrichment and storage

Market Penetration

The product is at TRL 7. Prototype (Minimum Viable Product) ready. Pilot validation is done with industrial customers. Currently working with mini-grids in Bihar and industries in Karnataka.

Potential Customers

- Small and marginal farmers
- Local communities

Growth Plans

- Set up 1000 distributed biomethane plants over the next 5 years
- To serve biomethane as a replacement for fossil fuels to industries

About the Company

Grassroots Energy Technologies (I) Pvt Ltd is involved in setting up distributed biomethane plants in areas without gas grids as well as manufacturing high-quality organic agri-inputs as a by-product of its operations.

About the Founder

a) Mateen Abdul, MBA Babson, 16+ yrs in distributed energy, cleantech & automobiles
b) Pradeep Podal, M.Tech Energy, IITB, 12+ years experience in renewable energy & IT

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Torus Robotics, Chennai

Innovation: Compact & Lightweight Axial Flux Motor for Vehicles

Product Information

Torus Robotics has indigenously designed and developed one of the world's most compact & lightweight axial flux motors. These motors are scalable from 0.25 kW to 500 kW (12V to 500V). These motors provide greater reliability, high efficiency (>95%) and high power density (3kg for 3kW).

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Industrial Automotives

Patent/IPR

N/A

Startup Registration Information

Registered with DPIIT, Reg No: DIPP51485

SDG Goals

Torus XAF 3000

Competitive Advantage

Being an indigenous and efficient solution, it provides upto 50% reduction in total cost of ownership, 15% increase in EV performance, and up to 2x increase in range due to better form factor and reduced weight. It has the potential to mitigate 500 MntCO2 considering 10,000 units sold.

Market Penetration

Torus is presently at TRL level 5 with a functional prototype. The next step is to conduct field testing with customers. The company has received interest from various Vehicle OEMs for pilot procurement and deployment.


Electric powertrain and Unmanned ground vehicle

Growth Plans

- File for patents
- Complete testing & certification
- Sale of motors and controller units
- Set up an assembly unit for direct sale of motors

Potential Customers

- Vehicle OEMs
- Industries and defence projects
- Independent power producers and agriculture sectors.

About the Company

Torus Robotics indigenously designs and manufactures, efficient electrical drives for electric vehicles and other industrial and commercial applications.

About the Founder

a) M. Vignesh Director, Co-Founder, Business & Finance, B.Tech (Mechatronics), MBA.
b) K. Abbhi Vignesh Director, Co-Founder Technical and R&D, B.Tech (Mechatronics), MBA.

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Ventragen, Jalgaon

Innovation: Mechanical Pulsed Power Transmission System for Harnessing Gravitational Energy

Product Information

Ventragen has developed a mechanical pulsed power transmission technology capable of harnessing gravitational energy during the power transmission process resulting in increased power output, which reduces the energy consumption of machines by upto 50%.

Category

Industrial Low Carbon GHG

Industry, Innovation Area

Industrial Machines, Automotive Drivetrains

Patent/IPR

14+ National & 2 International patents filed.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP55822

SDG Goals

Competitive Advantage

A first of its kind, Ventragen has developed a mechanical system that is retrofittable, affordable, and can reduce power consumption by at least 30%. It provides a 20% reduction in capital expenditure and up to 40% reduction in operational expenditure. Potential to mitigate 1MT of CO_2 in next 5 years.

Mono and dual harnesser

Market Penetration

The product is at TRL 5. The company is piloting at its customer site to develop its minimum viable product. The company is also working with Small & micro-manufacturing industries in Maharashtra for pilot run.

Potential Customers

SMEs (Equipment Manufacturing) with parallel operation of drives, EV-OEMs range extender.

Growth Plans

- Validate minimum viable product through pilot deployment
- Raise seed funding for product development
- Focus on R&D

About the Company

Ventragen focuses on the commercialization of pulsed power transmission systems for various industrial sectors and innovative affordable and highly efficient engineering solutions in the mechanical power transmission sector.

About the Founder

a) Pankaj Attarde, B.E., Mechanical with 18 years of experience in sales and supply chain in MNCs.
b) Saurabh Chaudhuri, B.E., Mechanical from North Maharashtra University.

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RESOURCE EFFICIENCY

Aria Aerotech, Mumbai

Innovation: Use of Telematics to Enhance Fuel Efficiency of Transport Vehicles

Product Information

Aria Aerotech is focused on making transport vehicles more sustainable and the transport businesses more profitable. The company uses the power of telematics and data analytics to pinpoint the most cost-effective ways to achieve maximum fuel efficiency.

Category

Resource Efficiency

Industry, Innovation Area

Automotive, Vehicle Engineering

Patent/IPR

N/A

Startup Registration Information

Registered with DPIIT, Reg No: DIPP14823

SDG Goals

AeroTruck

Competitive Advantage

Commercial vehicles make up a small fraction of the vehicles on road, consuming the system's majority of petroleum products. By focussing on making the vehicles more fuel efficient, the dual aims of making more profit and reducing harmful emissions can be met.

Trucks equiped with AeroTruck kit

Market Penetration

The product is at Technology Readiness Level (TRL) 8. Prototype (Minimum Viable Product) is ready. The product has been tested with a few customers already.

Growth Plans

Modification of vehicle design to conduct operational training for stakeholders.

Potential Customers

- Large and medium truck fleets
- Logistic companies

About the Company

AEROTRUCK® is a copyrighted & patent-pending aftermarket Aero-kit for Indian trucks that can improve fuel efficiency by 7-12%. Implementing AEROTRUCK® on 25% of Indian heavy-duty trucks can save 1 billion liters of diesel consumption annually.

About the Founder

Pradeep Pandurangi, MSc in Aerospace Engineering, Technische Universiteit Delft, 2012- 2014.

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Green Trek, Jammu

Innovation: Use of Steel Waste to create Green Alloy Castings

Product Information

Green Trek recycles steel waste and converts it into various products of steel and alloy castings for heavy industries. Utilizing technology, these green steel products are manufactured using 0% fossil fuel to achieve a circular economy model thereby reducing GHG emissions from the steel industry.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP84168

SDG Goals

Category

Resource Efficiency

Industry, Innovation Area

Resource Efficiency, Waste Management

Patent/IPR

Currently working on it.

Products from recycled steel waste

Competitive Advantage

Green Trek products have a higher level of purity, less expensive and higher durability.

Potential Customers

- Cement plants
- Stone crushers
- Power plants

Market Penetration

The product is at TRL 9. The company has validated its products and is currently in early revenue stage. It's target market is Himachal Pradesh, Jammu & Kashmir and Ladakh.

Growth Plans

- Reach production capacity of 200 MT/month
- Open unit in North East
- Penetrate into Canada & UK markets
- Diversify into other green technology areas

About the Company

Green Trek is an IIT-Mandi based startup that recycles steel waste and converts it into usable products for multifarious industries by utilizing technology where GHG's are reduced and a waste management process is put in place.

About the Founder

Sandeep has more than 8+ yrs experience in the foundry line. He oversees the manufacturing, R&D and operations part. Having worked abroad in MNC's he has a wide range of experience in HR & Adminstration.

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Himalayan Hemp, Kangra

Innovation: Wattle & Daub Hemp Hut without Cement, Concrete or Lime

Product Information

Himalayan Hemp has developed India's 1st wattle and daub hemp hut without using any cement, concrete or lime. They have a workshop model where they train people to build houses made of hemp.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP52929

SDG Goals

Competitive Advantage

- Alternative and sustainable building material
- India's only hemp construction workshop
- Free from cement, concrete, and lime breathable walls
- Competitive cost (INR 1350 cubic ft) and less time-taking (30 days) excluding interiors
- Modifiable with flexible build methods

Market Penetration

The product is at TRL 5. The company has completed their first build project in Kullu, Himachal Pradesh in September, 2021 in the form of a workshop.

Growth Plans

- Extend our capacity to 12 workshops per year
- Conducting validity testing and certifications for all builds
- Enhance the interior design product range and reduce the carbon negativity by 30 tons in next 5 years
- Emerging as the top hemp construction company in the world

Category

Resource Efficiency

Industry, Innovation Area

Construction and Training, Ecofriendly Buildings

Patent/IPR

Will be done after the testing and certification

Wattle & daub hemp hut

Potential Customers

- Architect students
- Engineering students, Eco-builders
- Healing center-owners

About the Company

Himalayan Hemp is a BIRAC, RABIRKVY and Nidhi-EIR supported social entreprise building on paving a pathway for the hemp community.

About the Founder

a) Haneesh Katnawer, ED and CEO, BE(Production) with 7years of experience in project management, consulting and lean six sigma.
b) Sonam Sodha, MD, MBA (IBM and IT) with 5 years experience in HR and project management.
c) Shreyas Papanna, B. Arch (BMS School of Arch.)

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Jivoule Biofuels, Hyderabad

Innovation: Transforming Organic/Biomass/Agricultural Waste into Compressed Biogas

Product Information

Jivoule Biofuels developed a new business model to transform organic/biomass/agri waste into compressed biogas (CBG) that can be utilized as a transport fuel to replace CNG and industrial fuel to replace natural gas.

Category

Resource Efficiency

Industry, Innovation Area

Renewable Energy, Business Model Adopting Dgital Technologies

Patent/IPR

Will apply post the commercial production begins

Startup Registration Information

Registered with DPIIT, Reg No: DIPP69393

SDG Goals

Competitive Advantage

- New and improved business model that creates, captures and delivers value
- Digital technologies for operations and maintenance, reliability, yield improvement and quality

Market Penetration

- The comapny are about to sign a commercial agreement to supply 2.4 TPD of CBG from upcoming plant in Hyderabad
- Secured offtake guarantee of supply of CBG for 15 years
- Pitched solution to two large corporates

Compressed Biogas (CBG) Plant

Growth Plans

- Setup 1st CBG plant in Hyderabad
- Expand model both to B2G and B2B
- Setup 10 CBG plants in next 3 years
- Build and develop market linkages of organic manure market with agritech startups

Potential Customers

- PSUs

About the Company

Jivoule Biofuels is pioneering tech enabled circular economy by transforming organic/biomass/agri waste into biofuels.

About the Founder

a) N Chandrasekhar has done masters in chemical engineering in USA and has wide skills and experience in manufacturing, project & quality anagement.

b) R Koumudi has done B. tech in computer science and has deep experience in programming and ERP.

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REVY-S, Vadodara

Innovation: Microbial Consortium for Waste Water Treatment and Biogas Generation

Product Information

REVY-S has formulated an innovative bacterial consortia that aids in effective treatment of waste water which enables improved operation and better performance of waste water treatment plants, and bioremediation of organic waste for improved biogas generation.

Category

Resource Efficiency

Industry, Innovation Area

Industrial, Biotechnology

Patent/IPR

Patent Application No(s): 201721040610 & 201921002371

Startup Registration Information

Registered with DPIIT, Reg No: DIPP8715

SDG Goals

Production Plant @ Revy Facility

Competitive Advantage

The company is treating waste water in an effective and economical way. India's first granulated sludge product with highest methanogenic content. Unlike other competitors, Revy-S provides 50% more biogas and 60% more savings along with up to 100% recovery of process water. Potential to mitigate up to 3000 Mnt CO_2 in next 5 years.

Market Penetration

The product is at TRL 7. Prototype (Minimum Viable Product) ready. Pilot validation is done with industrial customers. Currently working with food & beverages industries of Gujarat for pre-commercial deployments.

Potential Customers

- Food & beverages industries
- Textile industries
- Biogas plant manufacturers.

Growth Plans

- Set up a large-scale manufacturing plant
- Reach TRL 9 through large scale pilot deployment with industrial clients
- Fund raising for commercialization

About the Company

REVY Environmental Solutions provides waste-water treatment and bio-methane production through anaerobic digestion (AD) process. They provide bio-cultures to enhance aeration in ETPs / STPs for industrial waste containing high phenol or TDS.

About the Founder

a) Dr Vanita Prasad, Ph.D. in Biotechnology under Dept. of Biotechnology & CSIR, GOI.
b) Rajneesh Prasad, 25+ years of experience in strategic planning, product

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TGP Bioplastics, Satara

Innovation: Biodegradable Plastic Packaging Material

Product Information

TGP Bioplastics has developed indigenous, low-cost, low-emission biodegradable plastics for flexible packaging. The company is selling biodegradable plastic granules as raw material for packaging industries to manufacture carry bags, garbage bags etc. Currently Indian packaging manufacturers rely 100% on imported raw materials which are expensive due to high production costs. TGP's material is 20-25% cheaper than any other biodegradable material but with same quality and mechanical strength.

Category

Resource Efficiency

Industry, Innovation Area

Polymer Manufacturing, Chemicals.

Patent/IPR

Patent Application No: 201921041337

Company Registration Information

CIN Number: U25209PN2019PTC185482

SDG Goals

Competitive Advantage

- The production method has eliminated fermentative methods which saves production costs as well as time
- It is aided by a unique chemical composition that gives high-quality products at lower costs

Biodegarable plastic packaging material

Potential Customers

Plastic packaging manufacturers for carry bags, garbage bags and industrial packaging.

Market Penetration

They are currently at TRL 7. Industrial iterations for manufacturing and cost-effective production are going on.

Growth Plans

- Due to lower pricing and indigenous manufacturing, many industries are interested in our product
- The company wishes to develop further in a profitable yet eco-friendly manner with CAGR of 15-21%

About the Company

TGP Bioplastics develops and manufactures low cost starch-based biodegradable plastic blends having low carbon emissions. TGP wants to enable packaging manufacturers with compostable material as an alternative to conventional plastic.

About the Founder

Karan, Tejas and Indrajeet, co-founders of TGP, have been together on various projects since their college. After graduating as engineers in 2018-19, they decided to work full-time on bioplastics as their prime interest.

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URAVU Uravu Labs, Bengaluru

Innovation: Adsorption based Thermal Device to convert Air into Potable Water

Product Information

Uravu has developed EVA, an adsorption based thermal device which provides 100% renewable water from the air. Using a desiccant material and a heat source (solar/waste heat) at 80 °C. EVA can execute multiple cycles of adsorption & desorption to trap humidity from the air and turn it into high-quality renewable water.

Category

Resource Efficiency

Industry, Innovation Area

Potable Water, Industrial Water Conservation

Patent/IPR

1 complete patent application & 1 provisional patent filed. 4 more are in pipeline.

Startup Registration Information

Registered with DPIIT, Reg No: DIPP2686

SDG Goals

Competitive Advantage

The technology is heat source agnostic and works in all geographies (> 30% RH & GHI of 3kWh/m2/day). Inbuilt thermal storage with 80% capacity utilization. The technology is modular and scalable from 10 LPD to 1 MnLPD. The company claims to provide water between US$ 0.02-0.04/litre at scale. Potential to save 14,000 tCO2 in 5 years.

5 LPD prototype

Market Penetration

The product is at TRL 5. Currently conducting paid pilots of their 5 LPD system with beverage companies to reach a minimum viable product (20 LPD). Their order book consists of contracts from other FMCG beverage manufacturers.

Potential Customers

- Beverage industries
- Real estate
- Energy manufacturing companies

Growth Plans

- Develop modular products 20-250 LPD
- Build reference plants – 2000 LPD
- Set up manufacturing plants for core components
- Raise US$ 2 Mn in next round

About the Company

Uravu Labs is developing technologies like solar powered atmospheric water generation and decentralised greywater treatment to accelerate the progress towards water sustainability.

About the Founder

a) Swapnil Shrivastav, B. Arch from NIT, Calicut & has 4 yrs experience in product development, fundraising & partnership.
b) Venkatesh RY, B. Arch, NIT Calicut has 3.5 yrs experience in design and development.

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STORAGE TECHNOLOGIES

Cancrie, Jaipur

Innovation: Mesoporous Carbons for Enhancing Performance of Energy-Storage Devices

Product Information

Cancrie has developed premium quality novel mesoporous carbons made from bio-waste that delivers superior performance in energy storage devices. These carbons are energy efficient and easy to adopt.

Category

Storage Technologies

Industry, Innovation Area

Industrial, Energy Storage

Patent/IPR

Patent Application No: 202011040624

Company Registration Information

CIN NUMBER: U37200RJ2020PTC070052

SDG Goals

Mesoporous carbons made from bio-waste

Competitive Advantage

Cancrie manufacture carbons to be used as an electrode material for electrical energy storage. The customers are battery manufacturers who want to improve their devices' life-cycle & charging time at a reasonable price. The product is made from renewable resources, consumes 89% lesser energy and delivers up to 125% higher energy density. Cancrie is the first company in India to produce this grade of carbon.

Market Penetration

The product is at Technology Readiness Level (TRL) 6. The pilot scale setup is in Jaipur, India since 2019. The prototype (Minimum Viable Product) is ready. Ongoing pilot-scale validation with original battery manufacturer at industrial level in Delhi.

Potential Customers

- Lead-acid battery
- Lithium-ion battery
- Hybrid capacitors
- Super capacitors

Growth Plans

- Reach TRL 9 through small-scale production for B2B customers
- Penetration into the Li-ion battery market
- Production upto 1 tonne/day

About the Company

Cancrie converts biowaste into high-performing carbon for applications like energy storage devices, catalysis, water treatment and dye removal.

About the Founder

a) Dr. Akshay Jain, Ph.D. Chemical Engineering, National University of Singapore, 9+ years of academic & industrial experience in R&D.
b) Ms Mahi Singh, MS NTU, Singapore. 9+ years of experience in strategy.

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Offgrid Energy Labs, New Delhi

Innovation: Highly Energy Efficient Rechargeable Zinc based Batteries

Product Information

Offgrid has built a novel rechargeable zinc-based battery (ZincGel) that is 90% more efficient, sustainable and provides 2x returns relative to other rechargeable batteries (and provides a distinct advantage versus lithium-ion technology). ZincGel is targeting stationary & mobility applications with its two variants and has over 15 intellectual properties (IP) around chemistry, materials and design. ZincGel uses commonly available materials that are 100% sustainable & non-toxic, thus providing a sustainable energy storage alternative to the market.

Startup Registration Information

Registered with DPIIT, Reg. No: DIPP19275

SDG Goals

Competitive Advantage

The unique advantage of ZincGel is in its proprietary electrolyte that never evaporates and is non-flammable. ZincGel has identified several applications in which it can offer better role and safety. In such applications, ZincGel can even replace lithium-ion batteries and other zinc-based batteries.

Market Penetration

The product is at TRL 5 (validated in lab) and Offgrid has planned field trials with partners in both stationary and mobility applications.

Category

Storage Technologies

Industry, Innovation Area

Sustainable Batteries

Patent/IPR

4 patents filed (6 in the pipeline),
2 Trademarks granted 3 Trade Secrets

ZincGel Battery cell by Offgrid

Potential Customers

- Renewable industry
- Power utilities
- Low-power electric vehicles

Growth Plans

A robust plan for the next 18 months with field trials in stationary and mobility applications leading to commercialization by the end of year 2022.

About the Company

Offgrid is an IP-led, battery-tech company focusing on innovations in chemistry, materials and design to build efficient and sustainable batteries.

About the Founder

a) Tejas Kusurkar, CEO, Ph.D., IIT Kanpur
b) Brindan Tulachan, CTO, Ph.D., IIT Kanpur
c) Rishi Srivastava, 25+ years in global deep-tech companies
d) Ankur Agrawal, CFO, C.A.

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Virya Batteries, Mumbai

Innovation: Ultra-safe Li-ion Cell and Battery Packs for 2 Wheelers

Product Information

Virya an IIT-Bombay incubated startup that has developed indigenous low-cost novel anode material and a specific electrolyte that does not allow formation of dendrite inside lithium-ion cells. Virya's patented chemistry allows the cells to operate at a high temperature preventing them from catching fire. Elimination of dendrite improves the life and performance of the battery as well. The company is targeting the 2 & 3 wheeler segment in India.

Category

Storage Technologies

Industry, Innovation Area

Sustainable batteries

Patent/IPR

Patent Application No.(s): 201821000200 & 201821048907

Startup Registration Information

Registered with DPIIT, Reg. No: DIPP30951

SDG Goals

Ultra safe lithium-ion battery

Competitive Advantage

- World's first ultra-safe dendrite free cells
- Lower early cell failures
- Local manufacturing, import substitution
- Competitive pricing

Market Penetration

The product is at TRL 7, MVP ready. Pilot production scale is completed. Industrial production scale expected to be completed by May 2022. Customer Field Trial expected to be completed by Jun 2022.

Potential Customers

- Electric 2 and 3-wheeler
- Swappable battery companies

Growth Plans

- Pilot scale production of 500 kWh and test it across EV customers
- Set up an anode manufacturing unit

About the Company

Virya batteries is a manufacturer of ultra-safe lithium-ion cells and packs providing highest quality, meeting the global standard. Startup from IIT Bombay, incubated at SINE. Patented Technology for increased safety of Li-ion cells technology.

About the Founder

a) Sunil Mehta, B.Tech, IIT Bombay, MBA, Univ. of Minnesota, USA
b) Prasit Kr. Dutta, M.Sc, Ph.D., IIT Bombay
c) Prof. Sagar Mitra, Ph.D., IISc, Post Doc., France.

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Stakeholders

The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided more than $21.1 billion in grants and mobilized an additional $114 billion in co-financing for more than 5,000 projects in 170 countries. Through its Small Grants Programme, the GEF has provided support to more than 25,000 civil society and community initiatives in 133 countries. It has a unique governing structure organized around an Assembly, the Council, the Secretariat, 18 Agencies, a Scientific and Technical Advisory Panel (STAP) and the Evaluation Office. It serves as a financial mechanism for several environmental conventions. The GEF finances project, programmes and initiatives that underpin the generation and exchange of knowledge around global environmental issues, facilitating the capture, synthesis, transfer and uptake of this knowledge within and beyond the GEF Partnership.

Bureau of Energy Efficiency (BEE) was set up by the Government of India on 1st March 2002 under the provision of the Energy Conservation Act, 2001. The mission of Bureau of Energy Efficiency is to assist indeveloping policies and strategies with a thrust on self-regulation and market principles with the primary objective of reducing energy intensity of the Indian economy within the overall framework of the Energy Conservation Act, 2001. It co-ordinates with designated consumers, designated agencies and other organizations and recognize, identify and utilize the existing resources and infrastructure, in performing the functions assigned to it under the Energy Conservation Act. The Major Promotional Functions of BEE is to create awareness and disseminate information on energy efficiency and conservation, arranging and organizing training of personnel and specialists in the techniques for efficient use of energy and its conservation, strengthening consultancy services in the field of energy conservation, promoting research and development, developing testing and certification procedures and promote testing facilities, facilitating implementation of pilot projects and demonstration projects, promoting use of energy efficient processes, equipment, devices and systems, promoting innovative financing of energy efficiency projects and giving financial assistance to institutions for promoting efficient use of energy and its conservation.

Stakeholders

The United Nations Industrial Development Organization (UNIDO) is a specialised agency of the United Nations that assists countries in economic and industrial development. It is headquartered at the UN Office in Vienna, Austria. As of April 2019, UNIDO comprises 170 member states, which together set the organization's policies, programmes, and principles through the biannual General Conference. The mission of the United Nations Industrial Development Organization, is to promote and accelerate inclusive and sustainable industrial development (ISID) in Member States. UNIDO's mandate is fully recognized in SDG-9, which calls to 'Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation'. As a technical cooperation agency, it designs and implements programmes focused on its thematic priorities, which directly respond to global development priorities. Through these thematic priorities, UNIDO supports its developing country member states achieving the Sustainable Development Goals.

India is a founder Member of the UNIDO. It is both a recipient as well as a contributor to the programmes of UNIDO. The core elements of UNIDO's technical cooperation services in India are to implement its activities in harmony with national policy priorities and development strategies; to build strong and long-term partnerships with donors; to increase UNIDO's visibility; and to focus its assistance in a manner that addresses international development goals, especially the Sustainable Development Goals.

Sangam is a seed and early-stage venture fund that invests to improve access to sustainable energy and resource productivity solutions for the underserved in India that can lead to inclusive development and creation of communities that are resilient to climate change. Some of the top investments of Sangam includes Carbon Masters, Promethean Energy, Delectrik Systems, Smart Joules etc. Sangam was started by Karthik Chandrasekar to find a new model to provide early-stage support for climate change pioneers. Beyond investment we have AIC Sangam Innovation Foundation, India's first and only dedicated Clean Tech Incubator run by Sangam Capital Advisors in partnership with the Niti Aayog's Atal Innovation Mission Scheme. The Foundation was established in 2017 and currently runs 3 major acceleration programmes and an in-house incubation programme dedicated to fight climate change.

Thanks to Our Mentors

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IGNITING IDEAS

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Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
#startupindia

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