



B20 India Secretariat



Confederation of Indian Industry

# B20 INDIA 2023 TASK FORCE ON TECHNOLOGY, INNOVATION AND R&D

Compendium of Best Practices on Innovation Projects from  
India and other B20 Nations





**B20 INDIA 2023  
TASK FORCE ON TECHNOLOGY,  
INNOVATION AND R&D**

**COMPENDIUM OF BEST PRACTICES**

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## **Technology, Innovation and R&D**

Technological innovation is a key driver of economic development, a fundamental lever in fighting climate change, and a powerful enabler of social inclusion. However, uneven regulatory principles still slow down the development of new products and innovation. Innovation is also fostered by tech entrepreneurs or startups taking new developments to the market and thereby creating employment and growth. The development of technological products and services can be encouraged and nurtured through higher public support for R&D and private investments, as well as raising awareness on technology benefits.





**Kris Gopalakrishnan**  
Chairman, Axilor Ventures &  
Co-Founder, Infosys, India

## Foreword: Task Force Chair

We live in times that are defined by rapid technological advancements and an evolving socio-economic landscape. Technology has woven itself into the very fabric of our society and proved to be pivotal in our pursuit of a more equitable and prosperous world. It is therefore a privilege for me to lead the crucial B20 Task Force on Tech, Innovation, and R&D in its task of creating an environment that encourages the G20 nations and the world to pursue solutions that lie beyond the obvious.

Knowledge sharing is an important part of creating such an environment. Every day, somewhere in the world, a transformative idea is born. Some grow to a limited size, while others die for lack of nurturing. Seamless sharing and collaboration can increase the power of such ideas manifold and bring about change at scale.

And that is the intent behind this compendium. It is a compilation of some of the most successful technology projects deployed across G20 nations and is meant to serve as a knowledge resource for economies around the world. We hope it will serve to ignite new ideas, scale up existing ones, and lead to enabling frameworks and regulations across different geographies. It may be noted that the case studies have been included as shared by the members without any modifications.

While this compendium is a testament to the individuals, institutes, and organisations who believe knowledge is the key to a better world, it is also a validation of the belief that investment in technology, innovation, and R&D is critical to sustainable development. The world needs an environment of continuous learning in the interest of adaptability and resilience. To challenge the status quo, we must question conventional wisdom and push boundaries to explore solutions that may lie beyond the horizon.

This will only be possible if we collectively embrace the power of inquiry and innovation. I believe this compendium will be a nudge in this direction.

## Messages: Task Force Co-Chairs



“Innovation should know no boundaries. It is the fuel that can propel us forward in this digital era. Let us collaborate, share insights, and embrace technology to shape a brighter future together.”

**Alex Rogers**

President, Qualcomm Technologies, USA



“Adaptability is key in this ever-evolving technology landscape. It is important to embrace agility, encourage experimentation, and nurture a culture that rewards innovation in order to stay ahead of the curve and drive transformative change. I am sure this compendium will catalyze many a ideas.”

**Andre Soelistyo**

CEO, GoTo Group, Indonesia



“As business leaders, we must create an environment that encourages risk-taking and supports technology-driven entrepreneurship. Nurturing startups and small businesses, will pave the way for transformative change as this compendium shows.”

**Baba Kalyani**

Chairman & Managing Director, Bharat Forge, India



“AI is empowering people to find new solutions to humanity’s most pressing challenges. Taking a clear-eyed approach to both the opportunities and the risks, we can ensure that AI technologies are used responsibly and ethically, so that they serve the needs of all of society. This compendium shows what’s possible when we work together.”

**Brad Smith**

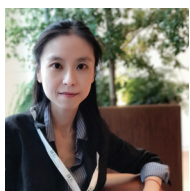
Vice Chair & President, Microsoft, USA



“As the world turns ever more to a technological, innovative economy and society, it is important to remember the values that drive us. These are values of humanity, of history, of culture! We must use technology, innovation and R & D to be the foundation of our humanity going forward!”

**Candace Johnson**

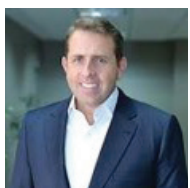
Founder/CoFounder SES, Loral Teleport Europe, Europe Online, Chair and Partner, Seraphim Space and Vice Chair NorthStar, ICC Executive Board Member



“This compendium makes a case to build resilient societies by using technology and innovation as core vehicles of development.”

**Dany Qian**

Vice President, Jinko Solar, China



“The key to success is continuous technological advancement combined with immediate impact applications. This compendium shows how broad and powerful innovation can be when applied in contexts that change people's life and promote sustainable development.”

**Fernando de Rizzo**

CEO, Tupy, Brazil



“Innovation thrives in diverse ecosystems. Collaboration between academia, industry, and government & international funding agency's foster breakthroughs that improve the quality of lives of people worldwide. I am sure this compendium will enable many to come together, work together & deliver together.”

**Suchitra Ella**

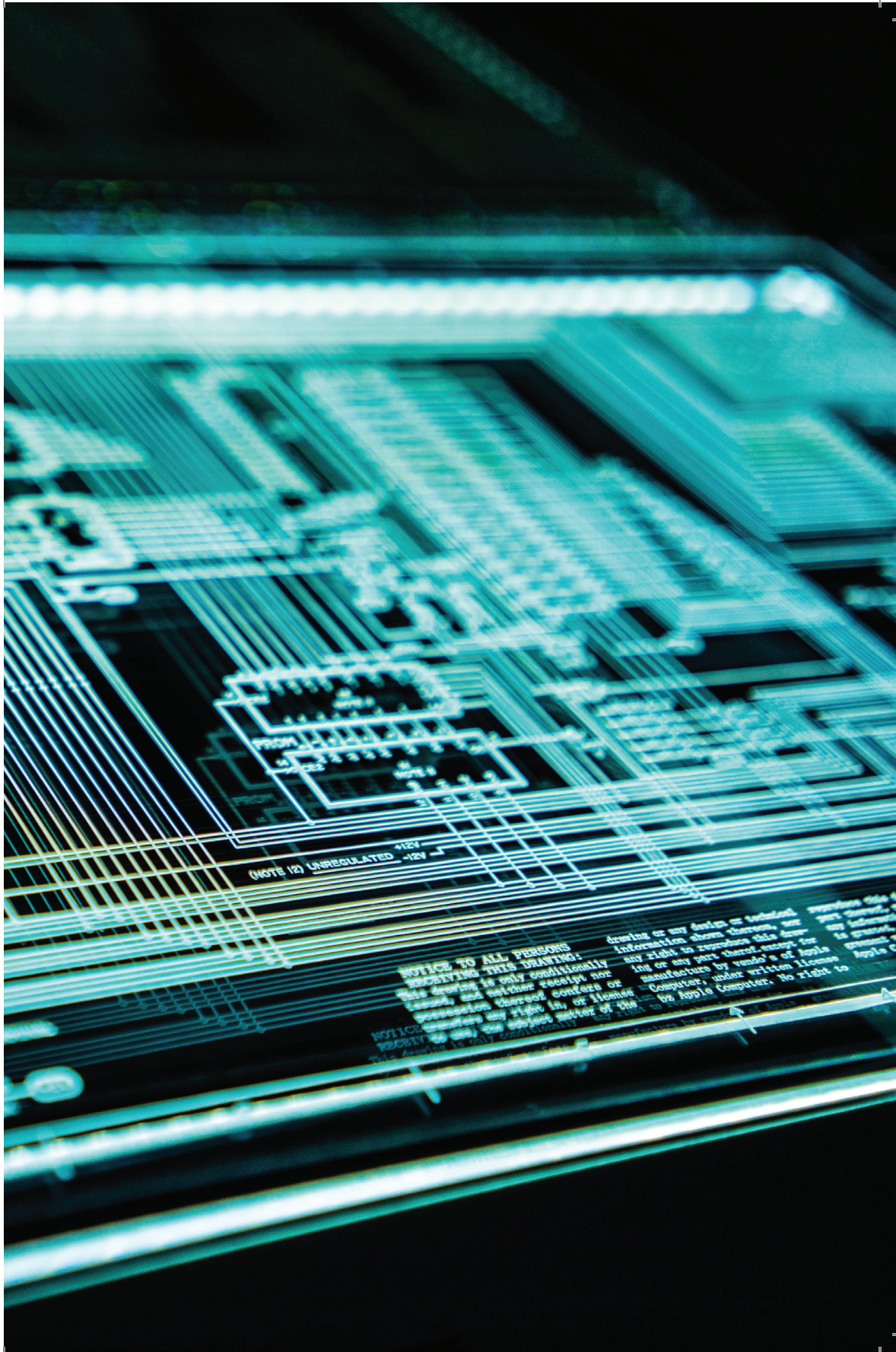
Managing Director, Bharat Biotech, India





# DEEP TECH





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# Affordable preventative and assistive technology for healthcare

Current commercial exoskeleton devices face critical technical and commercial barriers (cost effectiveness, data encryption and safety, real-time application, interference robustness, ease of use, adaptation to users’ size variations, limited expertise of personnel, lack of understanding or awareness as to how profits can be generated, public perception, and costs) that have been directly affecting widespread rapid adoption of wearable robots (exoskeletons).

## Project impact

- To develop assistive exoskeletons for high-volume markets such as assistive products to supplement the declining physical abilities of elderly persons.
- To develop affordable wearable suit for bio-sensing and human motion monitoring.
- Deployment of Bio compatible sensor.

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**ORGANISATION**  
Global Innovation and Technology Alliance (GITA)

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, United Kingdom

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 3, 9

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**PROJECT ANCHOR**  
Advance Tech India Pvt. Ltd.

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## AI based non-tobacco related material picking system

With the increasing sensitivity of customers towards the presence of NTRM in the final product, ensuring higher levels of product integrity through the elimination of Non-Tobacco Related Matter (NTRM) in the tobacco supplies is an imperative. To address this, our factory installed laser-based NTRM sorters in the lamina stream in processing lines for improved removal of NTRM from the final product. Typically, the sorters detect the NTRM and reject it into the reject stream, which also has some tobacco material along with the NTRM. Presently, the NTRM is segregated and removed manually from the reject stream by the deployment of workmen across shift operations. The current efficiency of manual picking is about 60%.

The following are the drawbacks and problems associated with the manual picking operation:

- Carried out manually, regular monitoring is required for the effectiveness of NTRM removal.
- It is a monotonous activity, and the picking efficiency varies across shifts due to changes in crew.
- Lower picking efficiency has a direct impact on overall removal efficiency as the reject stream is looped back to the infeed of NTRM sorters.

To address the above our unit developed and installed an “AI-based NTRM picking system” in the reject stream of the NTRM sorter, leveraging advanced artificial intelligence and image processing using the Deep Learning algorithm integrated with the Robotic Process Automation (RPA) approach.

### Project impact

- Product integrity and quality Improvement
- Productivity improvement through manpower rationalisation
- Real-time control and monitoring

Overall Cost: 60 Lakhs; Benefits Realised: 22 Lakhs

Payback Terms: 3 Years

Major users and beneficiaries of this best practice

- Customers
- Employees
- Dealers and Partners

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### ORGANISATION

ITC Ltd., Agri Business Division (ABD)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 9

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### PROJECT ANCHOR

In-house Developed Project of ITC Limited, Agri Business Division

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### CONTACT

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# Anomaly detection in flights data

This project focused on the unsupervised detection of anomalous flight from a large number of flight data sets, which were all time series data. The challenges were that there were no labels and the data size was not large. We developed custom unsupervised algorithms and also a new algorithm for synthetic data generation.

## Project impact

A completely novel data augmentation technique was developed. This is of general use for manufacturing systems. This will be tested in the client location.

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**ORGANISATION**  
IIT Madras

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, France

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**SUSTAINABLE DEVELOPMENT GOALS**  
-

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**PROJECT ANCHOR**  
Dassault Aviation

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## Asia Pacific Women's Cancer Coalition

The Asia-Pacific Women's Cancer Coalition (APAC WCC) is a multi-lateral group committed to stemming the growing burden of Cervical and Breast cancers among women in the region. Breast cancer is the cancer with the highest incidence and mortality rates in Asia Pacific; in 2018, approximately 839,000 women were diagnosed with the disease, and over 286,000 died from it. Furthermore, Asia Pacific accounts for 52% of the cervical cancer burden in the world; current estimates indicate that every year 351,720 women are diagnosed with cervical cancer and 199,902 die from the disease.

The value addition of WCC is that it focuses on three themes that set it apart from other existing platforms and oncology initiatives in Asia, and globally:

- Integrated solutions that consider the whole patient journey, from vaccination to screening to treatment
- Catalytic public and private partnerships to plug fiscal gaps
- Innovative technologies to support early detection and effective disease management

Founding members of the Coalition include Roche, Crowell & Moring International, JHPIEGO, and Together for Health. In particular, the Coalition focuses on identifying policy opportunities and addressing the gaps to support countries in achieving their national targets for cancer prevention and control, through catalytic public and private partnerships and the sharing of best practises for policy interventions, especially related to the adoption of innovative technologies to support early detection and effective disease management.

### Project impact

The Coalition was setup in 2022, and the first output will be a White Paper from the Economist Impact team, set to be launched in July 2023. The paper will provide country snapshots and assess how each is performing with regard to six key domains for both cancers: 1) Policy and Planning 2) Guidelines 3) Prevention and Screening 4) Access to therapy 5) Awareness and promotion 6) Support and funding

Following the launch of the White Paper, the WCC will conduct a series of in-country workshops to inform governments on the key findings from the paper, discuss policy interventions, and address Cervical and Breast cancer burden in the region.

Specifically, WCC will communicate and advocate for:

- Prevention through implementing effective vaccination and screening programmes for Cervical cancer, along with health promotion and early detection for breast cancer, to increase awareness and support early detection and treatment.
- Management through developing cost-effective and equitable health care innovations for the management of both cancers, with

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### ORGANISATION

Crowell & Moring International

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### COUNTRY

Singapore

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### COUNTRIES OF OPERATION

India, Malaysia, Thailand, Vietnam, Philippines, and Indonesia

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 1, 3, 5, 10

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### PROJECT ANCHOR

Roche

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### CONTACT

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a particular emphasis on the use of state-of-the-art technology to reduce cancer burden and improve cancer-related health outcomes in the region (e.g., scaling up molecular diagnostic capacity).

While the Coalition is in its nascent phase, it has ambitious targets for impact to bring about long-term and sustainable change in how governments approach Cervical and Breast cancer prevention and treatment in the APAC region.

The planned project outcomes over the next 3–5 years are as follows:

- Accelerate and scale integrated disease management of women's cancer (cervical and breast) through effective screening, diagnosis, and early treatment. Strengthen national health programmes and policies as well as advocate to drive focus on women's cancer programmes.
- Expand the application of health-systems tools, improve infrastructure, and enhance capabilities to support acceleration and scaling of patient journey solutions in screening, diagnosis, and early treatment. Benchmark reference countries (i.e., Australia, South Korea) to identify areas to strengthen and learn from.



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## Automated telemedicine enabled screening for eye diseases using an affordable and simple to use smartphone-based imaging device

People in the age group of 5 to 14 years have the highest risk for the onset of Diabetic Retinopathy. Early detection of this treatable disease can prevent complete blindness, also known as Sight Threatening Diabetic Retinopathy (STDR).

### Project impact

Development of an easy-to-use, cost-effective, and more accurate retinal imaging device that can be used at primary health centres to screen for STDR, leading to suitable treatment at an early stage.

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, United Kingdom

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3, 9, 10

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### PROJECT ANCHOR

Remidio Innovative Solutions Pvt. Ltd.

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### CONTACT

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# BS6 combi filter with 3 stage filtration for commercial vehicle application

## Challenges :

- Limited space in vehicle
- Increased Filter efficiency
- Critical water separation capability over lifetime
- Bio Diesel compatibility
- Low cost of ownership

## Solution :

- Combi filter (Pre + main in one housing)
- >98.8% achieved using high efficient media
- Stage filtration used to achieve end of life WS >95%
- Improved elastomers and coatings used
- Increased filter change Interval (60k km)

## Project impact

### Value Proposition:

- Low cost of Ownership both at OEM and at Field Service.
- High Efficiency Product Protects Fuel Injection Equipment & delivers tangible benefits to customer.
- Passive Water & Temperature sensor Low cost and No “Electronics failures”.

### Market Potential:

- Product Released for BS6 CV Segments
- 63350 nos. in field after since SOP : Jan-2020.
- Annual volume – 35,000 nos
- Potential to acquire similar applications in India.

## ORGANISATION

Bosch Limited

## COUNTRY

India

## COUNTRIES OF OPERATION

India

## SUSTAINABLE DEVELOPMENT

### GOALS

–

## PROJECT ANCHOR

Bosch Limited, India

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# Bus scheduling system

Most regional transportation operations are implementing Intelligent Transport Management Systems (ITMS), especially for buses, which comprise over 90% of public transportation in most Indian cities. At the same time, there are many variables at play in the working of public transportation systems, e.g., passenger arrivals, boarding passengers, alighting passengers, traffic, speed, etc. In the Indian context, this is exacerbated and needs appropriate management.

## Project impact

- Development of integrated planning and bus scheduling system which can be integrated with an ITMS for public transportation.
- Real-time optimisation through dynamic scheduling across transit network operations.
- Comprehensive depot management across fleet maintenance, stores and supplies, finance, and personnel.

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**ORGANISATION**  
Global Innovation and Technology Alliance (GITA)

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, Spain

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 9,11

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**PROJECT ANCHOR**  
Nano Kernel Ltd.

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## Cancer detection and cure

Cancer detection is a complex process that involves identifying the presence, location, and stage of cancerous cells or tumours within the body. Although there have been significant advancements in cancer detection methods, there are still several challenges that exist, including:

- **False negatives and false positives:** One of the most significant challenges in cancer detection is the possibility of false negatives and false positives, which can lead to an incorrect diagnosis. False negatives occur when cancer is present but the test results show negative results, while false positives occur when the test results show cancer when there is no cancer present. This can lead to unnecessary treatment or missed diagnoses, which can have severe consequences.
- **Sensitivity and specificity:** The sensitivity and specificity of cancer detection methods can also be challenging to balance. Sensitivity refers to the ability of a test to correctly identify cancer when it is present, while specificity refers to the ability of a test to correctly identify cancer when it is absent. In some cases, increasing sensitivity can result in decreased specificity, and vice versa.
- **Detection at an early stage:** Early detection of cancer is crucial for effective treatment and survival rates. However, detecting cancer at an early stage can be challenging as symptoms may not be present or may be non-specific.
- **Access to healthcare:** Lack of access to healthcare and cancer screening programmes can prevent people from receiving timely cancer detection and treatment. This can disproportionately affect people from low-income or marginalised communities who may not have access to the necessary resources.
- **Cost:** The cost of cancer detection methods can also be a significant challenge, as some methods may be expensive and may not be covered by insurance. This can prevent people from receiving timely cancer detection and treatment.

Addressing these challenges in cancer detection requires a multi-disciplinary approach involving healthcare providers, researchers, policymakers, and community organisations. Efforts should be made to improve access to cancer screening programmes, develop more accurate and cost-effective detection methods, and increase awareness about the importance of early detection and treatment. The use of artificial intelligence algorithms could be used for early detection of cancer as a reference point for people staying in areas where sufficient infrastructure is not available to the masses. Various imaging and associated data variables could be used to train the model to reduce false negatives and true positives.

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### ORGANISATION

RealNetworks India Pvt. Ltd.

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### COUNTRY

India

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### COUNTRIES OF OPERATION

United States of America

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 3

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### PROJECT ANCHOR

National Cancer Institute, USA

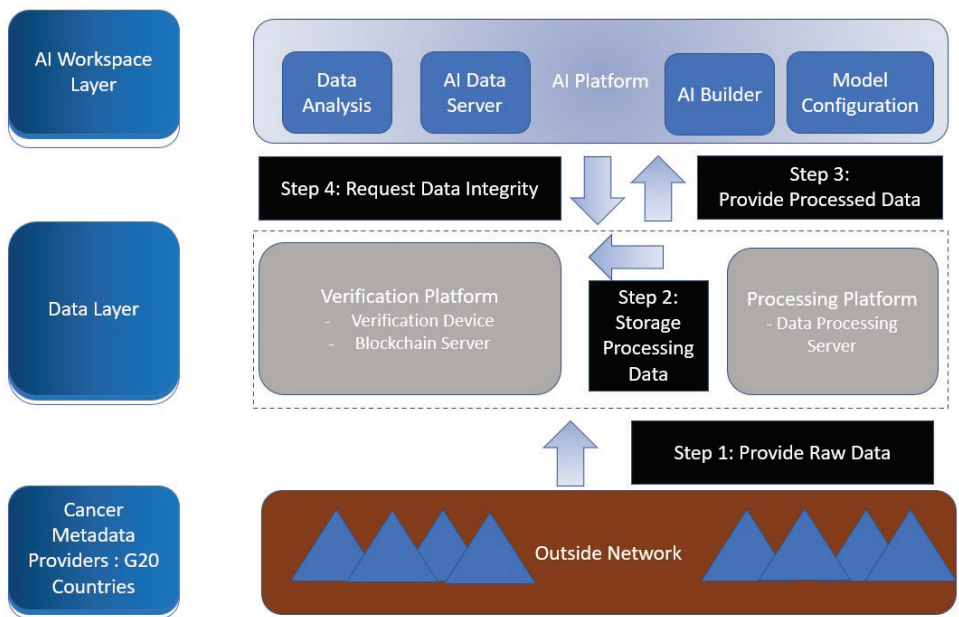
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**Project impact**

Scientists in National Cancer Institute, USA, NCI's intramural research program are leveraging the capabilities of AI to improve cancer screening in cervical and prostate cancer. NCI investigators developed a deep learning approach for the automated detection of precancerous cervical lesions from digital images.



## Caneus offsets-enabled Innovation Acceleration Fund: IAF

CANEUS, with industry partners from the US, Europe, and India, has created the Offsets-Enabled Innovation Acceleration Fund (IAF). This is an initiative to help bridge the gap between global aerospace contractors and Indian innovators, and accelerate the much-needed offset-enabled innovation acceleration in India.

The Aerospace Offset Programme provides the impetus for international contractors to benefit from the capabilities of Indian MSME's and R&D organisations and offers an incentive to develop relationships through subcontracting or collaboration. Recently, there has been an increasing demand by aerospace contractors to develop a sophisticated and reliable supplier base in India. Through investments in knowledge and transfers of skills, Indian suppliers can also become part of the supply chains that deploy these Indian components and products worldwide. The business arrangements that typically accompany an offset transaction are premised upon sound business cases that are clearly in the interest of both the suppliers and aerospace system manufacturers interested in working with Indian component developers and R&D institutes that are able to provide products or research with an ROI. Therefore, offset credit is usually seen by aerospace contractors as an obligation that must be satisfied, but not at the expense of good business practices. The aerospace system manufacturers, therefore, are looking for top-quality Indian MSMEs and R&D institutes with whom they can do business. Indian MSMEs and R&D institutes are interested in forging long-term relationships with international suppliers, and the offset programme provides both access and leverage into these companies' supply chains and development cycles. However, challenges and opportunities remain in bridging this gap.

The underlying challenges are that, often, Indian suppliers do not have insight into the offset needs of large offshore corporations. Equally, the large multinationals do not have an understanding of what Indian MSMEs can provide and often overlook a good prospect for an offset relationship. The greater the difference in scale between the foreign firm and the Indian company, the more significant the problems with a successful partnership.

There are opportunities because India, being equipped with a highly skilled workforce, is better positioned to absorb the transfer of aerospace technology than countries that do not have these attributes. These ambitious goals require the development and implementation of emerging technologies to make them cost-effective. The proven strategy by CANEUS using its 'Concept to Systems' (C2S) model focuses on how the offset programme can be positioned along with other programmes to produce a unique package of incentives to accelerate innovation in India. The strategy consists of identifying and grouping the strengths of technology-based companies and academia, identifying attractive targets among companies with offset obligations, capitalising on these strengths with identified opportu-

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### ORGANISATION

CANEUS International

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### COUNTRY

Canada

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### COUNTRIES OF OPERATION

India, Canada, USA, Europe

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 4, 8, 9, 12, 17

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### PROJECT ANCHOR

CANEUS

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nities, and qualifying the projects of greatest potential and interest in terms of their eligibility under the offset rules. Therefore, CANEUS initiated an offset-enabled Innovation Acceleration Fund to facilitate aerospace companies from the US, Europe, and Canada making investments in priority projects for India and being able to apply towards their obligations. CANEUS experienced that companies such as LM, Boeing, Airbus, etc. may also choose to set up an investment fund internally to encourage their business divisions, thereby leveraging the offset investment funds.

## Project impact

The project has a huge positive impact on aerospace multinationals. The approach leverages both money and know-how that is of direct relevance to the near-medium term needs of the company; thereby generating an external knowledge base through access to best international technologies and develop new sources of suppliers / innovation for the company's supply chain. Furthermore, investment and contributions in technology acceleration can carry with it a certification, thereby giving the company a potentially large offset credits, and lower risks/costs by leveraging knowledge, assets, and investment, from both inside the company and with partners.

It also benefits MSMEs and R&D institutes. The IAF model not only helps channel investment to Indian MSMEs and R&D institutes, but also provides them with early access to the supply chains of the large multinational making an investment.

The model further encourages (a) investment in India in niche and strategic technologies around well structured international collaborative programmes/projects, (b) leverage contributions from both national and international partners in the development of leading-edge technologies, thus reducing costs and risks, and (c) provide measurable benefits of the offset programme. The Offsets- Enabled Innovation Acceleration Fund Model offers a strategy for development of collaborative partnerships and attractive vehicle for multinationals interested in satisfying their offset obligations.



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## Case hardening process for stainless & carbon steel

Low-temperature heat treatment needs a special furnace, but this process can use an ordinary furnace to achieve the desired case hardness without compromising the corrosion resistance.

Special heat treatment for carbon steel material demands a special furnace, but this process can be used in an ordinary furnace for improving corrosion resistance and achieving case hardness.

### Project impact

- Import substitution has resulted in self-sufficiency and a reduction in lead time.
- Commercial benefits come from effective cash flow and clear savings.
- Within the available resources, it saves the power required for the furnace.

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#### ORGANISATION

Fluid Controls Pvt. Ltd.

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT GOALS

SDGs 9, 12

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#### PROJECT ANCHOR

Fluid Controls Pvt. Ltd.

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#### CONTACT

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# Cellular backhaul for universal service obligation project for unconnected villages, across multiple 4G operators

Historically, thousands of Indian villages have remained disconnected from the rest of the world. Tough terrain, a lack of motorable roads, unforgiving weather, insurgency, and network design challenges contribute to the situation. There is an urgent need to provide equipment that can work without manned supervision, withstand harsh weather conditions, and have high uptime, as the maintenance visits to these places pose their own set of challenges.

To help address this gap, the Hughes entities in India—Hughes India, Hughes Communications India Pvt. Ltd. (HCI), and Hughes Systique Pvt. Ltd. (HSC)—decided to collaborate to create customised solutions for the Indian situation. Hughes JUPITER Platform ground technology will be using ISRO's GSAT-11 and LSAT-29 communication satellites to provide broadband connectivity to remote and inhospitable locations across the entire length and breadth of India, including border areas like Galwan Valley in Ladakh. Hughes Communications India Private Limited (HCI) has been instrumental in successfully launching India's first high-throughput satellite (HTS) internet broadband service in association with the Indian Space Research Organisation (ISRO). The most important factor in implementing the initiative was the use of high-throughput satellites, which required one fourth the bandwidth and had a significantly lower cost compared to conventional satellites. The high spectral efficiency (bits/Hz) of the HTS and the smaller form factor of the remote equipment due to the high power of the HTS made it possible to achieve the desired throughputs and rollout speeds.

The Digital Engineering and R&D arm of Hughes in India, Hughes Systique Pvt. Ltd. (HSC), with its engineering teams in Gurgaon and Bangalore, has played a pivotal role in the design, development, and integration of various components across all generations of the Hughes JUPITER System, the platform that ISRO's satellites use for satellite broadband implementation. HSC, as the software development and innovation arm of Hughes in India, has been complementing them in their digital transformation journey, replacing their traditional backhaul network with networking entities leveraging emerging technologies based on SDN/NFV and edge computing.

## Project impact

Quantitative Outcome: a) Once completed, 300+ villages will be on the mobile network map of India. 81 villages already have 4G/LTE services and are reaping the virtues of digital connectivity. b) With an average population of 200, a population of 60,000+ is going to be connected to the outside world. c) Leveraging emerging technology innovations in areas like SDN/NFV and edge computing, Hughes has been able to improve the efficiency of its JUPITER system, thus contributing to

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## ORGANISATION

Hughes International

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## COUNTRY

India

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## COUNTRIES OF OPERATION

India. Also equipment development & deployment done in Indonesia and Africa.

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## SUSTAINABLE DEVELOPMENT

### GOALS

SDGs 3,4, 9, 10, 11

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## PROJECT ANCHOR

Hughes India with Hughes Communications India Pvt. Ltd. (HCI) & Hughes Systique Pvt. Ltd. (HSC)

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## CONTACT

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jaspreet.kaur@hsc.com



revolutionising the satellite communication technology landscape for better connectivity across different locations globally at an affordable cost.

**Qualitative Impact:** It is helping connect the unconnected and bridging the digital divide by providing connectivity to the remotest locations in India and hence enabling the citizens to participate in the opportunities that digitization is presenting, like education, e-governance, citizen services, e-commerce, medical care, etc. Communities in remote regions were once unable to access vital government resources, like land records, access to telemedicine, and the e-Sanjeevani initiative of the government. Now, these locations can procure goods and services via ships or aircraft and systematise development initiatives. This type of accessibility allows for the growth and development of our entire society.

The project has had an impact on the following SDGs:

- **SDG 9: Industry, Innovation, and Infrastructure:** Through this project, Hughes India, HCI, and HSC have been able to develop sustainable, resilient, and inclusive infrastructures through enhanced technological support and innovation. We brought access to information and communication technologies (ICT) to previously isolated, unconnected regions.
- **SDG 11: Building sustainable cities and communities.** Through this initiative, Hughes India, HCI, and HSC have been able to contribute to capacity building for inclusive development and integration of the population into the fold of the digitally connected world.
- **SDG 10: Reduced Inequalities:** Through this project, Hughes India, HCI, and HSC have been able to contribute to the better inclusion of the impacted remote regions and towards equal opportunity for the people inhabiting those isolated areas or regions by connecting them to the larger digitally connected world.
- By virtue of the benefits that digital connectivity brings, this initiative has had a positive impact that aligns with SDG 3 (good health and well-being) and SDG 4 (quality education).





**IP67 Outdoor Modem | Indian High Throughput Satellite | Major Telcos**

**4G / LTE in every nook and corner of the Country**



## Collaborative efforts in spacetechn

Grahaa Space and Genex Space have been collaborating with multiple organisations across the globe in areas of spacetechn and space education.

Grahaa Space, a spacetechn startup based out of Bangalore, has been working closely with the Centre for Emerging Technologies and HEX20, spacetechn startups based out of Adelaide, South Australia, to work on a nanosatellite mission to stream near-real-time high-resolution geospatial video data. Last year, Grahaa Space was the only spacetechn startup from India in 2022 to receive the coveted South Australian innovation grant under the Venture Catalyst Space Programme and was incubated by the Innovation and Collaboration Centre, University of South Australia. Grahaa Space is also working as a technology partner for Vellore Institute of Technology, Amaravati, Andhra Pradesh, to launch their payload through a ride-share mission later this year with Skyroot Aerospace.

Genex Space, which is an ISRO-authorized space tutor organisation, has been working closely with various organisations from a few countries to mutually promote and engage in space and astronomy-related education.

One of the recent projects included a collaboration with the Institute of Astronomy in Sri Lanka, where they did knowledge transfer on rockets and satellites, and in return, the Sri Lankan institute exchanged their expertise in Astronomy programmes. Genex Space has also been actively working with the Space Generation Advisory Council (SGAC) and has organised workshops for students from Mauritius. They have also been working with SpaceCat, a space education organisation from the Maldives, to provide astrotourism services, stargazing workshops, and space education programmes in schools across the country. Their collaborative education has also received great interest from some of the countries in South Africa and Australia.

At present, Genex Space, with technology support from Grahaa Space, is working with a private educational organisation in Tanzania to launch their cubesat into low-earth orbit.

Most of their programmes are conducted through a hybrid learning model where theory classes are conducted virtually and students get hands-on learning experience through practical classes conducted locally. During COVID, they have actively promoted online courses, and hence they have had good outreach.

### Project impact

More than 10,000 students have been trained and certified in space and astronomy-related education.

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#### ORGANISATION

Grahaa Space

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

Sri Lanka, Maldives, Mauritius, Ghana, South Africa, Australia, Philippines, Nepal.

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 4, 9, 10, 17

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#### PROJECT ANCHOR

Grahaa Space, Genex Space, VIT-AP (India), Center for Emerging Technologies & HEX20 (South Australia), Spacecat (Maldives), Olduvai Space Center (Tanzania)

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#### CONTACT

Loganathan M  
Ramesh Kumar V  
Nikhitha C  
Sujay Sreedhar  
Saki Jameson  
Lloyd Jacob  
Dr Ameet Chauhan

## Adaptive Optics in Undergraduate Lab for Astronomy Education



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## Computer-aided cancer detection and diagnosis

Computer-aided cancer detection and diagnosis (CAD) has been explored in various aspects of cancer detection. The accuracy of these CAD systems for specific cancers is still in its infancy, particularly for pancreatic cancer. Progress in machine learning techniques creates a new opportunity to identify and create novel computer-aided detection and diagnostic research.

Both machine learning and deep learning techniques, which are actively being pursued in academia as well as industry, provide means for examining radiographic data previously unrealized. Specifically, machine learning methodologies are being explored in many aspects of cancer care. Recent research has demonstrated that deep learning techniques might be able to improve cancer detection accuracy in ways never previously realised. These techniques have the promise to lead to more accurate CAD systems in cancer detection and diagnosis.

This will be accomplished in a multi-fold manner:

- Investigate machine learning and algorithmic analysis for the detection of abnormal features (e.g., sarcopenia, pancreas texture, density of tissue, architectural distortion) in patients' radiographic imaging (computer tomography of the abdomen, magnetic resonance imaging, or magnetic resonance cholangiopancreatography).
- Develop a method to predict whether abnormal features might be associated with the development of pancreatic cancer.
- Incorporate deep learning algorithms with separately identified clinically-promising biomarkers to be used for cancer detection.

### Project impact

Develop novel computer-aided cancer detection technology using deep learning formula in radiographic imaging for patients with pancreatic cancer.

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#### ORGANISATION

Sam Circle Venture

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#### COUNTRY

USA

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#### COUNTRIES OF OPERATION

USA and India

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#### SUSTAINABLE DEVELOPMENT

GOALS

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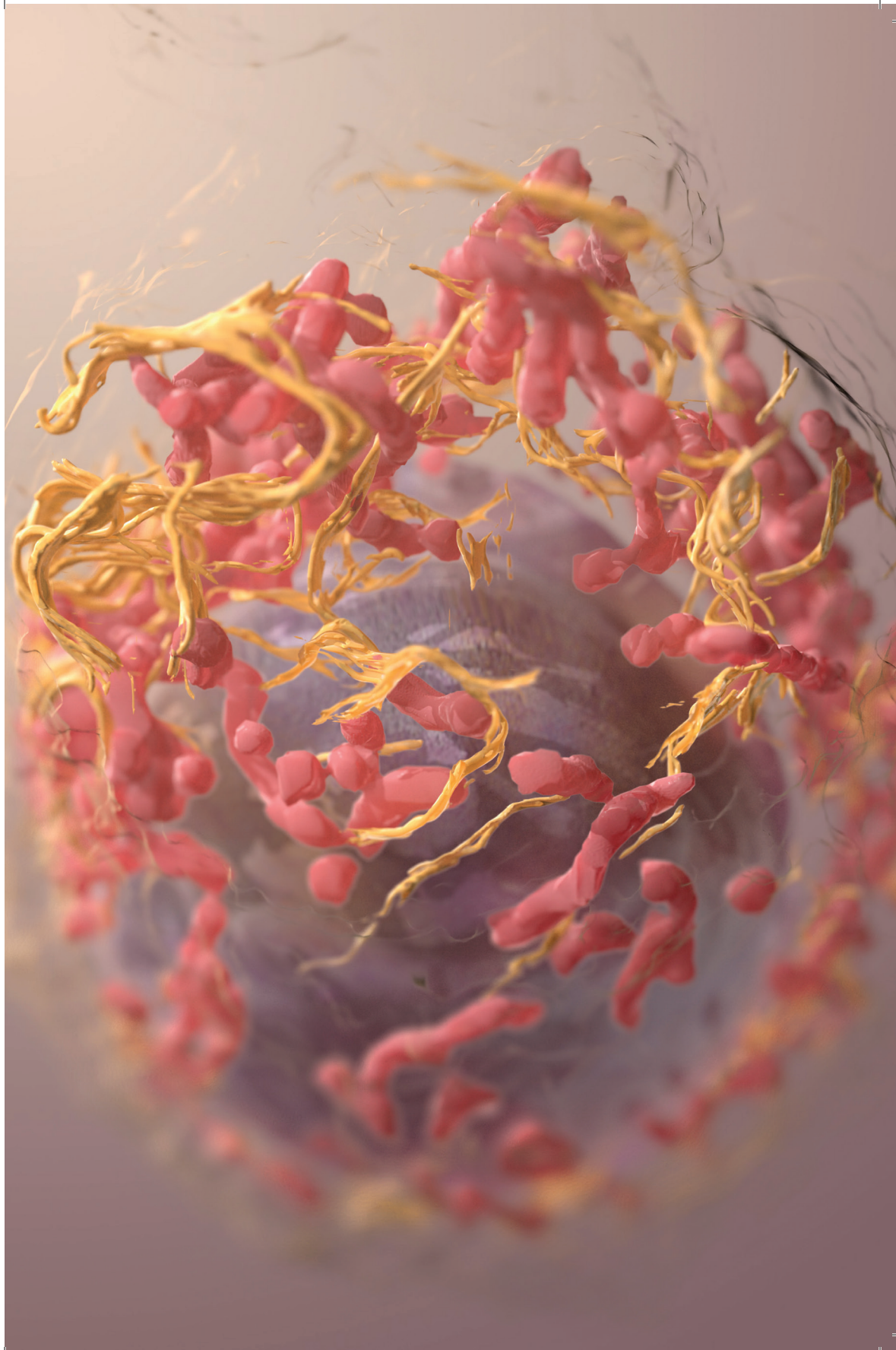
#### PROJECT ANCHOR

India International Innovation Institute with Henry Ford Health, Detroit and IIT Delhi as participating institutes

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# Data fusion platform for AI and Autonomy

Big data is a necessary precursor for AI and Autonomy. Management of big data is a challenging and expensive task for organisations and becomes one of the main barriers to the uptake of AI. The biggest challenges are the fusion of legacy and new data, varying data formats that don't speak to each other, a completely manual process to map the syntax and semantics of the different types of data, and managing data across locations. 114's technology is a code-free platform that allows seamless extensibility of databases, enabling the fusion of data across sources, types, and locations without writing any code. This drastically reduces the time and complexity required for the uptake of AI and autonomous solutions. Further, 114AI is working on inference and reasoning mechanisms to make AI more transparent, tractable, scalable, and human-like in its approach. The project was first started with the help of the United States Space Command in 2019. The main challenge was to get user buy-in to support the development of a completely new and disruptive paradigm of technology.

## Project impact

- Reduction in cost and time of enterprise adoption of AI.
- AI which is tractable, accountable and provides reasons for its decisions.
- Human- machine interface.

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**ORGANISATION**  
114ai Innovation LLP

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, United States of America

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 9

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**PROJECT ANCHOR**  
US Space Force, US Air Force  
Research Labs

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**CONTACT**  
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SPACEWISE

User

Logout

Set ISR Query Parameters

Reset Query

Set Time Window

Time Frame

Custom

Search

Select Fields (Showing Total 16 results)

-24 Hours

30 Minutes

1 Hour

5 Hours

10 Hours

12 Hours

24 Hours

48 Hours

72 Hours

96 Hours

Selected Filters

Time Frame

24 Hours X

Set Satellite Parameters

Satellite Operator Country

Mission

Satellite Series

Norad Ids

International Designator

Launch Site

Satellite Names

Custom

Search

Select Fields (Showing Total 1 results)

Select All

YAOGAN-37

Selected Filters

Satellite Operator Country

People's Republic Of China X

Mission

MLSAT X

Satellite Series

YAOGAN X

Launch Site

JUQUAN SATELLITE LAUNCH CENTER, CHINA X

Set Location Parameters

Location Type

Locations

Custom

Search

Select Fields (Showing Total 4 results)

Select All

Dabholm Airport

HAL Airport

Kanwar

Port Blair

Selected Filters

Location Type

Airport X

Submit

100%

1

	Dabholm Airport	HAL Airport	Kanwar	Port Blair
	UTC	UTC	UTC	UTC
1	55244	No ISR Event	YES / ZENITH	YES / ZENITH
		2023-06-07 20:20:24 UTC	2023-06-07 20:20:21 UTC	2023-06-07 20:20:33 UTC
		2023-06-08 09:56:34 UTC		2023-06-08 09:59:15 UTC

Detail

Decimal

DMS

Location Latitude : 11° 37' 24.2400" N

Location Longitude : 92° 43' 35.4000" E

Location Altitude (m) : 0

Location Name : Port Blair

Location Radius (km) : 50

NORAD ID : 55244

Show Overpass

ISR

Live Tracking

Projection

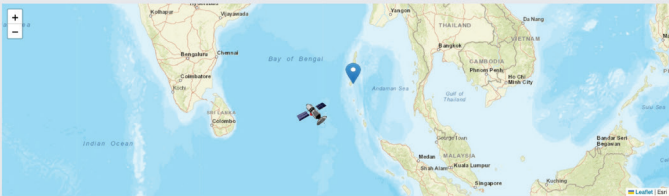
ISR EVENTS :

Zenith

Show ISR Events

NORAD ID : 55244

EarthLoc-SatFootprint (in %) : 74.8653



## Data marketplace for Indigenization of Diagnostics (InDx)

The containment of the COVID pandemic was one of the key priorities for the government of India in 2020. The government was taking the approach of “Test–Trace–Isolate” to address this. A major element of this strategy was to carry out all types of COVID diagnostics on a massive scale so that test coverage increases to provide a view of the spread and the necessary containment planning. However, the major bottleneck to this was the disruption in global supply chains due to lockdowns, impacting the supplies to the test kit manufacturers and those of the Tier 2 and Tier 3 suppliers.

CCAMP (Centre for Cellular and Molecular Platforms) developed the InDx platform, which provided visibility on the manufacturing capacity of Indian MSMEs manufacturing raw material for diagnostic kits for COVID–19 along with detailed quality parameters and acted as a means for Centres of Excellence (within and outside of CCAMP) to provide services to MSMEs where quality and/or quantity–related interventions were required. It acted as a marketplace, enabling negotiations on price and terms between the upstream and downstream manufacturers and ultimately the test kit manufacturers.

### Project impact

- The cost for a RTPCR kit to manufacturers, which was INR 1,800 in Jun ‘20 (MRP to end customer of INR 4,500) reduced to INR 50 by Jun ‘21, and INR 30 (MRP of INR 200 to 300) by Sep ‘21.
- 190+ Members (manufacturers, suppliers, service providers, etc.) onboarded and 400+ products & services registered.

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#### ORGANISATION

TCS

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALSS

SDGs 3, 8, 9, 10, 17

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#### PROJECT ANCHOR

CCAMP (Centre for Cellular and Molecular Platforms), a Govt. of India enterprise

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#### CONTACT

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## Design and development of autonomous amphibious unmanned aerial vehicle and UAV-mountable water sampling devices for water based applications

Existing water sampling and water quality assessment methods typically do not employ smart, ICT-enabled technologies. Water pollution is emerging as a major global problem, and research on effective monitoring, handling, and treatment of water is critically required. It is estimated that almost 70 percent of surface water resources are polluted by biological, toxic, organic, and inorganic pollutants.

This will drastically reduce the quality of the water, making it unfit for drinking and also not useful for irrigation and industrial activities. Water as an ecological source is regenerative in the sense that it could absorb pollution loads up to a certain amount. In fact, there could be a problem with water pollution only if the pollution loads exceed the natural regenerative capacity of a water resource. Hence, periodic inspection will help us maintain the water pollution at an acceptable level and carry out effective treatment methods.

### Project impact

- Design and development of an amphibious unmanned aerial vehicle for real time water quality analysis.
- Integrated autonomous amphibious vehicle with ability to function autonomously.
- Unique solution for water quality assessment in remotely located and also inaccessible water bodies through an amphibious vehicle.
- Integrated sensory systems for on-board /real-time water quality analysis.

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#### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India, Republic of Korea

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#### SUSTAINABLE DEVELOPMENT GOALS

SDGs 6,9

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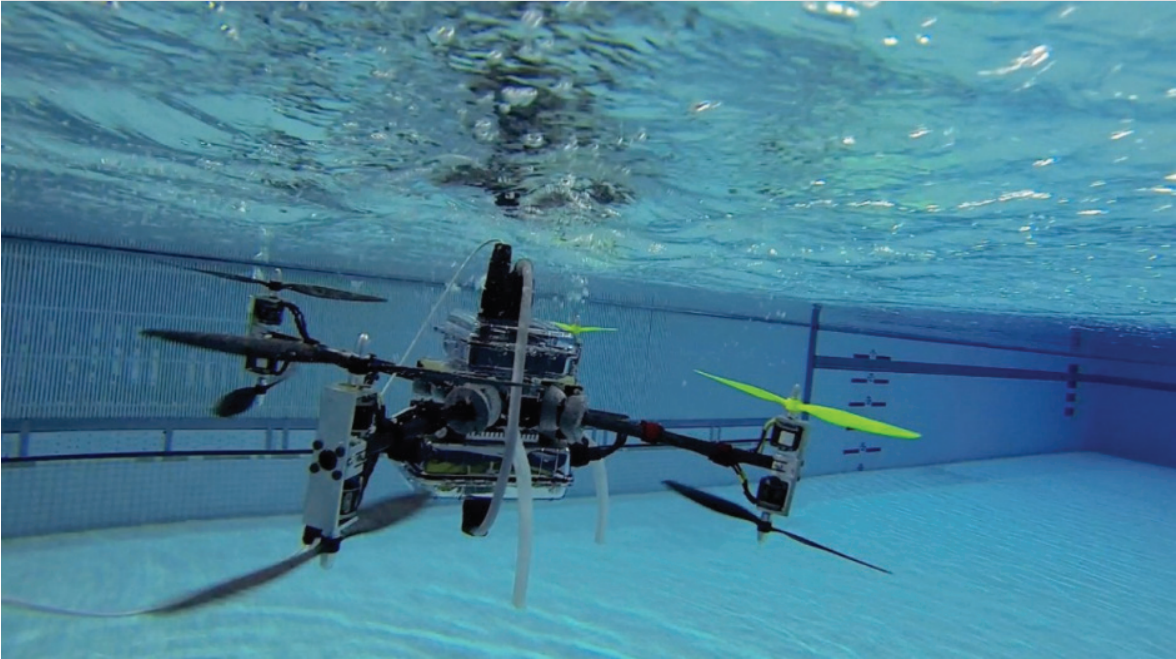
#### PROJECT ANCHOR

UCAL Fuel Systems Ltd.

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#### CONTACT

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## Design and development of robotic endotrainer

Robotic surgery is revolutionising treatment by providing minimally invasive and yet precise, stable, and dextrous functionality to surgeons, especially in the case of neurosurgery. Training is critical, and virtual simulators are less accurate than actual robotic training systems. The latter, however, tend to be expensive and are rarely available in India.

### Project impact

- Development of a prototype of an efficient, user-friendly, affordable, real-time training system for robot-assisted surgeries.
- The cost of the final product is estimated at INR 60 lakh vs. INR 20 crore for the imported alternative.
- A novel sensor design has been developed to enable haptic feedback. It will facilitate more widespread training of surgeons using robotic systems, leading to improved patient outcomes.

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### ORGANISATION

Global Innovation and  
Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Republic of Korea

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3,9

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### PROJECT ANCHOR

Larsen & Toubro (L&T)  
Technology Services

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### CONTACT

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# Development of high power RF amplifier for low field magnetic resonance imaging applications

While newer MRI machine development has trended towards much higher magnetic fields and more specialised imaging, the technology advances in superconducting magnets and image processing have also benefited the lower-field MRI market in that smaller, more flexible installations are possible that do not require the same magnitude of complexity and infrastructure. Similarly, RF amplifier technology and digital signal processing technologies have advanced as well. The RF technology in many of the existing installations had its genesis in the 1980s. The devices used in the amplifiers for these MRI units employ MOSFET technology, operating at relatively high voltages.

Recently, newer RF devices have emerged that can provide significant increases in power, reducing the number of output devices by a factor of three. Along with an increase in power capability, these newer LDMOS output devices provide a significant increase in ruggedness and a potential increase in efficiency.

While the the development of high-power amplifiers at these low (relatively) RF frequencies should not pose any problems using conventional matching techniques and design methods, but there may be a potential risk in finding the ferrite material that can handle these power levels without reaching saturation or becoming too hot. Other challenges could arise due to other supporting circuitry's power handling capabilities and/or cooling capabilities.

## Project impact

New/next generation of the high-power RF amplifier portion of more affordable MRI machines which can provide imaging equivalent to that of the higher-field machines for the majority of requirements along with more flexibility to enable use in surgery applications.

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### ORGANISATION

Global Innovation and  
Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Canada

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3,9

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### PROJECT ANCHOR

Kaynes Technology India Pvt. Ltd.

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### CONTACT

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# Development of low-cost, high performance PEMFC liquid cooled stack for small stationary applications

Fuel cells have the potential to address several societal challenges, but cost remains a significant barrier. High-performance (Membrane Electrode Assemblys) MEAs with low precious metal loadings and low-cost MEA components and plate materials will result in a greater uptake of fuel cell systems in India.

## Project impact

Development and optimization of a low-cost, high performing Membrane Electrode Assembly (MEA) and Polymer Electrolyte Membrane Fuel Cell (PEMFC) stack for portable and stationary fuel cell markets.

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**ORGANISATION**  
Global Innovation and Technology Alliance (GITA)

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, Canada

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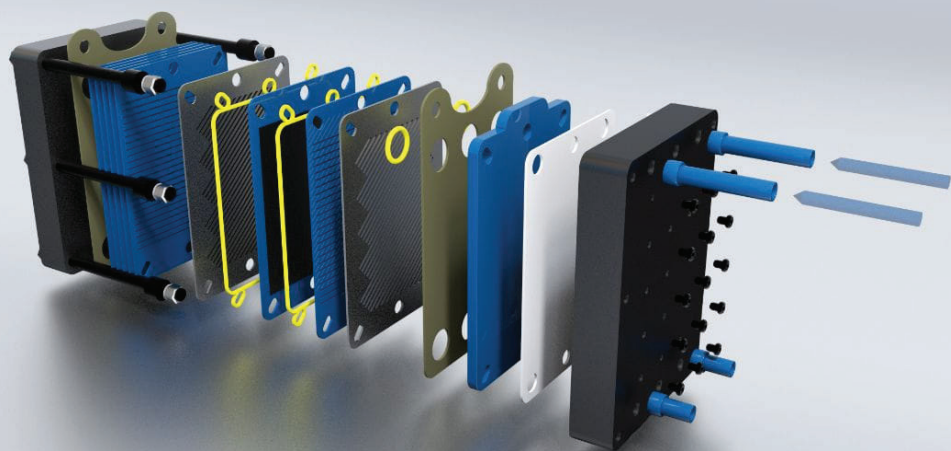
**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 7, 9, 11

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**PROJECT ANCHOR**  
Sainergy Fuel Cell India Pvt. Ltd.

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**CONTACT**  
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## Development of pearl millet hybrid seeds and novel food products: an affordable resource in the prevention of type 2 diabetes

The number of type 2 (mainly non–insulin–dependent) diabetics in India is currently estimated at 65 million. Pearl millet is a sustainable cereal with superior glycaemic control over wheat and rice, and it has high consumer acceptance in India due to its use in traditional foods.

### Project impact

Incorporation of pearl millets into breeding programmes to develop pearl millet cultivars that will be optimised for both agricultural sustainability and glycaemic control, which will then be developed into palatable and affordable breakfast products for the Indian market.

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, United Kingdom

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3, 9

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### PROJECT ANCHOR

SFPL Crop Life Science Pvt. Ltd.

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### CONTACT

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# DRISHTI: A remote sensing and AI-driven surveillance for hybrid seed production farms

Seeds are the embryos of future crops. Healthy and good-quality seeds are the first determinants of good yield, and they lay the basic foundation of food security. In India, arable land is depleting gradually due to rapid urbanisation and soil erosion. On the contrary, the country's population is growing. At this juncture, the importance of high-yielding seeds becomes more evident for feeding more than a billion mouths in India.

The future of Agriculture is becoming extremely vulnerable as the climate becomes volatile and inconsistent. The normal distribution of rainfall has been disrupted, and as a result, the frequency of excess and deficient rain is increasing. Insect and disease attacks are becoming more prevalent and difficult to predict with traditional systems. These factors adversely affect seed production, and as a consequence, it is becoming difficult to plan for both seed companies and seed growers without appropriate decision intelligence and forecasting tools.

Drishti: A decision intelligence system will improve the resilience of the farming community towards climate change. Rallis and tech behemoth TCS have joined hands to develop this state-of-the-art decision Intelligence and Crop Monitoring System. It harnesses the power of Spaceborne Remote Sensing and Artificial Intelligence (AI). The Predictive analytics from DRISHTI help the hybrid seed production (HSP) function spot future risks and opportunities and make informed decisions to optimise production costs and improve yield.

## Project impact

4X increase in farm scan and grading frequency:

- The high spatiotemporal resolution of the DRISHTI farm scan and yield monitoring process allows the seed team to have near-real-time monitoring of the scattered and distant production plots.
- DRISHTI generates a minimum of 8 farm scan reports per season, compared to 2 manual farm scan reports per season.

Yield enhancement:

- Quick identification of weak production plots allows the seed production team to take early corrective actions, which helps to improve yield compared to manual surveillance.
- It remotely identifies problem areas. Thus, it significantly saves time and human effort.

Customised and site-specific advisories:

- Seed growers get site-specific advisories based on pest and weather forecasts, leading to effective crop management by reducing the risks.

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## ORGANISATION

Rallis India Ltd.

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## COUNTRY

India

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## COUNTRIES OF OPERATION

India

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## SUSTAINABLE DEVELOPMENT

### GOALS

SDG 9

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## PROJECT ANCHOR

Rallis India Ltd.

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## CONTACT

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## Drought tolerant/Water efficient maize for Africa

The TELA Maize Project under Water Efficient Maize for Africa (WEMA) is a public–private partnership working to improve food security and rural livelihoods among smallholder farmers and their families in sub–Saharan Africa by developing and deploying new drought–tolerant and insect–pest–protected hybrid maize (corn) varieties. The project was originally led by the African Agricultural Technology Foundation.

Maize is the most widely grown staple crop in Africa, where more than 300 million people are depended on it as their main food source. Droughts, foliar diseases, and insect pests are intensifying food production problems in Africa, which makes for a vulnerable food security situation. Smallholder farmers in Africa, like farmers everywhere, want the choice to use the best tools and technologies available to minimise their risks and improve their lives. Also referred to as Drought Tolerant Maize for Africa, the project aims to mitigate drought and other constraints to maize production in sub–Saharan Africa.

The project brings together private sector innovators, farmers, research institutions, extension specialists, seed producers, farmer community organisations, and non–governmental organisations. It is jointly implemented in close collaboration by national agricultural research systems in participating nations, the International Maize and Wheat Improvement Centre (CIMMYT), and the International Institute for Tropical Agriculture. Millions of farmers in the region are already benefiting from the outputs of this partnership, which includes support and training for African seed producers and promoting vibrant, competitive seed markets.

### Project impact

By combining a diversity of skills and advanced breeding techniques, WEMA has worked for the past decade to deliver drought–tolerant seed varieties in five sub–Saharan African countries, increasing maize yields by at least one tonne per hectare under moderate drought and with a 20 to 30 percent increase over farmers’ current yields, benefiting up to 40 million people in 13 African countries.

With more than 5,200 tonnes of improved seed products sold royalty–free through the programme thus far, WEMA has had success in bringing new hybrids to growers. Collaboration with local partnerships was critical to the success of this project.

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#### ORGANISATION

US Council for International Business

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#### COUNTRY

United States

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#### COUNTRIES OF OPERATION

Kenya, Mozambique, South Africa, Tanzania, Uganda

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 1, 2, 3, 17

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#### PROJECT ANCHOR

African Agricultural Technology Foundation (AATF)

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#### CONTACT

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# EBAN space manifesto for a clean, safe, equitable and peaceful space for all

Space is the largest resource in the universe. It needs to be protected and made accessible to all. As the digital transformation gains further momentum, more and more countries and citizens around the globe are becoming dependent on space as a resource for their economies, for their societies, for the health and well-being of all life on the planet, and for peace in the Universe. The United Nations Sustainable Development Goals (UN SDGs) and the United Nations Declaration of Human Rights must now be extended to space. Without this, the same devastation that has occurred on earth and in our oceans will also be encountered in space, thus depriving us of this most valuable resource. Mindless, unintended, and intended harm is already endangering our access to and ability to operate in space. This includes pollution coming from fossil fuels, debris, and inefficient use or colonisation of frequencies or orbital positions. This is leading to an inequitable use of this invaluable resource. We must take action now to preserve and protect space in order to keep it clean, safe, equitable, and peaceful for all. In order to do this, we call on all existing and future operators to apply the UN SDGs and the U.N. Declaration of Human Rights. We, as investors, will not be able to ensure the financial viability of the ventures we are financing without applying these very principles and guidelines. In addition, we refer to the excellent work being done by UNOOSA and EUSPA on the report covering how space technologies such as GNSS and space data contribute to SDG 1, as well as work being done by The Secure World Foundation and several publications on Ethical and Socially Responsible Investing. All countries and citizens around the globe need access to space for eternity. Let's make it happen. Humanity deserves a clean, safe, equitable, and peaceful space for all.

## Project impact

This Manifesto has been published in a number of important publications, including the G20 official publication of 2022, page 15 ([https://issuu.com/g20magazine/docs/01\\_36\\_g20\\_indonesia\\_2022\\_issuu?fr=sMTcxNDU1MzYyMDU](https://issuu.com/g20magazine/docs/01_36_g20_indonesia_2022_issuu?fr=sMTcxNDU1MzYyMDU)).

This was an official publication of the G 20 with the foreword by the President of Indonesia ( page 3) and 'The Mobile Century'(<https://themobilecentury.com/using-space-and-space-technologies-with-blended-global-finance-to-meet-the-sdgs-and-international-climate-goals/>).

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### ORGANISATION

EBAN Space European Business Angels Network

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### COUNTRY

Belgium

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### COUNTRIES OF OPERATION

Belgium

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 12,16

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### PROJECT ANCHOR

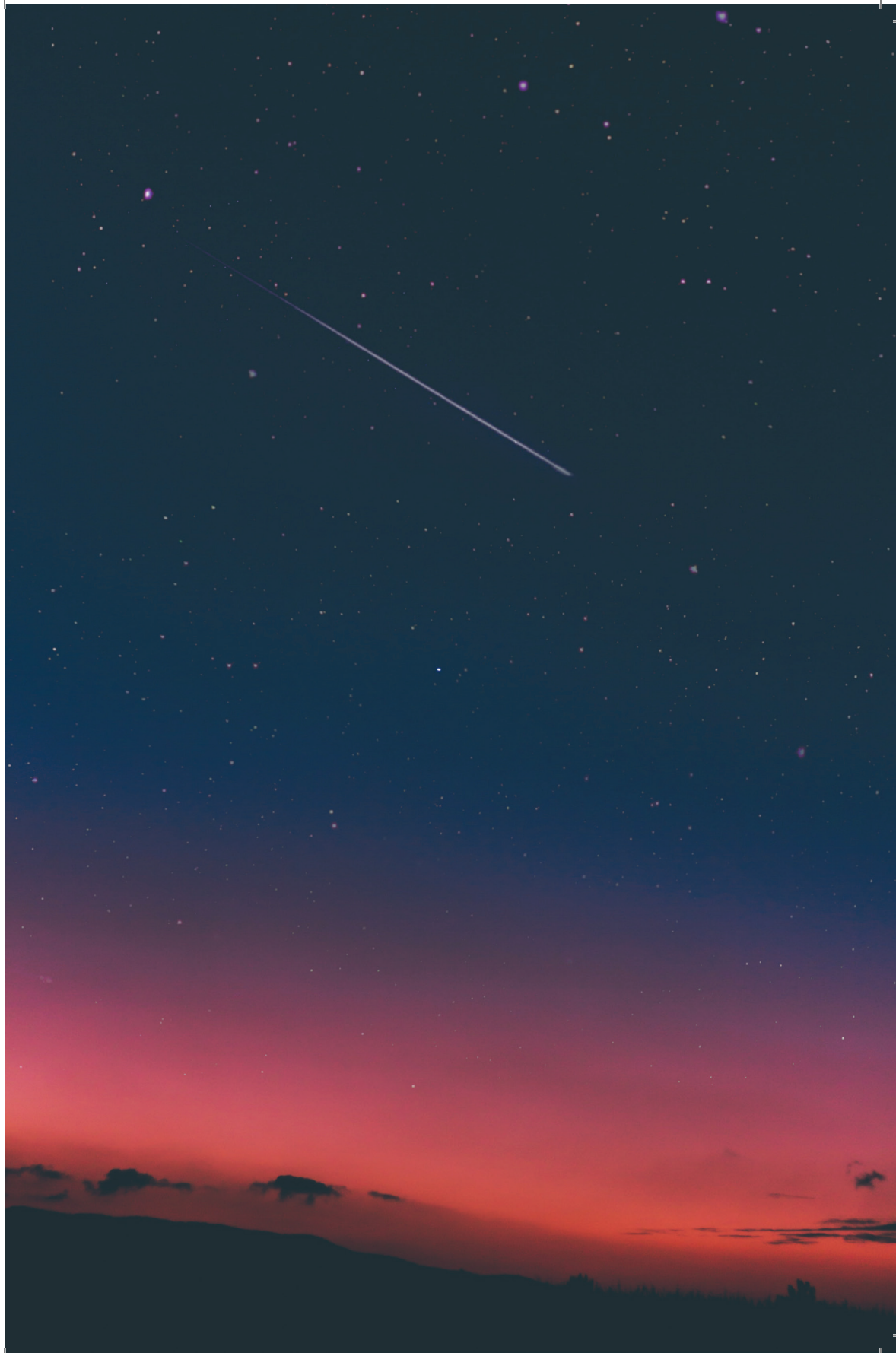
EBAN (European Business Angels Network)

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Candace Johnson  
[satellady@gmail.com](mailto:satellady@gmail.com)







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## Enabling technologies for intelligent wireless sensor network for health and environmental monitoring

Cardiovascular diseases continue to be the single largest cause of death in the world. Seismocardiography (SCG) helps in the identification of heart failure.

### Project impact

Wearable technology platform for low-cost, and low-energy intelligent devices and networks aimed at facilitating cardiac (ECG & SCG) monitoring, for delivery in a mobile environment (mHealth).

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Canada

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3, 9

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### PROJECT ANCHOR

Indian Institute of Technology (IIT), Jodhpur

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### CONTACT

Prof. Anil K. Tiwari  
akt@iitj.ac.in



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# Enhanced silver nanomaterial formulations for transparent conductive applications

India is the second-largest smartphone market globally and is expected to grow by 4.7 times in terms of the number of smartphones to reach over 650 million in the next four years. This showcases an opportunity for a growing market for transparent conductive films.

## Project impact

Developing new low cost and enhanced performance, transparent conductive films based on printed silver nanomaterials (nanoparticles and nanowires) for application in touch screen, OLEDs, Organic photovoltaics cells and to develop similar applications using this technology for optoelectronic products.

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**ORGANISATION**  
Global Innovation and  
Technology Alliance (GITA)

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, Spain

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**SUSTAINABLE DEVELOPMENT  
GOALS**  
SDG 9

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**PROJECT ANCHOR**  
Manipal Technologies Limited  
(MTL), Manipal

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**CONTACT**  
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# Full channel stave thickness measurement technique for blast furnace

A stave cooling system is a modern technology in Blast Furnaces. It is beneficial in terms of providing uniform cooling over a large surface area. But it is prone to continuous wear as it forms the inner layer of the blast furnace wall, which is exposed to the relative motion of the raw material and hot gases.

Therefore, periodic condition assessment of the wear condition of the staves is of high importance to prevent any catastrophic failure. In the past, 1G and 2G techniques were developed, but these are limited to thickness measurement at a point only, which is inadequate to represent the condition of the entire stave as the wearing process is not necessarily uniform. Hence, in this work (3G), a mini robot has been developed that can navigate through the intricate geometries of the channel and obtain the thickness profile for the entire channel.

After successful development at lab scale, it is being fully deployed in all the blast furnaces of Tata Steel, India. This unique invention is protected by two patent applications. Tata Steel is working on commercialising the solution for other steel companies as well.

The innovation is achieved by combining three major technologies:

1. Ultrasonic Thickness Measurement Technology: Ultrasonic thickness measurement at the water condition of the channel.
2. Miniature Robot: Enable a robot for navigation of the ultrasonic probe through the entire cooling channel. The robot was designed innovatively with provisions for self-guidance and alignment during the measurement.
3. Materials Science: Introduction of a unique material solution that can lose its rigidity in the case of stuck-up So, it eliminates the issue of jamming during the measurement.

## Project impact

The Full Channel Stave Thickness Measurement Technology has a huge impact on enhancing process performance, reliability, and safety. It ensures :

- Safe Operation of the Blast Furnace: Regular condition monitoring of the staves aids in the prevention of catastrophic failure due to massive water ingress from an unnoticed failure.
- Predictive Maintenance and Productivity: Regular Condition monitoring of the staves not only ensures safety but also enables proactive measures to replace the staves to avoid any productivity loss. The productivity loss can go up to INR 70 crore for a Blast Furnace per hour of downtime. In one of the TSL Blast furnaces, the technology could prevent a potential failure, saving an opportunity loss of 65 cr in FY23.

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### ORGANISATION

Tata Steel Ltd.

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 9

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### PROJECT ANCHOR

Tata Steel Ltd.

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### CONTACT

Dr S Balamurugan,  
s.balamurugan@tatasteel.com

- Environmental Impact: Running the BF with a failed stave until its repair impairs the efficiency of the Furnace, which significantly impacts the furnace's performance in terms of carbon emissions.

As this technology is the only comprehensive solution available across the world, it can address the problem of stave thickness measurement for all steel industry blast furnaces. Hence, Tata Steel is working to commercialise the technology in steel and other relevant industries.



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## Gateway device and cloud-based application platform for smart factory

The new cyber-physical manufacturing facilities which use robotics, sensors, big data, automation, artificial intelligence, virtual reality, augmented reality, additive manufacturing, cybersecurity systems need cutting-edge technologies in order to achieve unprecedented flexibility, precision and efficiency to the manufacturing process.

### Project impact

A cloud based application suite that helps industries to handle real-time production data to optimise operations. This will fetch the data from the existing legacy systems / IOT data and use robotics, sensors, big data, automation, artificial intelligence, virtual reality, augmented reality, additive manufacturing, cyber security systems and other cutting-edge technologies to deliver unprecedented flexibility, precision and efficiency to the manufacturing process.

Easy Plug & Play / Drag & Drop tool with minimum programming skills. The suite has module that will interface the configuration and monitoring of key data point to control the production environment in below sector.

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Italy

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### SUSTAINABLE DEVELOPMENT GOALS

SDG 9

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### PROJECT ANCHOR

Nano Kernel Ltd.

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### CONTACT

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## **Global Corporate Startup Stars Awards and ICC Gold Standards for the world's corporations to incorporate open innovation and corporate-startup collaboration**

Open Innovation is a challenge for Global Corporations. The ICC/MTB Global Corporate StartUp Stars Awards inspire Corporations around the world to embrace open innovation and work with start-ups, all the while giving them KPIs against which they can measure their progress. The two organisations have also published the "Gold Standard for the World's Corporations to Incorporate Open Innovation and Corporate Start-Up Collaboration".

The Global Corporate Startup Stars are an annual celebration of the best global practises and role models in open innovation. Organised by Mind the Bridge in partnership with the International Chamber of Commerce, the CSS recognises trailblazing international companies in the area of corporate-startup collaboration (<https://www.corporate-startupstars.com>).

Mind the Bridge, in partnership with the International Chamber of Commerce (ICC), developed a framework to recognise the best companies in open innovation and corporate-startup collaboration. Forbes 2000 and Fortune Global 500 companies based on publicly available information were analysed, and the best in open innovation were presented to a Judging Committee composed of independent experts from different innovation backgrounds. An application form was also available on the website [corporatestartupstars.com](https://www.corporatestartupstars.com) to allow every other company to apply. Overall results achieved across seven open innovation variables were factored in: innovation organisational structure, intrapreneurship, accelerator, venture builder, venture client (procurement from startups), CVC (startup investments), and M&A (acquisitions). The Awards also include: Corporate Startup Accelerator, Corporate Venture Client Award, Corporate Venture Capital Award, Startup M&A Award, Venture Builder Award, Intrapreneurship Programme Award, Innovation Organisation Award Winner, and Orbit.

### **Project impact**

Every year for the last three years of the Global Corporate StartUp Stars Awards, 100 companies from around the globe have been recognised for their work in embracing Open Innovation and working with start-ups. The winners of the Global Corporate StartUp Stars Awards 2022 can be found at <https://www.corporatestartupstars.com>.

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### **ORGANISATION**

ICC / Mind the Bridge

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### **COUNTRY**

Paris, France; San Francisco, USA, and Turin, Italy

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### **COUNTRIES OF OPERATION**

The ICC is established in France and Mind the Bridge is established in San Francisco USA and Turin, Italy

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### **SUSTAINABLE DEVELOPMENT GOALS**

Most aligned with SDG 9

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### **PROJECT ANCHOR**

ICC (International Chamber of Commerce) the Mind the Bridge

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### **CONTACT**

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# Global Drug Development Centre for small molecules and innovative formulations

The Pfizer Global Drug Development Centre at IIT Madras Research Park in Chennai is the first R&D facility established by Pfizer in Asia. It brings critical research and development (R&D) capabilities under one roof. The Centre's capabilities include the development of both active pharmaceutical ingredients (APIs) and finished dosage forms (FDFs) of differentiated products such as complex or value-added formulations, controlled-release dosage forms, device-combination products, lyophilized injections, powder-fill products, and ready-to-use formulations. Bringing new medicines or drugs to market is a long and complex process that requires the completion of many stages of work. Much of that capability is now centred here in Chennai.

The centre integrates three essential functions under the export-oriented undertaking of Pfizer Inc.

**Formulation Development:** The team develops complex sterile injectable formulations and device combination products for the hospital segment, including anti-infectives, oncolytics, and uniquely differentiated hospital products.

**Small Molecule API Development:** The team is engaged in discovering more advanced processes for developing products that address safety, environmental sustainability, and scalability aspects. Sophisticated equipment and techniques strengthen the manufacturing capabilities. The team pioneers next-generation API processes and manufacturing technology to supply medicines to patients around the globe.

**Analytical Technology:** This arm is focused on the development of contemporary analytical methods and novel techniques to determine low-level impurities. It works to address investigations connected to manufacturing and release.

The foundations that have been laid here in Chennai have given Pfizer the confidence to make bold investments for the future. Pfizer aspires to make this site in India one of 12 key R&D centres in the world and the largest in Asia, and to create a new footprint for future growth and investment. The Pfizer Global Drug Development Centre at IIT Madras Research Park has world-class facilities to carry out pharmaceutical research in key disciplines such as synthetic chemistry, analytical chemistry, and pharmaceutical design. This is enhancing the global research and development efforts that are the foundation for new drug discovery. The R&D facility in Chennai, being situated adjacent to the campus of IIT-Madras, allows us to recruit, access, and upskill the best Indian talent from the fields of science, engineering, and digital technologies. The site is contributing to the development of synthetically derived new Pfizer products that support key therapeutic areas; namely hospital products, oncology, inflammation and immunology, internal medicine, and specialty care, and will be capable of designing

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**ORGANISATION**  
Pfizer Ltd.

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
The API and Finished Drug Formulations that are supported from here would be integrated in sites across the US, Western Europe, Japan, Latin America, Australia and would be made available for patients across the globe.

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 3

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**PROJECT ANCHOR**  
PHIPL Pfizer Healthcare India Pvt. Ltd. at IIT Madras

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**CONTACT**  
Sidharth Prasad  
sidharth.prasad@pfizer.com

both innovative and differentiated generic products, which are being developed for global access. These products have the potential to be breakthroughs that change patients lives, which is our mission at Pfizer.

## Project impact

By bringing all functions under one roof, we will be able to speed up the journey from drug development to drug delivery, both for the world and for India. Proximity to a multi-disciplinary research cluster, incubation centres, and a premier academic research institute such as the Indian Institute of Technology Madras enables breakthrough research, bringing newer therapies to people and significantly improving their lives. Opportunities to collaborate with data science, AI, and ML organisations are empowering Pfizer's digitalization drive. Closer access to the tech corridor supports digital transformation and the acceleration of drug development. Pfizer R&D has engaged with some of the startups at IIT Madras in Process modelling to use the power of dynamic and transient mathematical models to develop new insights into operations backed by rigorous statistics, new-age inferential algorithms, and virtualized computing functions. Access to advanced instrument facilities (SAIF) for SMEs can speed up research activities and projects. The presence of IIT Madras Research Park enables connections with 70+ R&D, 200+ startups, and 10+ Innovation centres of excellence like the Advanced Manufacturing Technology and Development Centre, the Healthcare Technology Innovation Centre, etc., which helps automate complex development operations.

As part of its sustainability initiative, Pfizer R&D in Chennai is in initial discussions with IITM academics about expanding the use of green Chemistry (the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances). Green chemistry applies across the life cycle of a chemical product, including its design, manufacture, use, and ultimate disposal, and new technologies such as flow chemistry (which reduces the chemical and manufacturing footprint while accelerating development and production) are used in API development. Pfizer has also committed to 'net zero' goals and exploring innovative solutions to advance the sustainability of our overall supply chain.





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# Green hybrid Unmanned Aerial Vehicle for societal applications

Currently, there is very limited use of hybrid unmanned aerial vehicles due to a lack of research and sustainable design, which require multiple landings to accomplish long-range and long-duration operations. All present long-duration operations use manned helicopters, which are expensive.

## Project impact

Development of a Green Hybrid Unmanned Aerial Vehicle (G-HUAV), which will be a blend of battery-powered and also use thin-film solar cells on its wing with a combination of vertical take-off and landing capability. This feature enables the system to have longer endurance and can also be operated in cluttered terrain and confined areas without fully paved runways. The G-HUAV can be put to various societal applications like assisting farmers in monitoring crops for high yield, disaster management, forest and wildlife monitoring, pipeline monitoring, railway line monitoring, and mining surveillance.

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**ORGANISATION**  
Global Innovation and  
Technology Alliance (GITA)

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, Spain

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**SUSTAINABLE DEVELOPMENT  
GOALS**  
SDGs 7, 9, 11

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**PROJECT ANCHOR**  
UCAL Fuel Systems Ltd., Chennai

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**CONTACT**  
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paddu.mayoor@ucal.com



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## High precision biofarming making possible durable farming and biodiversity conservation on Earth, and optimized life support in space

At Interstellar Lab, our mission is to grow and protect life anywhere. We design, manufacture, and operate advanced controlled-environment biofarms for sustainable and high-precision farming on Earth and life support in Space, combining Hardware, AI, Life science, and Computational Biology. All our systems are designed to adapt environmental factors (nutrients, temperature, water, CO<sub>2</sub>, and light) to optimise yield and production of secondary metabolites, from microgreens and rare botanicals to endangered species. We mix open-source and data captured in our systems to build the largest database of plant species to suit various applications in health, beauty, agriculture, and biodiversity conservation. BioPod is our first product designed and engineered with advanced atmospheric and growing technology for sustainable farming on earth. NUCLEUS is our second product for plant science and food production in low gravity.

### Project impact

Our first product BioPod allows the production of 300+ varieties of high-value plants without dependence on the seasons or the surrounding climatic conditions, while limiting the use of resources, soil contamination, and the erosion of biodiversity. It recycles all the water and captures up to 1 tonne of CO<sub>2</sub> per year. Nucleus technology is the winner of Nasa's Deep Space Food Challenge in 2023. Its modular structure, composed of nine cube capsules, is designed to provide a nutritious diet for four astronauts for the duration of a two-year mission.

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#### ORGANISATION

Interstellar Lab

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#### COUNTRY

France and USA

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#### COUNTRIES OF OPERATION

France and USA

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 2, 3, 11, 12, 13, 15

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#### PROJECT ANCHOR

Interstellar Lab

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#### CONTACT

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# International Thermonuclear Experimental Reactor (ITER)

The International Thermonuclear Experimental Reactor (ITER) is a nuclear fusion power plant. The objective of ITER is to build the world's largest tokamak, a magnetic fusion device, to prove the feasibility of fusion as a large-scale and carbon-free source of energy based on the same principle that powers our sun and stars. ITER is one of the largest global collaborative R&D projects, involving seven ITER members. These countries are now engaged in a 35-year collaboration to build and operate the ITER experimental device and, together, bring fusion to the point where a demonstration fusion reactor can be designed.

With regard to the key challenges faced, in addition to its technical complexity, ITER is also a management challenge as it relies on an unprecedented collaboration of seven partners, representing more than half of the world's population, who provide 90% of the components as in-kind contributions. The successful integration and assembly of over one million components (ten million parts) built in the ITER Members' factories around the world and delivered to the ITER site constitutes a tremendous logistics and engineering challenge. Given the large number of partners involved, it is critical to ensure the standardisation and uniformity of component production around the world.

The ITER Project is currently under construction on a 180-hectare site in southern France. As of December 2022, over 77% of the work had been completed.

## Project impact

The ITER project is estimated to cost €17 billion (expected to be further revised upwards by the time it is completed).

For all members, the benefits of participation are significant: by contributing a portion of the project's costs (9%–15%), members benefit from 100 percent of the scientific results and all generated intellectual property.

ITER is designed to yield in its plasma a ten-fold return on power ( $Q = 10$ ), or 500 MW of fusion power from 50 MW of input heating power. If operated continuously and connected to the electric grid, ITER would be able to generate about 200 megawatts of electric power, enough for about 200,000 homes.

One of the primary goals of ITER operation is to demonstrate the control of the plasma and the fusion reactions with negligible consequences for the environment.

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## ORGANISATION

Shell-N-Tube Pvt. Ltd.

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## COUNTRY

India

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## COUNTRIES OF OPERATION

ITER Members: China, the European Union, India, Japan, Korea, Russia, and the United States

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## SUSTAINABLE DEVELOPMENT

### GOALS

SDGs 7, 9

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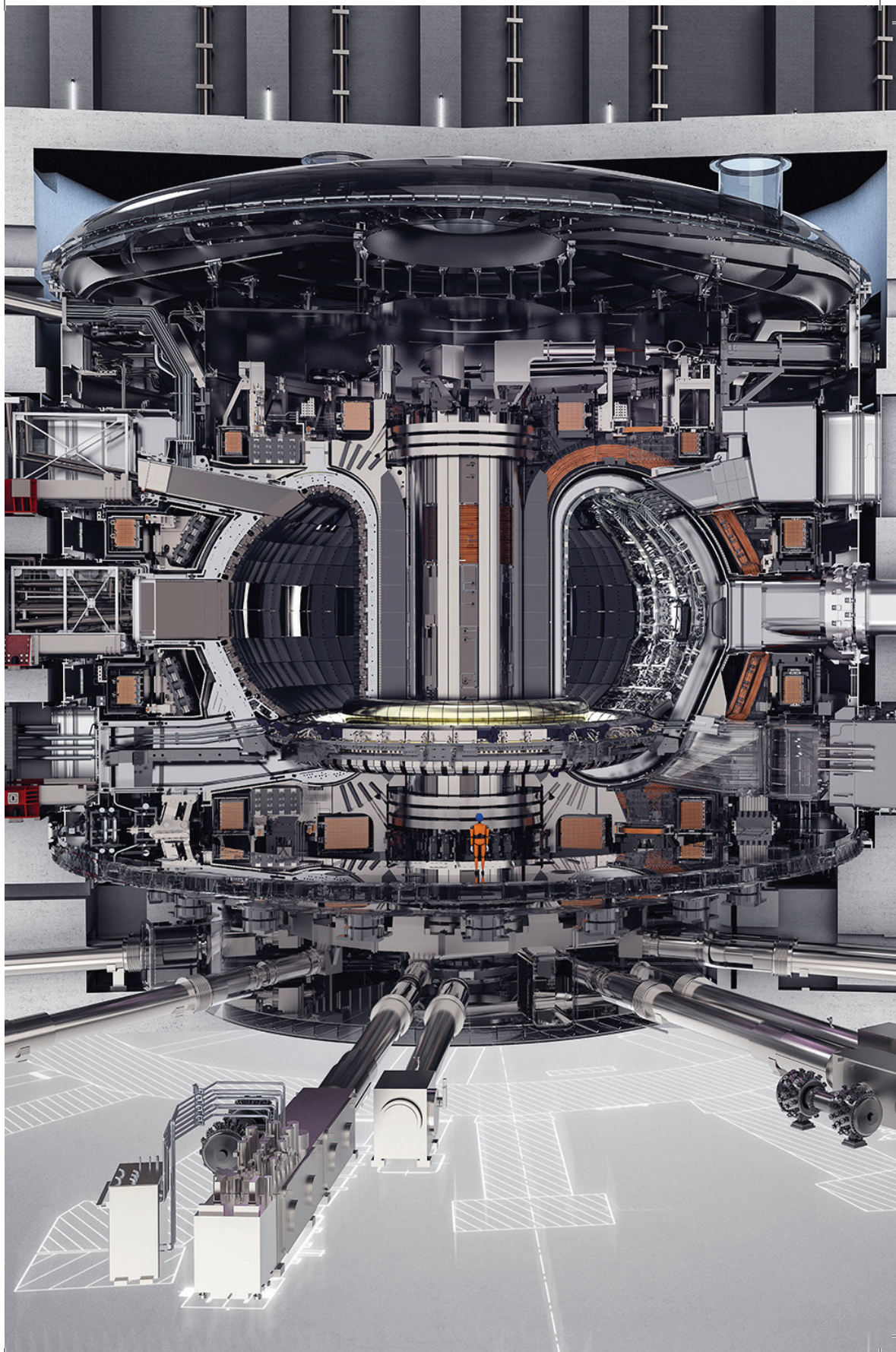
## PROJECT ANCHOR

ITER Organization

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## CONTACT

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## IoT-based intelligent smart street lighting system

Providing street lighting is one of the most important and expensive responsibilities of a city. Lighting can account for 10–38% of the total energy bill in typical cities worldwide (NYCGP 2009). Across India, poor lighting design is seen as a major cause of either excessive energy consumption, safety and security hazards, or excessive operation and maintenance costs. A smart street lighting system is the need of the hour, which is intended to save energy effectively, get real-time reports, reduce CO2 emissions, have complete control over the light intensity, and lower maintenance costs efficiently.

Bengaluru Airport City (BAC) envisions itself as a sustainable, smart, vibrant, and truly global destination. A few of the BAC's primary focuses are preventive maintenance, safety, security, and sustainability to provide an exemplary customer experience. Elsewhere, adopted street lighting systems are silent on resolving issues that are not in sync with BAC's vision.

BAC's move to adopt an IoT-based solution revolved around basic yet key issues, i.e., poor customer experience, energy losses, high turnaround time, and poor operational experience.

Presently, the street light system is a timer-based on/off trigger, which does provide energy savings but fails to consider the incurring O&M costs due to manual patrolling. We witnessed situations where dark zones were created due to faults and a lack of preventive maintenance; hence, BAC designed street lighting systems and adopted and implemented IoT network LoraWAN technology.

For the implementation of the desired design to minimise maintenance and operational costs and increase energy savings while maintaining customer safety and security, our foremost challenges were:

**Right technology and interoperability:** We had almost 3 months of rigorous discussions with various technology partners and lighting vendors to understand limitations with controller and LED light compatibility, operability, and sensitivity. Based on discussions, inputs, and offerings, BACL was able to shortlist the technology partner(s).

**Skilled manpower to install the controllers:** We took online and offline sessions with our technology partner (TATA Communication Ltd.) and lighting vendor (Suveg) to be in complete sync with the controllers' dimensions, supply requirements, and where we wanted them to be mounted. Because controllers are the most important component of an IoT solution, we made certain that the contractors' team received at least two offline, on-site training sessions on how to properly mount the controllers.

**BIAL internet security protocols:** After application onboarding, due to BIAL's high-security internet protocols, a few of the remote functionalities through the dashboard were non-functional.

**Software calibration:** After successful application onboarding, there were initial false alerts being triggered, i.e., online it would show

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### ORGANISATION

Bengaluru Airport City Ltd.  
(BACL)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 11, 12

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### PROJECT ANCHOR

Bengaluru Airport City Ltd.  
(BACL)

lamp failure while on site the same lamp was lit. Once it was brought to the attention of the technology partner, they were able to find the glitch in their software and rectify it.

**Adaptability:** cloud-based IoT-based Individual smart street lighting being done for the first time, the acceptance and transition from conventional lighting management solutions to cloud-based IoT-based Smart-street lighting management systems was quite enriching. The challenge was to ensure our employees could freely and comfortably use the online platform from anywhere at any time. BACL introduced technical sessions for almost 100+ employees to understand this platform, along with five online and offline training sessions for our employees to become comfortable with the remote dashboard application. BACL to date has ensured that for any difficulty faced by employees on use, concerned specialists are called to address issues.

### Project impact

- Pole-level incident or fault detection results in zero manual patrolling.
- On-demand fault resolution model
- Lighting vendor SLA review process optimisation through real-time data
- Reconcile billing data with energy consumption data for street lights.

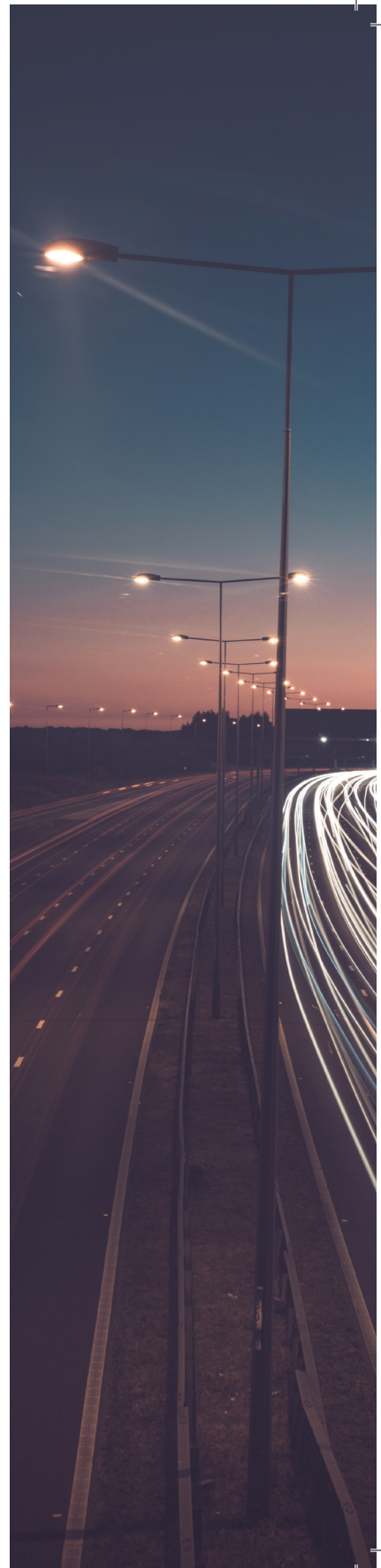
**Value Creation:** Being an IoT-based web application through LoRaWAN communication, we have access to the GIS location of poles and energy consumption monitoring per light. This helps:

- Optimise costs due to energy savings (approximately 35% savings have been seen).
- Reduce operational cost by digitalizing fault detection and remote handling, hence no manual patrolling and fuel wastage.

**Cross functional:**

- Facility/Security Dept.: A Better SLA results in safer and more secure premises.
- Procurement Dept.: Visibility on luminaire life and fault rate can help in better negotiation in future procurement.
- Maintenance Dept.: cost optimisation because of real-time visibility of lighting infrastructure performance.
- Electrical Planning: electricity demand planning based on consumption patterns and infrastructure inefficiency detection based on excess power draw data

**Turnaround Time:** With 24x7 control and monitoring through mobile or laptop in the last year of implementation, none of the facility team had to be on site for false errors or alerts. With continuous lamp status monitoring, we are always a step forward in understanding how the system works and, hence, can easily align and plan for any maintenance in advance.





## Magnetic noise reduction in an automotive generator

An automotive generator works on the principle of electro-magnetic induction. That is, a rotating magnetic field produces an emf in a stationary conductor. Generally, the magnet is on the rotating part called the rotor. This rotor magnetic field has to encircle the conductor, which is placed in a stator packet. The magnetic flux takes the path from the rotor to the stator packet tooth via the airgap between the two. This stator packet, which is made of ferromagnetic material, is laminated and then stacked together by welding at some points on the outer diameter of the stator packet.

These are laminated to reduce eddy current losses in the stator packet. When magnetic flux from the rotor enters this stator packet, these magnetic forces excite torsional vibrations in the stator and produce a noise known as magnetic noise.

This noise is an irritant, mainly to the vehicle driver. So, several steps are initiated to reduce this noise, which has become a standard feature in the automotive generator. These are: chamfering at the trailing edge of the claw-shaped electromagnetic pole in order to reduce noise; introduction of a smooth round chamfer; improving the concentricity between stator and rotor by providing better seating of the stator on the end shields, leading to lower noise; etc.

One of our customers wanted specific magnetic noise reduction in a close-range method of testing. While the standard noise features provided lower magnetic noise in the standard method of noise testing, they were not good enough for the close range of microphone testing.

Since the noise came from the vibrations of the stator laminations, the obvious thought process would be to glue these stator laminations together so that there would be no relative movement between them. Such glueing methods had been tried before, like the glueing of the stator laminations with different types of glues, vacuum impregnation of the stator packet, teeth riveting at the front end of the stack, stator lamination compacting at the front end of the stack, etc. None of them gave a lower noise result.

However, an ingenious process for arresting the vibration of laminations was adopted. This was the effective self-lock of the stator laminations concept. This self-lock reduced the close-range noise of the generator. The self-lock concept of stator lamination is having a notch in one lamination that will engage with the notch in the second lamination, and the two laminations are interlocked. The second lamination gets interlocked with the third, and so on. This way, the entire stator stack gets self-locked.

Despite the magnetic forces that act between the rotor and stator, this self-lock effectively arrests the relative movement of the laminations with respect to one another. So together with the standard noise features, the self-locked stator packet reduces the magnetic noise of the generator.

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### ORGANISATION

SEG Automotive India Pvt. Ltd.

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 9

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### PROJECT ANCHOR

SEG Automotive India Pvt. Ltd.

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### CONTACT

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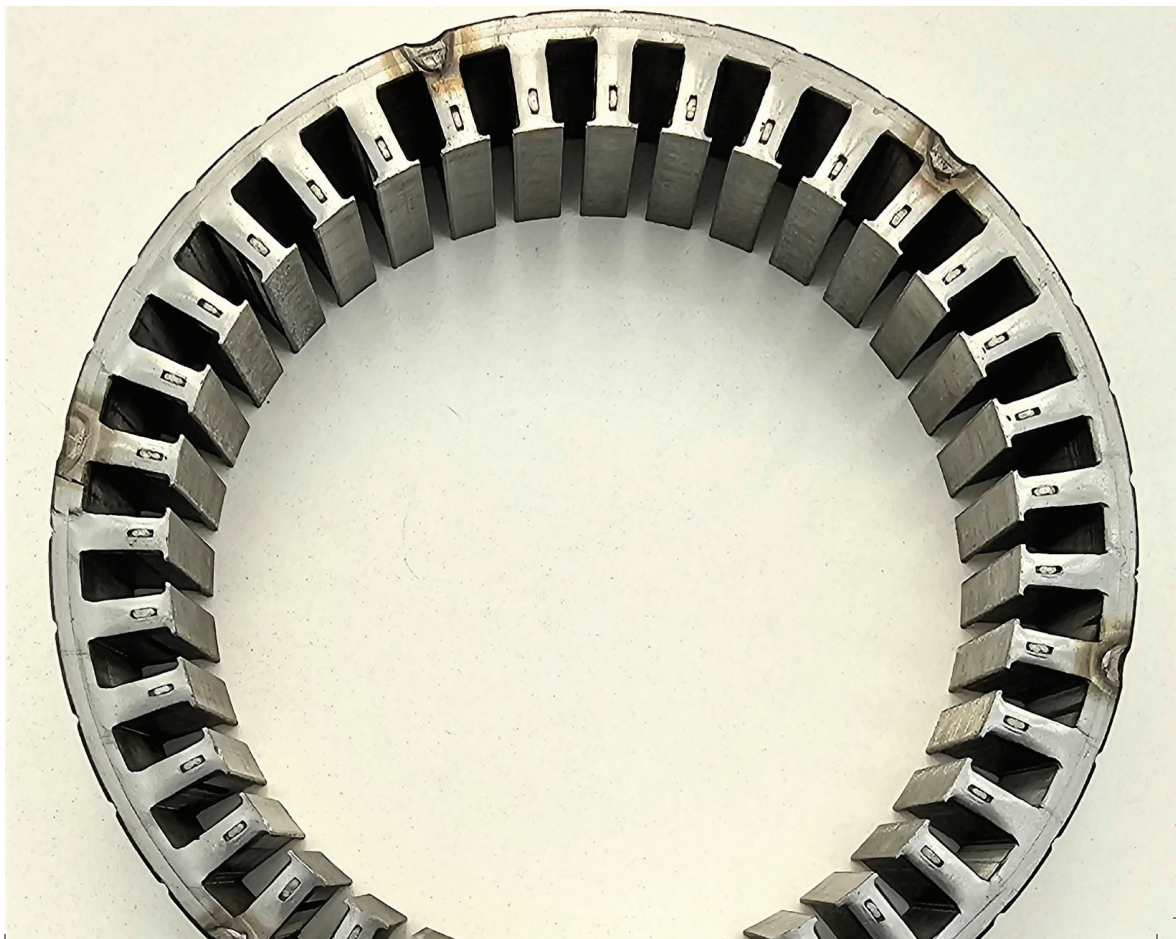
## Project impact

The outcome of the project was magnetic noise reduction that met customer noise specifications without affecting other performance parameters of the generator.

The generator noise is not a single value that needs to be met. The automotive generator works at a wide range of speeds. Hence, the generator noise is dependent on the speed at which the generator is operating. The generator must meet different noise levels at different speeds. The armature reaction effect and non-linear magnetic behaviour complicate this. All these make the magnetic flux in the air gap between the stator and rotor vary, which makes controlling the magnetic noise that much more complex.

While reducing the noise levels would have been easier by increasing the air gap between the stator and rotor, it would have negatively impacted the current output from the generator. To overcome this drop in output, we should increase the use of copper. To avoid natural resource wastage, without increasing the airgap or copper, we could achieve the noise specification.

In this project, with the self-locked stator packet, we were able to meet the noise specification of the customer at all speeds, even with the microphones placed very close to the generator.



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## Mission control intelligence: Enhancing autonomy of commercial rover missions

This project aimed to develop a Lunar rover (upgrading and modifying the existing engineering model with the IPL) with Artificial intelligence-based enhanced capabilities such as safe navigation and operations, quick turnaround analysis of terrain conditions, and other modules for effective planning of rover missions and the development of onboard autonomy. The project would enhance the scientific and engineering potential of rover platforms.

The technology developed as part of this project, i.e., mission control software and algorithms to develop autonomous features for navigation and terrain analysis, can have applications in planetary exploration missions and even non-space domains like defence, mining, automotive, etc. Primarily, the IPL would focus on the space domain for the commercialization of the technology so developed.

### Project impact

A Lunar Rover with enhanced capabilities that include Artificial Intelligence Algorithms for safe navigation and operations, quick turnaround analysis of terrain conditions, and effective planning of Rover Missions Up to 5kg payload capacity, 4WD, 15cm obstacle handling HD imaging capability, Pan and Tilt Mechanism.

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#### ORGANISATION

Global Innovation and  
Technology Alliance (GITA)

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India, Canada

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 9

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#### PROJECT ANCHOR

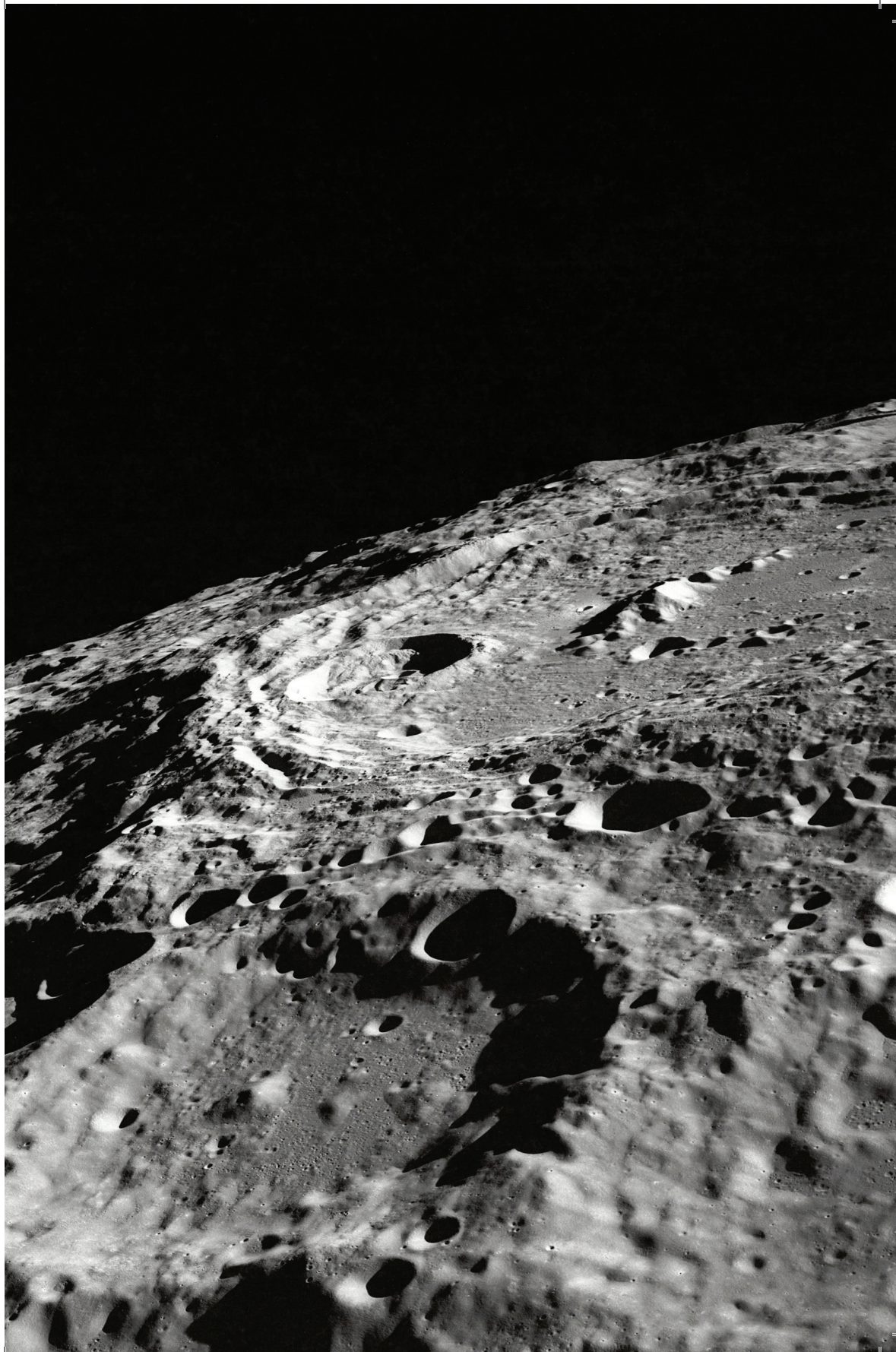
Axiom Research Labs Pvt. Ltd.

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#### CONTACT

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## Neurovascular devices

Currently, India relies heavily on imports of neurovascular products. The cost of neurovascular devices in India ranges from 50,000 INR (625 US dollars) to one million INR (12500 US dollars). Once indigenous devices are available, prices are expected to drop by 40–50%.

The biggest challenge lies in the size, especially the diameter. India has been producing a large number of implants for bones that are larger in size, and for arteries that are smaller in size, such as cardiac stents, peripheral stents, and so on. In the case of neuroimplants, especially those for the brain, where the diameters are just a few microns.

Therefore, very high accuracy and precision and a totally different research approach are required. During the development of neurovascular Implants, balloon catheters, microcatheters, and related accessories, from the raw materials to various processes like Braiding, Laser Cutting, Electro-Polishing, Heat Setting, Chemical Passivation, Delivery System Assembly, and Sterilisation, etc. The biggest challenge was achieving consistency for the desired level of precision in neuroimplants. This was especially difficult as all implants are very miniature, soft, and flexible due to the target location and critical clinical cases.

### Project impact

Meril gradually developed various technologies to make products and implants specifically for neurovascular applications. We have completed development work and have recently received DCGI approval for three neurodevices:

- Flow Diverter: Meril's brand, Silk Route, for the treatment of Aneurism.
- Clot Retrieval Device: Meril's Brand, Restora, to remove clots from the neurovascular artery.
- Neurovascular Coil: Meril's Brand, EmboNest, is also used to treat aneurisms.

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#### ORGANISATION

Meril Life Sciences Pvt. Ltd.

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 3

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#### PROJECT ANCHOR

Meril Life Sciences Pvt. Ltd.

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#### CONTACT

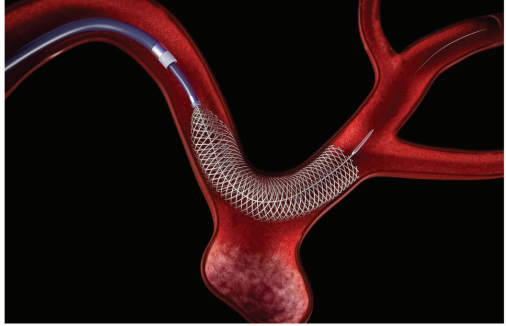
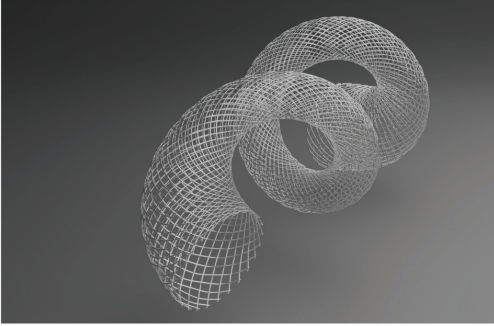
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devesh.kothwala@merillife.com

## NEUROVASCULAR DEVICES

**SilkRoute™**  
Intracranial Aneurysm Flow Diverter System

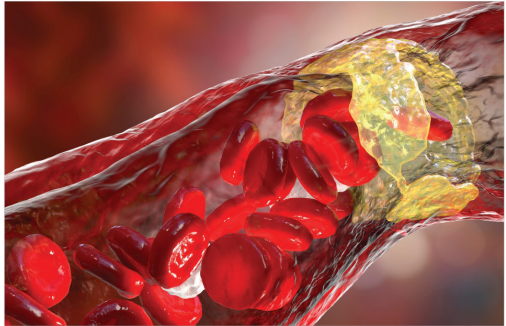
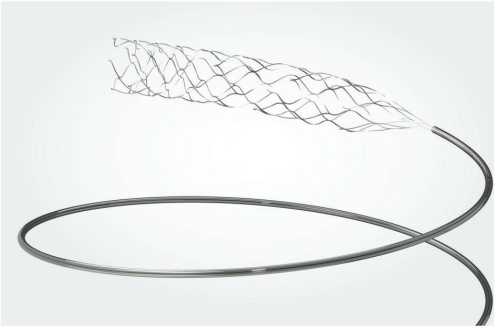
Flow Diverter: Advanced Treatment  
For Brain Aneurysms

Meril



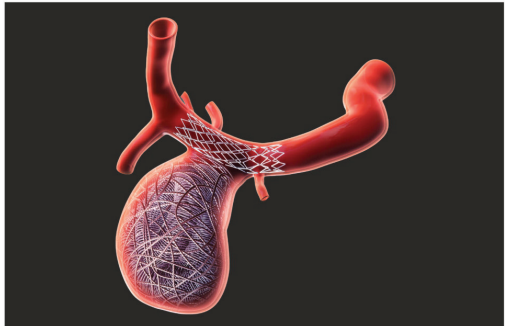
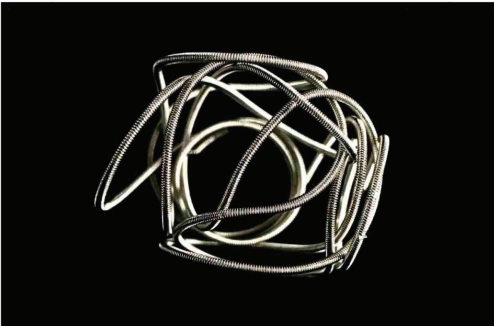
**Restora™**  
Clot Retrieval Device

Minimally Invasive: Blood Clot Retrieval



**Mbonest™**  
Embolization Coil System

Minimally Invasive: Regulating The Blood Flow  
Through The Lesion By Using Embolization Coil  
In The Treatment Of Ruptured Aneurysms



# Next-gen low cost optical coherence tomography

In an era of increasing costs in medical diagnostics and care, the vision is for an affordable, high-performance ophthalmic imaging and diagnostics device. There is an unmet need for a low-cost device capable of advanced imaging and diagnostics in many parts of the developing world, such as India, China, and Africa.

This innovative collaboration will research and develop a new device that operates with low power consumption, is extremely robust, has high performance, and can be produced at a low cost.

This device will be capable of delivering methods of early diagnosis, monitoring, and evaluation of patients ophthalmic health in the developing and developed worlds. It will be designed from the start to be a low-cost device, enabling a much wider level of use and adoption than current systems. Optical Coherence Tomography (OCT) is a rapidly evolving technology that uses partially coherent light to produce information on structure, similar to high-resolution ultrasound.

## Project impact

- Development of a low-cost, low-power consuming ophthalmic imaging and measurement device as an alternative for eye diagnostics.
- Lower power consumption than contemporary machines.

**ORGANISATION**  
Global Innovation and  
Technology Alliance (GITA)

**COUNTRY**  
India

**COUNTRIES OF OPERATION**  
India – United Kingdom

**SUSTAINABLE DEVELOPMENT  
GOALS**  
SDGs 3, 9

**PROJECT ANCHOR**  
Biomedix Optotechnic & Devices  
Ltd.

**CONTACT**  
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com





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## Oceania Women's Network Satellite Kacific

Owensat: Oceania Women's Network Satellite is a group of executive women who came together from around the world to inspire, help implement, and invest in Kacific. Kacific is a next-generation broadband satellite operator. We are committed to providing universal, fast, and high-quality broadband access at an affordable cost using robust technologies and an agile business model. Kacific's purpose is to make a rapid and lasting difference to the people of South-east Asia and the Pacific by providing high-quality, low-cost satellite broadband accessible from a small, easy-to-install, and affordable antenna. Broadband connectivity enables critical government services to reach the hearts of otherwise vulnerable rural communities. We are committed to using proven space technologies to solve the endemic lack of affordable broadband internet in remote and underserved regions and locations around the world. Satellite connectivity drives economic growth, provides infrastructure freedom to communities, and improves people's lives. Whether in urban, extra-urban, rural, or fringe and remote areas, we help businesses, governments, and communities fully participate in the digital world.

### Project impact

OWNSAT was incorporated in Singapore in 2013 and became one of the first and, at the time, largest investors in Kacific Satellite System, also incorporated in Singapore. Kacific was started in 2013. It covers today 25 countries in the Asia-Pacific islands and serves 600 million people with high-throughput broadband Internet.

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### ORGANISATION

Oceania Women's Network Satellite – OWNSAT PTE. LTD. and Kacific Satellites

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### COUNTRY

Singapore for both entities, OWNSAT and Kacific

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### COUNTRIES OF OPERATION

American Samoa, Bhutan, Brunei, Cook Islands, East Timor, Fiji, French Polynesia, Guam, Indonesia, Kiribati, Malaysia, Micronesia, Myanmar, Nepal, New Zealand, Niue, Northern Mariana, Papua New Guinea, Philippines, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 1–17

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### PROJECT ANCHOR

OWNSAT – Oceania Women's Network Satellite, PTE.LTD.

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### CONTACT

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# Optimal water flow management for crop irrigation (OPTIFLO)

There are advanced water-saving irrigation methods like drip and sprinkler, but these methods also result in non-uniform water distribution over the field due to hydraulic losses across the system pipeline.

## Project impact

- Design and manufacture of an accurate and robust water flow management regulating device for crop irrigation, resulting in water and energy efficiency.
- A pressure-independent flow that will provide the set required amount of water across modulating input pressures with a variation of less than 2%.
- Assess valve performance for a variety of sediment concentrations with an add-on removable filtration system without interruption of the primary flow.

**ORGANISATION**  
Global Innovation and  
Technology Alliance (GITA)

**COUNTRY**  
India

**COUNTRIES OF OPERATION**  
India, United Kingdom

**SUSTAINABLE DEVELOPMENT  
GOALS**  
SDGs 7, 9, 11

**PROJECT ANCHOR**  
Jain Irrigation Systems Ltd. (JISL)

**CONTACT**  
Abhijit Bhaskar Joshi  
abhijit.joshi@jains.com





## Orthopaedic knee implant

Meril Life Sciences, founded in 2006, has emerged as India's largest medical device manufacturing company. R&D and innovation have been the main focus of Meril, and as a result, within a short time, we launched various innovative medical devices. While expanding our product portfolio in medical devices, we looked at a US start-up company, Maxx Medical Pte. Ltd. (<https://www.maxxortho.com>), which designed knee implants. We initiated discussions, participated in equity, and showed interest in marketing the product in India through Meril. During the discussion, it emerged that Indians and Asians have different physical builds from Americans and Europeans. Therefore, knee implants for Indians and Asians require additional features. Maxx incorporated these into the design, and the US FDA approved the revised design in 2009. The patent was also granted (US 8,337,564).

The manufacturing of the metallic Cobalt Chromium (Co-Cr) knee implants from their raw casted parts involves operations like machining, coordinate measuring, buffing, polishing, finishing, sterilisation, etc. The biggest challenge was to get consistency for the desired level of precision in medical implants. With the help of Maxx Ortho, we started manufacturing step by step in India at Meril during 2009–2010 and started marketing the brand as 'Freedom Knee'. This was a good learning curve for us. Gradually, we built our capacity and installed machinery for all the operations.

We started end-to-end manufacturing at Meril Health Care, a subsidiary of Meril Life Sciences, and launched our own brand as Destiknee in 2014. We brought down manufacturing costs significantly and also obtained US FDA approvals, CE certifications, and Indian DCGI approvals for marketing in a different geography. Meril R&D is continuously exploring ways to provide next-generation medical devices; it has developed an advanced version of DestiKnee with surface coatings to improve abrasion resistance, allergy prevention, and durability. Meril has been granted an Indian patent for this version. It has also introduced a TiNbN coating-based brand as OPULENT, which is popularly known as Gold Knee.

### Project impact

By 2012–13, all the machines and equipment for manufacturing and quality testing had been installed. Initially, the ratio of QA-qualifying implants was about 80–82%, but gradually it has improved to about 94–95%, which is equal to the industry standard.

The National Pharmaceutical Pricing Control Body (NPPA) brought down the prices of Co-Cr implants in August 2017 by nearly 35–40% to Rs 25860. This posed another challenge to meeting the cost set by the NPPA. The company decided to increase the manufacturing capacity from 100,000 knee implants in 2016 to about 4,00,000 and thereby bring down the manufacturing cost due to scale-up and other efficiencies. Further, Ayushman Bharat from the present Indian

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### ORGANISATION

Meril Life Sciences Pvt. Ltd.

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3, 9, 17

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### PROJECT ANCHOR

Meril Life Sciences

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### CONTACT

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[dr.pkminocha@gmail.com](mailto:dr.pkminocha@gmail.com)



government resulted in steep growth of knee implants in India. Meril-manufactured Destiknee is approved in almost all Ayushman-based hospitals. Meril has also initiated exports where price realisation is fairly high to get a higher unit price average. In the first half of the current financial year, our total sales revenue in knee implants has reached 500 crores (62 million dollars), out of which 130 crores (16 million dollars) are from exports. Meril has experts in about forty countries, including the US and Europe. Meril also initiated academic courses for the upcoming surgeons and live surgeries in its academy by the top global surgeons; its reach has also started in Tier 2 and Tier 3 cities.

We have joined hands with Curexo, a Korean robotics company, for the supply and have also developed software that suits our knee implants, hence emerging as the first Indian company for robotic surgery. In less than two years, we have been able to supply about 38 such robots to Indian hospitals that have already started robotic procedures. We have also initiated working with IIT Madras to further strengthen the robotic systems development for Meril.

## Manual Knee Replacement Surgery



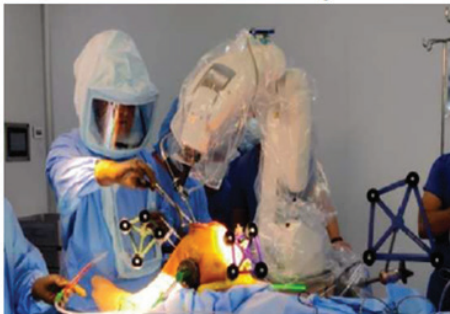
### Power Tools



Surgical Instruments Required For Single Knee Replacement.



## Robotic Assisted Knee Replacement



Operating Software  
Main Controller  
Robot Arm  
Milling Tool  
Irrigation  
System Monitor  
Surgical Planning - software  
Optical Tracking  
Surgical Accuracy



sub-millimeter accuracy



# Packaging density enhancement through automated pack assistant simulation

Pack Density is the measure of the number of parts stored within a Packaging container, viz., a bin, tote, or carton. Pack density optimisations were done selectively based on manual assessment during supplier packaging review at the New Model Launch. For Running Models, TVM (Team Value Management) workshops were conducted.

There was 50% missed opportunity in freight and packaging costs due to the lack of a digital approach. BOM assessment with respect to product development timelines was difficult to assess due to the manual approach. Additional manpower was engaged for the manual assessment.

A new technological innovation approach was adopted for Packaging optimization. Key steps in the value chain were enumerated and opportunities identified for standardization and automation for parts in standard packaging.

## Project impact

- An innovative solution was developed in the form of RPA BoT (Robotic Process Automation) to overcome the time and resource constraints and systematically assess 100% of the parts in BoM for pack density optimisation.
- The RPA downloads the part drawing or 3D Model from Team Centre according to the input BoM and performs simulation in Pack Assistant software for different orientations amongst predefined internal dunnage options.
- The numerical and simulated packaging drawing output of the RPA helped the analyst quickly choose the best option. The automation increased the throughput by more than three times and made it possible to cover all opportunities upfront.
- Environment: Reduced CO2 emissions, waste to landfill, packaging material, electricity, and water consumption.

**ORGANISATION**  
Ford Motor Pvt. Ltd.

**COUNTRY**  
India

**COUNTRIES OF OPERATION**  
India

**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 11,12

**PROJECT ANCHOR**  
Ford

**CONTACT**  
Balakrishnan A.S.  
abalakri@ford.com



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## Portable organic transistor-based biosensor for low cost thyroid testing

Approximately 42 million people in India suffer from thyroid disease. Existing tests use complex machines in central laboratories with significant infrastructure requirements to collect, ship, and store samples and, subsequently, carry out testing and report results. Machine-based methods are slow (several hours) and expensive.

### Project impact

Development of an economical rapid sensitive portable & low-cost multiplexed Point-of-care Testing (POCT) kit for the three most important thyroid biomarkers (TSH, T3, T4), that improves over ELISA methods and results in faster primary care.

To combine specific immune reagents with low cost organic thin film transistor technology to develop Portable readers and sensor units for detection of Thyroid markers.

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, United Kingdom

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 3, 9

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### PROJECT ANCHOR

Bhat BioTech India (P) Ltd.

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### CONTACT

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bhatbiotech@gmail.com





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## Product dtMAC

dtMAC, where dt symbolises desolventizing toasters in solvent extraction plants (SEP) and MAC symbolises measurement, analysis, and control.

The product is basically a machine-learning-based, auto-tuning and auto-correcting control system that dynamically calculates its set points to cater to variations in inlet process parameters and thus guarantees optimisation in energy consumption, consistency in outlet product, and maximum productivity.

### Project impact

Desolventizing toasters are the largest steam consumers in Solvent Extraction plants, and savings of 18 to 25% in steam consumption are documented, which have a substantial impact on the annual fuel bill. For a typical 400 TPD plant, savings of 35 to 40 LPA are documented.

The critical parameters of Deoiled Cake (output material at desolventizing toasters) are also seen to have tight control on variations, due to which there is a higher price realisation for DOC, which is also documented.

The control strategies available in the market are fixed set point-based, where the operator has to change the set point based on any variation at the input, and those set points will also be based on the operator's comfort level.

This strategy is not only completely automatic and self-learning but also has the capacity to take in all process parameters, calculate the most optimal region to operate in, issue new set points for the control system, and operate by the same logic. The percentage of savings that we have achieved points towards the same.

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### ORGANISATION

Forbes Marshall

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 9, 12

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### PROJECT ANCHOR

Forbes Marshall

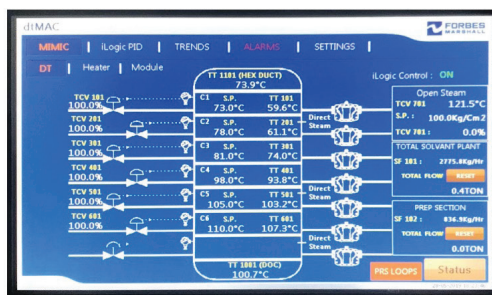
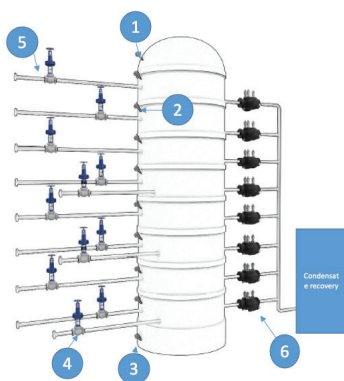
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### CONTACT

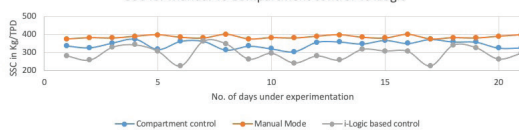
Shripad Kulkarni

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## dtMAC – An optimized process control based on advanced data analytics technique



SSC for Manual Vs Compartment control Vs iLogic





# Reconstruction of railway track infrastructure and drainage-transport shaft of the Severomujskij tunnel

Severomujskij tunnel is the longest railway tunnel in the Russian Federation (15,343 m) and the most complicated section of the Baikal–Amur Mainline due to severe climatic and geological (including tectonic) conditions and the high freight density of the line. Currently, the tunnel's throughput capacity is reduced due to tunnel portals, freezing and destruction of reinforced concrete structures in the wintertime, and the unsatisfactory condition of the heating and ventilation systems and the track structure. From 2016 to 2018, RSRS GmbH Railway Infrastructure Projects prepared the general design solutions for the reconstruction of the Severomujskij tunnel, and in 2018, the company was commissioned to perform design work and engineering surveys for the tunnel reconstruction project on the basis of the adopted basic design solutions. Currently, the project is undergoing approval by the State Expert Evaluation Department of the Russian Federation.

The main design solutions for the reconstruction of the tunnel are:

- Elimination of water ingress (water suppression and water drawdown) with the use of modern corrosion-resistant building materials.
- Restoration by modern methods of permanent bearing structures damaged by leaks, icing, or an aggressive environment.
- Replacement of the current track structure for the advanced ballastless LVT (Low Vibration Track) design, which provides maximum mechanisation of the track laying process in a short time during construction and minimises costs during operation.
- Stabilisation of the tunnel transport zone's heat and ventilation modes with a revision of the basic design ventilation layout, taking into account the accumulated operating experience and existing modern solutions.
- Introduction of automated energy-saving technologies.

## Project impact

The design project was carried out as a priority measure to increase the freight traffic on the Baikal–Amur Mainline by “debottlenecking” the bottlenecks and barriers. Design work and engineering surveys in the framework of this project were made on the basis of BIM modelling, which will allow the use of the developed project during reconstruction with the use of BIM modelling technologies. In the meantime, a database including geoinformation data (geodynamic activity, geology, and hydrogeology), archival materials (design, working, and executive documentation, research and scholarly work materials, materials of operating service providers), and current regulatory documentation was created.

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### ORGANISATION

RSRS GmbH Railway  
Infrastructure Projects

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### COUNTRY

Russia

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### COUNTRIES OF OPERATION

Russian Federation

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 9

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### PROJECT ANCHOR

RSRS GmbH Railway Infrastruc-  
ture Projects

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### CONTACT

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The information model being created will form a single information space for the object's life cycle, starting from construction and continuing through its operation. This information model will allow: – to form a unified database of the actual state of the tunnel passage as a whole; – to monitor the performance of construction and installation works during tunnel reconstruction; – to determine in a timely manner the necessary amount of construction work for the repair and ensure reliable operation of the facility; – to form automatic control of the main life support systems of the tunnel passage; – to promptly estimate the need for capital investments for the repair and modernization of the facility, as well as the total amount of funding by year.

Thus, this information model can be the first working model (BIM/GIS), created at the stage of development of design documentation for tunnel reconstruction and relevant during construction and installation works, including the stage of operation of the object, in other words, the entire life cycle of the object.



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## SatSure Cygnus

Today, private companies focus on high-value crops such as cotton, maize, pearl millet, sorghum, and horticulture. These have extensive scope for genetic improvement and a very high consumption rate across the world. There are potentially new seeds and variants of other undiscovered or underdeveloped crops. Thus, R&D in a seed company plays an essential role in giving a competitive edge to the players by creating robust seeds and increasing the crops under its portfolio. The seeds are continuously tested throughout the development phase in lab conditions and in the real world (control farms).

However, testing on control farms poses particular challenges:

- The availability of arable land for testing is reducing over time, thus increasing the demand for a fast and efficient testing process.
- High dependency on human resources: Companies rely on field staff to monitor farms. The information is collected manually leading to the possibility of data and information asymmetry.
- Seed companies use phenotyping to monitor crop performance on control farms. Many companies have started using satellite imagery to do so. However, agriculture monitoring through optical satellite imagery limits cloud cover. For instance, the Indian sub continent is under cloud cover for 67% of the year, which hinders continuous availability of data from optical satellite imagery.

### The solution

SatSure Cygnus is a virtual constellation driven by artificial intelligence and machine learning, that enables vegetation monitoring using satellite imagery even during heavy cloud cover, helping input companies easily monitor control farms. It tackles the challenge of cloud cover with its deep learning-based model trained on Synthetic Aperture Radar (SAR) imagery and optical satellite imagery to create a synthetic cloud-free image. The reconstructed image is then used to generate a vegetation index, which helps maintain the monitoring capability for our clients. This is possible because, unlike optical satellite imagery, SAR images can penetrate the cloud cover.

SatSure Cygnus provides its users with two monitoring capabilities. Spatial analysis helps establish the reconstruction done pixel by pixel for a farm. This ensures the accuracy of visual or statistical analysis at any level, whether a few square metres or square kilometres, remains the same. Knowing what crop is being monitored also increases accuracy. The number of pixels possible in smaller land holdings limits the possibility of monitoring minimal land holdings. In such cases, grid-level insights are generated by SatSure. On the other hand, temporal analysis ensures that the visual representation of variation gets displayed at the farm level or an aggregated level, standing at the actual Sentinel-2 NDVI (Normalised Difference Vegetation Index), an indicator of crop health.

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### ORGANISATION

SatSure

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 1, 2, 12, 13, 17

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### PROJECT ANCHOR

SatSure has worked with many clients on applications related to agriculture and climate action. They include: ICICI Bank, Reliance General Insurance, Govt. of Andhra Pradesh, Govt. of Telangana, Govt. of Maharashtra, and MNCFC.

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### CONTACT

Krishna Reddy  
reddy.krishna@satsure.co



The combination of Sentinel-1 and Sentinel-2 allows for control of the frequency of data delivery, which is also a concern if monitoring is done using only one satellite.

### **Project impact**

- Enabled more than 2 million farmer loans. Helped settle more than 4,00,000 insurance claims. 300+ districts are being monitored in India.
- 1 million+ sq. km are monitored every week. 16+ crops are classified.



## Si2 – revolutionising space situational awareness

NorthStar is developing a set of next-generation Space Information and Intelligence (Si2) services to protect and preserve our Space and Earth environments for future generations. With a unique approach to monitoring space from space and enhanced data fusion capabilities, NorthStar is a pioneer in Space Situational Awareness (SSA). Its high-speed, high-fidelity, and contextualised information services will provide decision-makers with the intelligence they need to protect valuable assets, optimise operations, and ultimately ensure environmental sustainability in Space and on Earth.

There is a critical need to monitor the ever growing population of satellites, space debris, and potential threats in space through comprehensive and accurate data on the position, trajectory, and behaviour of space objects. These data are a foundation for ensuring safe and sustainable space operations, mitigating collision risks, and maintaining a secure and sustainable space environment.

NorthStar has faced several challenges in realising this project:

- Identifying, monitoring, and tracking an ever increasing number of controlled and uncontrolled Resident Space Objects (RSOs), including space debris, defunct rocket stages, and active satellites, requiring advanced tracking and data collection systems.
- Determining accurately and in real-time the position, velocity, and attitude of RSOs, for precise and timely orbit predictions.
- Analysing vast amounts of complex data from multiple sources, such as radar systems, ground-based optical sensors, and space-based optical sensors. Developing sophisticated algorithms and models to process and interpret this data is essential for deriving meaningful insights and actionable information.

To address these challenges, NorthStar has undertaken several key activities:

- Securing public and private funding from respected organisations with a broad range of expertise and experience from the finance and space sectors.
- Leveraging technological innovation with a unique combination of space-based sensors, state-of-the-art image processing technology, advanced algorithms and operational software, Artificial Intelligence (AI) and Machine Learning (ML), data fusion (ingestion and processing of satellite flight plans, telemetry, and other 3rd party data of various types), and high-efficiency computing.
- Developing a global network of partners with a high level of expertise and experience across the service value chain, from satellite manufacture, launch, data capture, and fusion to analytics and distribution.
- Applying a sharp focus on Environmental, social, and Governance (ESG). NorthStar is working in collaboration with SES, a global satellite operator, to realise more responsible and sustainable

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### ORGANISATION

NorthStar Earth & Space

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### COUNTRY

Canada, USA and Luxembourg

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### COUNTRIES OF OPERATION

USA, Europe, India, Canada, Japan, Australia

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 2,3,9,11,12,13,15

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### PROJECT ANCHOR

Telesystem, Cartesian, Luxembourg Future Fund, Investissement Quebec, Space Alliance

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### CONTACT

rsvp@northstar-data.com

operations in space from all stakeholders.

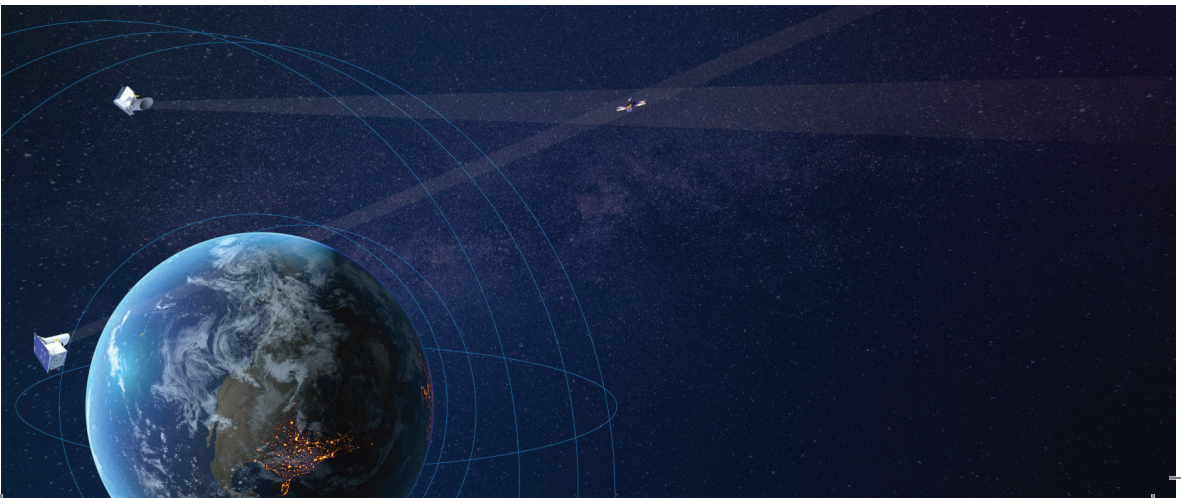
- Securing its place as the first non-US commercial organisation for the Sprint Advanced Concept Training (SAC-T) exercises organised by the US government, which have provided the ideal training ground in which to test new algorithms, software, and data fusion techniques.

## Project impact

Performance indicators show a marked increase in precision and speed of delivery of data through NorthStar's SSA services (over 50 times more precise and over 30 times faster than traditional ground-based services), with higher associated levels of confidence (covariance matrix) based on orbit determination and data fusion techniques selected to maximize quality of service. Similarly, tests against ground-based SSA service providers indicate a significant comparative increase in the quality and accuracy of NorthStar's Conjunction Data Messages (CDMs), which refresh the probability of collision of an operator's satellite with a threatening object within the next 7 days.

Such indicators demonstrate how NorthStar's unique space-based network of optical sensors, in combination with data from ground-based networks, proprietary algorithms, and advanced data analytics, deliver a unique 360-degree, near-real-time view of all space objects with unprecedented precision, speed, and reliability. This transformative level of high-fidelity, contextualised space surveillance information brings vital benefits for civil, commercial, and defence operators, insurers, investors, governments, and NGOs, with a radical improvement in space traffic mapping, close approach warning, global space hazard risk assessment, which is vital for fleet management, and future mission planning.

As the world becomes increasingly dependent on Space for the global digital transformation, economy, and society, NorthStar's SSA project plays a critical role in ensuring that the space environment is safe, secure, sustainable, and accessible for advanced, developing, and emerging spacefaring nations. The impact is clear: NorthStar's next-generation SSA services safeguard the burgeoning space economy and, crucially, protect earth observation satellites, enabling the maintenance and expansion of vital earth services.





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# Skyline cockpit remote control

Skyline Cockpit is a command and control centre for tower cranes and construction sites, enabling remote operation of cranes and providing a data communication system between the crane and the construction site available to everyone involved in the project, both on and off site.

The crane operator efficiently and safely operates the tower crane from the control centre using a system that is based on advanced technological developments such as artificial intelligence (AI) and augmented reality (AR). It answers three challenges the construction industry is facing today: costs, safety, and efficiency.

## Project impact

While operating the crane, the Skyline Cockpit simultaneously, in real-time, processes multiple variable elements that impact the construction site using sensors, a laser radar, and cameras suitable for working at great heights, after dark, and in changing weather. Peripheral wide-screen command-and-control screens support the operation, driven by algorithms and patented applications that provide the crane operator and the construction site with real-time alerts and data transferred online. These innovative features significantly increase the crane's efficiency and productivity while creating a more operator-friendly and safe work environment.

It is already being used by Electra Construction and Tidhar Construction to operate their cranes at their construction sites in Israel.

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**ORGANISATION**  
Skyline Cranes and Technologies

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**COUNTRY**  
Israel

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**COUNTRIES OF OPERATION**  
Israel

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 9

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**PROJECT ANCHOR**  
Skyline CockPit is bringing the people & technology back down to the ground, back to the job site

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**CONTACT**  
zachi@skcockpit.com



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## Smart electro permanent magnet block system development for industry robot with flux detecting and safety function technology

The robotic arms of industrial robots, traditionally have electric, hydraulic, or pneumatic jaws. A perennial issue is that robotic applications don't always securely lift heavy cargo.

### Project impact

- Design and development of a robotic arm clamping fixture having an electro-permanent magnetic system with real-time flux (unit of measurement) sensing technology to safely handle, lift, transport, and place ferrous and ferrous alloy items.
- 97% more energy efficient than traditional systems.

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Republic of Korea

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3,9

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### PROJECT ANCHOR

Shree Magnets Pvt. Ltd.

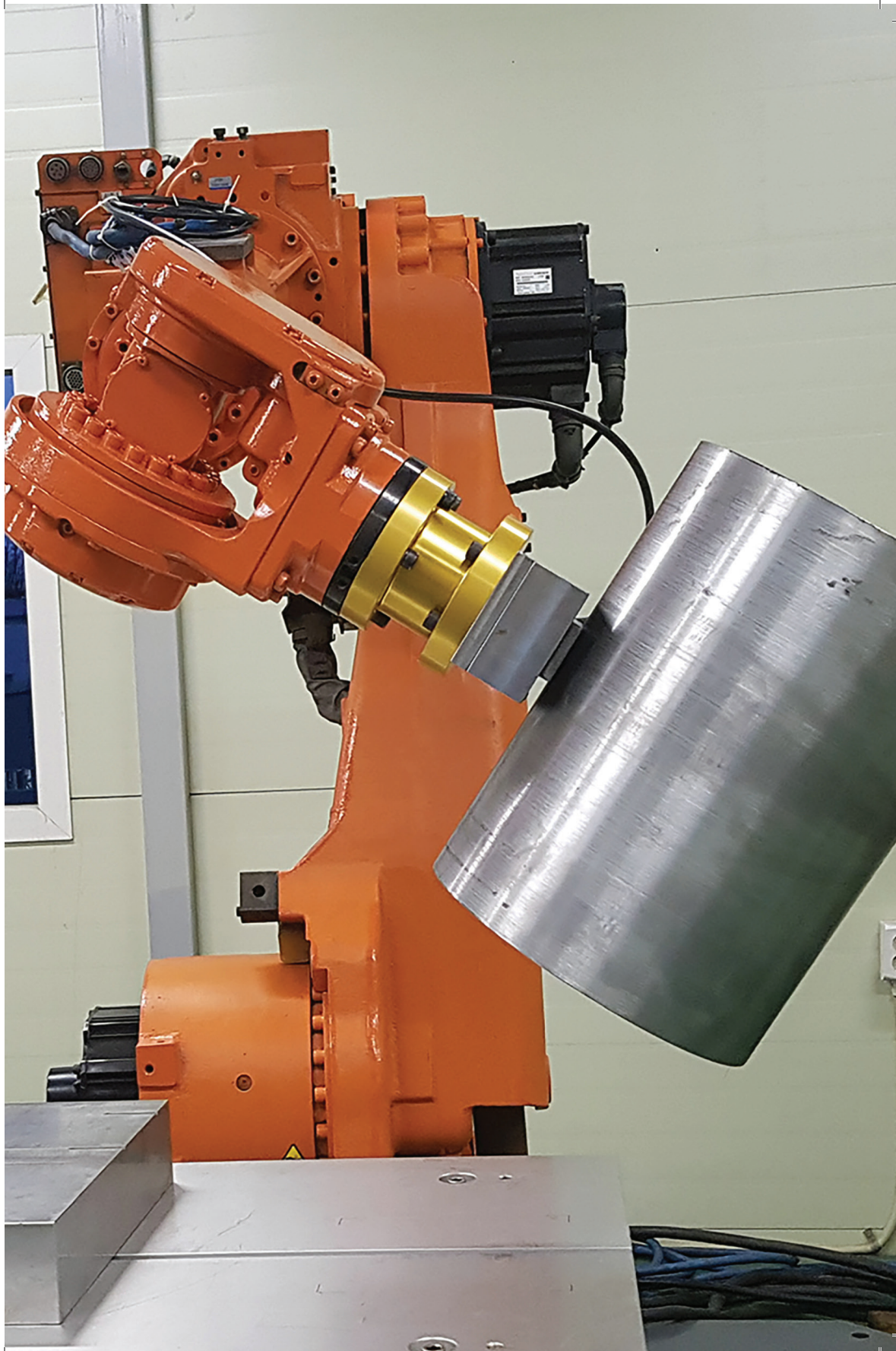
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### CONTACT

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## Smart warehousing and cargo visibility solutions using KoiVision™ platform

AA Fortune 50 Food and Beverage company faced supply chain operational efficiency and accuracy challenges due to low accuracy levels with current label scanning technologies.

Inaccurate scanning of SKUs and cargo during conveyer belt and dock door dispatch and receiving operations resulted in reduced efficiency and customer satisfaction and a tangible and intangible loss of value to the supply chain organisation. With over 500 warehouses and distribution centres, 800+ SKUs, and a network that processes millions of cartons per day, the company needed an innovative solution to improve cargo and inventory scanning accuracy to near 100% at each step in the supply chain.

KoiReader's industry-leading KoiVision™ Platform, which unlocks Enterprise AI on the Edge, paired with its patented AutonomousOC-RTM technology, eliminated this shortcoming. The Smart Warehouse of The Future application suite, comprised of KoiScan™, KoiPick™, and KoiTrack™ applications, improved scanning accuracy from SKU to pallet level across the supply chain network. KoiScan™ improved label scanning accuracy during conveyer belt and dock door dispatch and receiving operations; KoiPick™ improved manual picking and cycle counting accuracy by implementing Smart Glass and AutonomousOCRTM-powered vision picking of SKUs and cartons; and KoiTrack™ enabled real-time inventory visibility and human activity tracking leveraging a multi-camera vision AI system.

The entire Smart Warehousing application suite was integrated with the company's WMS, ERP, and Inventory Control Systems using the KoiConnect™ Enterprise Integration layer. Additionally, KoiReader interfaced with E-Commerce fulfilment applications such as Autostore and enabled operational KPIs and a digital audit trail from each solution into the KoiVision™ Web Platform and mobile application.

### Project impact

- The project improved label scanning accuracy from 75% to near 100% across both Inbound and Outbound warehousing operations, including a conveyer belt speed increment from 5 mph to 15 mph for better throughput.
- Additionally, the project reduced 2 to 8 FTEs per shift from conveyer belts to dock door operations for SKUs, cartons, and pallets by eliminating manual interactions across the supply chain network.
- The project, once fully deployed across the network, will unlock over a billion dollars in value over 3 to 4 years by improving supply chain efficiency and accuracy.

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#### ORGANISATION

KoiReader Technologies

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#### COUNTRY

USA, India

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#### COUNTRIES OF OPERATION

United States

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 9

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#### PROJECT ANCHOR

Fortune 50 Food and Beverage Company

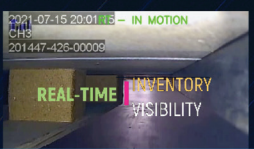
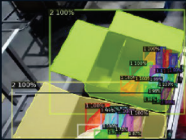
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#### CONTACT

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Met  
partner  
Cloud



SMART WAREHOUSING AND CARGO VISIBILITY SOLUTIONS USING KOIVISION PLATFORM AT FORTUNE 50 FOOD & BEVERAGE COMPANY



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# Soundeye, an A\*STAR spinoff

SoundEye provides advanced sound recognition solutions capable of classifying sounds such as screaming, gunshots, coughing, and crying. Possible applications include emergency monitoring, surveillance, smart buildings, predictive maintenance, in-vehicle monitoring, and healthcare. Our vision is to see the world through sound and, by doing so, improve productivity and save lives.

## Project impact

Seagate Lyve Innovator of the Year Award, Slingshot Top 50 Global Startup Transformative Digital Technologies Domain Winner, and Singtel Future Makers.

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**ORGANISATION**  
Quest Ventures

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**COUNTRY**  
Singapore

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**COUNTRIES OF OPERATION**  
Singapore, Japan, China, Australia

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 9,11

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**PROJECT ANCHOR**  
Soundeye, Agency for Science, Technology and Research (A\*STAR), Enterprise SG, Quest Ventures, Singapore Centre for Social Enterprises (raiSE)

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**CONTACT**  
Michelle Ng  
sustainableimpactaccelerator@questventures.com



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## Space data accessibility for sustainable development: SD4SD

It is globally recognised that space technologies and applications play a key role in helping countries achieve SDG targets. Space-related infrastructure, data, information, and integrated services could play crucial roles only if they are an integral part of the global effort for sustainable development and if they are integrated into the whole-society effort that is expected to take place in each country to achieve the SDGs. Thus, in order to make the contributions from the space community more relevant, timely, and actually available to the countries, there is a clear need for new partnerships involving both institutional and private actors, aiming at closing existing gaps that prevent countries from making full use of space assets for the 2030 Agenda.

CANEUS represents a first-of-its-kind approach to addressing the problem of transitioning new and emerging space technologies through the infamous “Valley of Death,” in which a large majority of these concepts are unable to achieve the technological maturity required for infusion into societal applications.

There are numerous reasons for these Darwinian odds, chief among them being the lack of a robust mechanism to take new concepts from the proof-of-principle stage to system-level implementation. CANEUS has recognised this technology gap and has spearheaded the creation of a smoothly functioning technology development “pipeline” by bringing all the stakeholders, namely, the inventors, system developers, end-users, and investors, under one roof. In this way, CANEUS ensures that the emerging technology is nurtured through the various stages of development. CANEUS’s novel approach is the formation of international public/private partnerships within the aerospace community by fostering a collaborative environment aimed at the adoption, adaptation, and accelerated commercialization of emerging technology concepts. The Concepts to Systems (C2S) model, created and implemented by CANEUS since 1999, forms the basis to (a) maximise Return-on-Investment and laterally compress the S-Curve, (b) pursue a coordinated, end-to-end technology development strategy, and (c) promote rapid insertion by creating application pull.

CANEUS, in partnership with the UN-Office for Outer Space Affairs (UNOOSA), undertook this collaborative project to devise a ‘Space Data Accessibility for Sustainable Development (SD4SD) global partnership that provides a great opportunity to address, in a coordinated way, technical and programmatic issues such as interoperability of data, systems, and services. CANEUS initiated and donated the necessary funding to UNOOSA to undertake a pre-feasibility study to develop a framework for the planning, implementation, and management of the proposed effort, offering affordable solutions through a global-scale PPP business model. An essential characteristic of this project, given the growing number of actors and expected large volume of data and products, is a coordinated and shared space

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### ORGANISATION

CANEUS

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### COUNTRY

Canada

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### COUNTRIES OF OPERATION

Global

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 1–17

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### PROJECT ANCHOR

CANEUS International

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### CONTACT

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milind.pimprikar@  
caneus.org



infrastructure, data, and services accessible to nations on a ‘fractional ownership’ model basis.

The key activities included:

- Undertaking a stock-taking exercise on all relevant initiatives and mapping their status and individual objectives.
- Identifying and assessing the requirements of all components of a global space data partnership and potential coordination mechanisms.
- Proposing the role(s) and responsibilities of potential initial partners.
- Preparing the project phases for the development of the global SD4SD partnership.

## Project impact

The CANEUS ‘Concepts to Systems – C2S’ model has been successfully implemented in G20 countries by undertaking several collaborative projects and spinoff ventures. This global coordinated PPP initiative contributed to:

- A new global framework for sharing space technology and data standards to serve nations’ disaster management needs, held at the Third World Conference on Disaster Risk Reduction in Sendai, Japan, helped establish a PPP to create a low-cost, internationally shared data collection and distribution backbone in space, with no barriers to entry for participating nations.
- A series of collaborative research initiatives, ‘Small Satellites and Sensors for Disaster Management (SSTDMM)’, with institutions from India, the US, Europe, and Canada, with the premise that no single country can afford to develop such a complete set of sensors and satellite systems needed for forecasting, monitoring, and mitigating climate change and disasters. It further created collaborative research opportunities to develop spacecraft payloads and sensors for an upcoming disaster management spacecraft mission.
- The findings of the pre-feasibility study were incorporated and are being validated at stakeholder forums such as UN GPDRR, UN–Ocean, UN–Water and UN–Food Systems.



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## Sustainable Impact Accelerator

Sustainable Impact Accelerator (SIA) is the result of growing public support for social enterprises and an urgent need to scale the impact of their solutions, powered by *raiSE* and Quest Ventures. Starting with the premise that strong mentorship is a good ignition point for social enterprise and startup founders, the accelerator is built as a spring-board to scale businesses and their impact.

It aims to drive socially impactful enterprises to the next level. Quest Ventures partners with the Singapore Centre for Social Enterprise, *raiSE*, the sector developer and membership body for aspiring social entrepreneurs, to provide financial and non-financial support to seed-stage startups in the sustainable impact sector to improve competencies and gain access to regional and global markets. *raiSE* was launched in 2015 by Dr. Tony Tan Keng Yam, former President of the Republic of Singapore, as part of the cross-sector collaboration between the Ministry of Social and Family Development, the National Council of Social Service, the Social Enterprise Association, and Tote Board.

The Sustainable Impact Accelerator Programme positions startups for success in Singapore and the region. All programme participants will receive an investment of up to SGD 75,000 and get access to 10 weeks of masterclasses, mentorship, and insights for sustainability, fund-raising, and go-to-market. Access to Quest Family Benefits (worth USD 770,000) will also be unlocked (<https://www.questventures.com/responsibility/community/family-benefits>).

In addition, all programme participants will have the opportunity to raise additional funding from investors during pitch events. At the end of the programme, programme participants will join the Quest Ventures Founders Group and Sustainable Impact Accelerator Alumni Network. As a registered Social Enterprise Member of *raiSE*, participants will also gain access to *raiSE* membership benefits such as preferential rates from partners, capacity-building programmes, networking opportunities, and branding opportunities, among others.

### Project impact

Investment of up to S\$2.25 million into 30 companies.

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#### ORGANISATION

Quest Ventures

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#### COUNTRY

Singapore

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#### COUNTRIES OF OPERATION

Global, Singapore

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 17

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#### PROJECT ANCHOR

Quest Ventures and Singapore Centre for Social Enterprises, *raiSE*

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#### CONTACT

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## TAVI – TAVR Transcatheter Heart Valve

Transcatheter aortic valve implantation (TAVI) or Transcatheter aortic valve Replacement (TAVR) is a less invasive alternative to surgical aortic valve replacement for patients with severe aortic stenosis. The procedure is minimally invasive as compared to complex open heart surgery using traditional surgical valves. Presently, most heart valve surgery is based on an open-heart surgical procedure that is fairly complex, and the recovery time is also long and risky. These heart valves are of the following two types: Tissue valves and Mechanical valves. The human heart has four different valves, but aortic heart valve surgery is the most common.

Cardiac bypass surgery based on opening the heart is largely replaced by minimally invasive procedures by implanting a stent crimped on a catheter. Meril conceived the idea of Valve Replacement with a similar system in 2010 and has taken up the Aortic Valve project in its R&D to simplify the procedure. The first and most significant challenge was the size of the heart valve, particularly its diameter in comparison to cardiac stents. The widest cardiac artery is just in the range of 4 to 4.5 mm, and the diameter of the heart valves ranges from 20 to 32 mm. Having the experience to manufacture the world's thinnest stent was quite useful, but it was still not enough. The normal heart beats at a rate of 72 times per minute, which is equivalent to more than 100 thousand times a day. The other challenge was to find an appropriate material that had enough flexibility as well as strength to sustain its integrity through this much opening and closing of the valve.

Almost 700 prototypes were prepared, and still, in most cases, the problem is the compressibility of the structure in such a way that it can pass through the femoral artery, which has a diameter in the range of 5–6.5 mm. The R and D started understanding the characteristics like elasticity, flexibility, and strength of the human artery system, especially in the pathway of arteries from the femoral to the aortic valve. It is understood that such arteries are very flexible and expendable for short intervals and do not rupture even when they are expanded to about 70–80% for very short intervals. This was an important clue for the design, keeping the safety margins of expansion and duration for the implanting valve. Having experience in making the thinnest stents by combining open and closed cells helped with some variation in cell sizes and with appropriate links, and as a result, some designs were found quite promising for further exploration.

### Project impact

A valve design having a hybrid honeycomb cell design concept, which emerged quite promising based on various mechanical testing. Finally, the entire Transcatheter Heart Valve (THV) design was completed using PET fabric internal sealing and external skirting, treated bovine for anti-calcification pericardium tri leaflets, and other supportive components such as the navigation system for Aortic Valve delivery and its introducer sheath. The sheath expands momentarily like a

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#### ORGANISATION

Meril Life Sciences Pvt. Ltd.

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 3

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#### PROJECT ANCHOR

Meril Life Sciences Pvt. Ltd.

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#### CONTACT

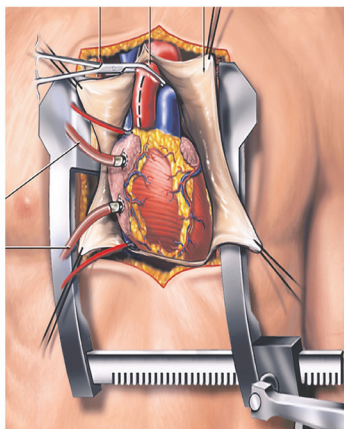
Dr P. K. Minocha ,  
dr.minocha@merillife.com

python swallowing its prey and conveniently allows passage of the crimped valve.

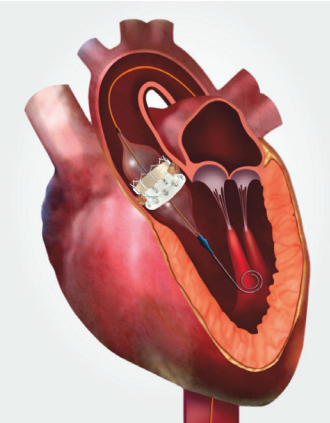
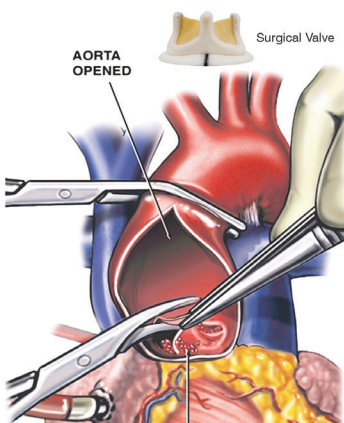
Subsequently, its clinical trial approval was taken from the Indian Regulatory Body, and Meril became the first Indian company to get approval from CDSCO towards the end of 2018 with the brand name Myval THV after an effort of around eight years of research. This valve has many novel features, and its clinical studies also proved various benefits over the existing valve designs. In the case of My-Val and its delivery catheter system, their combination and inventive features have made it possible to provide an integrated solution whereby the use of an external pacemaker device is around 2 percent as against 12 to 15 percent in available conventional TAVI valve systems. Meril has been granted various patents for its valve design, its navigation system, and the anti calcification of biological tissues used for tri-leaflets.

#### PROJECT: TAVI – TAVR TRANSCATHETER HEART VALVE

Open Heart Surgery  
For Aortic Valve Replacement



Minimal Invasive: Transcatheter  
Aortic Valve Replacement - TAVR



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## The development of a portable thermography-based health detection system (thermotect) in breast cancer screening

Breast Cancer is the most common cancer among women in India. The rising incidence of breast cancer drives the growth of the breast imaging market. The objective of this project is to develop a novel portable thermography-based health detection application for use as a highly efficient, less invasive, more convenient, and safer breast cancer screening tool in India.

Our technology applies thermography and computer-based image interpretation to deliver improved detection, nonionization, safety, and user/patient experience. This innovative project will be based on a portable mobile device application. This project makes a direct contribution to early detection and, therefore, the improvement of the welfare of India's population, where one in every two women diagnosed with breast cancer dies every year.

### Project impact

To implement a novel user-friendly system to capture, interpret, analyse, encrypt, transmit, and receive thermographic breast images between a user and a health management facility To develop a portable mobile device application that is connected to a cloud server that will host an artificial intelligent (AI) model classifier for non-invasive imaging for Breast Cancer identification at the early stages for proper medical guidance.

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#### ORGANISATION

Global Innovation and  
Technology Alliance (GITA)

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India, United Kingdom

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 3, 9

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#### PROJECT ANCHOR

Elion Technologies & Consulting  
Pvt. Ltd.

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#### CONTACT

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## The Ventilator Project

Design, manufacturing, and deployment of an ICU ventilator in 90 days under total lockdown conditions during March–June’20.

In late March 2020, a 20–member task force was formed to help a talented start–up (Noccarc Robotics) that had just then created its initial (‘alpha’) version of an ‘invasive ventilator’. This multi–disciplinary task force worked in mission mode’ to help this startup build a world–class product in record time. By late June 20th, the first batch of high–quality ventilators had rolled out of the production line in Pune. During these 90 days of COVID–19 lockdown, the story of the ‘IIT Kanpur Ventilator Project’ shows how new businesses will be built in the post–COVID era.

The new model enables innovative firms to access rich resources remotely, even while they are globally distributed. Such access, coupled with speed, frugality, high–quality outcomes, and social impact, leads to a new paradigm.

Underlying this success was deep collaboration between (1) young start–up founders and grey–haired mentors; (2) top science and engineering institutions, technology business incubators, and businesses; and (3) collaborators based across the world, working remotely and virtually using Zoom and WhatsApp. Several government and private corporations came forward to support the initial R&D with generous grants and loans.

This combination of factors—multidisciplinary taskforce, mission–mode working, boundaryless collaboration, speed, and frugality—made possible the creation of a world–class ventilator that’s priced at a fraction of imported ventilators, making it easier for cash–strapped hospitals to acquire them. As of date, over 3000 Noccarc ventilators have been deployed across India.

### Project impact

‘The Ventilator Project’ has a range of impactful outcomes that make it compelling and interesting to share:

- **Rapid innovation framework:** Under conditions of extreme lockdown constraints, this project showed that it’s possible to translate innovative ideas into tangible products at very high speed. Conventionally, multinational medical technology corporations take about 18 months for the idea–to–market transition. This project showed it could be done in a much shorter period of time.
- **Boundaryless collaboration:** The 20–member taskforce was geographically distributed across India, and it periodically called upon overseas advisors (doctors, medical device R&D) for their expertise. Such boundaryless collaboration was possible only because of the transition to a virtual mode of working.
- **Encouraging young technology entrepreneurs** to think of global impact: more than ever before, young founders, such as the ones

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### ORGANISATION

Noccarc

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### COUNTRY

India

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### COUNTRIES OF OPERATION

Currently, it’s India. However, the company (Noccarc Robotics) is actively looking at a global footprint

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3, 9

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### PROJECT ANCHOR

Startup Incubation & Innovation Centre, Indian Institute of Technology Kanpur

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### CONTACT

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at Noccarc Robotics, are now increasingly confident about thinking about making a global impact with their innovative products.

- Boost to the medical devices and hardware industry: the early work during COVID has led the founders of Noccarc Robotics to set up a modern manufacturing facility as well as sustain R&D efforts. Their efforts, as well as those of other similar startups in this space, are giving a boost to the medical devices and hardware industry in India.
- Enhancing the role and contribution of India's Technology Business Incubators (TBIs): TBIs, like the one at IIT Kanpur, became very active during COVID and were at the forefront of creating products and services that could help fight the pandemic. Post-Covid, TBIs across India have moved to a higher trajectory in terms of the quality of startups being incubated and the impact they are making.
- Industry-academia collaboration: The leadership and faculty at leading technology institutes in India now increasingly see innovation, incubation, and entrepreneurship as important focus areas.
- Reinforcing the role of government as a significant enabler: Government agencies played a key role in the success of the project in many different ways: (a) by publishing 'problem statements' that innovators and startups could work on; (b) by providing guidance with respect to technical evaluation and regulatory approvals; (c) by providing financial support.





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## VELYS™ robotic-assisted solution

Joint replacement surgeries are performed to fix the damaged parts of a joint with different types of implants. Several conditions can damage healthy joints, such as osteoarthritis, which is common in the elderly group of patients; however, anyone can need joint replacement depending on the severity of damage to the joint and related symptoms. The most common joint replacement performed today is knee arthroplasty, or knee replacement surgery. The conventional method of knee replacement has been the preferred treatment choice for many surgeons for the last several years. This method highly depends on pre-surgery scans, x-ray images, anatomy knowledge, and the surgeon's visual evaluation.

In traditional surgeries, there is scope for increased accuracy, which can make the recovery process for patients faster. Studies have shown surgeries performed with robotics offer more accurate results. The VELYS Robotic-Assisted Solution uses a variety of advanced technologies to ensure the surgeon has the information and tools they need to perform a highly accurate and precise knee replacement tailored to unique patient anatomy. As a next-generation robotic solution, the VELYS Robotic-Assisted Solution is designed to address future market needs, including reduced complexity, a simplified and short learning curve, and a smaller footprint to meet unique specialty hospital settings.

### Project impact

VELYS™ Robotic-Assisted Solution is a proprietary technology that maintains the saw-cut plane to help execute precise cuts. Adaptive tracking technology uses a high-speed camera to consistently track and adjust or control the resection plane for accurate and consistent execution as per plan. With the increased accuracy, pre-surgery surgeons can accurately resect bones that align and position the implant relative to the soft-tissue during total knee replacement without the need for pre-operative imaging. Uses an infrared camera and optical trackers to help surgeons achieve the highest possible precision level, and with Robotic assisted technology, patients experience less pain and a faster recovery due to reduced trauma and damage to tissue, leading to greater patient satisfaction. The VELYS™ Robotic-Assisted Solution aids the surgeon by accessing state-of-the-art technology to provide insights for real-time decision-making.

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### ORGANISATION

Johnson & Johnson

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### COUNTRY

India

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### COUNTRIES OF OPERATION

Across the globe in all regions

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 3

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### PROJECT ANCHOR

Johnson & Johnson MedTech

India (JJMI)

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### CONTACT

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## Wondra – Graphene doped conveyance solutions

Graphene Business is a derivative of Tata Steel's in-house technology and materials incubation. Since 2015, the business has been developing applications and solutions to turn this technology incubation into a profitable technology-led business. For developing the same, the business has been working with the three pillars of technology-led success:

1. Sustainability: Graphene is imparting strength to plastics as an alternative, replacing single-use plastic and multi-layer tetra packs with recyclable single-layer Sustainable packaging.
2. Circularity: Enabling complete multiple reuses of waste thermoplastic polymers with graphene doping Step towards circular economy in thermoplasts.
3. More use per unit: enhancing the life of the product with more graphene infusion and thereby reducing resource conservation. e.g., corrosion protection for over 7 years against 2–3 years from non-graphene paints.

The business has mastered the technology of doping graphene in thermoplastic systems for homogenous distribution of flakes imparting strength, thermal, and wear properties to thermoplastic products.

The envisioned world of WONDRA is to be a construction solutions provider with the following product categories:

- HDPE Pipes: Water Projects and Industrial Uses
- PVC Pipes: Plumbing, Agriculture, and Soil Waste Rainwater Pipes
- Construction Chemicals: Adhesives, Sealants, and Waterproofing
- Structural Solutions: Industrial Paints, Cements, Defenders, Protectors, Finishers, and Decorators

### Project impact

The Business piloted the Brand in the market in FY22 with the name as "WONDRA – A TATA Product" and basis the response from market as well as leadership direction for accelerated growth of the product, it was re-branded as TATA WONDRA. The name WONDRA is derived from the WONDER material Graphene. This Graphene enrichment tends to give the product a technological edge over the competition.

The fluid convenience product provides the following benefits over contemporary products:

- Improved abrasion value: HDPE Pipes for Slurry and Water Conveyance.
- Higher thermal stability and Pressure rating: CPVC pipes (Hot water, chemical conveyance).
- Both solutions are available with plastic welding to give excellent leak protection.

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#### ORGANISATION

Tata Steel Ltd.

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 9

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#### PROJECT ANCHOR

Tata Steel Ltd.

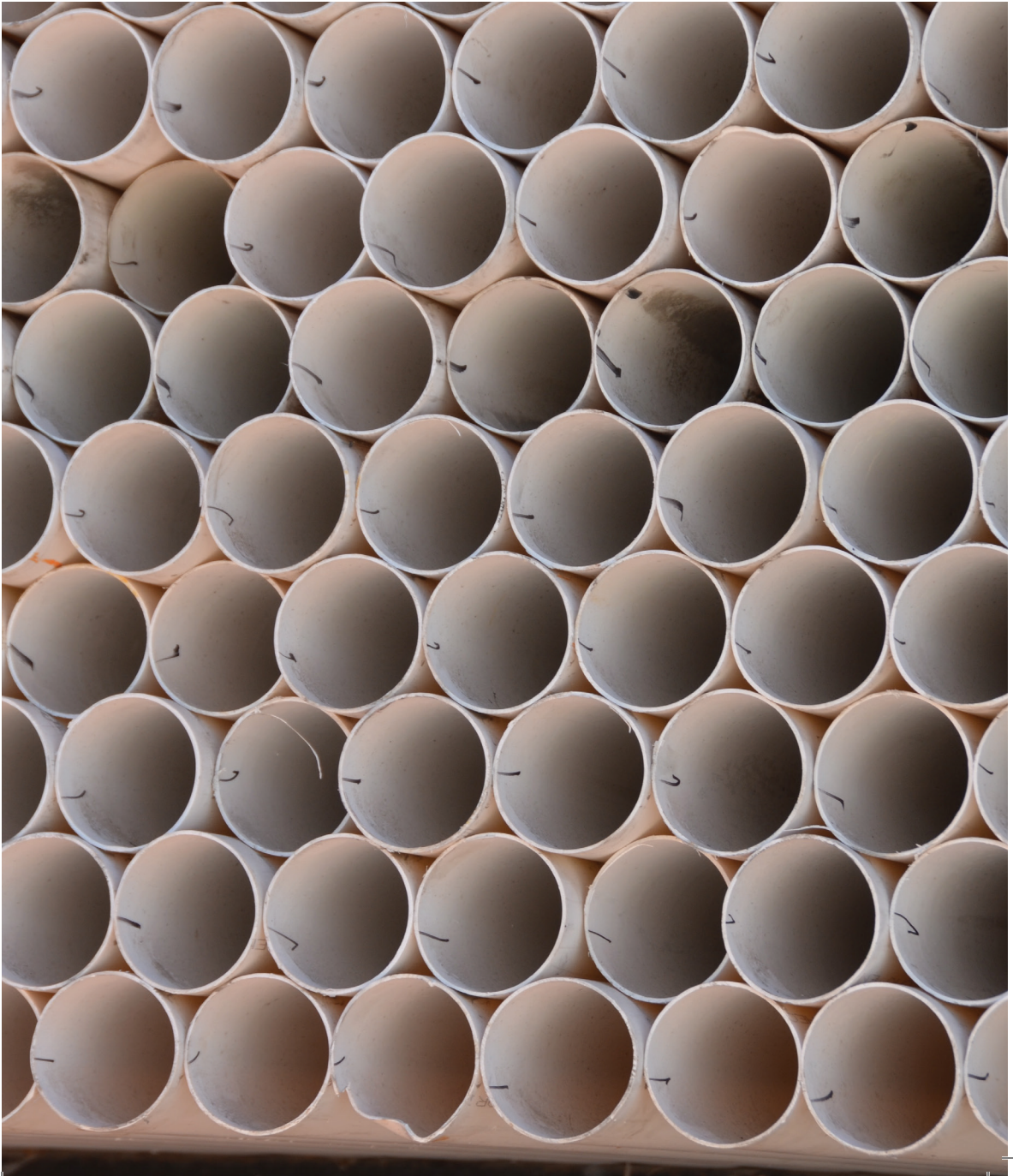
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#### CONTACT

Dr Shyam Kumar Choudhary,  
sk.choudhary1@tatasteel.com



Tata Steel made a double-digit revenue figure in FY21, and the business also showed 7X growth in FY22. Currently, the business has already delivered more than \$100 million in revenue in FY 23. This growth has come from the WONDRA range of products, which contribute to more than 70% of the total business revenue. The Business envisions WONDRA to be a USD \$1 billion brand in the construction solutions segment by FY30.



The background of the image is a dark blue, textured surface. In the upper right quadrant, there is a large, light blue graphic consisting of several interlocking, stylized shapes that resemble a circular flow or a recycling symbol. The shapes are composed of thick, rounded lines. The overall aesthetic is modern and industrial.

# **CIRCULAR ECONOMY**







## 5 tons per day CO<sub>2</sub> capture plant from blast furnace waste gas commissioned at Tata Steel Jamshedpur

Steel is one of the most 'hard-to-abate' sectors and contributes to about 8% of the total Green House Gas emission. Tata Steel has continuously pursued technology led excellence through development and deployment of breakthrough technologies. Keeping with its Tata value of "Responsibility", Tata Steel has undertaken the long term goal of decarbonization. To achieve this goal, it is imperative to pursue breakthrough technologies as well as operational process improvements. Tata Steel has undertaken a two pronged approach to decarbonization: Carbon Direct Avoidance (CDA) and CO<sub>2</sub> Capture and Use (CCU).

Amongst the many CO<sub>2</sub> capture technologies, amine-based process is the most suitable for separation of bulk CO<sub>2</sub> from Blast Furnace gas as well as other low-pressure dilute CO<sub>2</sub>-containing flue gas streams. Non-amine based processes are more complex and energy intensive with limited commercialization so far.

Tata Steel took a strategic step in the journey of decarbonization along with its technology partner. We commissioned a 5 TPD pilot plant capturing CO<sub>2</sub> from Blast Furnace gas stream using their CDRMax technology. It is a first-of-its-kind in Steel sector. The key value proposition of this technology as compared to other technologies:

- Lower CAPEX and 15–20% lower OPEX
- Low energy consumption due to high heat integration
- > 95% CO<sub>2</sub> recovery with >99% purity
- 4–6 years of solvent life
- Scalable upto 2500–3000 TPD CO<sub>2</sub>

The installed plant can capture 5 tons of CO<sub>2</sub> from 20 tons of Blast Furnace gas in a day. By principal, all impurities like other acidic gases and particulate matters are removed in pre-treatment section. Then the gas is passed through adsorption column for selective absorption of CO<sub>2</sub> in amine and rest of the gas mixture comes out of the system as is. The rich amine with CO<sub>2</sub> is then sent to the stripper to recover pure CO<sub>2</sub> using steam.

### Project impact

This 5 TPD CO<sub>2</sub> capture plant is just the beginning of the long journey of carbon capture and utilisation endeavours at Tata Steel. In this plant, Blast Furnace gas stream has been used to capture CO<sub>2</sub>. Blast Furnace gas has four major components such as CO<sub>2</sub>, CO, H<sub>2</sub> and N<sub>2</sub>. Amongst these components, CO<sub>2</sub> and N<sub>2</sub> being inert, do not play any

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#### ORGANISATION

Tata Steel Ltd.

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 9

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#### PROJECT ANCHOR

Tata Steel Ltd.

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#### CONTACT

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role in generating energy or converting iron oxide to iron. In future, Tata Steel aims to successfully separate N<sub>2</sub> post CO<sub>2</sub> removal, and feed the CO enriched gas back into Blast Furnace through Top Gas Recycling (TGR) to further reduce CO<sub>2</sub> footprint.

Specific to this plant the captured CO<sub>2</sub> will be used to replace purchased CO<sub>2</sub> for treatment of waste water to precipitate out free lime in Gas Cleaning Plant. On the other hand, the remaining CO<sub>2</sub> will be injected in LD vessel as a replacement of purchased Argon and Nitrogen there by providing benefit of increased vessel life, reduction in reblow and use of Oxygen. Such initiatives have been employed in very few steel plants in the world.

As an alternate avenue to utilise the Captured CO<sub>2</sub>, it can be converted into value added product such as methanol using H<sub>2</sub> in methanol synthesizer. As we aspire to become a carbon neutral steel maker, our future endeavours will be aimed at installing scaled up version of carbon dioxide capture and large volume utilization technologies.



## A20 platform for green oil, food, feed

In the context of the UN's Sustainable Development Goal (SDG) 2 which is zero hunger and SDG 13 which is climate action, RIL has been at the forefront of establishing sustainability-led production practices. It has become future-ready towards its COP26 commitments on Green House Gas (GHG) mitigation and climate change. Algae-to-Oil (A2O) at RIL has been the flagship platform in driving sustainability driven technology, aimed to develop the world's best green bio-oil production technologies for renewable energy production. The technology achieved by RIL valorises non-arable land and consumes GHG CO<sub>2</sub> to produce renewable fuels using just seawater and sunlight in the most sustainable manner. Over the past decade this project has achieved several significant technological innovations demonstrating large scale readiness. RIL's algae plant is one of the world's largest pilot scale microalgae production facilities and is strategically located next to the world's largest refinery in Gujarat mitigating supply chain challenges of feed and product. RIL's Biorefinery approach has led to the development of optimised manufacturing practices to produce food, feed and materials and green bio oil from algal biomass reducing operations and capital costs.

Risks and bottlenecks in the path towards feeding a burgeoning global population could be reduced due to introduction of modern practises and technologies in agriculture. However, such interventions also gave rise to added challenges such as top-soil depletion, emission of CO<sub>2</sub> and methane in environment, soil water contamination, gradual decline of family farms, bad conditions for farm labourers, higher cost of farming and disintegration of rural communities. The impact has led to a demand for applying sustainable agriculture practices where stewardship of natural and human resources is the main goal. Attaining sustainability goals is an uphill task given the complexity and diversity of the global agri-food-feed paradigm. RIL's Algal technology Innovation and the production philosophy have redefined the concept of sustainability with respect to seawater, land usage and GHG emissions.

Unique RIL Innovations that consolidate it to be the most effective and feasible alternate to conventional manufacturing are:

- A. The RIL Algae technology over the years has mitigated several severe challenges to Algal open cultivation which has hampered feasibility of other players in this area.
- B. Using optimised nutrient dosing, crop protection and modulating light exposure by manipulating photosynthetic abilities, we have doubled our productivity per unit and time compared to any other technology in the world.
- C. We have halved the deployment costs with rustic innovation using earthen pond liner and pump operated cultivation which are easy to scale compared to conventional concretised high-cost ponds.

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### ORGANISATION

Reliance Industries Limited

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 7, 13, 11, 6

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### PROJECT ANCHOR

Reliance Industries Limited

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### CONTACT

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- D. Harvesting being the most severe challenges to algal technology scaleup, is aptly mitigated by this program by stage wise operation and clever choice of filtration philosophies. This has not only made it more cost effective, but also made it able to harvest different strains of microalgae with more than 95% efficiency. Further this processed water and nutrients being recycled for cultivation drives down the cost to make it more sustainable.

## Project impact

Various techno-economic assessments of large-scale algal production indicated that capital cost of an open pond can range from ~\$US 6 – 50/m<sup>2</sup> and operating cost vary from US\$ 0.8/kg dry weight (DW) to up to \$8/kg DW for various applications (doi: 10.1016/j.algal.2017.04.002). We have worked extensively to close knowledge gaps in the field and have advances the technology to develop a biorefinery model to demonstrate microalgae as next-generation, low-cost, sustainable, scalable, and high productivity crop system. Thus, we have employed an algal-based bioeconomy, which will contribute to solutions to the imminent challenges caused by our growing society.

Some of the key societal and environmental Impact of the algae technology are listed below:

- 1) Water Usage – sustainable fresh water saving: Algae require 20 times less water than growing traditional cereal crops and vegetables, 50 times less water than growing corn, and 80 times less water than per kg of beef protein. A reflection in this trend is the volume of alternate protein market at \$50 billion and growing at more than 7% CAGR, with various emerging segments mostly as meat substitutes valued more than 10 billion.
- 2) Land usage – improve land usage: Cultivation of microalgae in non-arable land using photobioreactors and open ponds were demonstrated in 300 hectares of non-arable land in Gujarat.
- 3) Microalgae can capture around 100 Gt of CO<sub>2</sub> into biomass annually. Scientists have reported that Chlorella can grow in an atmosphere containing 40% (v/v) CO<sub>2</sub> with a fixation rate of 0.77 to 2.22 g/L/day.

A2O technology at RIL is consistent with the global carbon net zero vision, by utilising CO<sub>2</sub>, sunlight, and seawater to produce renewable fuels, thus reducing GHGs for a cleaner planet. When cultivating algae, a pond with a volume of 4000 m<sup>3</sup> can absorb about 2200 tons of CO<sub>2</sub>/year and CO<sub>2</sub> conversion rate was 0.44 kg CO<sub>2</sub>/m<sup>3</sup>/day, and the oxygen release rate was 0.33 kg CO<sub>2</sub>/m<sup>3</sup>/day can be emulated for sustainable food and materials. A2O has the capacity to transform the sustainable energy landscape drastically, given the right impetus.



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## Australian Business Growth Fund

CBA partnered with the Australian Government and some other Australian Banks to invest in the Australian Business Growth Fund (ABGF) which provides long-term patient equity capital to small and medium enterprises (SMEs) that have been in operation for at least 3 years. It is passive capital in that the ABGF does not take control over the investment. It is based on the British Growth Fund that was established by private banks in 2011.

The Fund looks to inject between A\$5m and A\$15m of capital into businesses that are in a growth phase for a minority stake of up to 49%. These businesses will have a turnover of between A\$2m to A\$100m.

The ABGF does not have a set time horizon for exit of an individual investment and so can manage the length of time of its involvement flexibly.

In addition to providing capital, the ABGF also looks to support the SME by connecting it to a network of business experts, growth strategists and non-executive directors.

### Project impact

Through this public-private partnership, the impact of the ABGF is to provide funding to SMEs that are looking to grow in a way where the founders do not have to give up control. As with both Canada and the UK, a funding gap for SMEs was recognised in Australia for passive equity investment and the ABGF looks to help fill this gap.

In providing investment for growing SMEs, the ABGF supports innovation, helps drive economic growth and creates more jobs.

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### ORGANISATION

Commonwealth Bank of Australia

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### COUNTRY

Australia

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### COUNTRIES OF OPERATION

Australia

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### SUSTAINABLE DEVELOPMENT

#### GOALS

Economic Growth

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### PROJECT ANCHOR

Australian Business Growth Fund

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### CONTACT

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**Commonwealth** Bank





# Bioenergy from non-food oleaginous seeds and W&R biofeedstock

The energy transition requires an energy paradigm shift and a transformation of the business model of energy companies such as Eni. The Eni agri-feedstock projects will contribute to the production of 700,000 tonnes of vegetable oil by 2026 to supply Eni's biorefineries, thanks to the vertical integration of the agri-feedstock supply chain derived from the cultivation of oleaginous seeds not in competition with food and the valorization of W&R, which will make it possible to ensure volumes of vegetable oil in a challenging context in terms of prices, growing demand for sustainable energy, and the availability of sustainable oils. Indeed, the Hydrogenated Vegetable Oil (HVO), a high-quality biofuel produced by Eni Sustainable Mobility's Venice and Gela biorefineries from waste raw materials and vegetable residues, can also be produced from low-ILUC energy crops grown on marginal land and/or in semi-arid areas; according to the criteria established by Directive (EU) 2018/2001 "RED II", the reduction of CO<sub>2</sub>eq emissions reported by HVO across the logistics and production chain in 2022 was between 60% and 90%, compared to the benchmark fossil-based blend (i.e. 94g CO<sub>2</sub>eq/MJ), depending on the raw materials used for its production. The reduction is strongly influenced by the decarbonization process of the agricultural supply chain: valorization of agricultural residues, etc. The GHG balance of agri-feedstock may be further improved by implementing sustainable farming practices to allow the increase of carbon stock in soils (e.g., the use of biochar). For this reason, Eni has launched a series of joint initiatives in various countries on the African continent to develop the supply chain for the production of sustainable low-ILUC agri-feedstock. Kenya is now the lead country in achieving the identified goals. Thanks to the advanced development of its agricultural sector and the collection and refining of used cooking oil, it will be able to reinvent its energy industry, making it efficient and sustainable.

This model is based on focal sites where the collected biomass and oil seeds are stored and processed; the so-called agri-hubs, capable of converting locally produced sustainable raw materials into bio-oil and other high-added-value products, will be a central asset in our vertically integrated supply chain. Following the mechanical extraction of oil from the seeds, two products are obtained: bio-oil, which is sent to the African ports to reach Eni's biorefineries, and a series of by-products with high added value, such as residual lignocellulosic materials and waste suitable for producing animal feeds and fertilisers.

In order to optimise the supply chain, there are ongoing research projects for the digitization of the entire agronomic processes that will allow additional support to the farmers involved in the agri-hubs in different countries; for instance, in Kenya, the overall project foresees the involvement of approximately 200,000 farmers, mostly family farmers, in the country, and the creation of a digital network to monitor activities will be essential in order to optimise and make more

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## ORGANISATION

Eni S.p.A.

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## COUNTRY

Italy

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## COUNTRIES OF OPERATION

The largest contribution of agri-feedstock production is expected from countries located in Africa, particularly Kenya and Congo. Agri-feedstocks will be provided also by other countries, including Mozambique, Angola, and Ivory Coast.

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## SUSTAINABLE DEVELOPMENT GOALS

Eni's model of agri-feedstock projects is based on the principles of a just transition. It focuses on five concepts:

1. food security
2. job creation and rural income
3. economic development
4. access to land
5. land regeneration.

The impact on communities is considerable, taking into account the thousands of farmers involved, who own on average less than one hectare. The long-term commitment through contract farming represents a great opportunity for development.

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## PROJECT ANCHOR

Eni S.p.A.

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## CONTACT

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efficient operations (planting, harvesting, crop and harvest analysis, and logistics of these agri-hubs). Also, as part of these digital networking projects, one of the main activities involves the creation of a digital tool that aims to identify marginal lands (abandoned, unused, or heavily degraded) whose use needs to be enhanced to obtain a larger scale, as to say industrial production, of agri-feedstock.

### **Project impact**

HVO biofuels will play a key role in Eni's decarbonisation strategy and, in particular, for the so-called 'hard to abate' sector i.e. heavy haulage, aviation and marine transportation. In this regard, our project aims to produce biofuels starting also from agri-feedstocks not in competition with food grown on low-ILUC soils. These oleaginous species will be cultivated with the aim of obtaining energy crops with high yields in terms of ton/hectare and in this regard hybrid varieties will be studied which may be more productive depending on the geographical context. Innovative initiatives will also be carried out for the decarbonisation of the agricultural supply chain, such as the development of carbon farming and the production of feed starting from agricultural waste. As reference, the first agri-hub, based in Kenya was opened in July 2022, in Makueni County just a year after the relevant agreement was signed with the Republic; in such location the pressing of castor, croton and cotton seeds takes place and from the port of Mombasa the first cargo of vegetable oil for the Gela biorefinery departed the following October. The agri-hub has been started up with a production of 2,500 tons in 2022 and it will be quickly scaled up to 15,000 tons in 2023.



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## Building hydrogen ecosystem

Environmentally friendly energy is becoming increasingly prevalent as many developed countries agree to start reducing global emissions. The trend towards hydrogen-based energy continues to grow and gain support from various parties globally. Building a hydrogen ecosystem is crucial. Many companies are trying to get involved in the hydrogen business discourse, regardless of the fact that the hydrogen business is still dominated by hydrogen derived from fossil fuels. In the future, the hydrogen business is expected to be dominated by more environmentally friendly hydrogen.

Environmentally friendly hydrogen is still not common. Efforts from more parties are moving towards increasing awareness about the importance of low-carbon hydrogen. Energy companies in Indonesia are starting to get involved in different ways. Among the ways are being actively involved and becoming a player in the hydrogen business value chain. The value chain is inseparable from conventional methods in the hydrogen production process. However, when discussing the energy transition in a more environmental direction, the value chain becomes something that is very rare and even needs to be built. Building a green hydrogen ecosystem is a challenge for hydrogen businesses in Indonesia.

In addition to research activities related to green hydrogen commercialization on the downstream side, there is a pilot plan for green hydrogen production on the upstream side. The challenges faced are high financing and regulations that are not yet available. Green hydrogen related technologies are still developing. Research to obtain low-carbon hydrogen generation is carried out to find alternative materials that are easier to obtain at more affordable prices. Regulations also continue to be pursued so that the green hydrogen business can run together with conventional energy. One way to reduce research and pilot plant costs is through collaboration with parties who have the same intentions and financial support. With the commencement of research related to green hydrogen technology innovation, the high cost of generation and commercialization will move in a better direction. The multiplier effect will also move towards faster regulation that is mutually supportive of the growth of eco-friendly hydrogen ecosystems.

### Project impact

Development of a pilot project for green hydrogen in a geothermal area with a production target of 100kg/day, as well as research in advanced fuel cell technology.

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#### ORGANISATION

PT Pertamina (Persero)

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#### COUNTRY

Indonesia

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#### COUNTRIES OF OPERATION

Indonesia

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 7, 12, 13, 15

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#### PROJECT ANCHOR

PT Pertamina

Geothermal Energy Tbk (PGEO)

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# Carbon capture & utilisation

Tata Chemicals Europe has put up the UK's first industrial-scale carbon capture and utilisation plant. In a world first, carbon dioxide captured from energy generation emissions is then purified to food and pharmaceutical grade for use as a raw material in the manufacture of sodium bicarbonate, which will be known as EcoKarb® and will be exported to over 60 countries around the world. Much of the sodium bicarbonate exported will be used in haemodialysis to treat people living with kidney disease.

## Project impact

The plant captures 40,000 tonnes of carbon dioxide each year, which is equivalent to taking over 20,000 cars off the roads and reduces TCE's carbon emissions by more than 10%.

**ORGANISATION**  
Tata Chemicals

**COUNTRY**  
India

**COUNTRIES OF OPERATION**  
UK

**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 9,11,12,13

**PROJECT ANCHOR**  
Tata Chemicals Europe

**CONTACT**  
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# Carbon tracking

Commonwealth Bank of Australia has partnered with CoGo to integrate within its banking app a tool to help customers understand what their carbon footprint is and allow them to understand different ways that they could reduce their emissions.

The “Carbon Tracker” in the app approximates the amount of kilograms of CO2 that a customer emitted during a month based on their spending and compares that to the national average. The tracker also breaks down the different categories of the emissions including, health, utilities, transport and travel.

## Project impact

Allows customers to better understand and reduce their carbon emissions and helps them achieve a goal of net zero footprint.

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**ORGANISATION**  
Commonwealth Bank of Australia

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**COUNTRY**  
Australia

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**COUNTRIES OF OPERATION**  
Australia

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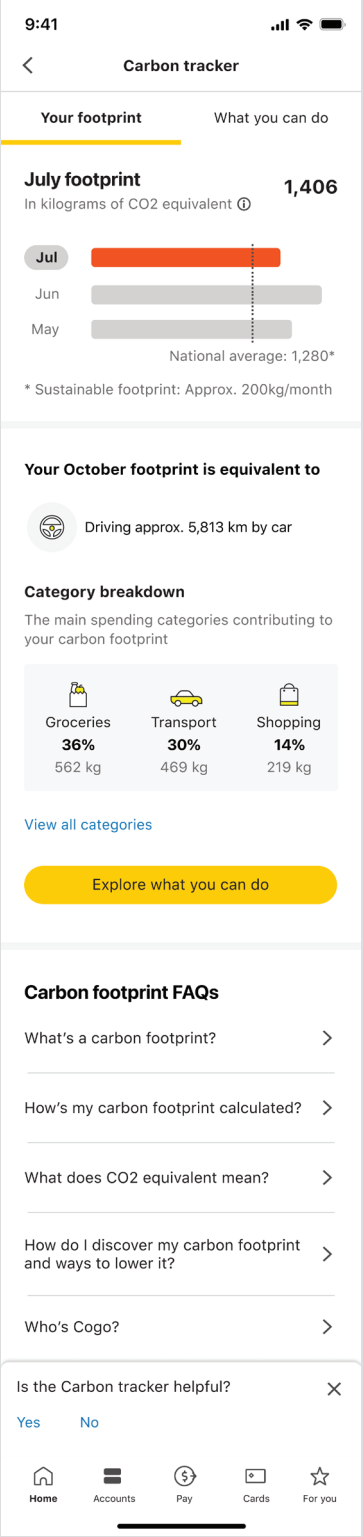
**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 7

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**PROJECT ANCHOR**  
CBA and CoGo

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## Catalytic gasification of biomass to hydrogen or syngas

In order to get energy security for India, imports of oil and gas has to be minimized by utilization of biomass alternative fuel. India is producing ~600 MMTPA of agri-residue wherein ~1/3th is surplus which is not being utilized in an efficient manner (i.e. being burnt at paddy and leading to deteriorate the quality of air significantly). This surplus biomass is capable to produce ~20 MMTPA of H<sub>2</sub> which can meet the total H<sub>2</sub> demand for India. On the other hand, this surplus biomass is capable to produce >250 MMTPA of raw syngas (of CV 2300 kcal/kg) which can be substituted partially with gas imports. There is an increasing demand for H<sub>2</sub> in various applications such as chemicals, process industries and mobility sector. Conventional method for production of blue H<sub>2</sub> from fossil may not be viable due to additional cost of CCS (carbon capture and sequestration). The upcoming stringent legislations on CO<sub>2</sub> from fossil fuels necessitates the need for green H<sub>2</sub> and next generation fuels /chemicals such as SAF, green methanol and green diesel etc. which led to enhanced research focus towards carbon neutrality with renewables. H<sub>2</sub> production through electrolysis with solar energy is yet to mature in an industrial scale due to its limited period of availability in a day. Large scale battery storage systems have to be installed to utilise solar energy for continuous supply of power/H<sub>2</sub> for industrial scale applications which is economically not viable at present. Biomass is available in a large quantity at scattered locations across India which can be stored round the year. The primary challenge is the infrastructure for collection, transportation and storage of biomass which limits its usage for large scale applications. In addition, there is need for a reliable and viable technology to utilize this agro-residue to convert into H<sub>2</sub> or syngas in a modular plant at distributed locations. There are matured processes available for compressing product H<sub>2</sub> or syngas at distributed plants which can be send to industry.

Conventional technologies of biomass gasification encounter with several issues of operational, reliability and viability such as tar formation, lower conversion, low calorific value of product gas, use of pure O<sub>2</sub>, etc. All thermal gasifier operates at temperatures >850°C to minimize the tar formation and uses pure O<sub>2</sub> (instead of air) for improving calorific value of syngas which demands ASU (air separation unit) and leads to higher OPEX and CAPEX. In the recent past, thermal dual fluid bed gasifier system has gained interest because it uses air and capable to provide high calorific value syngas. However, it's an energy intensive process due to its higher temperature (i.e. gasifier: >850°C and combustor: >950°C) operation. There is a need to introduce a catalyst to enhance the process reliability and viability by attaining complete conversion, eliminating tar formation and lowering operating temperature. Conventional catalytic gasification processes impregnate the active species on feedstock which ends along with ash after gasification. The separation of catalyst from ash need elaborative processing steps which limits the economic viability.

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### ORGANISATION

Reliance Industries Limited

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 7, 13

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### PROJECT ANCHOR

Reliance Industries Limited

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### CONTACT

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RIL developed a unique supported catalyst which has superior properties such as, attrition resistant, hydrothermal stability, better metal dispersion, high pore volume and activity which enables to get complete conversion of biomass at  $T < 700^{\circ}\text{C}$  to high quality syngas (molar  $\text{H}_2/\text{CO} > 4$ ) without tar generation which is reported first ever by achieving with solid–solid reaction mechanism. By using supported catalyst, loss of active metal (alkali) along with fly ash has been eliminated which avoids the catalyst recovery issues. However, a lot of challenges were encountered to make a superior support due to trading between high pore volume and attrition strength. On the other hand, hydrothermal stability is a major challenge to retain the surface area and pore volume which is essential for keeping the active species (solid) availability for the solid–solid reaction with feed (solid). In addition, stringent operating conditions are to be maintained for retaining the desired active phase of support material under this reducing atmosphere. There are challenges to minimize the attrition loss, ease of separation of ash from catalyst within the system by desired hydrodynamics etc. and also avoids the formation of bottom ash/agglomeration of ash, inactive complex's (alkali–alumino silicates) under the conditions of fluid bed gasifier.

RIL developed a new process of low temperature dual fluid bed gasifiers which facilitates to separate combustion ( $< 800^{\circ}\text{C}$ ) and gasification ( $< 700^{\circ}\text{C}$ ) reactions in different vessels with steam and air respectively. It allows to use the air (instead of pure  $\text{O}_2$ ) and separate the  $\text{CO}_2$  (from combustion) and  $\text{N}_2$  from the product syngas. The developed supported catalyst is capable to act as heat transfer material (i.e. transfer of heat from combustor to gasifier for meeting endothermic heat demand of gasification reaction). In addition, this novel catalyst is highly efficient in enhancing kinetics of steam gasification, tar cracking and water–gas shift reaction and overall it is capable to produce min. 10 wt.% of hydrogen from different agri–residues at significantly lower cost vs other conventional  $\text{H}_2$  production routes. A long journey has been taken to establish the optimum operating conditions, desired catalyst properties to obtain superior yields from variety of feedstock's in a more reliable and commercially viable manner.

## Project impact

A huge data bank has been generated at lab scale (gram scale) with variety of feedstock (different agro–residues, high ash coal and petcoke) and subsequently confirmed these yields from continuous feeding at 2 kg/hr pilot plant trials. This novel process is able to get  $> 10$  wt.% of  $\text{H}_2$  (vs  $< 7$  wt.% conventional) from any type of agri–residue at significantly lower temperature (minimum of  $100^{\circ}\text{C}$ ) vs conventional processes. This was achieved by the novel catalyst which was capable to provide complete carbon conversion, water gas shift reaction and tar cracking significantly lower temperature from any type of carbonaceous feedstock's. Moreover, several trials have been taken with high ash Indian coal and low reactive petcoke to ensure the kinetics of all these reactions and quality of syngas which reveals that this novel process is more robust and capable to handle any carbonaceous

feedstock without any challenges. The process configuration is similar to commercial FCC which allows to get high reliability and operating cost is also much lower than any other gasification processes. This process is scalable to a large industrial scale, however, a modular plant of 500 tpd feed processing capacity is a reasonably good size at distributed locations across the India wherever feedstock is available. The projected life cycle cost of H<sub>2</sub> from this novel process is <\$1.7/kg of H<sub>2</sub> vs conventional thermal gasifiers/solar >\$3/kg of H<sub>2</sub>. On the other hand, this novel technology is capable to produce high calorific value syngas which can be replace the fossil gas for energy applications. The life cycle cost of raw syngas (if gasifier operates under syngas mode) would be <\$5/mmBTU (vs. commercial > \$8/mmBTU) which ensures the commercial viability for this process while ensuring carbon neutrality. At present, the design of 16.5 KTPA demo plant for demonstrating this technology is under progress. The key outcomes of this demonstration is to produce green hydrogen from waste agro-residues for its utilization in speciality applications.







## CO<sub>2</sub> capture from dilute flue gases

Globally, several technologies have been developed for CO<sub>2</sub> capture owing to the increasing awareness regarding the importance of reducing CO<sub>2</sub> emissions. A few of these technologies such as Amine Absorption Process (AAP) for CO<sub>2</sub> capture is implemented at the industrial level. Despite commercial importance of AAP, there are various disadvantages that limit its applicability for full scale implementation, like (i) limited sorption capacity; (ii) significant energy demand; (iii) solvent degradation–oxidative & thermal; (iv) high solvent make-up; (v) energy–intensive reclamation; (vi) reliability issues– corrosion, volatility etc. Further to this, advanced amine process with its novel solvent formulations has been able to reduce the opex and capex as compared to AAP. But, it requires deep flue gas de–sulfurization for fine polishing that incurs higher capex. Firstly, the absorber inlet needs flue gas with least content of SO<sub>x</sub> (<0.1 ppmv) and NO<sub>x</sub> (<140 ppmv). Secondly, the activators in advanced amine causes toxic and unsafe operation. Learning from all shortcomings of AAP and advanced amine, RIL successfully worked to develop robust CO<sub>2</sub> capture process with reduced opex / capex, easy scalable, minimal reliability issues etc.

RIL's Hydrated Sorbent for CO<sub>2</sub> capture (HSC) process involves capturing CO<sub>2</sub> from different sources in power plant, oil refinery and chemical industries. It is an adsorption–based circulating fluidized bed process that follows carbonate–bicarbonate chemistry with following chemical equations –

Pretreatment:  $\text{K}_2\text{CO}_3 (\text{s}) + 1.5 \text{H}_2\text{O} (\text{g}) = \text{K}_2\text{CO}_3 \cdot 1.5\text{H}_2\text{O} (\text{s})$   
 $\Delta H = -101 \text{ kJ/mol}$

Adsorption:  $\text{K}_2\text{CO}_3 \cdot 1.5 \text{H}_2\text{O} (\text{s}) + \text{CO}_2 (\text{g}) = 2\text{KHCO}_3 (\text{s}) + 0.5\text{H}_2\text{O} (\text{g})$   
 $\Delta H = -40 \text{ kJ/mol}$

Regeneration:  $2\text{KHCO}_3 (\text{s}) + 0.5 \text{H}_2\text{O} (\text{g}) = \text{K}_2\text{CO}_3 \cdot 1.5\text{H}_2\text{O} (\text{s}) + \text{CO}_2 (\text{g})$   
 $\Delta H = +40 \text{ kJ/mol}$

During the sorbent and process development, many challenges were encountered which were solved with scientific rigour and resulted in impressive patent/publication portfolio. Few of them are below –

### Sorbent Innovations:

- Higher loading of K<sub>2</sub>CO<sub>3</sub> (45–50%) – (i) Multi–step impregnation method for uniform dispersion of K<sub>2</sub>CO<sub>3</sub> in macro–pores without blocking narrower meso–pores; (ii) Loading up to 45–50% K<sub>2</sub>CO<sub>3</sub> achieved.
- Support Modification by calcination (>900C) – (i) Surface acidity reduction; (ii) Minimal formation of heat stable species KAl(CO<sub>3</sub>)<sub>2</sub>(OH)<sub>2</sub> during adsorption; (iii) Decrease in regeneration temperature (<130C); (iv) Novel support with higher attrition resistance (<10%).
- Multi–cycle stability – (i) Tuneable textural and morphological

### ORGANISATION

Reliance Industries Limited

### COUNTRY

India

### COUNTRIES OF OPERATION

India

### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 13

### PROJECT ANCHOR

Reliance Industries Limited

### CONTACT

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## Decentralized electrically driven water treatment

Indra is driving the world away from use of harmful chemicals and over reliance on biological systems (large size and low through-put per unit reactor volume) towards an electrically driven energy efficient approach to achieve 90% lower footprint, 30% cost savings and 70% solid sludge reduction with up to 99% water recovery. Apart from innovations in treatment technology and power electronics, we have also achieved industry-first improvements in manufacturing, operations with standardization in the water sector. Our solution productizes the conventional water plant which is normally an Engineering, Procurement and Construction (EPC) project. Our novel standardized platform ensures quick scale-up and mass production of water systems powered by smart software and firmware. Conventional plants are designed from scratch each time. We can build up to 6 water treatment plants (1 million liters daily treatment capacity) every 45 days in our small factory as opposed to 8 months or longer to build and deploy each conventional plant. This is essential for financial innovations in rental/leasing models which require higher uptime, consistency & lower risk in deployed water assets. INDRA's patented electrically driven decentralized wastewater treatment solutions are modular, 90% smaller and treat domestic and industrial wastewater. Our systems are driven by INDRA SMART automation and SPECTRUM analytics to optimize efficiency & performance. Key benefits include lower energy consumption, no added chemicals in primary treatment of water, 65–70% sludge generation, up to 99% water recovery, higher efficiency and lower maintenance. INDRA's novel broad-spectrum pollution removal solution can handle a wide range of pollutants like suspended/dissolved pollutants, heavy metals, emulsified oils, oxygen demanding substances (COD & BOD), nutrients (nitrogen, phosphorous etc.), pathogens and petroleum. It also handles shock loads well unlike conventional chemically or biologically driven solutions.

Our solution is helping customers and partners to meet increasing water demands, overcome scarcity challenges, enhance environmental stewardship and comply with regulatory requirements. Indra has treated over 750 million litres of water for reuse while providing 70–75% life cycle carbon savings with its solutions.

### Project impact

Indra has treated over 750 million litres of water and we have measured impact in the following manner:

1. We have positively impacted the lives of more than 500,000 people.
2. 70–75% life cycle carbon savings are expected from the assets.
3. 35% cost savings was observed on an average per litre of water treated.

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#### ORGANISATION

Indra Water (Inphlox Water Systems Pvt. Ltd.)

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT GOALS

SDGs 6, 9, 11, 12, 13, 14

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#### PROJECT ANCHOR

Inphlox Water Systems Private Limited. (Supported by IIT Bombay, Dept. of Science & technology, ImagineH2O, World Economic Forum)

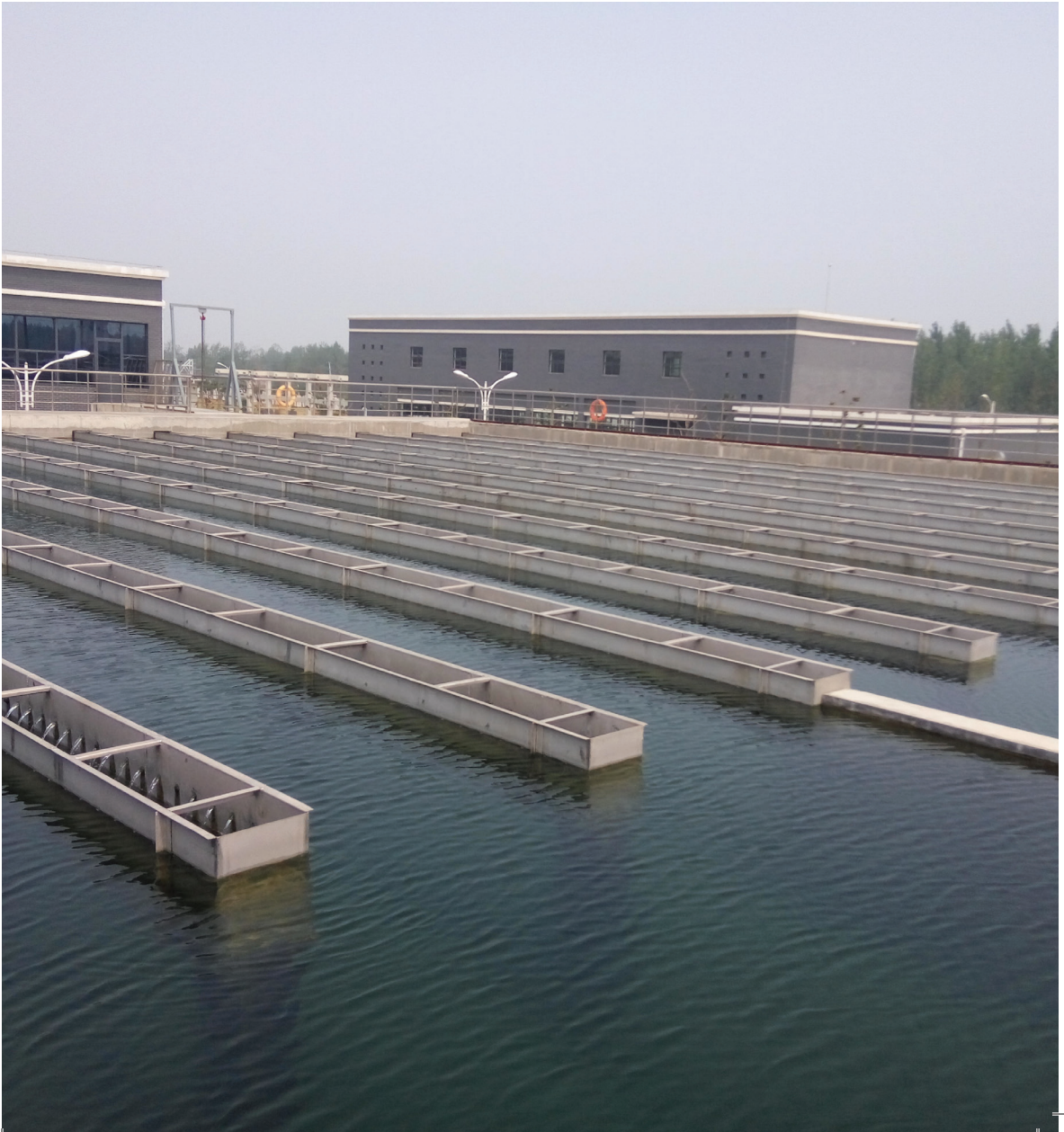
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#### CONTACT

Amrit Om Nayak  
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4. 25% less energy was consumed compared to conventional solutions for industrial wastewater.
5. Our solution has reduced solid sludge generation by more than 70% amounting to 3200 tonnes less sludge.
6. 2000 tonnes of toxic chemicals have been removed from pre and primary treatment of wastewater for pollutant breakdown.
7. 500 tonnes of greenhouse gas emissions have been reduced.
8. Average spatial footprint saved per 1000 litres of installed treatment capacity is about 90%.



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## **Design and development of advanced power electronics and related technologies for integration of solar power plants with power utility grids**

With the advent of latest technologies, electricity storage and renewable generation etc., major changes have taken place in generating and consuming electricity. Power generation from renewable sources can address the new pattern of electricity consumption, but the current grid system is unsuitable for this.

### **Project impact**

Prototype and field deployments of power grid integration technology at Low Tension Voltage for Solar Photo Voltaic applications upto 50 KW, which will help in flattening the load profile Development of Smart Energy Management (SEM) Module for solar invertors to optimize solar generation, storage and usage.

Development of Bi-directional Meters having remote management facility of sensing data and control mechanism for integration of Solar PV and other renewable generation.

Development of User Interface and Management Software (UIMS) for SEM modules & meters for its remote configuration and management.

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### **ORGANISATION**

Global Innovation and Technology Alliance (GITA)

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### **COUNTRY**

India

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### **COUNTRIES OF OPERATION**

India, Republic of Korea

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### **SUSTAINABLE DEVELOPMENT**

#### **GOALS**

SDGs 7,9,11

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### **PROJECT ANCHOR**

Allied Engineering Works Pvt. Ltd.

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### **CONTACT**

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## Design and development of India's first indigenized fuel cell bus

The search for cleaner and more sustainable automotive technologies is driven by the growing awareness of the impact of vehicle emissions on human health and the concern about fast-depleting fossil fuels. Hydrogen as an energy carrier shall play an important role in achieving sustainability and net zero across sectors. Specifically for automotive applications, it can be used in many ways, like blending with other fuels (HCNG), direct use in internal combustion engines (ICE), and even powering hydrogen fuel cells for highly efficient and clean electric use cases. These technologies play a vital role in improving energy efficiency in powertrains and show the way towards cleaner energies in the future. Amongst these technologies is the hydrogen fuel cell power system driven vehicles, in which the chemical energy of stored hydrogen is used to generate electric power by the fuel cell.

### The project had the following challenges:

**The Fuel Cell Power System Design:** This includes the humidification system, air throttle valve, hydrogen pressure regulation system, and water recovery unit. The required technology was not readily available with vendors; hence, the Tata Motors team took the initiative to develop this technology in-house and has registered six international patents.

**Control Strategy:** Developing a control strategy for fuel cell vehicles was a complex task that required one-of-a-kind implementation of such a strategy. The team developed an in-house control strategy for integrating the fuel cell system with the base vehicle architecture, and it has garnered two patents. Ensuring communication and hand-shaking of power-sharing strategies was crucial for delivering better vehicle performance.

### Embarked journey in the collaborative model:

**Industry Partners:** a. Tata Motors Ltd., Project Initiator, Anchor, and Programme Management Responsible for concept design, integration, digital evaluations, prototyping, safely working with hydrogen, and testing the buses. b. Indian Oil Corporation (IOCL): Hydrogen dispensing evaluation c. Gujrat Alkalis and Chemicals Limited (GACL): Hydrogen Supply d. Siemens: traction drive e. A123: Traction battery pack f. Eaton: air compressor.

**Govt. of India Institutes:** a. Indian Space Research Organisation (ISRO): technical guidance and hydrogen handling b. Department of Scientific and Industrial Research (DSIR): Funding for Technology Demonstration

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#### ORGANISATION

Tata Motors Ltd.

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 3, 7, 9

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#### PROJECT ANCHOR

Tata Motor Ltd, India

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#### CONTACT

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com



c. Petroleum and Explosives Safety Organisation (PESO): Approval of H<sub>2</sub> usage d. Central Institute of Road Transport (CiRT): bus safety audit e. Ministry of Road Transport and Highways (MoRTH): Approval for Test Drive.

Academic Institutions: a. Indian Institute of Science (IISc): housed the TML innovation centre and supported concept evaluation. b. Indian Institute of Technology (IIT); Bombay: Support in-house stack preparation and testing.

### Project impact

Hydrogen fuel cell-powered vehicles are an attractive option because they are easier to maintain and require faster refuelling. The fuel cell bus innovation is a zero-emission solution that benefits the transportation sector as well as steady-state power generation. The hydrogen fuel cell ensures a smooth transition from fossil fuels to renewable energy sources, which could lead to a reduction in fuel imports, savings in foreign exchange, and improved energy security for the country. The additional infrastructure created for hydrogen generation, storage, and dispensing can help generate new sustainable business and employment opportunities. With a collaborative development approach, technology development leaped from the initial technology readiness level (TRL3—proof of concept) to TRL8 (commercialization).



## Drone spray as a service in Indian agriculture

There are fundamental challenges facing Indian smallholders and Agriculture, such as small and fragmented landholdings, labour shortages, lack of skill, lack of real-time advisory, inefficient or over-use of insect-pest control products, water scarcity, operator safety, and efficiency of farm operations. All factors affecting farm productivity and innovative solutions like drones have the potential to address the challenges and increase farm productivity in a sustainable manner.

Drone technology, with its imaging and application technology potential, not only helps digitise farmer, farm, and crop data for real-time advisory but also enhances farm operations efficiency, i.e., it can spray a one-acre farm with crop protection products or nutrients within 6–8 minutes using only 8–10 litres of water, whereas otherwise a farmer takes 1–2 hours and 150–200 litres of water, respectively, with a conventional knapsack sprayer. With drones, farmers always remain at a safe distance, eliminating the chances of chemical exposure. Drone technology saves 95% of the water being used for agrochemical spraying while optimising the use of chemicals by avoiding overuse. It also has great rural employment potential as agribusiness graduates and rural entrepreneurs are coming up to take the technology to farmers by setting up drone technology enterprises or startups.

### Project impact

Bayer, being a pioneer of technology, secured all legal and regulatory approvals, partnered with a promising Indian startup, and helped them co-develop the technology and take it to Indian smallholders by working towards the deployment of drone technology in Indian agriculture. Currently, Bayer is working in seven states, offering drone technology solutions to farmers in multiple crops like paddy, chilli, corn, cotton, soybean, potato, wheat, etc. R&D is ongoing to develop expertise in plantations and vegetable crops as well. The technology has been demonstrated to over 5000 farmers so far and in the last year, and Bayer plans to reach out to 50,000 farmers.

By the end of 2022, more than 1000 farmers were happy to experience the services from Bayer since the start of Bayer drone solutions. Bayer developed the know-how and has been working towards capability and capacity to support potential rural entrepreneurs by facilitating technology access, digital capability, financial linkage, and business support wherever possible.

The present technology impacts SDG 6, which is Clean Water and Sanitation. Agriculture uses a higher percentage of the clean water available on earth. Water saved in agriculture can be used for human consumption. Every acre sprayed by drone saves 95% of the water. Through this technology, Bayer aims to save 10 Million Gallons in another 3–5 years by covering approximately 300,000 acres.

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#### ORGANISATION

Bayer CropScience Limited

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 6

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#### PROJECT ANCHOR

Bayer CropScience Limited

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#### CONTACT

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bayer.com





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## Flexisource – steam & power

The fuel source for steam & power has been continuously changing. This change is driven by availability, fuel costs & environmental considerations. Decarbonization and sustainability are becoming key drivers for energy transition. This is fuelling opportunities for new technologies and new business models.

Industry is looking for hybrid multi-waste input energy systems to maximize renewables and have higher input flexibility at the same time maintain economic viability. It is therefore paramount to offer a comprehensive adaptive solution to users for handling the energy transition.

The main considerations for fuel sourcing are cost, availability, environmental impact, and process waste disposal. The main considerations for equipment design are reliability, availability, efficiency & flexibility. Our recently launched FlexiSource™ is an important step in that direction.

Our team at TBWES had to take efforts to develop the solution to overcome challenges of efficiently combusting difficult to burn waste fuels like non-recyclable solid waste, agricultural waste like rice straw, empty fruit bunch etc., refuse derived fuel along with biomass and biofuels. At the same time meet the emission norms making it an environmentally friendly solution.

FlexiSource™ is a result of years of experience and research that has led to such unique solution. The combustion expertise of handling 140+ different fuels off and on field has been efficiently moulded in an automated & digitally enabled combustion technology. This ensures better controllability & efficient combustion of multi-waste fuels. Our special inclined reciprocating grate combustion technology coupled with co-ordinated multiple fuel feeding systems is designed to take fuels ranging from low (1800 kcal/kg) to high (4000 kcal/kg) net calorific value waste fuels with irregular shape. There is no need to have a shredder installed for sizing the fuel.

Finding out correct mix of fuel composition for designing boiler was very difficult. Hence a range of composition was considered for designing boiler as well as related equipment. Estimation of pollutants for waste fuels was also one of the challenges. Our experience of RDF and similar fuels has been used to estimate the pollutant concentration at boiler outlet, which formed the input for design of downstream pollution control equipment.

We designed the equipment to meet guidelines of Solid Waste Management 2016 (norms followed for firing Municipal Solid waste and Refuse Derived Fuel) considering the waste quantity in fuel mix. As the market demand is new and mainly addressing cost sensitive users, the boiler design was made compact as much possible with bottom-supported structure. Tall furnace increases residence time of flue gases, allowing fuel to burn completely. High pressure, deep

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### ORGANISATION

Thermax Limited

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3,6,7,13

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### PROJECT ANCHOR

Thermax Babcock & Wilcox  
Energy Solutions Limited

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### CONTACT

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penetration second generation secondary air jets are strategically located at multiple levels on furnace walls, ensuring proper turbulence and good mixing of volatiles with air ensuring complete combustion and reducing CO.

The integrated Flue Gas Cleaning System comprising of dry scrubbing with hydrated lime and activated carbon depending on the fuels combusted and bag filter ensures our high environmental standards and commitment to clean energy and clean air.

### **Project impact**

- This solution will help clients to safely utilise and dispose wastes and other available fuels in their areas in an environment friendly way.
- Provides high flexibility to source green fuels that area available to keep up availability without compromising on overall efficiency.
- The users can save on costs and hence can create pull to consume high waste volumes.
- The waste fuels generated in nearby industries or waste segregation plants can be sold to nearby users or industries. Costs related to waste handling are saved, thereby reducing the overall carbon footprint and CO<sub>2</sub>.
- The steam generated can be utilized for process or captive power.
- This solution can address waste volume reduction more than 90%.
- The users will be able to displace coal with multiple waste fules reducing the carbon footprint. (A 40 TPH 45/400 boiler could otherwise consume about ~60,000 tons of coal annually).



## Free cooling in data centers

Indirect Direct Evaporative Cooling (IDEC) is a method of precooling (sensible) air by a heat exchanger (air-to-water) and then the pre-cooled air is passed through the adiabatic cooling system. Due to sensible precooling of air, the Wet Bulb Temperature (WBT) comes down and air can be cooled below ambient WBT.

IDEC as an Option for Free Cooling in Data Centers:

In free cooling mode, the air which is cooled by the IDEC system is then fed to the chiller for condenser cooling. Water which is cooled by the IDEC system is then circulated to dual coil PAHUs for pre-cooling of hot air coming from the server hall. The concept of free cooling thus enables reduction in hot air on an average of 5 to 6degC. This particular system has offered opportunities 1) to improve chiller performance and 2) also reduced chiller load. While most of the free cooling systems available in market will only provide limited operating hours wherein free cooling can be achieved. However, the concept adopted and implemented in one of data centers has demonstrated use of free cooling throughout the year except monsoon season (when RH is more than 70%). Psychrometric process is explained in the chart how the IDEC system can be utilised for free cooling in DCs.

Key Activities Undertaken:

Feasibility study carried out for a small-scale data centers in composite climate of India, and measured supply and return air temperatures, availability of space and quality of air and water, to make sure that IDEC system can operate well without any deterioration to the system and its component. Cooling load assessment was also conducted to estimate the capacity requirement and to foresee potential benefits along with ROI (return on investment). Design layouts prepared for the IDEC system, plumbing and coil placement at PAHU. Further, a dedicated IDEC plant manager was designed to minimise the energy consumption and water consumption. IDEC unit and complete system were commissioned in March 2018, the system performed at the best, since the ambient humidity found in the month of March was quite low. Early result showed a drop of 4–5°C in return air which was 40% of the total heat load. Further, calibration performed in IDEC plant manager to have more emphasis on water conservation by dropping water circulation to zero when RH goes more than 70%.

Key Challenges:

- Water quality posed major challenges and it had required a dedicated water softener plant to ensure low O&M cost.
- Existing PAHUs algorithms required to re-configure as per return air temperatures (in case of lower temp cases).
- Cannot be implemented in coastal areas due to high humidity throughout the year.

### ORGANISATION

Green Business Centre

### COUNTRY

India

### COUNTRIES OF OPERATION

India

### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 7

### PROJECT ANCHOR

IGBC

### CONTACT

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## Project impact

Key outputs:

1. Effect on Chiller: Instead of having 31degC return air temp, recorded return air temp was much lower, due to precooling which has partially closed chilled water valve which has resulted lower cooling load at existing chiller. The graph shows up to 50% saving on chiller power consumption by using IDEC as hybrid free cooling system. Performance data recorded; sample data is appended.
2. Effect on PUE: PUE dropped by an average of 0.05–0.07. This effect is combination of evaporative condenser cooling and precooling of return air .
3. Graph shows resultant impact on return air temperature from the base line of 31°C.



# Geothermal power plant

Development of geothermal power plant in Banten Indonesia – As geothermal energy is expected to play a significant role in reducing Indonesia’s greenhouse emissions, PT Sintesa Banten Geothermal is currently developing a 110 MW Geothermal Power Plant in Serang and Pandeglang, Banten, designed to be one of the largest geothermal plants in Indonesia.

## Project impact

Environment, climate change and socio economy.

**ORGANISATION**  
KADIN Indonesia – Sintesa Group

**COUNTRY**  
Indonesia

**COUNTRIES OF OPERATION**  
Indonesia

**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 7, 8, 13, 17

**PROJECT ANCHOR**  
Sintesa Banten Geothermal – Sintesa Group

**CONTACT**  
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sagroup.com







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## Godrej Platinum

Godrej Platinum is a residential multi dwelling facility located in Ali-pore, Kolkata. The facility has two residential towers having basement, ground and nine floors. Parking is provided in basement, ground floor and first floor. There are total 36 flats in the building. The site area is 5,485 sq.m and the builtup area is 12,002 sq.m. The project is located in Kolkata, West Bengal which belongs to Warm and Humid climate zone. The project is IGBC Gold certified project.

**Rainwater harvesting:** The project has 2 nos. of rainwater harvesting pits and 1 rainwater harvesting tank for 100% rainwater harvesting (116 KLD).

**Organic Waste Management:** The project team has established an effective organic waste management plan. As per this plan, project has ensured that all the household organic waste are diverted to on-site waste treatment technology and treated within Site itself. The organic waste converter of 100 kg/day installed for treating organic waste in the site. Further compost generated will be used in landscaping within site itself.

### Project impact

**Energy Savings:** The project by the use of energy efficient lighting fixtures and efficient building envelope has achieved 16.6% energy savings over the baseline.

**Water Savings:** The project by the virtue of using efficient water fixtures has achieved 44.5% of potable water reduction over the baseline.

**Material Resources:** The project has used 23.2% of materials with recycle content and 77.6% of material locally available in the project. In the project, 97% of the generated construction wastes are diverted from being sent to landfills. The generated waste includes Steel & Aluminium wastes, Broken bricks, Cement/Concrete bags, Stone wastages and broken tiles. These construction waste either used in the road backfill and sold to the scrap dealer for recycling.

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### ORGANISATION

CII – Indian Green Building Council

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 9,11, 12

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### PROJECT ANCHOR

Godrej Properties Ltd.

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### CONTACT

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## Green data centre framework to transform the sector

In 2016, IGBC (Indian Green Building Council) developed an integrated holistic approach to encourage Data Centers (DC) to become Green Data Center (GDC). GDC framework facilitates new and existing data DCs to have benchmarked design parameters for reducing design PUE upto 1.2. In case of existing DCs, the framework defines green parameters which can enable transformative changes leading high power savings and also achieve lowest PUE, in the range of 1.3 and 1.4. Since DCs are energy guzzlers hence more than 60% weightage given to energy and its related parameters. GDC framework further strengthened by incorporating 'User Guide for ECBC (Energy Conservation Building Code) 2017 in Data Centers', a joint initiative of CII, BEE (Bureau of Energy Efficiency, Govt of India) and LBNL DOE USA. This integration enables DCs to achieve PUE in the range of 1.6 (Level-I), 1.4 (Level-II) and 1.2 (Level-1). Achieving these PUEs transforms DCs, the way they are being operated in most of the regions. This is more important, as most of the DCs are gradually loaded over the years hence, inefficiency in parts can lead significant loss in revenue. Now, the GDC framework is well established in India; as on date, 40+ green DCs are certified/ongoing. Several efforts have been made to promote emerging technologies in DCs which can further boost energy efficiency and can showcase PUE upto 1.1.

### Key Activities Undertaken:

A technical committee comprised of domain experts formed to bring all verticals of sustainability in Data Centers. After the rigorous process and defining thresholds (taking feedback of industry DC stakeholders) of each green criteria, the framework was developed.

### Key areas covered in Green Data Centers:

- Energy Efficiency and Operation & Maintenance (O&M)
- Water Conservation
- Indoor Environmental Quality
- Site Selection and Planning
- Building Material and Resources

Since the framework covers IT and Non-IT part thoroughly, every DC adopting GDC rating; intangible and tangible benefits are enormous and payback varies between 1 and 3 years. The framework has again distributed weightage on Cooling, Chiller, Electrical systems and IT Hardware & Software Management; to address sustainability holistically.

### Project impact

#### Impact Analysis:

The GDC framework has created an eco-system in Indian DC industry

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#### ORGANISATION

CII-GBC

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 7

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#### PROJECT ANCHOR

CII-GBC



and has laid down the path of green. Since the framework defines component level benchmarking, designs are most sophisticated and benefits are assured to data centers. There are four key components which enabled to establish as an eco-system:

1. **Building Green DC Consultants:** The framework created an opportunity for professionals to craft services for GDC as Green Data Center Consultants. Further, IGBC handholds these consultants to improve the whole eco-system.
2. **Development of Green DC Products:** Created a Benchmarking for OEMs to make their product greener by specifying requirements (high performance, zero losses, low carbon, etc) for eco-label (level-III). This created more awareness in product selection criteria of Data Centers Operators towards efficiency and carbon footprint.
3. **Development of Green DC Operations:** The framework not only covered green products, It also has a dedicated section for operating conditions like Temperature, Humidity, Indoor air quality, Health and wellbeing, Water conservation and Waste disposal.
4. **Capacity Building:** Number of workshops/training programmes were conducted across India to impart awareness on GDC.



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## Happy Digital X Healthy Planet–project results in this beautiful presentation called ‘Net Worth’ from Tapestries of the Seas and Port Planet.

The Happy Digital X, Healthy Planet project resulted in a beautiful presentation called ‘Net Worth’ from Tapestries of the Seas and Port Planet. During the G–20, the Indonesian Government hosted a number of forums and exhibitions focused on sustainability, global blended finance and the circular economy. One of the most interesting exhibits highlighted the results of the Healthy Planet project that had been incubated during the Happy Digital X course from TSEA with the United in Diversity Foundation and Tsinghua University. The Healthy Planet project focused on building a circular economy, which involved fishermen and villagers gathering plastic waste fishnets and bottles from the sea, then recycling them into pellets and yarn, and subsequently woven by Indonesian and Malaysian artisans into beautiful tapestries and cloth, from which a luxury fashion designer created a dress. The original project, conceived by Creative Cooperative, was also based on digital and AI technology as satellite imagery of the sea was used to identify the used plastic fishnets and then applied to create unique patterns, reflecting traditional motifs. A digital loom was used for the final weaving of the scarf and was programmed by the native artisans, incorporating both traditional and new patterns to produce the tapestry and cloth.

The entire cycle is captured in Digital Certificates, developed by Trust Place, tracing the whole process, and most importantly, profiling the artisan and ensuring that each piece is a certified original and cannot be copied. A first scarf was conceived, designed, and created by the Creative Cooperative, who worked with the Healthy Planet group during their HDX project and presented the work at Cop 26 at the invitation of the Indonesian Government Ministry of the Seas.

### Project impact

As a result of the Circular Economy project and all of the work done by the various participants in the project, the project was presented at Cop 26 in Glasgow and then at the G 20 in Bali. Recently, the various stakeholders have now applied to the European Union Horizon program for “Asia Plastic Watch” and hope to be one of the grant winners.

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### ORGANISATION

Happy Digital X, Creative Cooperative, Trust Place, Launchpad for Material Innovation, Dumasi Inspiration and Plastic Xchange

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### COUNTRY

Indonesia

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### COUNTRIES OF OPERATION

The project started in Indonesia with the Happy Digital X program. It then widened its horizon to include Creative Cooperative in France, Trust Place in France, Launchpad for Material Innovation in the UK.

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### SUSTAINABLE DEVELOPMENT GOALS

This project touches many aspects of the UN SDG's: First it uses AI (Artificial Intelligence) to scour the seas to find the plastic in the oceans and then recuperate it. It then uses AI and Blockchain to help identify those workers who have gathered the plastic and brought it to the recycling plants. Once the pellets have been processed, the yarn is produced from the recycled fish nets. Digital looms are then used to translate the designs (many times Indonesian heritage designs) into tapestry, which can then be used to create beautiful scarves and dresses. Each of these items is bestowed with a Digital Certificate to trace the tie process and to make certain that the new owner knows that it is an authentic piece of work and that the artisan is rewarded.

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### PROJECT ANCHOR

Happy Digital X

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### CONTACT

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# IGBC green transit initiative

IGBC Rating Framework for Green Transit:

1. IGBC Green Railway Stations Rating: Applicable to Long-distance rail based transportation systems with operations throughout the country.

IGBC Green Railway Stations Rating System has been developed by IndiaGBC with the support of Environment Management Directorate of Indian Railways in 2016. The rating is a tool to facilitate adoption of green concepts, thereby reduce the adverse environmental impacts due to station design, construction, operation & maintenance. The overarching principle of the rating is to optimize resource usage and enhance commuter experience.

2. IGBC Green Mass Rapid Transit System (MRTS) Rating: Applicable to Urban transportation systems such as rapid transit, metro rail, monorail, other light rail transit systems

IGBC Green Mass Rapid Transit System (MRTS) Rating is the World's first exclusive rating system to address sustainability in new Mono Rail and Metro Rail systems. The rating system is a tool to enable Rail based MRTS to apply green concepts during design & construction, so as to further reduce environmental impacts that are measurable. The overarching objective of IGBC Green MRTS Rating is to ensure environmental sustainability while enhancing the commuter experience. This rating is applicable for Underground, Elevated and At grade MRTS stations.

3. IGBC Green Airports : IGBC New Building rating is applicable to airports.

Also, IGBC Green Cities rating is applicable to Aerocities (Modelled on smart city concept with futuristic offerings such as walkable districts, multi-modal connectivity, open spaces and modern amenities)

4. IGBC Green HSR rating system is the World's first exclusive rating system to address environmental sustainability in high speed rail stations.

The rating system has been developed with the support of IGBC Green HSR Technical Committee led by National High Speed Rail Corporation Limited (NHSRCL) along with key stakeholders from Ministry of Railways & Metro Rail Authorities.

This rating system will be a tool to enable new High Speed Rail (HSR) stations to apply green concepts during design & construction, so as to further reduce environmental impacts that are measurable. The overarching objective of IGBC Green HSR Rating is to ensure environmental sustainability, while enhancing commuter experience.

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## ORGANISATION

CII – Indian Green Building Council (IGBC)

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## COUNTRY

India

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## COUNTRIES OF OPERATION

Majorly India

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## SUSTAINABLE DEVELOPMENT GOALS

SDGs 3, 6, 7, 9, 11, 12, 13

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## PROJECT ANCHOR

Indian Green Building Council (IGBC) of CII, representing India at World Green Building Council

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## CONTACT

Saurav Choudhury  
sourav.choudhury@cii.in

## Project impact

1. CII is working with more than 60 railway stations and facilitated 35 railway stations to achieve Green Railway station rating so far. First 30 Green railway stations have achieved an annual savings of 40 crores per year, energy saving of 22 Million kWh/ year and water savings of 3 Billion Litres/ year, and GHG emission reduction of 18,000 tonnes/ year.
2. IGBC Green MRTS Rating has received tremendous response from metro rail authorities across the country. Over 700 metro stations in India from 17 metro rail authorities amounting to a built-up area of 70 million sq.ft are going green.
3. More than 10 airports have adopted a green path for design, construction and airport operations which include Hyderabad, Delhi, Mumbai, Bangalore, Goa, among others.
4. The environmental benefits of greening railways/ metro/ HSR projects include:
  - Reduced dependency on air travel and private vehicles
  - Seamless multi-modal integration
  - Reduced heat islands
  - Reduction in non-traction energy consumption towards upto 30%
  - Water consumption reduction upto 30%
  - Low carbon first & last mile
  - Increased use of renewable energy
  - Improved station facility management
  - Effective ventilation
  - Use of eco-friendly construction materials
  - Increased environmental awareness among commuters & rail staff

### Green Railway Stations Rating System

Pilot Version  
March 2017



Confederation of Indian Industry



# RAILWAY STATIONS IN INDIA



Indian Green Building Council  
Greening India since 2001



IGBC Green High Speed Rail  
(HSR) Rating



Indian Green Building Council  
Greening India since 2001

### IGBC Green Mass Rapid Transit System (MRTS) Rating

Version 1.0

Abridged Reference Guide  
November 2015



www.igbc.in

# METRO



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## IGBC green village initiative

India has 6,40,000 villages and 90 crore people in these villages, which means 65% of people in India still live in villages

Today, major challenges faced in the villages are open defecation, drinking water scarcity, lack of adequate health care, access to basic amenities & school and power shortage. In this context, converting existing villages to green and self-sustainable is of paramount importance to the Nation.

IGBC Green Village rating is developed to address many of the rural challenges. The green concepts and techniques in the villages can help address national concerns like water availability, energy availability, reduction in fossil fuel use, handling of waste and conserving natural resources. Most importantly, these concepts can enhance health and well-being in villages, which is assuming greater importance.

"A Green Village is one which offers access to clean energy, adequate water, basic education, good healthcare, hygienic sanitation, leading to economic prosperity and enhanced quality of life, in a manner that is environmentally sustainable".

IGBC Green Village Rating System is a tool for identification & implementation of green features in a village. Parameters covered as part of rating include:

I. Health & Hygiene – Clean village with access to safe drinking water, sanitation facilities, school, healthcare

II. Village Infrastructure – Well connected village with amenities & green cover, livestock management

III. Water Conservation – Planned water supply & sewage network, treatment & reuse and rain water harvesting.

IV. Energy Availability & Efficiency – Rural Electrification, efficient lighting and promotion of alternative sources of energy.

V. Materials & Resources – Use of local materials & techniques, waste management, green product manufacturing

VI. Social & Community Actions – Spread Awareness on green and develop green village as a Eco tourism spot.

The green village rating framework is developed in Hindi as well as in English.

### Project impact

Vision of IGBC Green Village Initiative is to facilitate and support the development of 1000 Green Villages in India by 2025.

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### ORGANISATION

CII

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### COUNTRY

India

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### COUNTRIES OF OPERATION

Majorly India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15

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### PROJECT ANCHOR

Indian Green Building Council (IGBC) of CII, representing India at World Green Building Council

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### CONTACT

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sourav.choudhury@cii.in



Till date, 35 villages in 10 states have adopted the green village concepts and 28 villages have been green certified by IGBC.

These include nationally acclaimed villages, Sansad Adarsh Gram Yojana villages, CSR driven village transformation, villages adopted by politicians, sportsperson, film industry celebrities. This has helped in popularising the concept and get more stakeholders engaged in greening of villages.

These villages are excellent examples of the efficacy of a focused go-green plan and the benefits that accrue, and the recognition encourages more villages to go green.

The conversion of existing villages to green villages have resulted in multifold benefits.

**Tangible Benefits:**

- Reduced water demand (20–30%)
- Reduced power demand (30–40%) and Power security through Clean Energy
- Better managed solid waste

**Intangible Benefits:**

- Access to basic facilities, transport, recreation
- Adequate infrastructure for Education & Healthcare
- Hygiene, access to safe drinking water & sanitation
- Clean Village and Improved Lifestyle
- Local Economic Development
- Digital Village Initiative
- Enhanced Quality of life



Confederation of Indian Industry

# IGBC Green Villages

Pilot Version

Abridged Reference Guide  
June 2016

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## Infosys Autonomous System Platform

Infosys Autonomous System Platform is an advanced autonomous mobility system powered by Intelligent vehicle localization and modelling algorithms. It houses innovative, curated autonomous modules and computer vision intelligence modules powered by Infosys patented drive-by-wire technology. It has smart autonomous navigation and path planning algorithm stack accompanied with smart lane detection, obstacle detection, obstacle avoidance for safer navigation in real time environment dynamically. The key challenges are with manual driving or on-time driver availability, lack of driver skillsets and ownership on the vehicle, lack of maintenance, loss of productivity and efficiency across industries. Infosys has addressed these challenges by developing, nurturing, and maturing the autonomous system platform to SAE 3.5 level for controlled environment. The platform was built using minimum viable product approach by transforming existing electrical vehicle to autonomous vehicle. Infosys had successfully addressed and overcome technology challenges while maturing this platform from concept to industrialization. The prominent technical challenges are lack of availability of blueprint for autonomous vehicle design for industrial applications, the real time environments with uneven driving surfaces and irregular lane definitions with unpredictable pedestrian behavior. The drive by wire systems availability and cost was a big challenge to enable autonomous mobility. Infosys innovated In-house Drive-By-Wire system and platform application components, with optimized design to cost approach and secured a patent for Drive by Wire system (Indian Patent Application No. IN201841042450 system and method for integrated auto-steering and auto-braking mechanism in autonomous vehicles as a retro fit). The Platform created multiple derivative products but not limited to Autonomous Buggy, Autonomous Tow Truck, Automated Guided Vehicle. The platform is positioned in the market to provide cost effective and feasible Industry 4.0 solutions for inbound and outbound logistics.

- <https://www.infosys.com/services/engineering-services/service-offerings/autonomous-systems-solutions.html>
- <https://www.infosys.com/services/engineering-services/case-studies/first-autonomous-buggy-manufacturers.html>
- <https://www.infosys.com/infosys-stories/preserving-our-planet/driving-forward-autonomous-technology.html>

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### ORGANISATION

Infosys

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 7

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### PROJECT ANCHOR

Infosys

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### CONTACT

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# Liquid immersion cooling for green data centers

Project Brief : IGBC has been promoting energy efficiency in Data Centers since 2007 and has also published guidelines & manuals to support the Industry through adoption. An exclusive Green Data Centers framework was developed in 2016, later a User Guide was published while working with LBNL–USA which defined component level energy use benchmarking. As on date, 40+ green DCs projects are certified/ongoing with IGBC. Several efforts have been made to promote emerging technologies in DCs. Immersion cooling is one of them. Recently, few DCs have installed ‘Immersion Cooling’ to reduce PUE (carbon footprint) significantly and bringing more reliability.

Key Activities Undertaken: Reliance–Jio DC Mumbai installed Immersion Cooling system, since lot of power being consumed to cool the servers and further to remove the heat from server hall. As and when, power density of server increases, cooling of server by air cooling system becomes extremely difficult. To resolve this, servers compatible with 1–phase di–electric liquid (oil) were chosen to dip in the oil to take the heat away. It eliminated the use fans needed for cooling the servers and also avoided adverse effects such as dust, humidity and environment pollution. The removal of fans from server led further reduction of server power consumption and reduced overall IT energy use. The server heat can be easily rejected into the atmosphere by transferring the heat from oil to a closed loop water cooling circuit and from the water cooling circuit to the air through an outdoor unit known as dry cooler unit. The dry cooler unit has inbuilt pump for water circulation (closed loop ) which rejects the heat through cooling coil into ambient.

Key Challenges : Major challenge that came in implementation was ensuring IT hardware compatibility and the way heat is being rejected. The optical connectivity cable deployed as an additional attachment of copper, as refractive index of air and oil are different. It was also ensured that component doesn’t have any hardening/brittling effect due to submergence in an oil, 24X7.

## Project impact

Outcomes Summary :

Essentially the coolant (single phase di–electric liquid) supports high heat density which is 1200 to 1600 times higher than the air. This leads high dispersal of heat from the servers (server boards are immersed in the liquid contained in a slim casing).The power consumption dropped drastically as there was no requirement of chillers, air–distribution system etc. Also, the inbuilt air fans are eliminated which has offered huge savings in fan power. In traditional DCs, the PUE found to be

**ORGANISATION**  
Green Business Centre and Reliance

**COUNTRY**  
India

**COUNTRIES OF OPERATION**  
India

**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 7

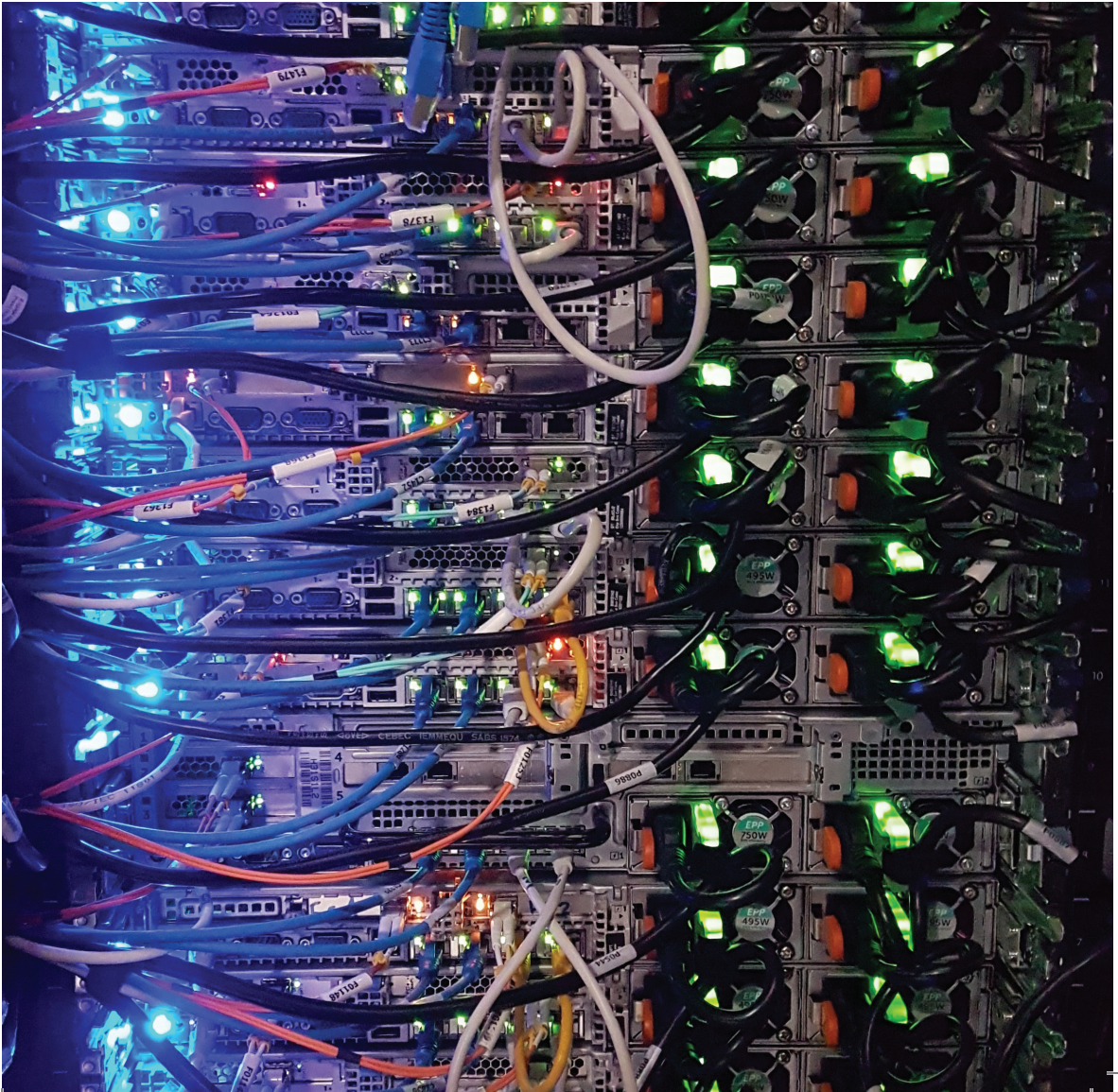
**PROJECT ANCHOR**  
Reliance Jio

**CONTACT**  
Mr Gouranga Munain  
gouranga.munain@ril.com

in the range of 1.5 to 1.7 which dropped to 1.1 (in the range of 1.1 and 1.15). Such implementations can transform the DC industry and reduce power in a drastic manner.

**Major Impact:**

- Energy use in cooling reduced by 70% (operating as well as connected load).
- 10% reduction in IT load. Further, the reduced connected load lowered the sizing of equipment (transformers, DG and power train components. Indirect carbon emission also cut-down.
- It also acts as a thermal energy storage (TES) system during short power failure (can eliminate requirement of TES).
- Enhance life of IT hardware (Dust and airborne corrosion deteriorate IT equipment).



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## Manufacturing & assembling components for mass housing

The Ideal Choice Homes multi-unit housing construction system provides pre-engineered, quick-to-build community housing for development sites in seismic zones 1 through 3. Developed for the Indian housing market, the Ideal Choice Homes construction system is designed to meet demand for well-built, low-cost, sustainable housing. It is a fully developed housing solution suitable for mass application. Its material-optimised, factory-fabricated modular components leverage established precast concrete technologies. Factory-made components are designed to be easily transportable and site-assembled with basic erection equipment. Factory-finished exterior surfaces do not require rendering or painting. Finishing options for the interior accommodate the needs and budgets of specific project conditions.

### Project impact

1. Solid: Each ICH is solidly constructed using precast concrete technology. Prefabrication in a controlled environment inside the factory ensures that each piece meets rigorous quality standards. Precast concrete provides durable, prefinished surfaces for painting or tiling as desired.
2. Quick to Build: The ICH system reduces typical construction time by at least half. Components are factory-built under careful control, then assembled on site in as little as four weeks per story, with minimal re-shoring requirements. Floor, wall, and partition components fit together quickly, requiring limited use of heavy machinery.
3. Affordable: ICH prioritises quality housing at an affordable price point. The costs are comparable to those of conventionally constructed buildings of similar size. In addition, reduced construction time leads to an average savings of 5% on interest costs.
4. Comfortable: With ample natural light and ventilation, ICH is designed to be thermally comfortable year-round, limiting the need for mechanical heating and cooling. Deep roof overhangs coupled with walls that are formed for self-shading contribute to a comfortable interior temperature.
5. Customizable: ICH multi-unit buildings are customizable to a variety of sites and conditions and are available in G to G+3 building heights. Unit plans can be sized and configured to meet site and development requirements.
6. Self-Sustaining: ICH uses innovative design to reduce reliance on resources and utilities. Each building responds to the change in seasons by minimising heat gain from the sun, encouraging air movement, and reducing cold air infiltration during the winter. The said

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### ORGANISATION

Sam Circle Venture

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### COUNTRY

USA

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT GOALS

In particular, agri-feedstock initiatives can facilitate market access for small farmers, local job creation, diversification of income-generating opportunities, and the development of local industry. The impact on communities is considerable, taking into account the thousands of farmers involved, who on average own less than one hectare. The long-term commitment through contract farming represents a great opportunity to develop.

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### PROJECT ANCHOR

Sam Circle Venture, Kieran Timberlake, Bakeri Engineering

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### CONTACT

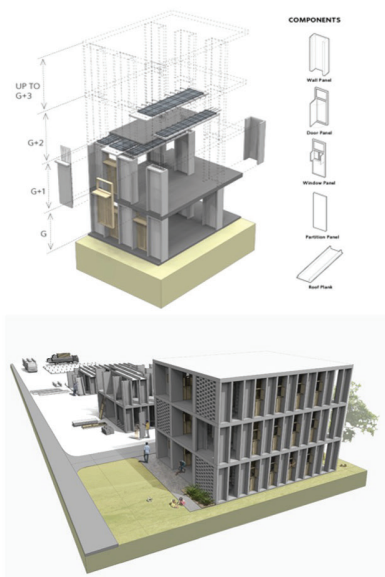
Amber Malhotra  
am@samcircle



system is quick-to-build, reducing on-site construction time by more than half and enabling a 3,000 m<sup>2</sup> G+3 building to be constructed in eight months



## Transforming how homes are designed and built today



The current housing shortage amounts to million of units in urban and rural area for middle and low income groups across the world. The product and process by which homes can be mass customized and mass produced through a managed supply chain is a solution to create environmentally responsive housing that is affordable and swiftly constructed.

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## Microfibre-based innovative structural auto-parts

The automotive industry has been one of the first industries to be targeted by such legislation, probably because of the massive amount of waste generated by vehicles that have reached the end of their useful life. It has been estimated that every year about a million vehicles reach the end of their useful life in India.

In real terms, this accounts for more than 3 million tonnes of end-of-life waste in India. This industry is undergoing a big shift in its business models and products. The automotive industry is striving to reduce cost of its products and reduce pollution to meet the ever tightening environment standards. They are grappling with the challenge of finding sustainable alternative to material, processes and fuels. The current focus is to have light, low cost and sustainable alternative materials. This will reduce the fuel consumption and pollution. One of the innovative solutions is alternate and sustainable product which is the microfiber reinforced bio based polymer.

The overall objective of the proposal was to develop and commercialize natural fibre reinforced lightweight material and automotive structures from it. This can translate into a net weight reduction in vehicles, thus resulting in improved energy efficiency and direct reductions of greenhouse gas emissions. Benefits of reduced vehicle weight can have an important environmental impact since fuel efficiency potentially increases 6% to 8% for every 10% in vehicular weight reduction.

### Project impact

Development of various automotive structures/parts using natural fibre-reinforced lightweight materials.

Reduced CO<sub>2</sub> emissions and increased recyclable proportion of auto parts.

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Canada

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 9,12, 13

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### PROJECT ANCHOR

Central Institute of Plastics Engineering & Technology (CIPET), Chennai

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### CONTACT

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# Microsoft circular data centers

**Context Setting:** The Microsoft Circular Centres programme launched its first location at the Amsterdam datacenter campus as part of Microsoft's zero-waste sustainability efforts. Microsoft decommissions and disposes of thousands of assets every year from its datacenters. These assets have gone to third-party IT asset disposition (ITAD) companies to recycle and remarket various hardware components. Microsoft's built-in regenerative and restorative supply chain lifecycles lead to greater resiliency, stronger ties with communities, and increased collaboration with upstream and downstream Microsoft partners. Microsoft built the first-of-their-kind Microsoft Circular Centres to facilitate the reuse and recycling of servers and hardware within its datacenters.

**Challenges faced:** The decommissioned assets arrive at the Circular Centre's truck-loading dock; however, the containers don't come with an Advanced Shipping Notice (ASN), meaning the dock operator doesn't know the contents of the shipment prior to arrival. The disposition route, IT Asset Disposition (ITAD), requires a different flow and accounts for a large percentage of decommissioned assets. In a Circular Centre, ITAD material is packed and staged until enough is accumulated to be shipped out. Since this type of material is packed immediately, a sales order could not be created. Standard disposition routes involve creating a sales order, at which point the licence plate number would be registered. For that reason, there is a lack of native front-end UI for licence plate reservations in Dynamics 365 when processing ITAD orders.

Key activities undertaken:

- Microsoft Dynamics 365 Supply Chain Management was used to drive the implementation of the programme, which emerged as the winner for Microsoft Circular Centres. In addition, Dynamics 365 was used to provide the flexibility to iterate and implement any necessary customizations along the way.
- The Microsoft development team built upon the robust features and capabilities of Supply Chain Management, such as the procurement and sourcing module and the sales and marketing module, which are standard inbound and outbound requirements for warehouse management operations. The Microsoft team created a custom reverse supply chain module within Supply Chain Management.
- Microsoft established the Intelligent Disposition and Routing System (IDARS), which tracks asset tags and assigns end-of-life processing routes once that asset is commissioned into the Microsoft supply chain.
- A custom API connects Purchase Order data so it can be imported into the Dynamics 365 reverse supply chain module and logs all necessary disposition routes based on asset tags.
- The team created a custom data entity in Dynamics 365 that creates the ability to indicate the goods have been received without opening and scanning containers.

**ORGANISATION**  
Microsoft

**COUNTRY**  
India

**COUNTRIES OF OPERATION**  
Amsterdam, Netherlands

**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 9, 12, 13, 17

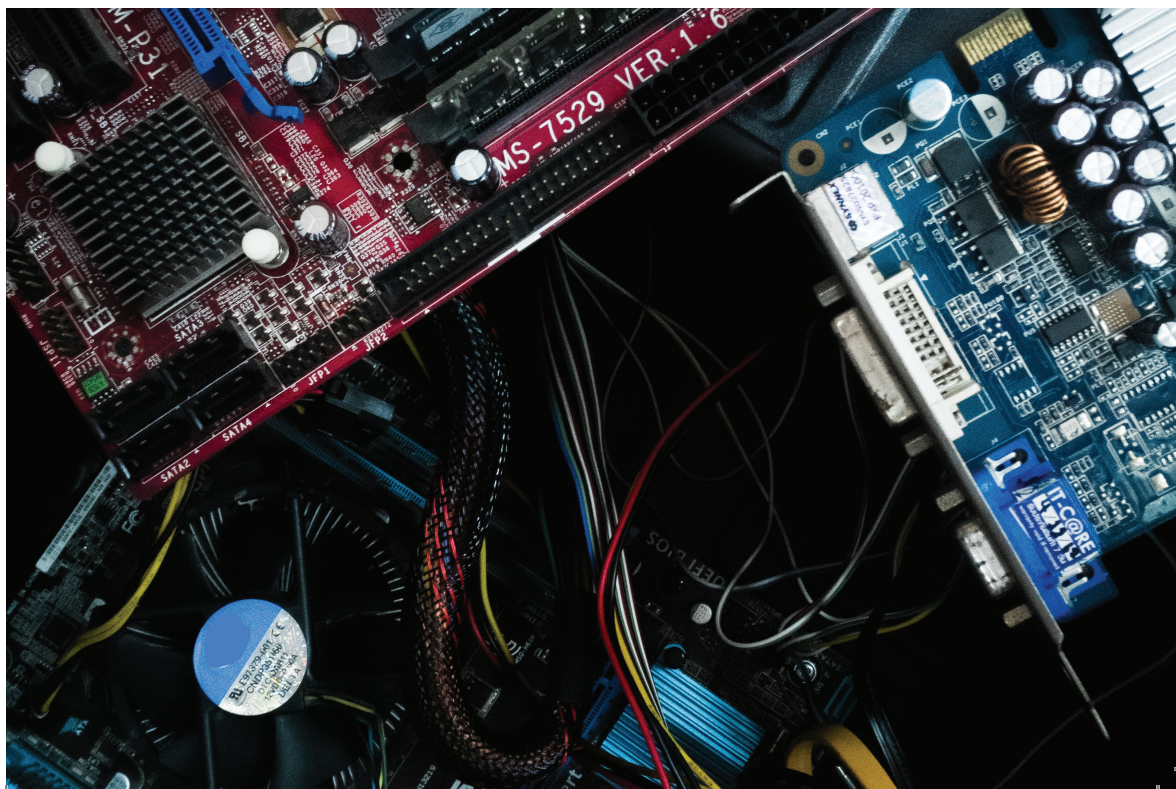
**PROJECT ANCHOR**  
Closed Loop Partners

**CONTACT**  
Sandeep Aurora  
saurora@microsoft.com

- The development team utilised Power Apps to create a container-receiving app designed for seamless user interaction and data entry.
- A dock operator uses a tablet device to scan the bill of lading and purchase order number to log it in Dynamics 365, then the containers go to a temporary staging area.
- The warehouse operator view using the Dynamics 365 warehouse mobile app, which allows users to scan licence plate numbers to see part or asset disposition routes.
- The project team designed a Power Apps application embedded in the Sales order form to give operators a seamless experience within Dynamics that allows users to create licence plate reservations for ITAD orders.
- Lastly, the team implemented a new wave to convert “prepacked” containers to standard containers. From there, a sales order is created when it’s time for pickup.

### Project impact

Using Microsoft Dynamics 365 Supply Chain Management and Microsoft Power Platform, the Circular Centres’ reverse supply chain management solution successfully manages warehouse operations such as inventory handling, processing of decommissioned servers, and parts harvesting this system enabled optimised reuse, resale, and recycling of decommissioned assets and set Microsoft on the path to achieving its ambitious 2030 sustainability targets. The Circular Centres model has achieved 83 percent reuse and 17 percent recycling of critical parts while contributing to the reduction of carbon emissions by 145,000 metric tonnes of CO<sub>2</sub> equivalent.



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## My Home Avatar

My Home Avatar is built on the 80:20 principles, where 83.5% of space is dedicated to open areas of recreation, driveways, pathways, landscape, equipment & services area and 16.5% for living. The site area is 91,071 sq.m and the builtup area is 3,96,201 sq.m. The project is located in Hyderabad, Telangana which belongs to composite climate zone. The project is IGBC Gold certified project:

**Rainwater harvesting:** The project has 14 nos. of rainwater harvesting Pits and 3 rainwater harvesting tank for 100% rainwater harvesting.

**On-site STP:** The project has 3000 KLD STP (Rotating Media Bio-reactor).

**Renewable Energy:** The project has on-site Solar PV catering to 90% of the common area lighting.

**Organic Waste Management:** The project team has established an effective organic waste management plan. As per this plan, project has ensured that all the household organic waste are diverted to on-site waste treatment technology and treated within site itself. The organic waste converter of 3000 kg/day installed for treating organic waste in the basement level 1. Further compose generated will be used in landscaping within site itself.

### Project impact

**Energy Savings:** The project by the use of energy efficient lighting fixtures, efficient building envelope and use of renewable energy has achieved 13.4% energy savings over the baseline.

**Water Savings:** The project by the virtue of using efficient water fixtures and reusing treated water from STP for flushing has achieved 50.8% of potable water reduction over the baseline.

**Material Resources:** The project has used 22% of materials with recycle content and 79% of material locally available in the project. In the project, 98% of the generated construction wastes are diverted from being sent to landfills. The generated waste includes steel & aluminum wastes, broken bricks, cement/concrete bags, stone wastages and broken tiles. These construction waste either used in the road backfill and sold to the scrap dealer for recycling.

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### ORGANISATION

CII – Indian Green Building Council

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 7,9,11, 12

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### PROJECT ANCHOR

My Home Group

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### CONTACT

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## Myst Kasauli

Myst is India's first residential development designed using biophilic architecture. It's an approach that brings residents closer to the pristine nature of the Kasauli hills, while presenting them with every luxury. This exclusive gated community has been designed by the world's leading experts in sustainable architecture, Llewelyn Davies Yeang. Located on a high promontory, myst blends contemporary design seamlessly with the unique ecology of the area. The site area is 48,807.617 sq.m and built-up area is 3,16,577sq. ft. The project is located in Solan, Himachal Pradesh which belongs to cold climate zone. The project is IGBC Platinum certified project.

**Rainwater harvesting:** The project has 22 nos. of rainwater harvesting Pits for 100% rainwater harvesting of roof and non-roof runoff.

**On-site STP:** The project has 96 KLD STP (MBBR type).

**Organic Waste Management:** The project team has established an effective organic waste management plan. As per this plan, project has ensured that all the household organic waste are diverted to on-site waste treatment technology and treated within Site itself. The organic waste converter of 200 kg/day installed for treating organic waste in the site. Further compose generated will be used in landscaping within site itself.

### Project impact

**Energy Savings:** The project by the use of energy efficient lighting fixtures and efficient building envelope has achieved 9.18% energy savings over the baseline.

**Water Savings:** The project by the virtue of using efficient water fixtures and reusing treated water from STP for flushing has achieved 50.8% of potable water reduction over the baseline.

**Material Resources:** The project has used 25.20% of materials with recycle content and 97% of material locally available in the project. In the project, 95.2% of the generated construction wastes are diverted from being sent to landfills. The generated waste includes Steel & Aluminium wastes, Broken bricks, Cement/Concrete bags, Stone wastages and broken tiles. These construction waste either used in the filling & leveling and sold to the scrap dealer for recycling.

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### ORGANISATION

CII – Indian Green Building Council

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT GOALS

SDG 9,11,12

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### PROJECT ANCHOR

Myst Group

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### CONTACT

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# Nanotechnology for water purification, plastic packaging, plants growth, and CO<sub>2</sub> adsorption

This project is to produce nanomaterials and their nanocomposite for water purification, plastic packaging, peatland restoration, and CO<sub>2</sub> adsorption. The nanomaterials are derived from lignocellulose materials (biomass) and are extracted via chemical, mechanical, or mixed methods. Many advanced characterizations are used, such as TEM, SEM, FTIR, TG, DSC, BET, anti-bacteria and anti-fungi properties, and so forth.

## Project impact

This project is intended to produce nanomaterials and nanocomposite products for water purification, plastic packaging, plant growth, and CO<sub>2</sub> adsorption.

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### ORGANISATION

World Water Council

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### COUNTRY

Indonesia

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### COUNTRIES OF OPERATION

Indonesia

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 7, 13, and 15

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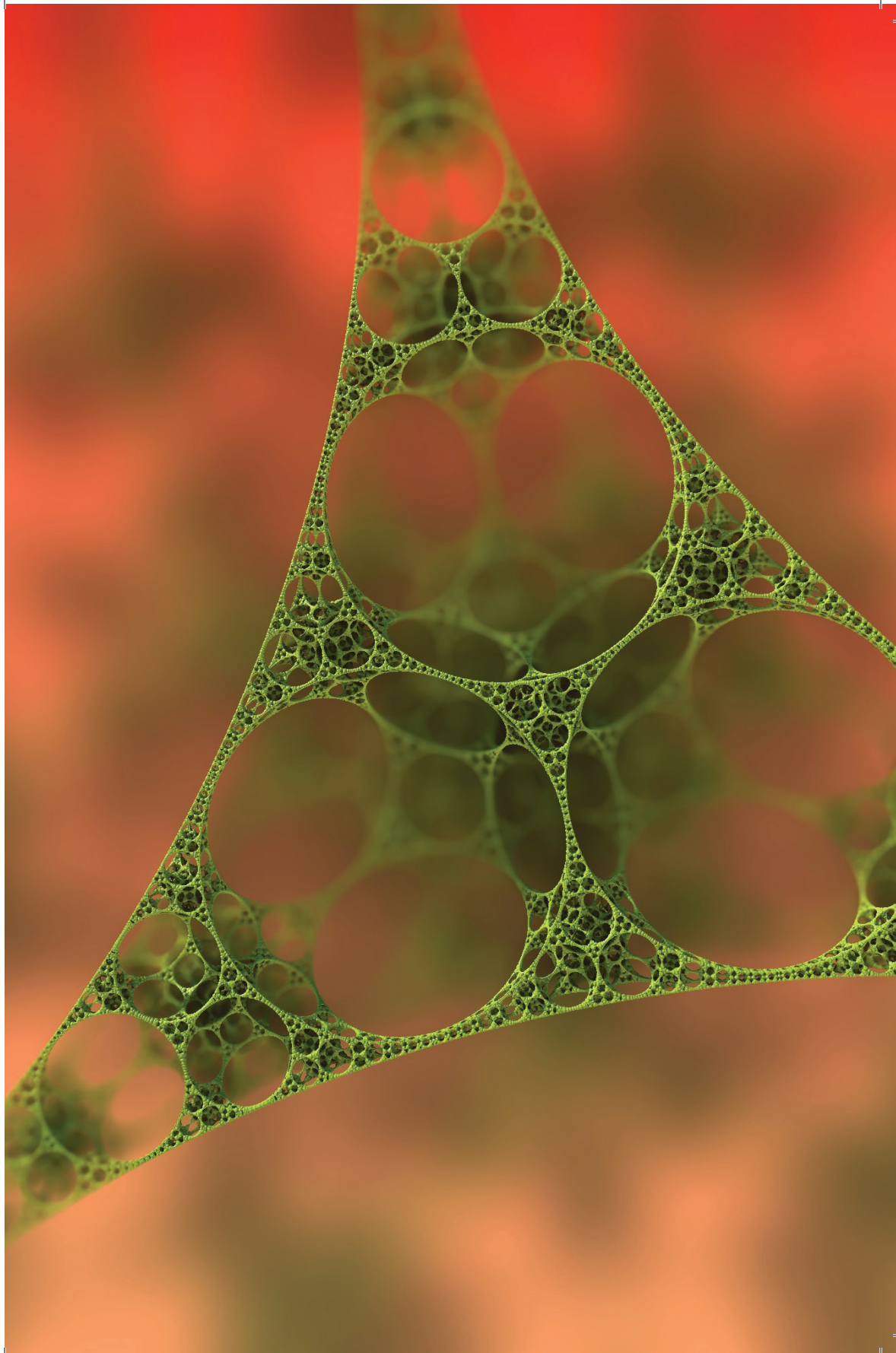
### PROJECT ANCHOR

IPB University

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### CONTACT

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achmad.solikhin1995@  
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# Nanotechnology use for land rehabilitation

This project focuses on the use of biomass (circular economy) for producing nanomaterials and micromaterials used for land rehabilitation, plant growth media, and water purification.

## Project impact

The project creates eco-friendly products with multiple purposes, including water purification, land rehabilitation, slow-release fertiliser, and plant growth media. In addition, previously, these materials were used as reinforcing agents for food and plastic packaging.

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**ORGANISATION**  
ERIA

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**COUNTRY**  
Indonesia

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**COUNTRIES OF OPERATION**  
Indonesia

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 12,13, 15

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**PROJECT ANCHOR**  
IPB university and STP Bogor

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## Oxred platform ITUS Edge

Oxred Platform is a Software Platform to improve the safety, performance, and longevity of EV batteries. The platform uses AI to predict EV safety, risks, and failures, which is valuable to EV OEMs, fleets, and insurers.

ITUS Edge is a Secure Hardware edge device to interface with the EV for data collection, edge processing, and transmitting to the cloud over 4G. Both of these projects are led by our Portfolio company, Datakrew ([www.datakrew.com](http://www.datakrew.com)).

Conventional energy sources are undergoing a permanent price hike. They weren't ideal for the environment in many ways, but for the longest time, they were the cheapest. Batteries are quickly becoming a considerable competitor to fossil fuels; they are better for the environment, and they save money in the long run. When it comes to electric vehicles, batteries take centre stage; they are the main component people pay for and constitute 50% of vehicle acquisition costs. However, recent reports of battery fires and explosions are making potential customers hesitant to purchase EVs or invest in ESS plants. Also, reduced visibility of EV performance, vehicle range, and reverse logistics are some of the challenges in the EV industry.

Every EV battery has a BMS (battery management system) unit, to which our ITUS EV IoT Gateway can connect over CANbus. It collects time-series operational battery data at every 2–5-second interval. It is also equipped with a GPS module for location tracking. The gateway comes with a Lightweight Battery Model and Edge ML Preprocessing to perform the first level of sanitization of the data using edge analytics. The data is then securely transferred to the cloud through a post-quantum encrypted channel.

The OXRED cloud has a virtual EV Digital Twin of all the EVs. It performs multiphysics simulations to determine the Ideal Battery Performance Characteristics (IBPC). The multiphysics simulation uses cell and pack models built using the cell specifications and pack configuration. The IBPC curves are then used to benchmark and compare the ideal and actual behaviour of the battery. Additionally, operational data from BMS is combined with driving data (using GPS) and traffic data (using third-party APIs) to perform first-level data analysis and inferences. Moreover, individual models are trained for each OEM to predict values such as SOH (state of health), risk score, mileage, faults, safety index, driving behaviour, and dynamic insurance.

Predictive Maintenance and Recommendation models are also trained to give users detailed insights about their vehicles. Federated Machine Learning models are trained to combine learnings from different OEMs, EV makes, and types to enhance prediction accuracy in a privacy-preserving manner. Finally, the quantified outcomes of these models (risk, safety, and faults) are used to give the stakeholders business-case insights like downtime predictions, automated kanban, and predictive reports.

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**ORGANISATION**  
BEENEXT

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**COUNTRY**  
India, Singapore

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**COUNTRIES OF OPERATION**  
India, Indonesia, Singapore

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 7, 9, 11, 12, 13

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**PROJECT ANCHOR**  
Datakrew ([www.datakrew.com](http://www.datakrew.com))

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**CONTACT**  
Sumanta Bose  
[sumanta@datakrew.com](mailto:sumanta@datakrew.com)

## Project impact

Datakrew has done a market study to collect first-hand primary data. For this, we have extensively interviewed 115 EV OEMs and distributors. All of them, without exception, have validated the need for a battery analytics system. <2% of OEMs are planning to develop such systems internally (in-house), whereas others are planning to procure them from an analytics solution provider (similar to Datakrew) subject to their requirements, budget, and timeline. But the need for such battery analytics has been confirmed by all OEMs. The company is working with over eight OEMs and will add several others later.

The project impacts the following sustainability goals:

Goal 7 (Affordable and Clean Energy) by enabling the efficient and effective management of EV battery systems

Goal 9 (Industry, Innovation, and Infrastructure) by enabling the development of more advanced battery technologies and creating new opportunities for infrastructure development, such as charging stations and battery recycling facilities.

Goal 11 (Sustainable Cities and Communities)

Goal 12 (Responsible Consumption and Production) by optimising battery performance and extending battery life, which can reduce the need for battery replacements and lead to a more sustainable use of resources.

Goal 13 (Climate Action): Oxred can help mitigate the impact of climate change by enabling the use of renewable energy sources and reducing greenhouse gas emissions from transportation.

Oxred can contribute to the development of more sustainable cities by promoting the use of clean energy in transportation and reducing air pollution.





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## Production of peat-based SAF (Sustainable Aviation Fuel)

Currently, in world practice, SAF is mainly produced from waste, residues and non-food crops grown on degraded lands. However, it is possible to use other sources to create biomass – peat, algae, wood. The use of SAF implies a significant reduction in greenhouse gas emissions over the entire life cycle of the airline compared to the use of fossil fuels. In its pure form, SAF cannot be used due to the presence of residues during combustion; therefore, its maximum share in aircraft tanks is 15% (according to expert estimates). Strict requirements are imposed on SAF – these fuels must :

- Meet strict sustainability standards for land, water and energy use.
- Avoid direct and indirect impacts of land use change, such as deforestation.
- Not to displace food crops and not to compete with them.
- Have a positive socio-economic impact.
- Have minimal impact on biodiversity.

### Project impact

Environmental friendliness is a new aviation trend. Although airplanes produce only 2.5% of CO<sub>2</sub> emissions into the atmosphere, airlines, manufacturers and governments are aiming to achieve a zero carbon footprint in the coming decades. To do this, countries, for example, reduce the number of short-distance flights or introduce special environmental charges. Technologies also do not stand still: perhaps in the near future, fully electric aircraft and hydrogen-fueled vehicles will enter regular flights. There is another way to reduce aviation emissions: environmentally friendly fuel, which will replace the currently used aviation kerosene.

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#### ORGANISATION

JSC Complexprom

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#### COUNTRY

Russian Federation

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#### COUNTRIES OF OPERATION

Russian Federation

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 7,13

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#### PROJECT ANCHOR

Vyatka Torf

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#### CONTACT

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SukhihEV@vyatkatorf.ru



# Reliance Catalytic Hydrothermal Liquefaction (RCAT-HTL) technology for the conversion of organic wastes to green oil

Reliance has been leading efforts in development of clean, green and sustainable technologies for conversion of biomass to biofuel and bio-products. Research on Hydrothermal Liquefaction (HTL) process at RIL began as part of Algae to Oil (A2O) program in 2011, aimed to convert algae grown in artificial ponds to green oil using HTL. HTL soon found application in converting wet organic biomass and bio-waste to produce green oil. RIL has set a landmark in biofuels industry by commissioning the world's largest HTL demonstration unit at R&D Biofuels site at Gagva, Jamnagar.

Currently, India is facing severe crisis in waste management. According to Report of Task Force on Waste to Energy, more than 80% of municipal waste generated annually is disposed indiscriminately at open dump yards. It is estimated that approximately 68.8 million tons of waste is generated every year in India by urban population alone. A major portion (~50%) of this is food waste with high moisture content. Furthermore, nearly 150 million tons of food processing waste is generated annually in India during production, post-harvest, processing, and distribution activities. Likewise, India also generates over 190 million tons of agricultural residue yearly including rice husk and rice straw, most of which is burned down openly, contributing to severe air pollution.

This is where RCAT-HTL comes in as it converts wet organic biomass and bio-waste to green oil using water as a solvent at high temperature and high pressure ([https://drive.google.com/file/d/1Q\\_LXeW-Pz8mT7NX77eVltRKHtbEcWUFNC/view?usp=sharing](https://drive.google.com/file/d/1Q_LXeW-Pz8mT7NX77eVltRKHtbEcWUFNC/view?usp=sharing)). It essentially expedites the natural process of crude formation from biomass, instead of millions of years as taken by nature, HTL achieves the process in a few minutes. HTL is suitable for wet biomass containing as much as 80% water and does not require drying. RCAT-HTL ([https://drive.google.com/file/d/1Mw8PfeKSKrbSFgwKoi-eGteS5wV\\_MOrK/view?usp=sharing](https://drive.google.com/file/d/1Mw8PfeKSKrbSFgwKoi-eGteS5wV_MOrK/view?usp=sharing)) can be a one-stop solution for India's waste management woes. Utilizing only organic part of the above reported waste as feedstock, RCAT-HTL process can generate over 300-400 million barrels/year of green oil. Realizing the full potential of this technology, green oil produced from waste could help cut the India's crude oil import bills by a significant 10-20% and generate more than 50000 jobs, contributing to growth of economy. This will also be RIL's significant contribution to Swachh Bharat campaign.

Key activities undertaken for RCAT-HTL process:

- a) Development of tuneable kinetics: By changing kinetics of RCAT-HTL process, a product mix of biofuel and bioproducts can be achievable as per the market demand.
- b) Development of proprietary catalyst: Reliance's proprietary catalyst

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## ORGANISATION

Reliance Industries Limited

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## COUNTRY

India

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## COUNTRIES OF OPERATION

India

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## SUSTAINABLE DEVELOPMENT GOALS

SDGs 7, 13, 11, 6

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## PROJECT ANCHOR

Reliance Industries Limited

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## CONTACT

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provides higher green oil yield and carbon recovery from feedstock compared to other technologies.

- c) Attractive economics: Benchmarking with conventional technologies shows RCAT-HTL has attractive payout period due to high drop-in green oil yield and valuable byproducts such as biochar and nutrient-rich water.

## Project impact

Substantial reduction in Green House Gas (GHG) emissions:

Offsetting fossil crude with renewable green oil can achieve reduction in GHG emissions as much as 85% ([https://drive.google.com/file/d/1mgrFSyTt5xC74AhjV-4uLjBtGOeuh\\_K/view?usp=sharing](https://drive.google.com/file/d/1mgrFSyTt5xC74AhjV-4uLjBtGOeuh_K/view?usp=sharing)).

Sustainable solution to treat bio-waste – An alarming global problem  
With over 1.3 billion tons of food waste generation per annum across the globe (UN FAO Report, 2011), waste is one of the alarming issues faced by the world. India generates close to 68 Million tons of Municipal Solid Waste (MSW) and more than 190 million tons of agricultural crop residue. By using RCAT-HTL any carbonaceous waste can potentially be converted into crude green oil.

Water recovery:

An unparalleled feature that distinguishes RCAT-HTL from other technologies is its capability to recover almost 100% water present in the feed. Water recovered from RCAT-HTL is biologically sterile, reusable and clean.

Social and environmental benefits:

- RCAT-HTL adds value to low revenue streams such as agricultural crop residues which benefits rural economy and generates employment.
- Unlike other waste treatment processes, RCAT-HTL generates no odour, no emission of harmful pollutants, no soil and ground water contamination.



# Solar O&M 4.0 (Operation & Maintenance 4.0)

The portfolio of generating capacities of the Unigreen group of companies will reach 3 GW by 2025. The peculiarity of solar generation lies in the considerable length of the technical site, as well as the remoteness of most technical sites from large settlements and logistics routes. The storage of a significant number of spare parts at generation sites and the presence of permanent maintenance personnel at solar power plants significantly reduces the economic potential of green energy production. In order to maximize the coefficient of used capacity of solar power plants, it is advisable to carry out regular scheduled preventive maintenance and repair of equipment. Carrying out such events in a short time with a minimum number of personnel is impossible without effective coordination of logistics, defects and installation work. At the moment, there is virtually no ready-made digital product on the market that allows you to combine the processes of certification, robotic diagnostics of equipment and the creation of work orders for repairs and the supply of spare parts.

In this regard, SOLTEKH LLC has launched a project to create a hardware and software complex that includes an unmanned system for searching for defects of solar panels directly on the site, an artificial intelligence subsystem that provides classification of defects, an information system for maintenance and repairs of equipment, a mobile equipment certification complex. At the moment, a complex of mobile certification of equipment, an information system for maintenance and repairs is being tested at the Toreyskaya SES, a model for classifying defects is being trained. The integration of the unmanned complex is being completed.

## Project impact

As a result of the successful implementation of the project, it will be possible to carry out on-site planning and preventive measures by minimal teams in a short time (50% less labor-intensive than the classic process), inventory and spare parts logistics will be optimized (up to 25% savings on logistics and storage), the average duration of repairs and, accordingly, downtime of generating capacities will be reduced by up to 50%, which, in terms of the installed capacity utilization factor, can give a cumulative increase of up to 1–2.5% per year, depending on the climatic characteristics of the region. At the moment, the project is undergoing testing at the Torey Solar Power Plant. Additional effects of the project implementation are the end-to-end digitalization of the life cycle of photovoltaic cells from production to delivery, operation and decommissioning. The accumulation of big data during the life cycle of photovoltaic converters will allow us to create high-precision predictive models of solar generation and optimize production and technological processes.

**ORGANISATION**  
JSC Complexprom

**COUNTRY**  
Russian Federation

**COUNTRIES OF OPERATION**  
Russian Federation

**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 7, 9, 13

**PROJECT ANCHOR**  
Torey solar power plant

**CONTACT**  
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a.dmitriev@soltekh.ru





# Swedish data centers, sustainable data centre

Context Setting: Microsoft believes that its datacenters should be positive contributors to the grid, and Microsoft will continue to innovate in energy technology and monitor resources to support our corporate commitment to be carbon negative by 2030. In 2020, Microsoft announced the availability of the first commercial 24\*7 energy matching solutions, which were used to monitor energy use and provide zero-carbon energy matching for Swedish datacenters. Microsoft made a commitment to shift to a 100 percent renewable energy supply for datacenters by 2025. Microsoft is the first hyperscale cloud provider to track hourly energy consumption and renewable energy matching in a commercial product using the Vattenfall 24/7 Matching solution for new datacenter regions in Sweden.

Challenges faced: There is a fundamental flaw in monitoring the source and quantity of energy consumed. For any given hour, a business does not know the source of the energy it is consuming. That energy may come from renewable sources or it may be produced from fossil fuels. The current system does not have a way of matching the supply of renewable energy with the demand for that energy on an hourly basis. And without the transparency of supply and demand, market forces are unable to work to ensure that renewable energy demand is supplied from renewable sources.

Key activities undertaken: Microsoft Sweden's datacenters are powered by renewable energy through the procurement of Energy Attribute Certificates, called Guarantees of Origin (GOs), which trace electricity from renewable sources to provide information to electricity customers on the source of their energy not just on a monthly or yearly basis but on an hourly basis. Efficient use of IoT remarkably supports more accurate energy monitoring.

Apart from the above project-specific key initiatives, Microsoft in principle adheres to the following sustainability practises:

A. LEED: Microsoft has set in place a programme of LEED volume certification through which new projects will be certified LEED Gold via credits prototyped and pre-certified by the U.S. Green Building Council (USGBC).

B. Zero Waste Initiative: Microsoft has developed an internal programme to reduce or eliminate solid waste created during the operational lifecycle of the building.

In general, the scope includes: 1. A plastic baler in the loading dock area. 2. Increased casework to store durable wares 3. Water bottle re-fill and filtration stations 4. Central locations and signage for recycling, landfill, and compost bins.

Microsoft is committed to designing working environments that support the needs of the diverse workforce that will operate our data centres.

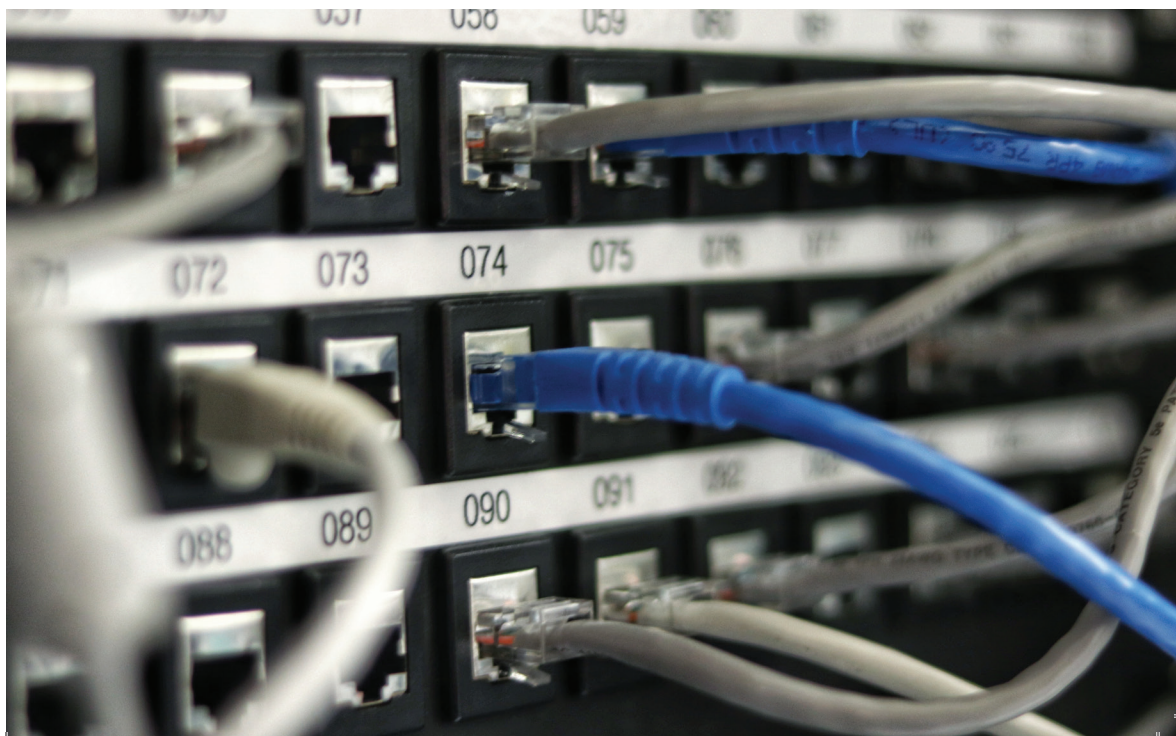
<b>ORGANISATION</b> Microsoft
<b>COUNTRY</b> India
<b>COUNTRIES OF OPERATION</b> Sweden
<b>SUSTAINABLE DEVELOPMENT GOALS</b> SDGs 7, 9, 12, 13, 17
<b>PROJECT ANCHOR</b> Vattenfall
<b>CONTACT</b> Sandeep Aurora saurora@microsoft.com

These needs include, but are not limited to: 1. Support Women and Families in the workplace; 2. Support local cultural and religious practises: 3. Support employees with medical needs.

### **Project impact**

The 24/7 matching of GOs and Renewable Energy Efforts offers the following benefits:

- Businesses can see if their commitment to 100 percent renewable energy covers each hour of consumption and translates the sourcing of renewable energy into climate impact.
- Energy providers can more easily understand demands for renewable energy hour by hour and take action to help production meet demand.
- 24/7 matching of consumption to production drives true market demand for renewable energy.
- As 24/7 hourly renewable products are rolled out across the world, they will incentivize investment in energy storage so that energy companies can store renewable energy when it is generated so they can continue to supply their customers with renewable energy when it is not.
- Over time, this storage will allow electricity grids to supply 100 percent decarbonized power.
- The system can inspire regulatory change in how GOs and RECs are created, acquired, and retired.
- IoT enables companies to gain near-real-time insights into the physical world by connecting objects to give you insights into the health of a system or process, predict failures before they happen, and gain overall efficiencies in operations.



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# Technologies enabling circular economy

Technology has made the obsolescence of products faster, and a lower attention span and an instant gratification culture are contributing to the faster discard of products, leading to disproportionate wastage. Organisations are pushing products faster for their own reasons. Among all these, we need to find a way to reuse and make it fashionable to reuse so that the impact on the environment and nature can be minimised.

## Project impact

More equitable distribution of access to the latest technology, so that there is a larger market and oversaturation of selling the newer products to the same consumer again and again is minimised.

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**ORGANISATION**  
Infosys Ltd.

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India

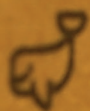
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**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 12

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**PROJECT ANCHOR**  
Infosys is at the forefront of reuse with self sustainable campuses and larger awareness among employees on reuse.





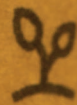
PLASTIC FREE



COMPOSTABLE



RECYCLED



BIO

DEGRADABLE

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## **THVAC (Thermal HVAC): Bus air conditioning solution using engine exhaust.**

Revolutionary Air Conditioning Technology THVAC of THERMAX for Commercial Vehicles (First of a Kind in the World) Thermax's consistent quest for sustainable solutions resulted in THVAC for the mobility industry. Catering to the most common demand of cabin comfort in buses and trucks with the readily available engine exhaust heat, THVAC offers unique and efficient waste heat recovery (WHR) solution. It offers competitive advantage to automotive industry in terms substantially improving fuel economy (5–6.7%) with reduced CO<sub>2</sub> emissions. THVAC is unique solution that offers efficient, environment friendly & economically viable HVAC solution for the automobiles.

THVAC technology and product incorporates multiple innovations such as developing pair of sorbent materials, sorbent reactor bed design with faster kinetics, Exhaust gas recirculation arrangement for efficient WHR, smart hybridisation with conventional Vapor compression system to maximise fuel saving benefit.

THVAC cleared stringent European Roadworthiness certification and is approved for plying in Europe. It was extensively tested for >25K Km on European drive cycle to establish on road performance and fuel savings.

### **Project impact**

1. Fuel Saving Potential of T-HVAC is 40–60 % of conventional HVAC – THVAC utilizes engine exhaust gas heat and converts it into cooling. In conventional HVAC systems a refrigeration compressor draws power from diesel engine and run vapor compression cycle to provide cooling. With use of THVAC compressor engagement is reduced substantially (50–70% reduction). Test results showed that THVAC uses 40–60% less fuel than conventional HVAC.
2. Bus Fuel economy (FE) improvement of 5–6.7% – Bus fuel economy (FE) includes fuel consumed by HVAC system and it contributes 15–20% of the total fuel consumption. Use of THVAC results in substantially reduced HVAC compressor engagement with engine. This improves bus fuel economy and has potential to reduce crude oil import & save foreign exchange for India.
3. Use of natural refrigerant and >5% lower CO<sub>2</sub> /NO<sub>x</sub> emissions from Bus – THVAC uses natural refrigerant as working fluid hence does not contribute to GWP & ODP. THVAC improves bus fuel economy resulting less CO<sub>2</sub> / No<sub>x</sub> emissions per km.

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**ORGANISATION**  
Thermax Limited

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India

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**SUSTAINABLE DEVELOPMENT GOALS**  
Efficient passenger transport with reduced CO<sub>2</sub> emissions

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**PROJECT ANCHOR**  
Thermax Limited

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**CONTACT**  
Devadatta Navale  
devadatta.navale@thermax-global.com



Thermal HVAC system

**THVAC**

**A revolutionary cooling solution**  
for coach buses from Thermax



The background is a dark, abstract composition featuring a dense array of green and blue bokeh circles of various sizes. Thin, bright green and blue lines radiate from the bottom left towards the top right, creating a sense of depth and movement. The overall color palette is dominated by deep blues and vibrant greens, with white highlights from the bokeh and lines.

# **DIGITAL**





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# 1Bridge

The challenge was to address how to employ rural youth, regardless of skill or educational level, and create an opportunity to make a comfortable living with urban-level wages serving rural communities. By creating a value-added network of entrepreneurs and leveraging technology to provide an on-ramp of digital and physical services to rural India, 1Bridge has been able to affect a number of communities through positive developments and employability.

## Project impact

The network now includes over 5,000 “rural entrepreneurs,” creating a platform for delivering digital and physical services to the rural community. Enabling Rural e-commerce (r-commerce) and providing an on-ramp of goods and services otherwise unavailable to the tier-3 and rural towns across districts in India. The economic empowerment of youth can have a lasting impact on the morale of the individual and the community they serve. It enables civic engagement in an inclusive way and provides a way to create a self-sustaining way to support themselves and their families through ownership and accountability of their own efforts in their community.

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## ORGANISATION

Jorn Capital

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## COUNTRY

United States

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## COUNTRIES OF OPERATION

India

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## SUSTAINABLE DEVELOPMENT

### GOALS

SDGs 8, 9, 10.

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## PROJECT ANCHOR

1Bridge, C4D partners, and Angel Investors

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## CONTACT

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madan.padaki@1bridge.one





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# Adaptive model-driven application runtime

Currently there are more than 60,000 insolvency cases languishing in Indian courts with no resolution in sight. More than 10% of major banks' financial assets are locked in unresolved insolvencies, making banks less inclined to loan money to businesses, thus putting pressure on economic growth.

## Project impact

Develop a personalization of cloud-based case resolution engine for insolvency case management in India allowing real time reaction to events in each case and make decisions autonomously based on business rules.

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**ORGANISATION**  
Global Innovation and  
Technology Alliance (GITA)

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, Canada

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**SUSTAINABLE DEVELOPMENT  
GOALS**  
SDG 9

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**PROJECT ANCHOR**  
Enkindle Technologies Private  
Ltd., Bangalore

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**CONTACT**  
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## AirJaldi: connecting rural India to economic opportunity

**Context setting:** AirJaldi began partnering with the Microsoft Airband Initiative in 2016, when it received a grant to expand its work bringing internet access to more people in India, primarily in underserved rural areas. The ISP provides broadband via Wi-Fi and fibre, and once it gets the go-ahead from the Indian government, it will add TV White Space (TVWS) to the mix, which will add a last-mile solution. Microsoft's Airband Initiative aims to close the digital divide and bring high-speed internet connectivity to unconnected communities around the world. It officially launched in 2017 with the goal of bringing broadband connectivity to 2 million people in the U.S. After early success, that goal grew to an additional 40 million across the globe.

**Challenges faced:** India is not the only nation to suffer from a yawning gap between the digital haves and have-nots; half of the planet's population currently lacks any form of internet connection. Those without tend to be in already-disadvantaged, isolated rural communities. Rural communities around the world lacking broadband access miss out on opportunities for digital transformation, including the ability to participate in the digital economy.

**Key initiatives undertaken:** With the help of Microsoft experts and the cloud platform Microsoft Azure, AirJaldi is beginning to analyse vast swaths of data about how schools, businesses, hospitals, and homes are using the internet. Artificial intelligence allows AirJaldi to recognise trends in usage, from what time of day people upload and download to where they are located. Azure also helps AirJaldi's technical team monitor and manage their networks and relays.

### Project impact

AirJaldi is extending its work beyond internet connectivity into services that will benefit consumers once they get online. One future avenue: Precision agriculture, where low-income farmers in rural India will be able to use internet-connected devices and AI predictions to increase yields and income. AirJaldi will be working with Microsoft experts in this field, which is especially important in improving food production in the country. AirJaldi-provided internet is building businesses and create a better life.

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#### ORGANISATION

Microsoft

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 1, 9, 10, 17

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#### PROJECT ANCHOR

Airjaldi

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## AT&T 5G Innovation Studio

Innovation cannot be done in isolation and we have to create an ecosystem of partners to come together – industry partners, start-ups, research-based academia, investors, early adapters, tech enthusiasts, policy makers, government agencies, NGOs. The full power of technologies like 5G can only be discovered and realized when the various ecosystem partners come together as one and ideate, collaborate, build, test and scale up. An example of that is the 5G Innovation Studio set up by AT&T US in Plano Texas alongwith industry ecosystem partners like Nokia and Ericsson. The project involves collaborating with customers and industry partners to bring 5G to life in new ways. We're cultivating the ecosystem today as we move to a 5G world at scale. It brings together organizations and provides an environment where together we explore many new enterprise and consumer use cases and accelerate the path to market of new product offerings and key strategic initiatives. The space is equipped with the latest wireless and wireline technologies including mmWave and sub-6 5G radios, multiaccess edge computing, a private standalone 5G network, multigig fiber broadband, and more. With customers and industry collaborators, our scientists and engineers ideate, test and validate new 5G-centric applications across a variety of industries including working on Multi Access Edge Computing to enable low latency services at the network edge where all the action is.

### Project impact

One of the biggest benefits of 5G will be the reduction of latency, the increase in bandwidth and the overall reliability of the network. The studio will harness these network enhancements to improve consumer and business experiences. This includes technologies such as on-premise edge compute (MEC) and edge compute at the network edge (ANE) that when combined with 5G will bring new experiences to life. We recently worked with Microsoft and the drone company EVA to deploy a test environment representative of our Microsoft Azure Edge Zone with AT&T. The environment, enabled by AT&T Network Edge, was equipped with cloud services including Azure Kubernetes Service (AKS) to host EVA's drone command control application. The low latency of 5G combined with EVA's app deployed at the network edge on Azure enabled autonomous drone control beyond visual line of sight. This proof of concept, along with ease of network and cloud scalability, demonstrates how AT&T and Microsoft's technologies will enable the future of drone delivery in metro areas.

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#### ORGANISATION

AT&T Global Network Services  
India Pvt. Ltd.

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

USA

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 9

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#### PROJECT ANCHOR

AT&T US

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#### CONTACT

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arun.karna@intl.att.com





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## BAGS search

With the shutdown of the baggage tracing service in Russia by the monopoly vendor (SITA company), it was decided to develop our own baggage tracing service. Great efforts were focused on the simplicity of working with “BAGS search”, reliability and fault tolerance, responsible and safe storage of personal data. Within one year, it was possible to develop a functionality that covers all the main tasks in the search for baggage, things forgotten on board aircraft, and registration of damaged baggage.

The service has been tested at 40 airports and 10 airlines from three countries. Now airports and airlines in Russia, Belarus and Armenia have the opportunity to use the service on new and modern technology stack, easy for upgrade and adding new features, including ML. The BAGS search team is expanding the service to other countries.

### Project impact

Thanks to the implementation of the project, the largest airlines and airports retained the ability to work together to search for baggage using an automated system and received some additional opportunities. Now the number of service users exceeds 600 employees from 37 airports and 10 airlines from 3 countries of the world. BAGS search has helped more than 30,000 passengers retrieve their delayed baggage as soon as possible. The project also received the IT Project of the Year award in the transport industry from the organization Global CIO. It is a sound example of giving a way for new technologies on monopolised market. Openness to such projects worldwide will help to bring competition in monopolised sectors (as baggage search now is), bringing more benefits to consumers.

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### ORGANISATION

JSC Complexprom

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### COUNTRY

Russian Federation

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### COUNTRIES OF OPERATION

Russian Federation, Belarus, Armenia

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 9

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### PROJECT ANCHOR

Koltsovo Airport PSC

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### CONTACT

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## Be The Change for TB

India bears 26% of the global TB burden of new cases with ~32% of the country's TB Burden is shouldered by youth (18–29 years). Despite being vulnerable, young people are less likely to seek care due to a lack of awareness of TB symptoms, stigma associated with the disease, lack of social support, leading to millions going without diagnosis. Johnson & Johnson India (Janssen India) launched one of its kind, digital–first, precision messaging led initiative #BeTheChangeForTB on 24th March 2022 under the Corporate TB Pledge, a joint initiative between the Central TB Division, Ministry of Health and Family Welfare, Government of India, and United States Agency for International Development. The initiative, backed with data insights and research aimed to target youth (18–29 years) in 8 geographies of the country.

The objective was to create awareness about TB among youth, engage youth as TB changemakers and improve health-seeking behavior in communities and help in finding the missing TB patients. The digital deployment of the campaign enabled to understand the audience, their personas, motivators, and barriers. Digital signals further enabled right targeting and deployment of programmatic messaging with the usage of google platforms and social media channels to reach the youth. The creative strategy aimed to inspire youth and speak to them in their language. An innovative approach of simplifying the complex disease using music as a medium of expression was used in collaboration with youth influencers– Vaani Kapoor, well known Bollywood celebrity and Kaam Bhari, a young rap artist, the initiative was launched with an engaging rap song all digital platforms with an aim to trigger and normalise the conversation on TB. Besides influencer led content, interesting content and activations were done through partnerships with youth centric platforms like Terribly Tiny tales, Logical Indian and Humans of Bombay to reach the audience with different forms of engaging content while continuing interest through informative social media content.

### Project impact

- In less than a year of launch, campaign garnered 55 million reach and 371 million impressions in target audience of 18–29 years and 35,000 youth signed up as changemakers.
- 13% increase witnessed in TB awareness over same period last year measured by keyword search analysis.
- 105K health seeking actions were recorded including downloads of the Government of India's TB App and phone calls to Government TB helpline.
- More than 200 leading national and regional publications were engaged to reach out to more than 370 million readers.
- The rap song built with a message on creating awareness on TB and taking timely action had a 572K reach, 845K impressions and 262K video views across the social media platforms.

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### ORGANISATION

Johnson & Johnson

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 3

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### PROJECT ANCHOR

Johnson & Johnson PTE limited

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### CONTACT

Jyotsna Ghoshal

JGhoshal@ITS.JNJ.com

- The campaign received 10 prestigious external awards and recognitions in 10 months including from Central TB Division (under MoH, GOI), South Asia Sabre Awards, Shorty Impact Awards.
- Through multiple other on ground initiatives, we were able to touch lives of more than 225k TB patients and support them in the journey of TB diagnosis and treatment in 2022.
- We have supported training 6500 HCPs on effective management of TB and DRTB as per the treatment guidelines.

Johnson & Johnson INDIA

**BE THE  
CHANGE**  
बेदलाव  
Let's Fight TB Together

**Every change  
starts with you**

**#BeTheChangeForTB**

Scan to know more



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## BlendNet – last mile digital connectivity

With almost half the world's population still offline, reliable and affordable access to digital services is a real global challenge. Two-thirds of the world's school-age children have no internet access at home, reflecting the magnitude of the digital divide, especially in access to educational and skill-building content.

To bridge this digital divide, BlendNet offers a low-cost, satellite-and intelligent-edge-based platform that delivers digital services and content to last-mile users in a hub-and-spoke model. The intelligent edge devices receive encrypted bulk content refreshed via satellite and serve as delivery endpoints for last-mile users. Our mobile application and SDK enable end-users to discover, stream, and download content to their devices in offline mode (using local Wi-Fi) without the need for the internet. BlendNet aims to serve as an open, intelligent, and affordable digital distribution platform that can democratise access to digital services across the world.

### Project impact

We have conducted successful research pilots and large-scale field trials across India in partnership with SES, a global satellite leader, and various educational and entertainment content partners to validate the technology at scale and capture user insights. We have had good learnings from the field trials, particularly that people are willing to pay for these kinds of services in a sachet pay as you use kind of manner, which works better for this population than a subscription-based model.

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### ORGANISATION

Microsoft Research Lab India Pvt. Ltd.

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 8

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### PROJECT ANCHOR

Microsoft

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### CONTACT

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AUDIO  
LESSONS



VIDEO  
LESSONS

E-LEARNING



SEARCH

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# Decision support system to enhance safety of railway track workers

Since the advent of rail transportation, the integrity of the rail and track conditions play a significant role in ensuring that trains are able to move people safely. As track infrastructure is impacted by ambient temperature, inclement weather and normal wear and tear, inspections of the rail and track area must be conducted on a regular basis. These inspections must be conducted at all hours of the day and night, due to the frequency of required inspections, and the job presents hazards as track inspectors often walk along tracks while \trains are in revenue service.

## Project impact

TrackSafe – a decision support system enabling reliable and timely communication between track workers, train operators and other key stakeholders – mitigating hazards associated with inspection and maintenance of track and related infrastructure.

Leverages emerging technologies such as RFID, communication networks, embedded systems.

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**ORGANISATION**  
Global Innovation and Technology Alliance (GITA)

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India, Canada

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 3, 9

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**PROJECT ANCHOR**  
Indian Institute of Technology (IIT), Kanpur

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**CONTACT**  
Dr. B.V.Phani  
bvphani@iitk.ac.in







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## Design & manufacturing of Artificial Intelligence based electronic metering & monitoring system for Indian power distribution sector

Indian Power distribution Sector is plagued with very high technical & Commercial (AT&C) losses of 30–40% which is attributed to ineffective metering systems. The metering systems used in India are primarily conventional which requires manual management and interventions making the system inefficient.

### Project impact

- Developed advanced metering and monitoring system with automation–based system integration and decision–making capability based on advanced data analytics, contributing to the Indian power distribution sector.
- Development of Meter Data acquisition system (MDAS), Head End System (HES) and Meter Data Management System (MDM) for data communication, analytics, decision making and implementation, monitoring and reporting.
- Development of miscellaneous functionalities like Outage Management System, connection and payment management, tariff control.
- Development of communication canopy using RF/GSM/PLC technologies.

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### ORGANISATION

Global Innovation and Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Spain

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 3, 9,10

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### PROJECT ANCHOR

Plenar Health Solutions Pvt. Ltd.  
Ahmedabad

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### CONTACT

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## Digital transformation: improving competitiveness, delivering bottom line impact

The organization was aware that Productivity / OEE was low but was not able to point to the specific reasons. Being a leader with global operations they were keen to improve their sustainability footprint and two areas where Industry 4.0 could contribute was on reducing Energy consumption and reduce use of papers in shop floor. Papers were used in sharing large format drawings to the shop floors. The solution focussed on providing IoT hardware that captured real time events/ data and providing visibility on part count, downtime with reasons, cycle time variation etc eventually leading to the OEE of the plant. Energy Meters provided info on the energy footprint. Solution also focussed on providing a Digital interface that ensured all drawings, Work Instructions, Control Plan, Inspection Reports etc were provided in Digital format thereby minimizing flow of paper from and to the shop floor.

### Project impact

The project enabled improving machine utilization by minimising downtimes due to setups, operator absenteeism, inconsistent air pressure at machine, longer development cycles etc. Automated data collection ensured data accuracy, people spend more time on analysis and information presented to enable decision making. OEE improved from 35% to 66% in a span on 12 months with perpetual savings of Rs 1.6 cr (USD 200K approx).

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#### ORGANISATION

Ace Micromatic Group

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 12

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#### PROJECT ANCHOR

A leading Turbine Manufacturer

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#### CONTACT

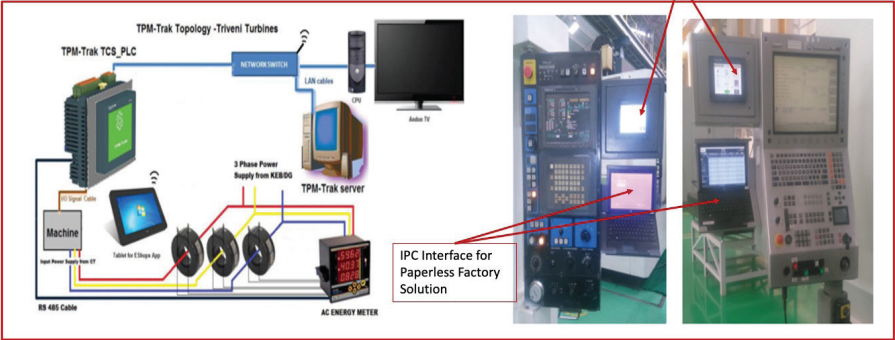
Ramesh J

rameshj@acemicromatic.com



**Digital Transformation:  
Improving Competitiveness, Delivering Bottom Line Impact**

**Topology and Solution Deployment at machine**



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## Edge device enabled AI and quantization of neural networks

As ML models are computationally taxing, it's very important to start pushing AI near the data for faster decisions. Currently, a lot of the models just dump the data on cloud servers and wait for responses; in cases of lower connectivity, this can leave the device useless. Multiple use cases include facial recognition and drone-based AI for edge device scenarios. The models were able to achieve decent accuracy, but the research did take a lot of time. Also, the model architecture and retraining were complex tasks.

### Project impact

As the fingerprints of employees were not clear due to work at the warehouse, these models were used for real-world facial attendance systems at a warehouse with internet access. This led to a higher quality of verification in the biometrics system. Also, a drone irrigation detection model was successfully run using Edge AI.

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### ORGANISATION

Prodigal AI

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT

#### GOALS

Internet for All

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### PROJECT ANCHOR

Unreal AI – deployed at Delivery and IIT Delhi project collaboration.

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### CONTACT

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# Global Technology Innovation Contest

Global technology Innovation Contest is an organization-wide innovation contest strategized, designed, and executed from India. The contest fosters Accenture's strong culture of 'innovation-first' mindset by encouraging our 700,000+ people to invent, develop and apply latest technologies, processes, and capabilities. Our exceptional people get the opportunity to work with the latest and greatest technologies, to create path-breaking solutions for leading companies across industries and work to harness meaningful, powerful change for our communities, and be recognized for it, on a global platform. The program provides a platform empowering our people to think and bring to life innovations that impact our clients' businesses and our communities, and to create an innovation-led way of working, where people apply new thinking and ideas in their everyday roles.

Launched as 'India Innovation Summit' across our India Centers in 2015, the innovation contest aimed to bring new and innovative ideas to transform our clients' businesses. After successfully running in India for few years, the contest in a new "global" avatar expanded to global centers – driving our ambition of India becoming an exporter of Innovation. There were many challenges as we embarked on designing this scaled innovation program, which could hinder on achieving the purpose of the event, specifically on global operational governance, communication, enablement tools and adjudication.

We set-up a vibrant network which included 2000+ senior leads who joined this journey to drive the ideation, review and mentoring process, ensuring the right spread of industry expertise and governance for the overall program. We engaged different ways of communications like townhall events, dedicated web portals, mailers, live connects etc to engage& encourage the employees to innovate. Ideation process involved submission of tens of thousands of ideas, and required a strong platform to support this scale, we created a robust innovation management platform which enables idea submission and the 5-stage review process of ideas. The innovators who participate in the contests got funding and mentorship to bring their idea to life. The adjudication of ideas were done by an eminent panel of global CxO's, who bring many years of experience and vast expertise from diverse industries and sectors.

The program is spread across 6–7 months, with 8–10 weeks provided for each idea for prototyping. There is a lot of emphasis on storytelling as the idea matures bringing out the most impactful version of the innovation.

## Project impact

Over the years, the contest has been a goldmine of innovation for Accenture. The programme enables us to create a pervasive culture of innovation by engaging hundreds of thousands of employees and generating over 300,000 ideas. In FY23, the contest encouraged

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### ORGANISATION

Accenture Solutions Pvt. Ltd.

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India

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### SUSTAINABLE DEVELOPMENT GOALS

The program has three ideation themes which focuses on majority of the 17 SDGs.

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### PROJECT ANCHOR

Accenture Solutions Pvt. Ltd.

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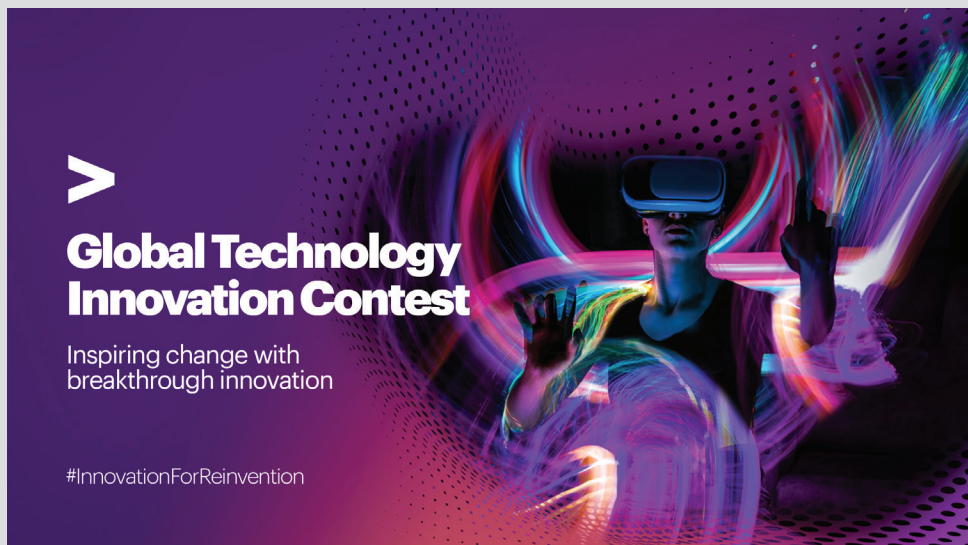
### CONTACT

Suja Jain

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93,000+ employees from more than 20 countries to innovate; in India, we had 67,000+ employees participate in this contest. Through the programme, we received 65,000+ ideas globally, including 48,000+ from India. The programme involved 3,000+ mentors and coaches supporting the innovators in their journey.

Through stringent reviews and empowering mentorship, we were able to create 300+ prototypes, which are in various stages of implementation. The programme has enabled the creation of hundreds of patents, disrupted the industry with breakthrough innovations, and introduced automation and optimisation in hundreds of projects. The Global Technology Innovation Contest continues to drive the strong culture of innovation at Accenture India.



# GTWN Call to Action to ensure Digital Inclusion for All

The entire Call to Action and its results is published here: <https://themobilecentury.com/wp-content/uploads/2023/04/GTWN-Call-to-Action-to-ensure-Digital-Inclusion-for-All.pdf>.

The context that inspired the Call to Action published in February 2023 was warning from the GSMA that the Mobile Gender Gap was widening after years of contracting. The GTWN International Board Members, <https://www.gtnw.org/international-board/>, decided to issue a Call to Action to all corporations, governments, NGO's, and individuals to do one project that would destroy the gap and bring about Digital Inclusion for all. In addition, each GTWN International Board Member committed to bringing one project to inspire others to do the same (see below under Project impact). The combined impact of the GTWN International Board Members' projects, be they individual, corporate or NGO-based have already brought about huge impact and most importantly are now inspiring corporations, organizations, governments, and individuals around the world to follow suit. In particular, we are very pleased to now partnering with the ICC (International Chamber of Commerce) and their "Global Digital Economy Commission" to ensure that corporations around the world join the initiative. Through our work, we have discovered that perhaps the one most important thing that we can do to ensure digital inclusion for all is to give women and the underprivileged the following package: a Smart Phone, a Data Package, and an Educational Program so that they know how to use the Smart Phone/Raspberry Pi's etc for their businesses and lives. This is the next phase of the project that we will be working on and we would be pleased if all the corporations, governments, NGO's and individuals around the world would join us in this action.

## Project impact

As can be seen, the GTWN Call to Action encompasses actions from around the world and is still inspiring corporations, governments, organizations, NGO's and individuals to undertake and make known their projects to ensure Digital Inclusion for All. Please find below representative project impacts: 1) Janice Hughes, CBE is GTWN Co-founder and Founder and CEO of Graphite Strategy Ventures LLP. Janice is also Founder of Spring Fibre – a new green fibre, building group in the UK that's already bringing a green fibre network to the smaller towns and rural businesses in the UK. This Spring Fibre project is rolling out green gigabit fibre to 100,000 homes in the next few months and then scaling up to 1m homes. [See her article on Green Fibre Networks.] Janice is also Chair of Space for Giants, a charity for conservation and biodiversity founded in 2011, which is launching a new group Green 14 as a carbon credits entity on the London Stock Exchange to send funds back to Africa to deploy in tree planting, reversing desertification, training ranger and local communities in safeguarding biodiversity. They already have a dozen projects that qualify and they're targeting some 8m hectares. The Board will be

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**ORGANISATION**  
GTWN

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## COUNTRY

Global Organization based in Germany

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## COUNTRIES OF OPERATION

The GTWN is a global organization and as can be see from above, our Call to Action is truly global and affects many countries. Representative lits includes UK, USA, Lebanon, the entire world with SES and Iridium, all of Oceania with OWNSAT and Kacific – American Samoa, Bangladesh, Bhutan, Brunei, Cook Islands, Timor-Leste, Federated States Of Micronesia, Fiji French Polynesia, Guam, Indonesia, Kiribati, Malaysia, Myanmar, Nepal, New Zealand, Niue, Northern Mariana Islands, Papua New Guinea, Philippines, Samoa, Solomon Islands, Tonga, Tuvalu Vanuatu, the African Continent with AfriLabs, etc.

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## SUSTAINABLE DEVELOPMENT GOALS

Whether it is alleviating poverty, improving connectivity for all, providing access to education, gender equality, sustainable cities and communities, life on land, peace-justice and strong institutions, decent work and economic growth, climate action etc. GTWN Call to Action addresses at least 10 of the UN SDG's

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## PROJECT ANCHOR

GTWN ([www.gtnw.org](http://www.gtnw.org))

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## CONTACT

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made up of mostly women and we have the former President of Botswana Sir Ian Khama as the head of the Advisory Board. <https://www.spaceforgiants.org> 2) Keri Gilder, CEO of Colt Technologies is leading change across the TMT industry by pioneering the industry's first ever inclusion and diversity score with the tmforum. The score sets the gold standard for measurement of diversity at the CEO – 2 management level enabling a true understanding of not only overall diversity within a company but whether those diverse employees are being promoted into senior level positions. It also is the first score to measure inclusion through employee sentiment questions. The insights and enablement of real actions through the IDS scoring tool can help address the talent problem that we have as an industry. She has also partnered with other standards bodies such as the MEF to help drive further understanding of how to build Inclusion and Diversity into the high tech and innovation areas of the industry. 3) Rebecca Enonchong is Chair Emeritus of Afrilabs, a network of over 400 innovation centers in 52 African countries supporting over 1.5 million digital entrepreneurs. Co-founder and Board Chair of ActivSpaces, a founding member of Afrilabs, that has three tech hubs in Cameroon supporting digital entrepreneurs and promoting technology. One of its hubs in a rural area has run programs to support 40 rural women small business owners by providing them with smartphones, Internet access for a year, assistance and training on helping them digitize their business. Rebecca is also Board member of Imagine Worldwide, providing solar-powered tablets to disadvantaged schools in Africa. The tablets provide research-based pedagogy with a full literacy and numeracy curriculum in the local language that is adaptive and appropriate for the local context. By the end of 2023, over 60,000 children would have benefited from the program. An initiative launched in Malawi will increase this to 2.5 million children. One of the observed outcomes is that boys and girls have similarly successful results, even in math. Rebecca was recently inducted as an International Fellow of the Royal Academy of Engineering. She has been a judge for the Royal Academy's Africa Prize for Engineering for 6 years, a program that awards four African innovators with up to £25,000. 16 innovators a year benefit from a 6-month training program for their startup. 4) Vrinda Kapoor is CEO and Co-Founder 114ai, which has developed a platform that re-defines interoperability of data. While organisations across the world talk about the amount of data they generate – and how that data is going to help them generate insights by leveraging AI – most of that data is virtually unusable because it exists in siloed platforms and in formats that do not talk to each other. The current state of the art is to create standards and then spend endless time and resources converting data to structured standards, only for the real world to push back and constantly force changes to those standards. This new solution utilises knowledge graphs to “infer” the shared semantics and syntax of all of that data, making it usable in a few quick clicks. Once operationalised, this solution will unlock insights in legacy data across organisations, adding enormous value and spurring innovation in digital tech. <https://114ai.com/> 5) Leticia Latino van Splunteren, CEO Neptuno, was appointed for the 2022–2024 term to the FCC Equity and Diversity

Council's Innovation and Access Working Group. This Working Group is tasked with creating guidelines and promoting existing programs that States can implement and roll out, making the best use of the \$2B of the \$46B BEAD (Broadband Equity, Equity, Access and Deployment) program which has been allocated specifically to help improve digital literacy, address the digital divide, augment programs and outreach. [www.fcc.gov](http://www.fcc.gov) / <https://www.internetforall.gov/program/broadband-equity-access-and-deployment-bead-program>. Her family business Neptuno, over the past 50 years since its founding, has engineered, supplied and installed over 10,000 Telecom Towers over 15 countries, which are at the center of providing connectivity to all. [www.neptunousa.com](http://www.neptunousa.com). Leticia is also Board Member of the South Beach Jazz Festival, which has the mission of supporting musicians with disabilities. One of the objectives is to make sure that accessibility to Digital Content is ADA (American Disability Act) Compliant, so that the digital divide is not further exacerbated in the disability community. She provides USD\$20,000 yearly in scholarships, mentorship and training for South Florida residents. [See her article on the use of VR to diversify training for tower technicians.] 6) Lucy Lombardi is Director, Head of Technical and Operational Partnership and Contracts at TIM. After leading telco innovation for many years, she is currently using her considerable telco experience to introduce a new approach to governing partnership relationships and contracts. As the telco ecosystem is becoming increasingly interconnected and the, once linear, value chain increasingly blurred, success often relies on the ability to attract and maintain a productive ecosystem of partners, suppliers and peers. Lucy believes that the key to developing and maintaining such an ecosystem is successful governance, which ranges from partner relationships to transparent and effective contract management in line also with the "G" of ESG. <https://www.gruppottim.it/it.html> <https://www.gruppottim.it/it/archivio-stampa/mercato/2022/CS-TIM-FS-Copertura-4G-tratta-Bologna-Firenze.html> 7) Candace Johnson is a Serial Space Entrepreneur: SES, Loral Teleport Europe, Europe Online, OWNSAT. She is currently Chair of the Seraphim Space Advisory Board and Partner and Vice Chair of NorthStar, Executive member of the Board of ICC and is a Founding member GTWN. After having created or helped create a number of satellite systems (SES, Iridium, Teleport Europe, etc) to bring digital communications to citizens around the world having founded Europe Online, the world's first Internet-based online service in the 80's, 90's, and first two decades of the 21st century, Candace is continuing the goal of digital inclusion for all with such projects Kacific (OWNSAT) – The Heart of Broadband bringing high throughput broadband Internet to all of the Pacific Islands. Oceania Women's Network Satellite (OWNSAT) is one of the original investors in Kacific and 7 of our GTWN members, (Bridget Cosgrave, Sallye Clark, Ellen Strickland, Vicki MacLeod, Walda Roseman, Audrey Mandela and Candace Johnson) are investors. She has also continued the work begun by the GTWN by bringing coding and programming to all of the Lebanon schools with Raspberry Pi under the leadership of Eliane Metni. Her work at the ICC (International Chamber of Commerce) has also focused on the Digital Standards Initiative, to enable SME's, corporations, and governments

around the world to adopt digital technologies for international trade. [See her articles on the Space Manifesto and on the GBRW initiative.] <https://seraphim.vc>; <https://northstar-data.com>; <https://iccwbo.org/about-us/governance/executive-board/>; <https://kacific.com>; <https://iea.org/ib/Sections.php?ID=5>. 8) Laureen Cook is an Alumna of the IFC (World Bank), where she was the Principal TMT Adviser, in the Global Telecoms, Media & Technology Private Equity Sector. Currently she is the Founder & CEO of Extelcon, LLC; providing technical and commercial oversight to the Investment Banking Community, Regulators, and TMT & Satellite industry sectors as Lender's Technical Adviser for multi-billion USD telecoms & technology companies. Prior to joining the IFC, Laureen was with Alcatel-Lucent (now Nokia), as Vice President 4G Strategy & Innovation, developing revenue generating products & services. She is a founding Director of the GTWN, and is an Investment Committee member of Innovate Cyprus, a European Union funded 6M Euro Venture Capital Fund providing financing for 4G/5G IoT Start-ups. She holds an MSc in Telecommunications Engineering from Rochester Institute of Technology, and an MBA from Long Island University in New York. <https://www.extelcon.com>. As an IFC (World Bank) Alumna, Laureen continues to provide her technical and commercial expertise to the financial community, regulators, and corporations in order to close the digital divide in developing countries. To date she has worked in over 43 countries worldwide building, managing, & funding, the TMTS industry in both developed and emerging markets. 9) Rosalia Gitau is CEO at Bixie. Bixie's mission is to empower women to grow their worth. Women are the largest group financially excluded group in the world, yet women account for 80% of all spending decisions. Bixie looks to reverse this trend by empowering women to control their finances and grow them, using financial literacy, expert community, and a marketplace of financial products tailored to our needs and preferences, in an easy-to-access manner. In the Philippines, Rosalia has channeled 500 female owned MSMEs with grants from USAID, SME business insurance from AXA, and SME Loans from Unionbank (PH largest bank)-- to increase their worth in under 1 quarter. The program is being scaled up in the Philippines and South East Asia in order to impact more women's lives. Value of contribution is USD1M <https://www.mybixie.com/> <https://www.mybixie.com/rise> 11) Elisabeth Slapio is the former Director of Innovation and Environment at a German Chamber of Industry and Commerce. She is now working in a private capacity on various measures to overcome digital connectivity gaps. She is currently involved in working to identify appropriate measures to prevent gaps in digital participation. The first project she is involved with is the promotion of public health through the application of digital technology. The aim is to provide solutions to overcome the lack of digital inclusion of older groups in an ageing society. One part of this project is the role of start-ups in developing innovative digital health solutions. Elisabeth is also working to support voluntary low-threshold measures in social hotspots with the aim of supporting future "help for self-help" through digital fundraising. The aim of this initiative is to overcome any digital divide that could be expected to occur in these areas. Both



of these projects are only at the beginning of the first implementation phase. The outcomes of this work will help provide much needed fundamental support in terms of digital connectivity to society, the economy and government.<sup>12)</sup> Sallye Clark is the Strategic regulatory counsel for AST&Science, a satellite system that will provide service to any cell phone for truly global, ubiquitous service; donations of satellite services to humanitarian aid and disaster relief programs in developing countries; Sallye is also one of the founding investors in OWNSAT (Oceania Women's Network Satellite) with Bridget, Vicki, Walda, Audrey, Ellen, and Candace, created to bring high through-put broadband Internet to all of the Pacific Islands with Kacific Sallye also was a member of the founding team of Iridium' to bring ubiquitous communications to the developing world through its NOMAD program and emergency communications capabilities, anywhere/anytime.<sup>13)</sup> Ana Tavares Lattibeaudiere is Executive Director of the Global Platform and former GSMA Executive. Her work at the Global Platform has included the recent initiatives to drive more participation of women in standardization activities. While at the GSMA, she created the GSMA's Tech4Girls program to drive more girls to choose technology careers and address the pipeline barrier that is so often talked about. Early work at the GSMA included driving down the cost of IOT devices and IOT connectivity to bring IOT to the mass market; the launch of the emerging market handset programs at GSMA (driving 2G And 3G



Sallye Clark



Vicki MacLeod



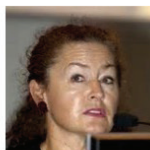
Bridget Cosgrave



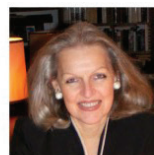
Audrey Mandela



Ellen Strickland



Walda Roseman



Candace Johnson

handset costs down through joint operator tenders) and the launch of GSMA's Development Fund (today M4D) to drive investment in viable businesses that would improve the digital divide but that did not have seed funding.<sup>14</sup>) Audrey Mandela is Chair of Women in Telecoms & Technology, a networking group for women in tech in the UK. For the past 22 years WiTT has hosted events to enable women to network and meet other women who share a common interest in the telecommunications and technology industries; to educate members on current and future trends in the industry; to provide guidance and mentoring through the exploration of real-life career paths (including supporting events for schools to help girls to learn more about the sector); and to elevate the voices of women with expertise in our sector through talks at events. Audrey was co-founder of Multimap, an online mapping company acquired by Microsoft. She now invests in women-led start-ups and mentors their founders. She serves on the Advisory Board of Angel Academe, which invests in female-founded tech start-ups and introduces more women to angel investing. She is also one of the founding investors in OWNSAT (Oceania Women's Network Satellite) with Sallye, Bridget, Vicki, Walda, Audrey, Ellen, and Candace, created to bring high through-put broadband Internet to the Pacific Islands with Kacific.

## GTWN/Raspberry Pi initiative leads to education success in Lebanon: Youth to Youth and Coder Maker

GTWN/Raspberry Pi initiative leads to education success in Lebanon  
Eliane Metni, President and Director of the International Education Association (IEA) Candace Johnson, Founding President GTWN In 2012 a number of GTWN Members (Janice Hughes, Bridget Cosgrave, Candace Johnson) started hearing about Raspberry Pi from their friends in Cambridge– Jack Lang, Hermann Hauser and Sherry Coutu. The GTWN was already working with the United Nations on getting more girls to learn coding and programming. We realised that Raspberry Pi would be the perfect device to get more young people, especially girls, access to real computers and with that to learn how to code and program, particularly in the Middle East. We prevailed on the Raspberry Pi Foundation, in particular Jack Lang, at the time the head of the Computing Lab at Cambridge to provide for the project two of the first 10 Raspberry Pi's that came off of the assembly line. At the time, Liz Upton from the Raspberry Pi Foundation welcomed this initiative: “We’re very pleased to see the Raspberry Pi being used to help educate children all over the world. Learning computing concepts equips kids with a formidable toolset of problem-solving skills and algorithmic thinking that they can apply to all areas of their lives; we’re delighted to see those skills being developed and shared by the children who are participating in this project. We wish them every success in the future.” Now the group of GTWN members had to find someone who could put together a program in Arabic to help fashion educating young girls in the Middle East how to use the Raspberry Pi's. Working through our international networks of colleagues, we cast the net wide and miraculously found Eliane Metni, President and Director of the International Education Association (IEA) and a French–English–Arabic speaking educator of computing and learning in Lebanon. Not only was she excited about the possibilities that Raspberry Pi offered, with her extensive background in education she also knew exactly how best to get the program started. At first the two Raspberry Pi's were used in one of the oldest, most prestigious private schools, high in the mountains of Lebanon. For even then, it was difficult in the Arab world to convince everyone that young girls should have access to computing! Together the GTWN members put together USD 5000 to get the program started. We were thrilled and honoured to be invited to the inauguration of the Youth to Youth program that Eliane Metni had created to teach young girls and boys how to code and program with the Raspberry Pi's in the school. Well, actually, it was to first teach a group of young girls and boys and then to have them teach their other school mates, hence the name “Youth to Youth”! The momentous day arrived when the GTWN was invited to the school in Lebanon to view the fruits of their investment. We were delighted to find that not only were there government ministers and educators from all around Lebanon attending the inauguration of the program, representatives of UNICEF were also present. Everyone was amazed when they could see what was possible using a Raspberry Pi.

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### ORGANISATION

GTWN and IEA (International Education Association)

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### COUNTRY

GTWN is a global organization and IEA is a French and Lebanese based organization

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### COUNTRIES OF OPERATION

GTWN is a Global Organization and IEA is a French Lebanese organization impacting today the Middle East and Africa

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### SUSTAINABLE DEVELOPMENT GOALS

Education, Digital Inclusion

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### PROJECT ANCHOR

GTWN and IEA

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### CONTACT

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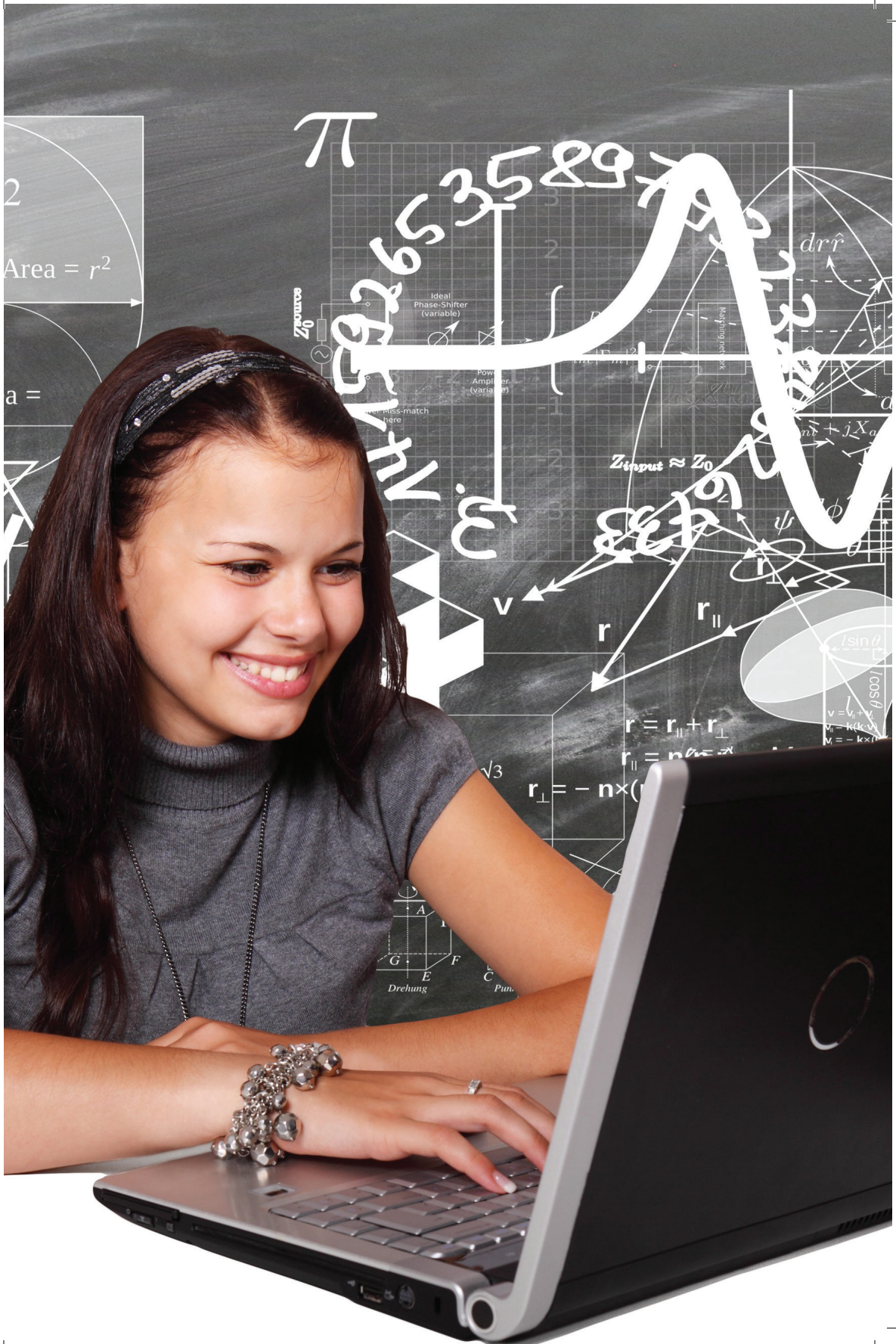


**\*\*Put in Picture from Power Point with Caption:** Lebanese Telecoms Minister showing his Education Minister colleague the Raspberry Pis when the GTWN delivered its second batch of 50 Raspberry Pis. UNICEF immediately saw the potential of the program for the Syrian Refugee camps in Lebanon and asked Eliane if she would consider putting the program and the Raspberry Pi's (which consume almost no energy) into the camps. Of course she would! Not only that, she would use the opportunity to teach the children in the camps how to read and write and also how to become entrepreneurs. It was a huge success. From there Eliane tirelessly added to the program, going from "Youth to Youth" to "Coder Makers". The GTWN continued its support by purchasing more Raspberry Pi's and over the years, also extending the program from Lebanon to Kenya where "Youth to Youth" developed into "Mamas to Mamas", particularly in the Maasai community, known for its color-coded beading. The photo is from Lebanon's first Raspberry Pi Schools competition in 2016. <https://www.electronicsworld.com/blogs/engineer-in-wonderland/lebanons-first-raspberry-pi-schools-competition-2016-04/> The story continued and today, the Lebanese Government and the Mona Boutros foundation have instigated an initiative to put Raspberry Pi's, the Youth to Youth program and the Coder Maker program in all the public schools in Lebanon. Upon learning the news of this initiative, one of the GTWN's original supporters Sherry Coutu, CBE, Member of the Raspberry Pi Foundation Board and philanthropist working in education, <http://www.linkedin.com/in/coutu>, wrote: This is simply joyous to receive—Thank you so much!!! Eliane recalls the path to success of the program and the role that the GTWN has played in it: The GTWN initiative has helped us to be where we are today and to scale digital transformation with the Raspberry Pis at a national level. We started with 2 Raspberry Pis that the GTWN had sent us and partnered with UNICEF to work with refugees. Slowly, but surely, we made our way into public schools with our partners from the Mouna Bustros Foundation. Those first two Raspberry Pis that the GTWN had sent to Lebanon with subsequent deliveries, were the base of our Youth-to-Youth program and today the "Coder Maker". Slowly but surely, year after year, we made our way into mainstream learning in the Lebanese Education system. We have achieved the absolutely ground-breaking program we have set out in a country which defies defeat and sees education in the Digital Society as the way forward. Thank you for all your support, I couldn't have done it without you.

## Project impact

The story continued and today, the Lebanese Government and the Mona Boutros foundation have instigated an initiative to put Raspberry Pi's, the Youth to Youth program and the Coder Maker program in all the public schools in Lebanon. Upon learning the news of this initiative, one of the GTWN's original supporters Sherry Coutu, CBE, Member of the Raspberry Pi Foundation Board and philanthropist working in education, <http://www.linkedin.com/in/coutu>, wrote: This is simply joyous to receive—Thank you so much!! Eliane recalls the path to success of the program and the role that the GTWN has played in

it. The GTWN initiative has helped us to be where we are today and to scale digital transformation with the Raspberry Pis at a national level. We started with 2 Raspberry Pis that the GTWN had sent us and partnered with UNICEF to work with refugees. Slowly, but surely, we made our way into public schools with our partners from the Mouna Bustros Foundation. Those first two Raspberry Pis that the GTWN had sent to Lebanon with subsequent deliveries, were the base of our Youth-to-Youth program and today the “Coder Maker”. Slowly but surely, year after year, we made our way into mainstream learning in the Lebanese Education system. We have achieved the absolutely ground-breaking program we have set out in a country which defies defeat and sees education in the Digital Society as the way forward. Thank you for all your support, I couldn't have done it without you.





## Improving water scenario in drought prone Aurangabad villages, Maharashtra, India

Water remains a key resource imperative for socio-economic development, healthy ecosystems and for human survival itself. To support activities towards improving water scenario in select villages in drought prone districts of Maharashtra, CII partnered with Standard Chartered Bank on a water program. Through an integrated approach enabled through application of CII's digital Tool, WATSCAN interventions have been implemented which is aiding drought proofing of villages of Aurangabad, Maharashtra. Infrastructure strategies combined with training and awareness on water use efficiency, cropping patterns, agricultural practices and community engagement, is resulting in long term transformation in drought prone villages of Aurangabad, Maharashtra.

Assessment based on application of CII's WATSCAN Tool – an integrated IT driven, GIS and Remote Sensing based Decision Support System, found that the selected village were experiencing a demand-supply gap of 3200–3500 cubic meters per hectare in a normal monsoon year. This gap in a weak monsoon year increased further, thereby placing a much higher dependency on groundwater reserves. With high vulnerability and low resilience, water was becoming increasingly scarce. Erratic rainfall meant that village wells would go dry by February– March each year, leading to high dependence on tanker water supply. Several farmers were giving up agriculture and their selling land to adopt another vocation to earn their livelihood.

Water Management strategies were selected to augment the water availability keeping in mind their effectiveness i.e. appropriate strategy at appropriate location, after complete validation of the locations from CII's WATSCAN Tool and in partnership with the Government.

### Project impact

Supply Side Interventions:

- Identification of strategies with pin-pointed locations for implementation using drone surveys, Vertical Electrical Sounding (VES) groundwater surveys and water quality testing.
- Implementation – check dams; gabion bandharas; recharge shafts; rainwater harvesting; desilting and Automatic Weather Stations.
- Creation of additional water storage to bridge village water demand, impacting over 4000 villagers.
- Water for sanitation in rural schools successfully linked.

With supply side interventions village Paithan Kheda, has water supply increased by 1500–1700 cu.m/ha. Similarly, with demand side interventions that include training of small-scale farmers in Sericulture,

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**ORGANISATION**  
CII Water Institute

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**COUNTRY**  
India

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**COUNTRIES OF OPERATION**  
India

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 6

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**PROJECT ANCHOR**  
CII Water Institute

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a multi-cycle, 'crop', to create alternate livelihood options; Technical support and expert advice on input material, best practices; soil quality analysis for selected farms recorded on farmer soil health cards; access to the local 'Paithani Silk' market; provision of shade nets to control evaporation and help cultivate healthier crops and adoption of drip irrigation has helped reduce water demand by 2300–2500 cu.m/ha, thus bridging the demand–supply gap at farm level. Groundwater level in the village is stabilizing and water tables are improving, taking the village towards becoming water secure.

The demand side measures are helping farmers increase income by approximately 2–3 times; improve employment for the farmer family, leading to reverse migration. The intervention of shade nets (low cost evaporation control measure) is helping reduce water loss, preserve soil moisture which helps increase productivity by 1.5–3 times, while saving water.



# Indigenous Knowledge Research Infrastructure (IKRI): a novel global digital collaborative tool for the implementation of the SDGs and global agendas

Indigenous and Traditional knowledge (ITK) and practises are increasingly considered important and necessary to integrate with and complement the emerging technology-based tools and solutions to address the SDGs. Unfortunately, ITK is scattered and at times exists in small pockets, and much is transferred through practises that are not well documented. It needs to be recognised, preserved, and protected, especially given the challenges facing accelerated technological inequalities and barriers covering policy, languages, and gender inclusion. Therefore, CANEUS, in partnership with global stakeholders, by leveraging the complementary competencies of the G20 countries and the Group of Friends of Indigenous Peoples, undertook a series of initiatives aimed at identifying the technical and policy challenges and developing new models covering data governance protocols and procedures for integrating ITK and emerging technologies for the implementation of SDGs at national, regional, and global levels.

These activities covered three steps: (a) a Global Dialogue involving consultations with ITK and S&T communities; (b) the conceptualization of the “Global Research Initiative and Knowledge Repository;”, and (c) the launch of the “Indigenous Knowledge Research Infrastructure (IKRI)” at the 2021 UN Food Systems Summit to support the implementation of SDGs. The digital infrastructure initiative includes a “technology-based repository” that uses frontier technologies, e.g., Earth Observation and geospatial intelligence with AI, ML, and block-chain, to capture, process, analyse, and present ITK from multiple sources. The IKRI aims to leverage diverse efforts worldwide, covering a structured framework and partnership with a new workable and replicable development model that will support the needs of the most vulnerable communities and ensure that no one is left behind.

The key activities being undertaken include: 1. reviewing existing ITK literature, activities, databases, and initiatives with experts and organisations working in this area; 2. Engaging key IKRI stakeholders through related forums such as UN-GPDRR, UNFCCC, COP15, UN-Ocean, UN-Water, UN Summit of the Future, etc. to understand the requirements and formulate partnerships; 3. Assessing the technologies and tools to tap into existing scattered data from the public and private domains and local languages to define data components and develop an IKRI digital platform that would be safe, secure, and robust; 4. Refining the best approaches to collecting data from primary sources with a network of NGOs, academic and research organisations, social groups, etc.; 5. Defining the preliminary architecture of the IKRI platform (dashboard, frontend tools, background technologies, approaches, methodologies, etc.); 6. Preparing approaches

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**ORGANISATION**  
CANEUS

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**COUNTRY**  
Canada

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**COUNTRIES OF OPERATION**  
Canada, India, Spain, LAC region,  
Global: Asia, Africa, Americas,  
and Europe

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 1–17

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**PROJECT ANCHOR**  
CANEUS International

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**CONTACT**  
Milind Pimprikar  
milind.pimprikar@caneus.org

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on how this knowledge will benefit stakeholders in conserving their habitats and ecosystems

The project further aims to leverage the combined B2O capabilities in Technology, innovation, and R&D for: 1. the creation of collaborative digital infrastructure; 2. the development of complex datasets; 3. Multilingual data mining; 4. GIS visualisation and instant report generation; 5. Capacity building workshops; 6. HPC-driven big data analytics; 7. Internet of Things (IoT) data-driven analytical framework; 8. Development of framework for IPR protection of ITK; 9. Development of on-line collaborative decision-making framework, e.g., on-line MoU between knowledge holders and Industries for production of ITK (for which IPRs have been obtained); 10. AI/ML implementation

## Project impact

The IKRI outcome contributed to understanding and addressing the challenges, barriers, and policy issues for integrating ITK with emerging technologies and providing workable and replicable solutions and a new development model for the accelerated implementation of the SDGs.

The IKRI was recognised among the top 5 most valuable 2022 global partnerships by UN ECOSOC, and several key organisations from the G20 countries have partnered with it and are supporting its development and implementation.

The dynamic digital global collaborative research infrastructure, with four regional Hubs in Asia, Africa, the Americas, and Europe, will further contribute to: 1. Support the dissemination of and access to ITK to bring long-term socio-economic returns to society. 2. Support socialising the decision-making on the use of ITK for SDGs and providing input to policymakers. 3. Support ongoing research collaborations to bring like-minded partners together to prioritise key challenges where ITK can make a difference, including land management, social health and improved nutrition, utilisation of genetic resources, and conservation of biodiversity. 4. Support linkages between ITK and other data repositories, including data made available through technology transfer under the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) Art. 6.2. 5. Encourage interest in public-private partnerships to develop viable ITK-based products and ventures.



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## Industry 4.0

The journey began four years ago when Dr. Reddy's embarked on an ambitious programme to 'digitise its core'. This involved upgrade of infrastructure and digitisation of processes for robust and comprehensive data capture. Real-time data and insights laid the foundation for Project 'OpsNext' which was initiated to transform the plant into an Industry 4.0-driven 'Lighthouse' factory as defined by the WEF. The site saw the deployment of six of the eight technologies of 4IR – Advanced Analytics, Digital Twins, Robotic Process Automation, Augmented/Virtual/Mixed Reality, Digital Performance Management and Industrial Internet of Things (IIoT). The OpsNext team identified 40+ business results linked use cases impacting various aspects of productivity such as customer service, quality, energy consumption, sustainability, equipment efficiency and people productivity. The company also invested heavily in building people capabilities such as digital and analytics translators, data scientists and data engineers.

### Project impact

In response to business scenarios of price erosion, sustainable manufacturing practises, the need for constant vigilance, and the maintenance of uncompromising standards of quality, the journey has already yielded significant results at the site.

- 43% manufacturing cost improvement
- 30% reduction in production lead time
- 41% energy consumption reduction, and
- significant dip in quality deviations.

This also saw the successful inclusion of our 25-year-old site in Hyderabad as a 'Digital Lighthouse' factory, which is a big milestone in our productivity improvement journey. We are in the process of scaling and replicating this across the rest of our manufacturing network. Building such 'factories of the future' is integral to innovation and the healthcare of the future.

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### ORGANISATION

Dr Reddy's Laboratories Ltd.

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, US

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDG 7, 9, 12

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### PROJECT ANCHOR

Dr Reddy's Laboratories Ltd.

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### CONTACT

Sanjay Sharma

[sanjay.sharma@drreddys.com](mailto:sanjay.sharma@drreddys.com)

Industry 4.0



Before



After



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## Innovation for SDGs

Keidanren is promoting “Society 5.0 for SDGs” to achieve SDGs through the realisation of Society 5.0. Keidanren’s SDGs introduced a wide variety of cases in which Keidanren member companies and organisations are working towards achieving the SDGs. The website “Innovation for SDGs” is a case study collection and a platform for introducing these initiatives. We hope that this platform will encourage companies, organisations, and diverse stakeholders to work together to solve social issues through partnerships that will lead to the sustainable development of society. The SDGs require the private sector to demonstrate creativity and innovation in order to achieve their ambitious goals.

In 2018, Keidanren solicited innovations that contribute to the achievement of the SDGs that are being undertaken by member companies and published on this website. As progress has been made in corporate initiatives, we asked member companies and organisations to provide examples of their latest efforts from September to December 2021, and in February 2022, an updated version was released to the public. Among various innovations in business methods and appropriate technologies, we received 281 case studies from 82 companies, focusing on initiatives to solve social issues by utilising innovative technologies such as AI, IoT, robotics, and big data. We organised the cases by SDG target and found that many were related to Goal 9, “Industry and Technological Innovation,” Goal 7, “Energy,” and Goal 3, “Health and Well-Being. This website allows users to search by name or keyword, narrow down the SDGs by goal, and narrow down the examples of achieving the SDGs through the realisation of Society 5.0. Keidanren will continue such efforts not only with member companies and organisations but also with local governments, civil society, universities, international organisations, and other diverse stakeholders in Japan and abroad in order to promote understanding of the SDG initiatives of Japanese companies and organisations and to promote collaborations.

### Project impact

Each project has various impacts and outcomes. For example, a case study on Polycarbonate resin, a transparent and tough plastic, is expected to reduce the weight of cars. Production process technology utilises CO<sub>2</sub> as a raw material. Such plants, where 170,000 metric tonnes of CO<sub>2</sub> per year are absorbed or consumed as a raw material and then converted to polycarbonate resin, have already been in operation in five countries. Compared with the conventional method utilising phosgene gas as a raw material, the CFP in this method is reduced by 10%. Link: <https://en.keidanrensdgs.com/data/104>

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#### ORGANISATION

Keidanren (Japan Business Federation)

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#### COUNTRY

Japan

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#### COUNTRIES OF OPERATION

Worldwide

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#### SUSTAINABLE DEVELOPMENT GOALS

SDGs 1–17

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#### PROJECT ANCHOR

Keidanren member companies and organizations

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#### CONTACT

<https://en.keidanrensdgs.com/contact-us>



## Reducing malaria patients and contributing to infectious disease prevention

Sumitomo Chemical Co., Ltd.

Olyset® Net, long-lasting insecticidal net for malaria prevention.



@Maggie Hallahan  
/Sumitomo Chemical

The Olyset® Net is a mosquito net that maintains its effectiveness over a long period of time by incorporating insecticide into the polyethylene fibers, which gradually bleeds out onto the surface.

Considering global warming due to climate change may have an impact on the spread of mosquito born infectious diseases such as malaria and dengue, Olyset® Nets prevents malaria infection by protecting inhabitants from mosquito biting.

### Related Goals/Targets



3.3 End the epidemics of communicable diseases  
3.4 Reduce mortality from non-communicable diseases  
13.b Promote mechanisms for raising capacity for effective climate change-related planning & management in least developed countries

### Status

Already

### Start

April 2003

### Relation to Society 5.0



IoT/  
Robot



Big data



AI



Open  
Innovation



Others

### Partners

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## Large population health monitoring and clinical assessment platform

Patients and doctors are disconnected post consultation, surgery and chronic disease management guidance which results in various problems.

### Project impact

Development of a remote patient monitoring platform with semi-automatized clinical assessment support tools in order to support the physicians to cost-effectively monitor and assess large number of patients facilitating massive data collection.

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### ORGANISATION

Global Innovation and-  
Technology Alliance (GITA)

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### COUNTRY

India

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### COUNTRIES OF OPERATION

India, Canada

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### SUSTAINABLE DEVELOPMENT

#### GOALS

SDGs 7,9

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### PROJECT ANCHOR

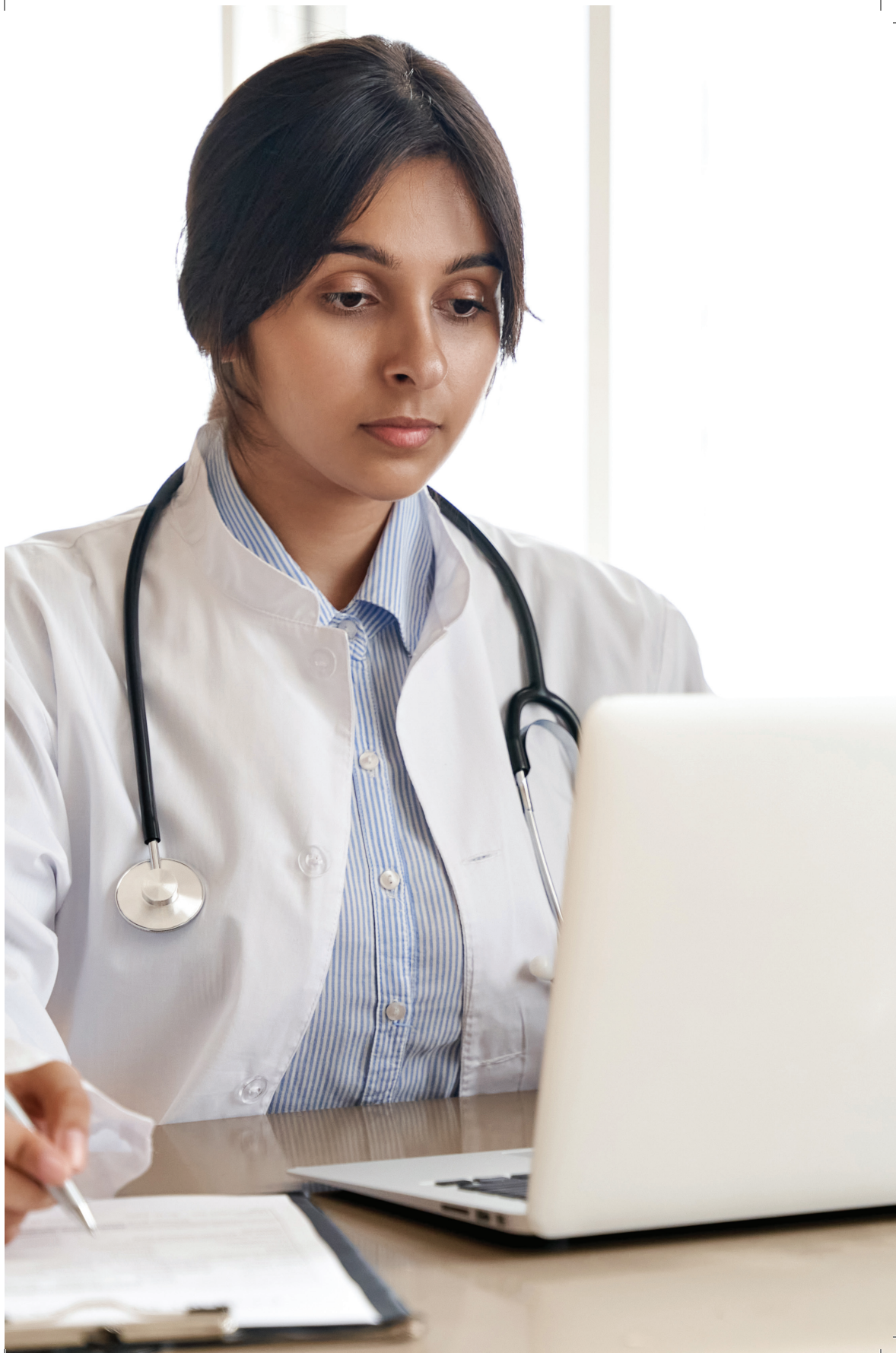
Allied Engineering Works Pvt.  
Ltd.

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### CONTACT

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## MEI Tools

MEI Tools, launched in September 2016, is an initiative of the Entrepreneurial Mobilisation for Innovation (MEI), coordinated by the innovation board of the Brazilian National Confederation of Industry (CNI). It is a portal and publication that collects information on the main innovation incentive instruments in force in the country. In addition, the tool aims to offer new solutions to overcome challenges that mark the innovation environment by being an updated information channel on the support instruments in this area as well as an initiative to articulate agreements and new initiatives between partner institutions.

This tool presents instruments managed by the public sector as well as information on corporate mechanisms. With this, MEI and CNI seek to bring innovation agents closer and improve support for the Brazilian industry to develop continuously and sustainably. Thus, today, MEI Tools is an important tool that helps companies of all sectors and sizes, as well as Science and Technology Institutions (ICTs) in Brazil. In addition, it has different user profiles such as Consultants, Financial Managers, R&D Managers, Public Policy managers, and Startups.

Currently, there are two ways to query the content. It is possible to access the material by downloading the publication in PDF on the portal or by using the site's search tool with filters. To feed the content of the portal, MEI Tools has the partnership of 20 institutions that assist in the updates and provide information on the instruments that are available and in force in Brazil, and an active search for instruments is performed by the project's team. Updates are periodic and occur every 3 months.

To expand the project and offer more modern and complete solutions for companies, startups, and Science and Technology Institutions (ICT), at the end of 2022, CNI initiated a Technical Cooperation between CNI and the Brazilian Micro and Small Business Support Service (SEBRAE), which was integrated with MEI Tools. This partnership is intended to improve the work of the project as well as further digitise its search system. Another positive point of cooperation is that it allows for greater public reach and the creation of new resources and mechanisms for the project, thus consolidating MEI Tools as an important tool of information on the main innovation instruments in Brazil.

### Project impact

MEI Tools is currently the main information and research tool for innovation available for Brazilian industries and companies of all sizes. In the last year, its website had more than 4000 users. An average of 180 instruments were identified in 2022 in each update, covering more than 100 institutions across Brazil offering these instruments. The Working Group (GT-MEI Tools), has resulted in cooperation between the National Service of Industrial Training (SENAI), the Brazilian Company of Research and Industrial Innovation (EMBRAPII), and the Brazilian Micro and Small Business Support Service (SEBRAE) in the editions of the Innovation Notice for Industry and the alignment of

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### ORGANISATION

Brazilian National Confederation of Industry (CNI)

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### COUNTRY

Brazil

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### COUNTRIES OF OPERATION

Brazil

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 9, 17

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### PROJECT ANCHOR

Entrepreneurial Mobilization for Innovation (MEI), coordinated by the innovation board of the Brazilian National Confederation of Industry (CNI)

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financing instruments between FINEP and BNDES. In addition, it has become a great tool in the training of Local Innovation Agents (ALI and SEBRAE).

The project has an impact on SDG Goals 9 and 17. From SDG 9 we highlight “the access of small-scale industrial enterprises in developing countries, to financial services” and “to enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially”, from SDG 17 “Promote the development, transfer, dissemination, and diffusion of environmentally sound technologies to developing countries on favorable terms, including on concessional and preferential terms” and “Fully operationalize the technology bank and science, technology, and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology.





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## mitoken.tech

MiToken Technology is in the space of innovating technologies that enable communities to find people, help them connect and engage, and help them grow their businesses. We envision and strive for a diverse future. We are the first to establish a worldwide NFT (Non-Fungible token)-based democratic process in the metaverse, thus enabling communities to share their interests and ownership. We have simplified the democratic participation process in our NFT network by providing every community with SMIT, a digital currency, and digital engagement software. Therefore, we empower people with the tools that they need to ensure, that the digital relationships between the people, their businesses, and the government are safe with a very honest intention and free from all sorts of bullying, trolling, stalking, or impersonations.

### Project impact

MiToken Technology ensures a greater degree of decision-making consensus and raises the standard of decisions, especially at the level of major global corporations. To engage in democratic processes and produce transparent, accountable policy outcomes for communities, MiToken is creating curated and verified communities and establishing an NFT network that can assess and gauge the social effects of corporations, organisations, and institutions. Finally, encouraging business engagement, empowering social media, and guaranteeing public transparency around the world.

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### ORGANISATION

MiToken Technology Limited

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### COUNTRY

United Kingdom

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### COUNTRIES OF OPERATION

United Kingdom, India, EU and Australia

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### SUSTAINABLE DEVELOPMENT GOALS

SDGs 16, 17

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### PROJECT ANCHOR

Envestors Limited, London

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## People's Before Patients – Orange Phoenix

Our objective is to innovate in the health industry, especially digital health. There are so many information systems that are not connected. Patients don't have access to their health in one place. Doctors have difficulty knowing their patients overall health conditions. Also, in health care, we tend to treat the illness rather than educate on prevention. A focus should also be placed on prevention.

### Project impact

This new project is an incubator/accelerator that will put the person before becoming a patient. Wellness of the body and mind should be put forth. This project gathered healthcare practitioners, researchers, and patients together to find solutions that could scale up to Canada and eventually the world.

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#### ORGANISATION

Canada–ASEAN Business Council

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#### COUNTRY

Canada

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#### COUNTRIES OF OPERATION

Canada

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 3

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#### PROJECT ANCHOR

People's before patients

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# Reskilling/Upskilling workers to participate in the 4IR (Industry 4.0 and digital manufacturing)

By partnering with local universities and technology institutes, Western Digital created a successful programme to upskill or reskill thousands of workers in Thailand and Malaysia with skills applicable to 4IR, including autonomous robotics, big data analytics, cloud computing, and IIoT.

## Project impact

This programme serves as a model for companies looking to reskill or upskill workers to participate more fully in the digital economy and increase workers contributions to the local economy. It also aims at upskilling and reskilling workers with minimal to no impact on workforce numbers.

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**ORGANISATION**  
Western Digital

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**COUNTRY**  
United States

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**COUNTRIES OF OPERATION**  
Malaysia, Thailand

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**SUSTAINABLE DEVELOPMENT GOALS**  
Land Regeneration

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**PROJECT ANCHOR**  
Western Digital

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**CONTACT**  
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## SixSense Innovision: Revolutionizing Quality Control with classifAI

SixSense's classifAI product is an innovative solution that utilises Advanced Visual AI to revolutionise quality control in 24/7 manufacturing operations, addressing the challenges associated with high-cost visual inspection in semiconductor fabs and hi-tech manufacturing.

The development of this groundbreaking solution faced several key challenges. One such challenge was accessing industry-specific information and datasets essential for tailoring the solution to the unique requirements of the manufacturing sector. To tackle this obstacle, SixSense actively pursued collaborations and partnerships with industry experts and stakeholders, enabling them to acquire the necessary information and datasets. This approach ensured the development of a solution that precisely caters to the needs of manufacturing operations.

Another significant challenge was the requirement for mature research and development in computer vision to bridge the gap between theoretical advancements and practical applications. The software engineers at SixSense were instrumental in addressing this challenge by translating cutting-edge research in computer vision into tangible products. This allowed end users to effortlessly set up and maintain hundreds of AI models on a daily basis, significantly enhancing efficiency and productivity in manufacturing operations.

Furthermore, a critical factor in overcoming challenges was the collaboration of talent at the intersection of digital product design and manufacturing engineering. Designers with AI exposure and limited knowledge of the manufacturing environment worked hand-in-hand with manufacturing engineers who lacked expertise in designing scalable digital products. This collaboration ensured the development of an intuitive feature set tailored specifically for the manufacturing industry. By combining diverse skill sets, SixSense accelerated the product development timeline and produced an optimised solution for end users.

Lastly, the availability of adequate support and capital played a crucial role in successfully commercialising deep technology products like classifAI. SixSense was fortunate to secure support from investors who understood the prolonged gestation period inherent in commercialising such innovations. This financial backing allowed SixSense to focus on refining and perfecting its product, ensuring its readiness for widespread adoption within the manufacturing sector.

In conclusion, SixSense's classifAI product has overcome significant challenges to introduce an innovative solution that addresses the high-cost visual inspection problem in semiconductor fabs and hi-tech manufacturing. By leveraging industry-specific information, bridging the gap between research and application, fostering interdisciplinary collaboration, and securing robust financial support, SixSense has brought about a game-changing innovation. The

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**ORGANISATION**  
BEENEXT

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**COUNTRIES**  
India, Singapore

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**COUNTRIES OF OPERATION**  
Singapore (fabrication plants and management team), India (core product development)

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**SUSTAINABLE DEVELOPMENT GOALS**  
SDGs 7, 9, 12

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**PROJECT ANCHOR**  
SixSense, GlobalFoundries, Infineon, and others under NDA

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**CONTACT**  
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akanksha@sixsense.ai

classifAI product significantly enhances quality control in manufacturing operations by accurately classifying defects and improving overall efficiency in a 24/7 production environment.

## Project impact

International semiconductor fabrication plants have paid over a million dollars to licence ClassifAI. The software is already analysing millions of images, helping manufacturers cut down on their inspection operator headcount by 80%. Leading semiconductor leaders such as GlobalFoundries, Infineon, have publicly confirmed the value addition by SixSense in their manufacturing.

The projects impacts in the following ways:

- SixSense's classifAI software has made a significant impact in the semiconductor industry, with international semiconductor fabrication plants investing over a million dollars in licensing the product. The software has been instrumental in analyzing millions of images, resulting in a remarkable reduction of up to 80% in inspection operator headcount for manufacturers. Renowned semiconductor leaders like GlobalFoundries and Infineon have publicly acknowledged the value added by SixSense to their manufacturing processes.
- The project has had both quantitative and qualitative impacts. Quantitatively, it contributes to the United Nations' Sustainable Development Goals (SDGs) such as Decent Work and Economic Growth, Industry, Innovation, and Infrastructure, and Climate Action. By enabling superior product quality and minimizing defects, SixSense's classifAI envisions a world without manufacturing flaws.
- In addition, the project has positive environmental implications. By improving chip yield in electronic devices, particularly in electric vehicles, it accelerates the world's electrification process and helps reduce carbon footprint. This aligns with the goal of climate action and sustainability.
- Furthermore, the project brings about time savings and improves customer service by reducing product recalls related to quality issues. The enhanced product quality resulting from classifAI leads to significant time savings for both manufacturers and customers, positively impacting their overall experience.
- Moreover, the project improves the quality of life for visual inspection operators. By automating the tedious and physically demanding task of visual inspection, SixSense's technology relieves operators from repetitive work, enhancing their well-being and quality of life.

In conclusion, SixSense's classifAI has achieved remarkable impacts, including cost reduction for manufacturers, significant advancements in sustainability and climate action, time savings, and improved quality of life for workers. The software has revolutionized the semiconductor industry, enabling manufacturers to produce high-quality products more efficiently and contributing to a greener and more automated future.

# Supply chain digitalization and IBP

Berger Paints is the second largest Paints company in India; and operates 14 factories, 130 depots, 8 Regional Distribution Centres and caters to about 38000 customers spread across the country. Paint industry is a consumer facing business involving short turn around; with market requirement of serving customers within 4 hours of order receipt. The dealers are mostly small players having space and inventory holding constraints.

There was no system in place in Berger to perform Integrated Demand and Supply Planning. There was a distinct lack of visibility in the process. However, Berger being a century old company had various legacy processes addressing specific needs. Many of these processes were siloed and required an overhaul. However, any new transformation project had to keep in consideration these existing systems, which were quite complex at times. There was the inherent risk of the entire business workflow collapsing if the requirements were not properly understood/ development not in line with the requirement/ the new system failed to integrate with the legacy processes.

## Key Activities

Berger initiated the Supply Chain Digitization work in early 2020 and completed the end-to-end process in a time frame of 18 months. The outcome was that the company moved from taking siloed, semi structured approach of planning across various departments to an integrated, transparent planning process where information is shared with stake holders in real time.

The Entire solutioning was performed taking user centric design approach. The Best-in-Class practices of Supply Chain were introduced, brought in by a new age tool. Simultaneously, the unique and complex business flavours of Berger and the related processes were retained and modelled in the Solution. To achieve this feat multiple Design thinking workshops were organized with cross vertical participation, including the leadership of the company.

The outcome was an amalgamation of a best in breed Supply Planning Solution which addressed the complex business needs of Berger.

A New Product Introduction(NPI) module had to be developed from scratch to meet Berger requirements.

## Project impact

- 1. Demand Planning: Earlier there was no Process of month-on-month Forecasting; an Annual budgeting exercise was performed. Forecast Accuracy improved from 10% (Annual Budgeting) to about 55% through proper Demand Planning. This was achieved through:
  - a. Statistical Forecasting
  - b. Capturing Market Intelligence through Collaborative and Consensus Demand Planning

**ORGANISATION**  
Berger Paints India Limited

**COUNTRY**  
India

**COUNTRIES OF OPERATION**  
India

**SUSTAINABLE DEVELOPMENT GOALS**  
SDG 9

**PROJECT ANCHOR**  
o9

**CONTACT**  
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Arnab Dasgupta 7596066175



## 2. Establishment of Central Supply Planning Vertical & Generation of Production and Despatch plans:

- a. Earlier no Production plan was generated. Factories would plan Production basis Distribution Plan. Capacity Utilization/ over-loading of factories could not be tracked. Now a Production plan, Capacity Utilization and Supportability Report get generated.
- b. A dispatch plan gets generated daily which considers the following:
  - i. Month forecast, MTD sales and subsequent balance forecast
  - ii. Stock level and Safety stock Requirement at depots and factory
  - iii. Lead time and routing plan from the factory to depots.  
Earlier no prioritized dispatch plan was generated. The factories would see all pending orders and dispatch basis available inventory.

## 3. Generation of Material Requirement Plan

Earlier Raw Material Requirement was not linked to Demand of Finished Goods. Raw material requirement was predicted centrally basis historical consumption. BOM Explosion had to be done by the factories one item at a time. This was error prone and required high inventory levels to avoid stock outs. Through supply chain digitization, BOM explosion is performed basis Production Plan of the FG. A new functionality, Tentative long term Procurement Plan is generated basis long term statistical forecast for strategic decisions.



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## TCS Access Infinity

The 2006 UN Convention on the Rights of Persons with Disabilities (UNCRPD) has declared information access a basic human right. However, the proportion of content available globally in accessible formats is tiny, at ~5%. Nearly 25% of the world's population with visual impairment live in India, but barely 1% of all published content in the country is available in accessible formats for the print-disabled. In past, the published materials in the accessible format were available only after months and there was no visibility for the same. Often end user had to run from pillar to post to even know if the book required by them is available in the accessible format or not. Due to this lack of timely information and knowledge, it impacted the education, future job prospect and consequently the social standing of a print-disabled individual.

The major problem identified was that the various stakeholders involved in the publishing of educational content were unorganized, isolated, not acquainted with technology for creating accessible content and viewed it as overhead and a significant risk towards content piracy. Several specialized production houses like NGOS are producing books in accessible format in silos with low production capability. There is no way to achieve scale and exchange the books between the libraries throughout the countries.

TCS conceptualized the solution addressing the needs to provide equal access and opportunities of education and employment for print disabled. Instead of creating just an online library, we have taken a holistic approach where we have innovated multi-modal-channel platform to create country wide eco system where all the stakeholders can collaborate and create multiplier effect. The solution has transformed the accessible digital publishing landscape in India. It is a Multi-modal Multi-channel service delivery platform, catering diverse needs of users, either tech savvy or not having access to computer, empower publishers to one click conversion to deliver accessible content and scale up significantly. It helps country like India to follow international laws like Marrakesh treaty for DRM with unique patented watermark trademark on accessible content. This platform also has futuristic view and created interface using Webservices/API for CROSS border exchange to get international books available to our Indian users.

### Project impact

With more than 6.5 M books, 203 libraries, it transformed the accessible digital publishing in India and increased the reach to rural and the bottom-of-pyramid users in large scale. All educational content/syllabus of leading universities like JNU, Delhi University, 13 Education boards; newspapers and magazines like The Hindu, Jagran, Telegraph, India today, readers digest etc. are available in real-time in accessible format. During the Coronavirus pandemic, most educational institutes used this platform for providing books to

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#### ORGANISATION

TCS Limited

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 4, 8, 10

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#### PROJECT ANCHOR

Daisy Forum India and TCS

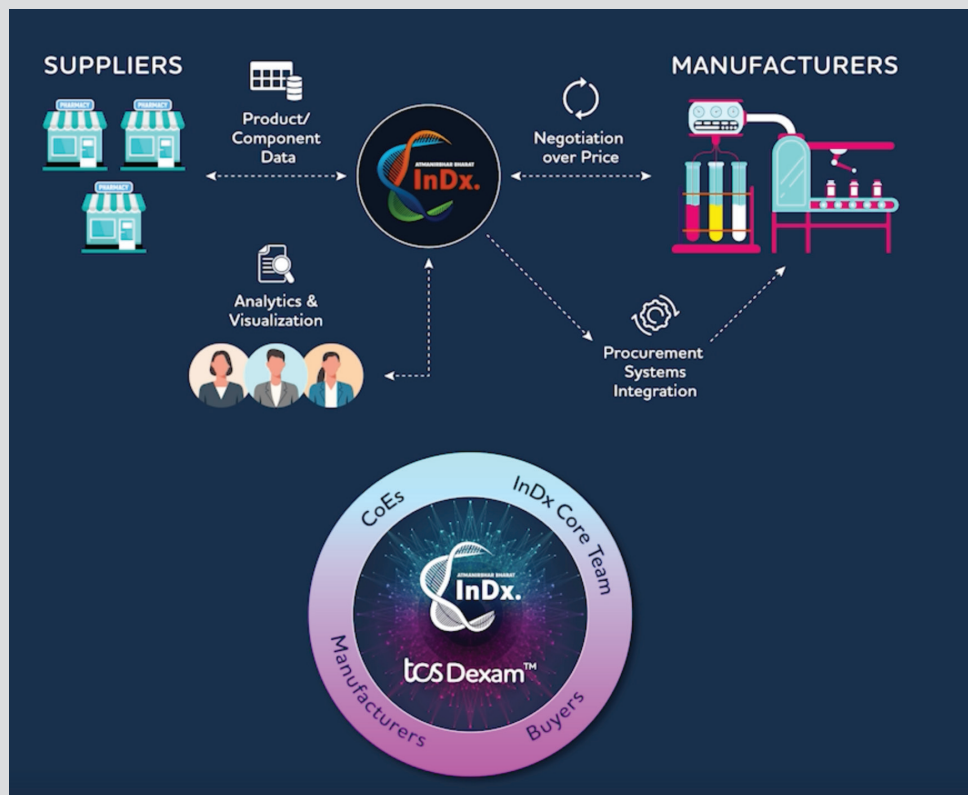
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#### CONTACT

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print disabled. Looking at the impact, stakeholders (Daisy Forum of India, NGOs, TCS, Government of India) have come up with multiyear plan to target 1 M registered users to be added in the next 3 years. TCS is proud that our innovation gave print disabled an opportunity to lead life independently , helped many users to crack competitive exams like banks , IIT etc so that they can realize their true potential and aids in nation building activity.





## Tech for transforming youth from 540 slums in Pune

The Project was a Public Private Partnership between the Lighthouse Communities Foundation and the Pune Municipal Corporation with the active support of the Smart Cities Mission in India. From early beginnings that mapped out all the slum communities with technology and set the baseline for the large numbers of youth who needed hope for the future and skills to get a job and sustain their own financial independence, the mission has enjoyed the support of an entire eco-system – employers, skills partners, elected representatives and the bureaucrats. The uniqueness of the model is that it uses technology and innovative mechanisms at every stage of the youth journey. Large scale Google mapping has helped identify the status of each household, a unique game based approach called Rhythm enables youth to shed their fears and acquire agency and aspirations, counseling is done through simulation and immersive technologies like virtual reality (soon Metaverse ) and students are encouraged to use digital technology in their skills journey, during the job search and even when they become alumni. This approach has solved the early challenge of poor curriculum and pedagogy design and weak outcomes of job placements and retention on the job. The model is now being transported across the state of Maharashtra and also to Delhi Odisha Telangana and soon Uttar Pradesh.

### Project impact

The impact of the intervention has touched thousands of lives so far and there are Lighthouses in every Administrative Ward (14) of the Pune Municipal Corporation. and in the adjoining Pimpri Chinchwad Municipal Corporation. Over 11,000 youth are now enjoying sustainable livelihoods are becoming true ambassadors of change, and are technically competent, worthy contributors to digital India and truly thoughtful members of society.

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#### ORGANISATION

Lighthouse Communities Foundation

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#### COUNTRY

India

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#### COUNTRIES OF OPERATION

India

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#### SUSTAINABLE DEVELOPMENT GOALS

SDGs 3,4,8,10 and 11

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#### PROJECT ANCHOR

Lighthouse Communities Foundation

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## The Digital Perks Initiative for inclusive technology adaptation: bridging the digital divide

Digital transformation is crucial for addressing issues encountered by organizations and communities across a range of industries in today's quickly changing technology landscape. This change has a significant impact on the development and prosperity of entrepreneurs, MSMEs, and inventors, giving them previously unheard-of chances to contribute to and prosper in the global economy. However, MSMEs' capacity to fully utilize the advantages of technology has been hampered by the absence of proper assistance for them during their digital transformation journey.

The Digital Perks Initiative was created as a result of collaboration between the public and private sectors using the Corporate Social Responsibility Framework to solve this issue. Through the integration of private sector technology and creativity with public sector incentives, this project provides micro, small and medium-sized businesses (MSMEs) with access to the digital platforms and resources needed to embrace the digital era. The Digital Perks Initiative supports responsible innovation and digital adaptation, which helps not only MSMEs but the broader business environment. Through the provision of free credits, this project empowers people and the community, fosters growth and development, and equips Tech Startups and MSMEs to embrace digitization. The Digital Perks Program was developed in collaboration with esteemed partners to offer entrepreneurs and MSMEs the tools, technology, and technological resources required for their digital transformation and adaptation.

### Project impact

The Digital Perks Initiative is prepared to significantly contribute to the digital preparedness of entrepreneurs and MSMEs through successful public-private partnerships, enabling sustainable and equitable financing solutions for their digital adoption. The Digital Perks Initiative has had a really revolutionary effect on MSMEs. The operational efficiency of digitized MSMEs has significantly improved, outpacing that of their offline counterparts in terms of concrete advantages. These MSMEs have seen significant increases in operational efficiency as a result of implementing digital solutions, which has allowed them to improve customer experiences, optimize resource utilization, streamline processes, lower development costs, and accelerate go-to-market plans in order to reach a larger market.

We have successfully supported more than 500 Tech Startups through the implementation of this project, achieving an average operational cost reduction of 35%. Additionally, we have helped MSMEs in a variety of conventional industries adopt basic technologies, which has led to an average operating cost decrease of 5% and effectively offsets the costs of moving to digital technologies, making digitalization more affordable and feasible for MSMEs.

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#### ORGANISATION

Startups House

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#### COUNTRY

Saudi Arabia

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#### COUNTRIES OF OPERATION

Saudi Arabia

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDGs 4, 8, 9, 10

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#### PROJECT ANCHOR

Ministry of Communication and Information Technology. Designed and operated by Startups House

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#### CONTACT

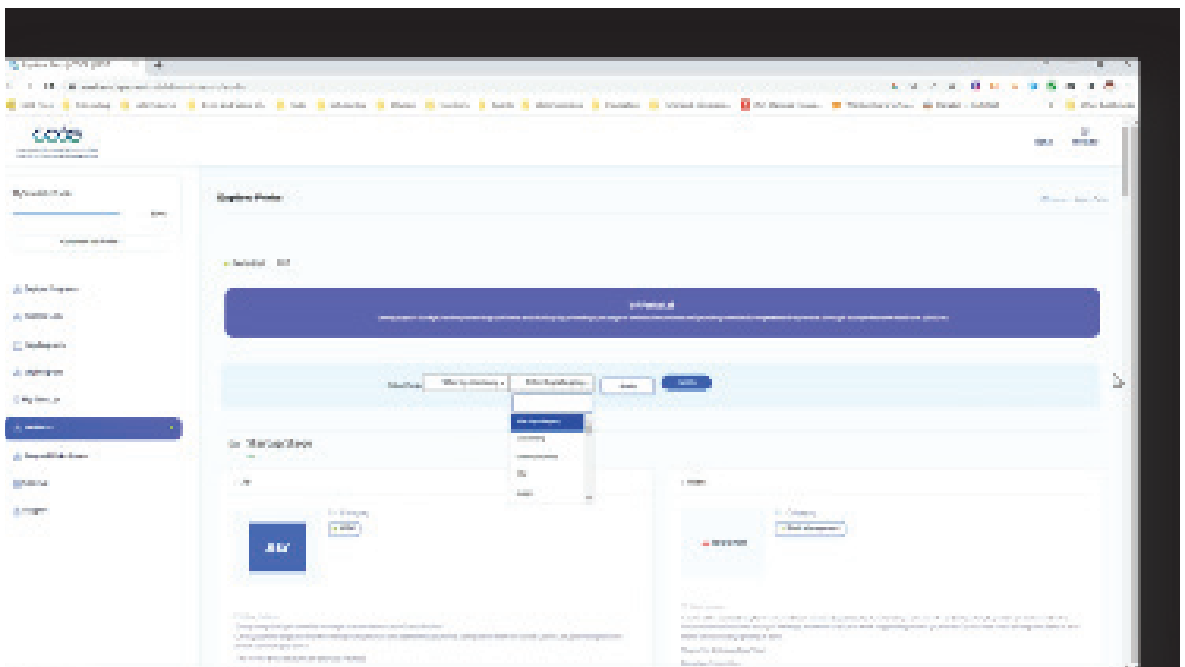
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The Digital Perks Initiative has successfully proven its capacity to overcome the digital divide and strengthen MSMEs and Tech Startups in Saudi Arabia and beyond. The following results show how the initiative is having an impact:

- 1.Enhanced Operational Efficiency: Digitized MSMEs have witnessed improved operational efficiency, allowing them to optimize resource allocation, streamline operations, and cut expenses.
- 2.Improved Customer Experience: MSMEs are now more equipped to provide outstanding customer experiences, which promotes client loyalty and satisfaction. MSMEs have improved accessibility to their goods and services, broadened their customer base, and personalized their offerings by utilizing digital platforms.
- 3.Lower Development expenses and Quicker Time-to-Market: The Digital Perks Initiative has helped MSMEs and Tech Startups lower their development expenses and quicken their go-to-market strategies. Early-stage tech startups have been able to create and launch their products more quickly because of access to digital platforms and resources.
- 4.Wider Customer market: MSMEs now have access to a wider customer market thanks to digitalization. MSMEs have overcome geographic constraints, reached new customers, and unlocked development prospects by utilizing digital platforms.

The Digital Perks Initiative has an influence that goes beyond particular verticals. The project has packaged digital incentives to boost technology adoption across several sectors and industries in partnership with the Ministry of Communications and Information Technology (MCIT) and other important stakeholders.



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## USAID Enterprises for Development, Growth, and Empowerment (EDGE) Fund

The EDGE Fund is a first-of-its-kind fund designed to unleash private sector impact on global development challenges. Rather than focus solely on using government dollars, the Fund aims to leverage greater private sector investment than is possible with most traditional development finance. The EDGE fund, working with Congress, will be used to launch new partnerships that unleash business capabilities and influence commercial operations in the service of advancing development objectives. Past such partnerships have increased the representation of women in corporate supply chains, helped distribute vital medicines to remote communities, and spurred the provision of crucial agricultural inputs to smallholder farmers. These partnerships all benefited not solely from private capital but also from private expertise derived from a company's strategic edge in a given domain.

The following private sector entities are eligible to collaborate with USAID on a funding request: 1. For-profit, commercial entities and their affiliated foundations; 2. Financial institutions, investors, and intermediaries; 3. Business associations and cooperatives; 4. Micro, small, medium, and large enterprises that operate in the formal and informal sectors; and 5. American, local, regional, and multinational businesses.

### Project impact

The EDGE Fund will launch with \$50 million, pending US Congressional approval, dedicated to providing resources on a competitive basis to support these types of groundbreaking partnerships with the private sector to drive more inclusivity, resilience, and shared prosperity.

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#### ORGANISATION

US Council for International Business

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#### COUNTRY

United States

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#### COUNTRIES OF OPERATION

Will be finalized

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#### SUSTAINABLE DEVELOPMENT GOALS

Multiple SDGs

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#### PROJECT ANCHOR

US Agency for International Development

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## Vxnaid, a vaccination monitoring platform

At Johnson & Johnson, we believe research and development specifically for resource-limited settings is essential to saving lives and achieving greater health equity. We developed Vxnaid, a digital vaccination monitoring platform that integrates innovative technologies to improve patient tracing, data management and communication for impactful vaccination campaigns. The platform has three components: unique patient identification, dashboard reporting on campaign progress, and mobile phone messaging for patient follow-up.

Ebola is a persistent and growing public health threat, and Johnson & Johnson is committed to preventing outbreaks before they start. The first large-scale use of the Vxnaid platform was in Rwanda's UMURINZI Ebola vaccination campaign. The campaign aimed to protect the country's most at-risk citizens from the threat of Ebola virus disease in districts bordering the Democratic Republic of the Congo—a heavily traveled border crossing. Vxnaid supported vaccination of more than 203,000 persons with Zabdeno® (Ad26.ZEBOV) and Mvabea® (MVA-BN-Filo), a two-dose vaccine regimen administered eight weeks apart. Johnson & Johnson partnered with the Rwandan Ministry of Health to train personnel and strengthen health system capacity. The use of Vxnaid was readily integrated and deployed by 14 vaccination sites and a mobile unit.

### Project impact

Vxnaid facilitated 400,000 touchpoints with community participants and was instrumental in maintaining community trust throughout the campaign. The adherence rate for the two-dose vaccine regimen was exceptionally high—98% prior to the COVID-19 pandemic, and 94% even with COVID-19 restrictions. To facilitate broader impact, we made Vxnaid open-source and available to any organization to access and implement. The vaccine agnostic platform has recently been adopted by the World Health Organization for their COVID-19 Solidarity Vaccines trials occurring across three continents. By developing new technology and partnering with local governments and organizations, Johnson & Johnson is working to prevent infectious diseases through vaccines, advance global health security, and elevate the quality of public health data in resource-limited settings.

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#### ORGANISATION

Johnson & Johnson

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#### COUNTRY

United States

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#### COUNTRIES OF OPERATION

Rwanda

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#### SUSTAINABLE DEVELOPMENT

##### GOALS

SDG 3

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#### PROJECT ANCHOR

Johnson & Johnson

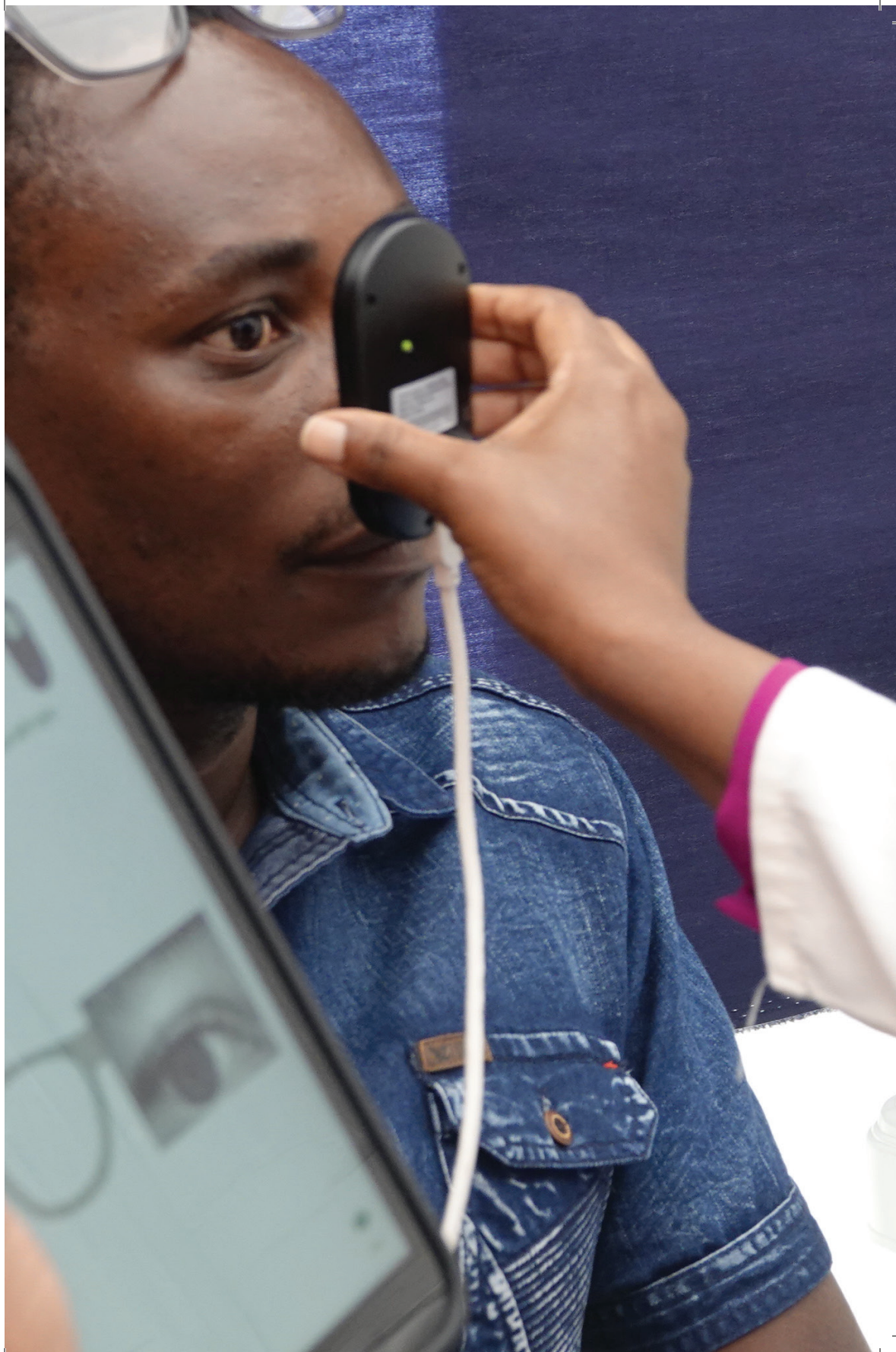
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## NOTES

## NOTES

## NOTES





## About B20 India

Business 20 (B20) is the official G20 dialogue forum with the global business community. Established in 2010, B20 is among the most prominent Engagement Groups in G20, with companies and business organizations as participants. The B20 leads the process of galvanizing global business leaders for their views on issues of global economic and trade governance and speaks in a single voice for the entire G20 business community.

Each year, the G20 Presidency appoints a B20 Chair (an eminent business leader from the G20 host country), who is supported by a B20 Sherpa and the B20 secretariat. The B20 aims to deliver concrete actionable policy recommendations on priorities by each rotating presidency to spur economic growth and development.

The B20 bases its work on Task Forces (TFs) and Action Councils (ACs) entrusted to develop consensus-based policy recommendations to the G20 and to international organizations and institutions. The B20 officially conveys its final recommendations to the G20 Presidency on the occasion of the B20 Summit.

As India holds the Presidency of G20 in 2023, India will host the eighteenth G20 Summit in New Delhi. The Confederation of Indian Industry (CII) has been appointed as the B20 India Secretariat for India's Presidency. CII, as the B20 India Secretariat, will host the B20 India Summit in New Delhi from 25–27 August 2023.

For queries, reach us at **[b20secretariat@cii.in](mailto:b20secretariat@cii.in)**