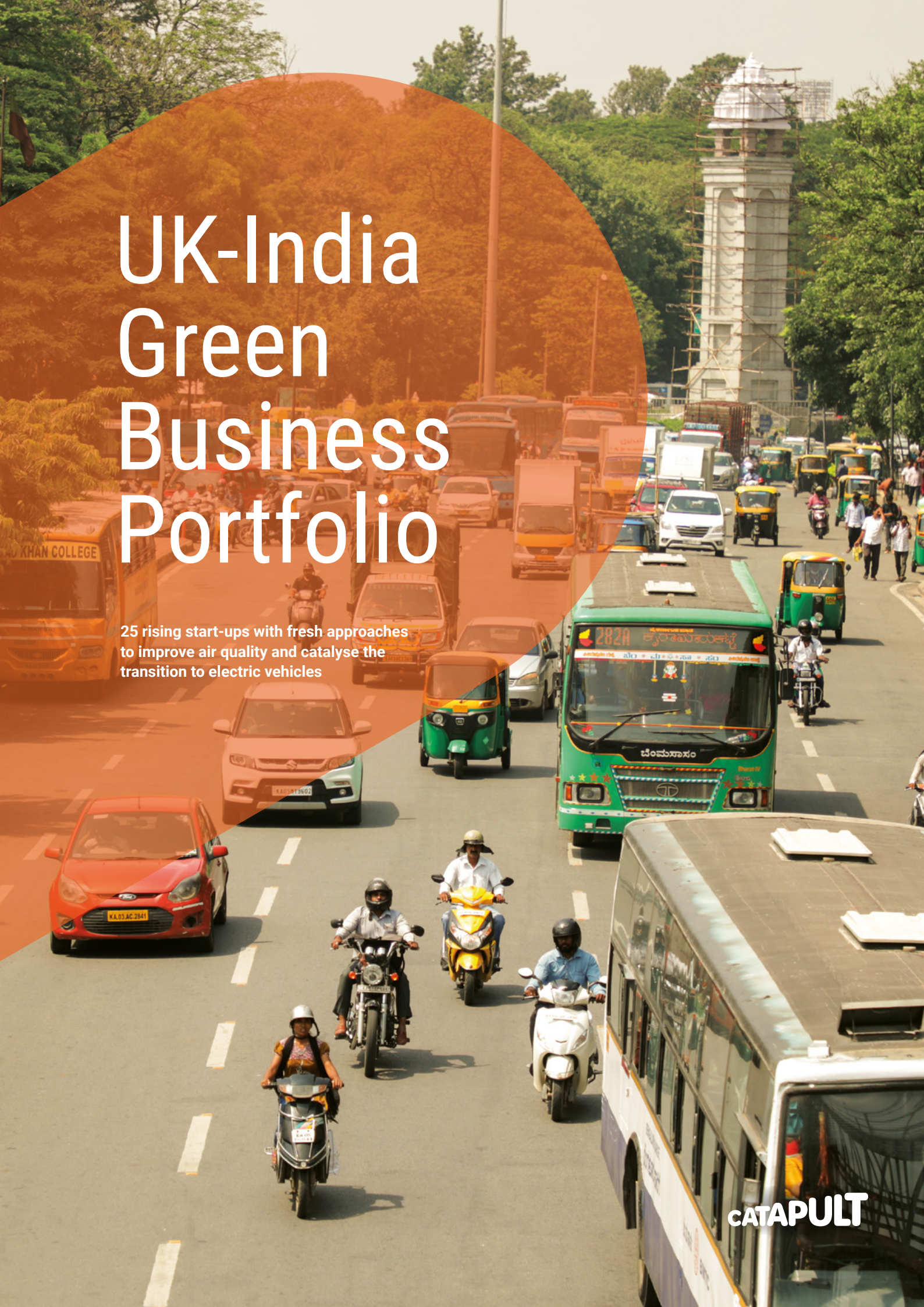
UK-India Green Business Portfolio

25 rising start-ups with fresh approaches to improve air quality and catalyse the transition to electric vehicles



CATAPULT

The Newton Fund builds research and innovation partnerships to support economic and social welfare development, and to develop research and innovation capacity for long-term sustainable and equitable growth.

UKRI works in partnership with universities, research organisations, businesses, charities, and government to create the best possible environment for research and innovation to flourish. Operating across the whole of the UK with a combined budget of more than £7 billion, UKRI brings together the seven Research Councils, Innovate UK and Research England.

Connected Places Catapult is the UK Government-backed Centre of Excellence for Innovation in Mobility and the Built Environment. We work with local and national government, academia and industry to accelerate the integration of innovations which boost physical, digital and social connectivity in our towns, cities and communities.

Energy Systems Catapult accelerates the transformation of the UK's energy systems and ensures UK businesses and consumers capture the opportunities for clean growth. We take a 'whole systems' view of the energy sector, helping to identify and address innovation priorities and market barriers to decarbonise the energy system at least cost.

Satellite Applications Catapult boosts UK productivity by helping organisations harness the power of satellite-based services. We help organisations, both large and small, to bring new services to market. By connecting industry and academia we get new research off the ground and into the market more quickly.

Contents

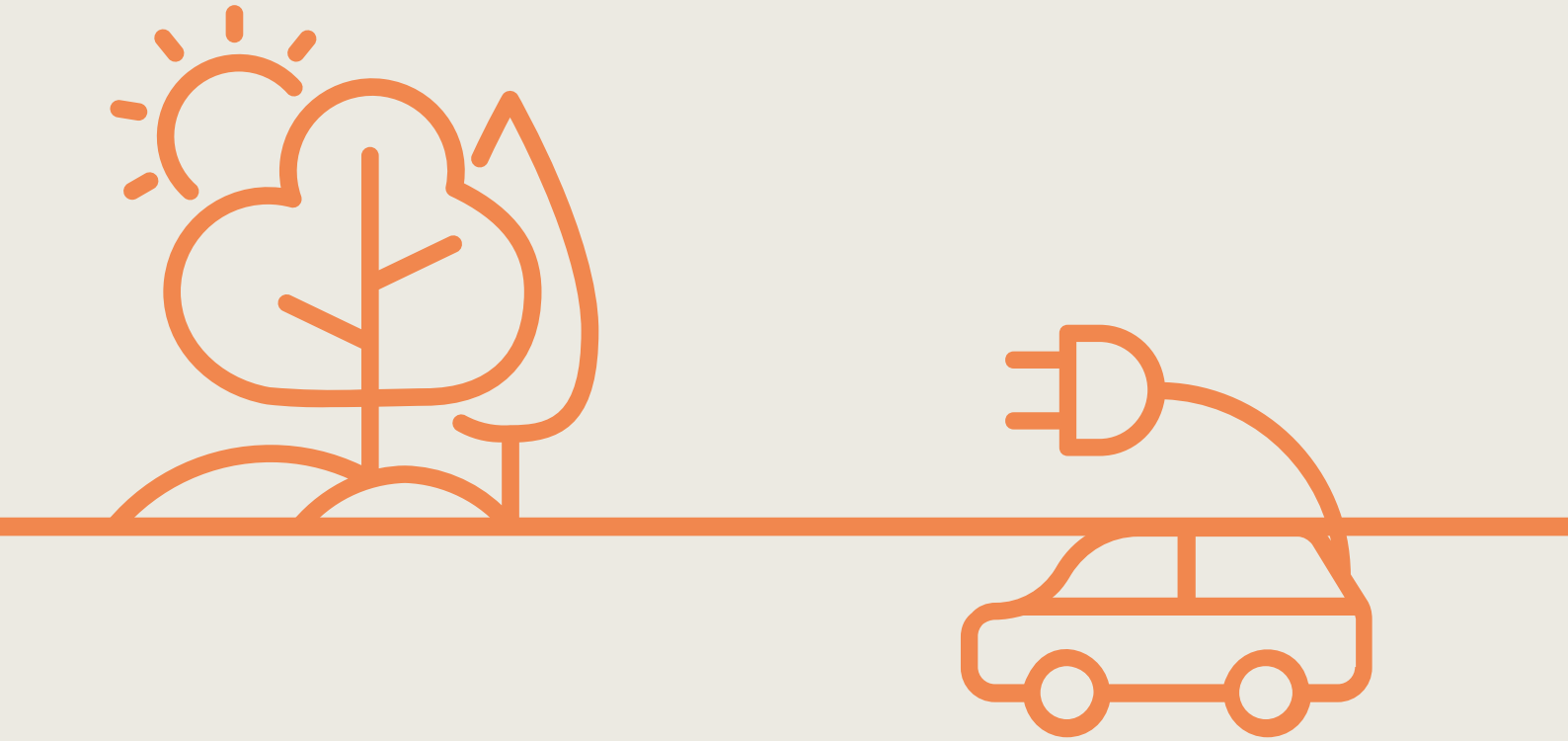
Introduction

The Covid-19 crisis has brought cities globally to a standstill. Beyond the immediate tragic shock of its impact, the dramatic changes which lockdown has imposed on cities do nonetheless also provide hints of a more positive future. Cities have cleaner air now than they have for decades – might it be possible to keep pollution levels down? This portfolio features 26 British and Indian companies who are bringing innovative approaches to improving air quality (AQ), measuring pollution levels, and reducing traffic emissions by accelerating the transition to electric vehicles (EVs).

The portfolio is curated by three UK Catapult organisations – Connected Places Catapult, Energy Systems Catapult and Satellite Applications Catapult – under the aegis of the Innovating for Clean Air (IfCA) programme. The companies included were identified as the most promising start-ups following a competitive open call process, and range from early-stage businesses seeking seed capital to more mature scale-ups looking for partnership opportunities.

Whilst by no means an exhaustive overview of the clean air and EV innovation landscape, the UK-India Green Business Portfolio provides an insightful snapshot for investors, as well as government and industry stakeholders looking to implement cutting edge air quality and electric vehicle solutions in the UK, India and worldwide.

The IfCA programme is led by Innovate UK, part of UK Research and Innovation (UKRI), and co-funded by the Newton Fund and various partners in India. The programme builds on the strong relationship between India and the UK represented by the UK-



India Tech partnership announced in April 2018. It focuses on strengthening connections between businesses, local authorities, academics and civil society organisations in Bengaluru and the UK, pooling expertise and efforts around the shared challenges of improving air quality and accelerating the adoption of electric vehicles. With the cities of London and Bengaluru leading the global C40 Air Quality Network, it should come as no surprise that numerous organisations have been found working creatively and energetically in these areas.
So, if you are an investor or a buyer, or whether you are looking to find a partner or procure a cutting-edge service, you will be sure to find lots of interesting candidates in the portfolio. If you are interested in other aspects of the programme or the work of the catapults in general, then please don't hesitate to get in touch!

Acknowledgements

As well as the businesses featured in the portfolio, this report would have not been possible without the generous contributions of the partner organisations listed at the end of the document.

Featured companies

The portfolio provides an overview of the products and services of 26 clean air and EV companies operating across a variety of subsectors. If you are interested in any of the companies, please use the contact information detailed in their profiles.

If you would like to find out more about the Innovating for Clean Air programme, and how you can be involved in the work of the Catapults, please see the details at the end of the portfolio.

Company Profiles

Agnisumukh Energy Solutions

Key facts

HQ: Bengaluru, India

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Industry sector:
Energy efficient commercial kitchen equipment

Locations active:
India

Looking for:
Government buyer, private buyer, distributor, technology partner, investor

Overview

Agnisumukh Energy Solutions, an award-winning clean-tech start-up from Bengaluru, manufactures commercial cookstoves and steam boilers driven by LPG, natural gas and bio-gas. Their innovative energy efficient radiant heat gas burner is flameless, smokeless and produces uniform heat similar to charcoal.

Agnisumukh technology has the potential to transform lives in the commercial kitchen space with its energy saving devices.

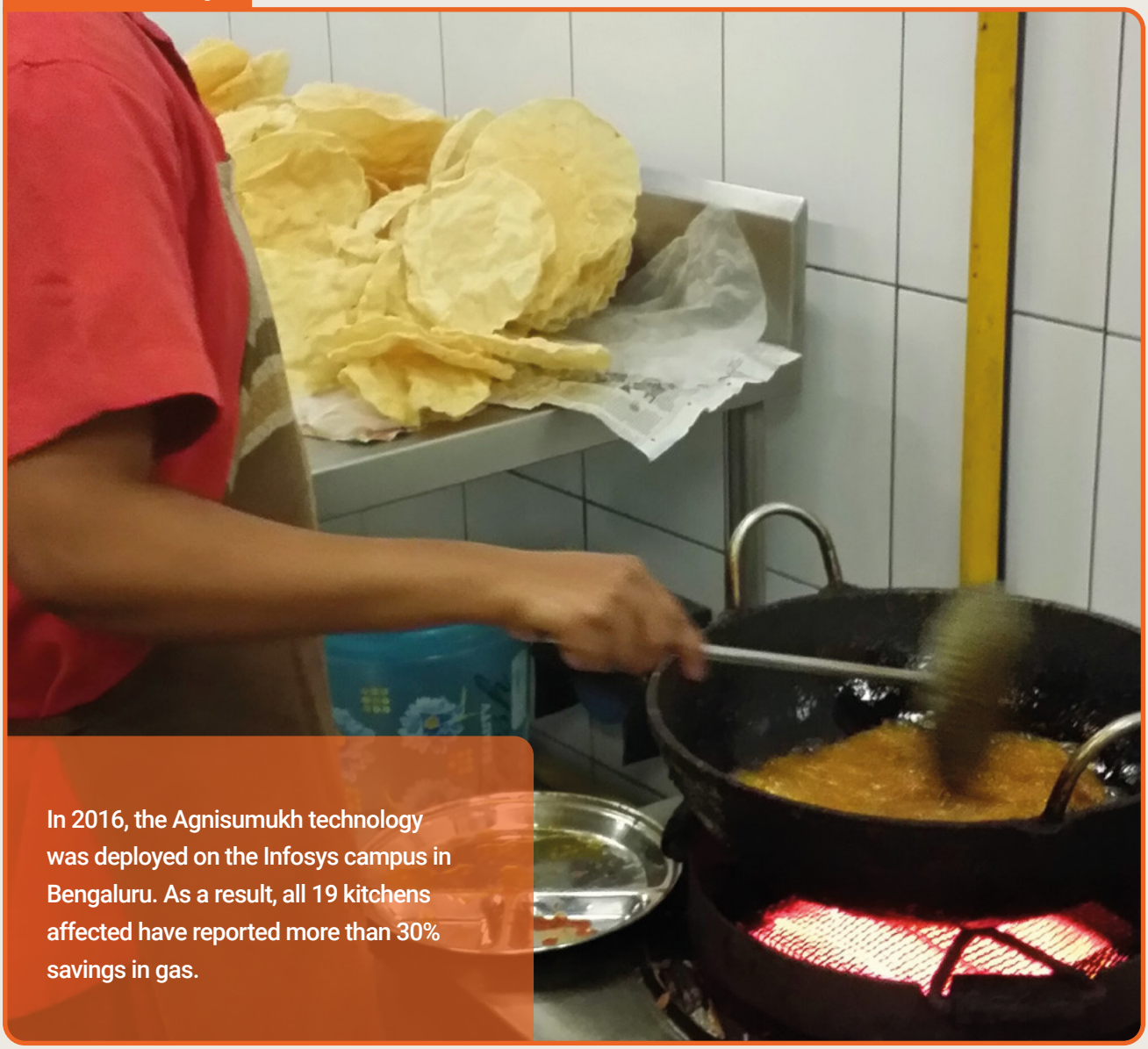
How Agnisumukh's innovation contributes to tackling the challenge of urban air pollution

The Agnisumukh technology consumes 30% less gas than conventional burners. This has a direct impact on indoor air quality, as well as usage of water. By allowing off-grid rural households to use bio-gas and energy efficient cooking technologies, Agnisumkh improves people's health and reduces forest degradation. It is estimated that their stoves can increase the green cover in India by 450 million trees by preventing unsustainable wood harvesting.

Why partners should work with Agnisumukh

Agnisumukh burners are flameless, smokeless, noiseless and have the potential to reduce more than 10 million tonnes of green house gas emissions in India. The cookstoves operate under low gas pressure and produce uniform radiant heat resulting in over 30% of gas fuel savings and high thermal efficiency of 69%. Comparable commercial gas burners under equivalent M and T Class burners specified under BIS – IS 14612 have an efficiency of only 36%. Agnisumukh burners preserve nutrition in food and keep pots and pans clean saving over 50% of water and detergent.

Case study



In 2016, the Agnisumukh technology was deployed on the Infosys campus in Bengaluru. As a result, all 19 kitchens affected have reported more than 30% savings in gas.

Airhead

Key facts

HQ: Littlehampton, UK

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Industry sector:
Urban mobility, health wearables, data

Locations active:
UK, EU, North America, Australia, India

Looking for:
Supplier, government buyer, private buyer, distributor, investor, technology partner, joint venture

airhead

Overview

Airhead is taking the fight to air pollution and is working to improve outdoor safety in cities. They've created an innovative pollution mask to protect people in urban areas from the negative health effects of air pollution. Working in collaboration with Brunel University and their team of expert designers, scientists, and researchers, they have developed a unique product that protects people from particulate matter and harmful gases found in city air, and therefore reduces the risk of the most common health problems related to air pollution.

"We know that wearing a mask doesn't always feel natural and that others are hot, embarrassing, and sometimes ineffective. We've solved these issues with a product that people will be proud to wear."

Harry Young, Co-founder

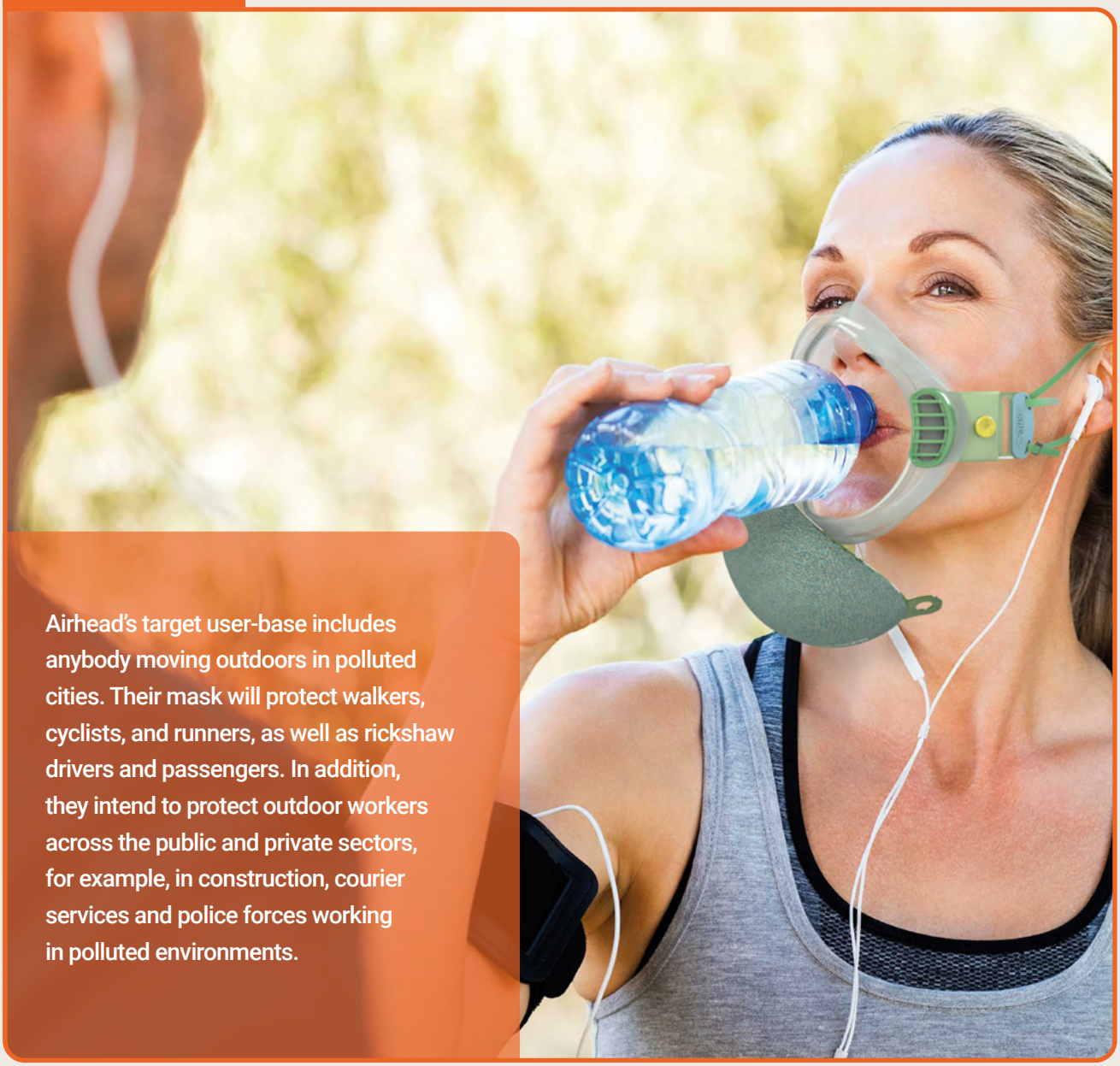
How Airhead's innovation contributes to tackling the challenge of urban air pollution

This product will provide direct protection to people by filtering out particulate matter (PM) as small as 0.3 microns, whilst its activated carbon technology will provide protection against harmful gases. By improving outdoor safety, this innovation will encourage active transport methods as an alternative to driving and empower people to exercise more and adopt healthier lifestyles over the long term. In the future the Airhead mask will include sensor technology to measure pollution levels and generate health data based on breathing analytics. This will give real-time pollution data based on the location of the user and a better understanding of customer behaviour in polluted environments.

Why partners should work with Airhead

Airhead is an award-winning member of the NatWest Accelerator, and is partnered with industry-leading design experts at Brunel University as part of a government-funded programme. Their patent-pending innovation includes radical improvements across every aspect of a traditional mask, driven by extensive research, customer feedback and design expertise.

Case study



Airhead's target user-base includes anybody moving outdoors in polluted cities. Their mask will protect walkers, cyclists, and runners, as well as rickshaw drivers and passengers. In addition, they intend to protect outdoor workers across the public and private sectors, for example, in construction, courier services and police forces working in polluted environments.

The Air Project

Key facts

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Industry sector: IoT, Built Environment, Indoor Air Quality, Well-being

Locations active: UK, South East Asia

Looking for: Government buyer, Private buyer, Investor, Technology partner, Joint venture

Overview

Seven million deaths worldwide are attributable to air pollution. 1.31 billion people globally have asthma, and poor air quality can lead to hospital admittance and death for severe conditions. The Air Project is currently developing an IoT, patent-pending modular air quality monitor and digital interface. The company's goal is to make the invisible visible and provide recommendations on reducing exposure to pollutants. Its vision is to empower people to control the quality of the air they breathe.

"The Air Project is a smart indoor air monitoring assistant that helps visualise invisible pollutants in the air. Indoor activities like cooking or cleaning can create pollution that can impact your family's long-term well-being, including weakening of the respiratory systems, which in turn can lead to higher risks to airborne illness such as COVID-19. The Air Project helps you understand and take control of your indoor air to make measurable improvements."

How The Air Project's innovation contributes to tackling the challenge of urban air pollution?

Indoor pollution can be many times worse than outdoors because of improved insulation in architecture, and insufficient air exchange with the outdoors. The Air Project empowers domestic owners to understand the underlying sources of indoor air pollution by increasing awareness and visualising pollutant levels. By providing real time data, the Air Projects' monitors aim to improve long-term well-being and make knowledge of indoor air pollution more accessible and actionable. Research has indicated that improved air quality is also associated with improved decision making and productivity.

Why partners should work with The Air Project

The Air Project's aim is to address accessibility, affordability, and adaptability while meeting individual needs for indoor air pollution. The modular design enables seamless adaptation to a change in the environment or personal health needs. Users who begin with a dust sensor might then become aware of the importance of other pollutants. Users are therefore able to pick the pollutant that is a concern in their context.

The founder - Yuki Machida (MEng MA MSc MAS)- has worked for MIT and Microsoft Research and is experienced in developing innovative digital and physical experiences

Case study

Air quality monitoring for domestic or office use. The Air Project's monitors have been placed in homes to see changes in indoor pollutants. This has helped change behaviour to reduce activities that lead to pollution indoors and reduce health symptoms for those who might be sensitive.
The Air Projects' sensors have also been placed in co-working spaces and meeting rooms to understand better the accumulation of pollutants, such as carbon dioxide, to inform when to take a break or open the door for some ventilation. Carbon dioxide is known to reduce productivity and decision-making skills, making it essential to be aware of working environments.

Airlite

Key facts

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Industry sector:
Built environment

Locations active:
UK, Italy, Spain, Portugal

Looking for:
Government buyer

Overview

AM Technology is the manufacturer of Airlite – a paint that is:

- Air-purifying
- Anti-microbial, and
- Environmentally friendly.

Airlite is a powder-based product that is mixed with water on-site to form a paint that is applied by brush, roller, or spray. Airlite is available in a range of 180 colours.

"The earth has been cleaning pollutants in the air for billions of years. We copied this natural process, concentrated it and put it in the most environmentally friendly paint. We produce a paint that neutralises air pollution and odours, is VOC-free and has a significantly lower CO_2 footprint than any other paint."

How Airlite's innovation contributes to tackling the challenge of urban air pollution

Airlite is a paint-like substance that neutralises NOx, reduces odours, is VOC free and has a lower CO_2 footprint than any other paint.

Airlite uses light energy and air humidity to produce negatively charged ions – the same ions produced in the earth's atmosphere. These ions attach and neutralise pollutants, bacteria and odours.

- Airlite combines a mineral-based paint (made from recycled marble dust) with nanotechnology to produce the ions
- At the painted surface, these ions break down pollutants, bacteria and odours, turning them into harmless by-products and purifying the air.

Airlite is naturally anti-microbial due to two separate attributes:

- The calcium base combined with the high pH level naturally exhibits anti-microbial activity that kills bacteria, even in the absence of light energy.
- The negatively charged ions are anti-bacterial through oxidation – they kill bacteria and break down viral proteins.

Why partners should work with Airlite

Airlite offers a product that is simple to understand, apply and benefit from. Airlite is a paint like substance that is air purifying, anti-microbial and environmentally friendly and is already being used as the paint of choice for a major London property estate and Bouygues.

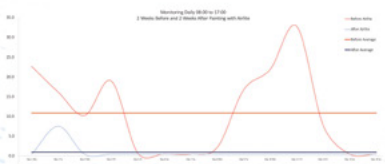
Case study

airlite

Airlite Trials 2019

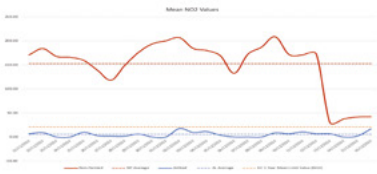
Airlite was applied in three independent trials in London in 2019.

School hall in West London.
Client: School.
Measurements before and after application showed a mean reduction in NO_2 of **76%.**



Premium offices in Mayfair, Central London.
Client: Estate owner and developer.
Simultaneous measurements of identical offices, one painted with Airlite and one with conventional paint showed a mean reduction in NO_2 of **49%.**

School classrooms in South London.
Client: Main contractor and facilities management provider.
Simultaneous measurements of identical classrooms, one painted with Airlite and one with conventional paint showed a mean reduction in NO_2 of **95%.**



Environmental Benefits**

Airlite is applied like paint to walls, ceilings and facades, without odours or chemicals (VOCs). Once applied, Airlite replicates the reactions that occur in nature to purify the air. Pollutants (NO2) and smells/odours are broken down and neutralised, surface bacteria is killed, mould is eliminated and dust/allergens are prevented from settling on surfaces.

EPD Data**	Trade Emulsion	Airlite	Change
VOCs	8 g / l	<0.1 g / l	-98.75%
Hazardous Waste	0.18 kg / m²	0.00 kg / m²	-99.99%
Global Warming Potential	0.48 kg CO_2-eq. / m²	0.11 kg CO_2-eq. / m²	-76.09%

** Source: Airlite Purelight EPD (Environmental Product Declaration) and Dulux Trade Matt Emulsion EPD. All EPD data published in accordance with ISO 14025 and EN 15804 standards.

A major London estate embraced Airlite as a simple replacement for their existing paint. The decision was driven by:

- Their own testing at multiple locations which showed a reduction in NOx of between 49% and 95%
- The benefit of anti-microbial surfaces without the use of chemicals or VOCs. Airlite kills 99.99% of bacteria
- Airlite's environmental credentials, which demonstrated a reduced CO2 footprint and reduction or elimination of hazardous waste and VOCs

Ambee

Key facts

HQ: Bengaluru, India

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Industry sector:
Data as a service, platform, IoT

Locations active:
Worldwide (data sales), India (platform)

Looking for:
Supplier, government buyer, private buyer, distributor, franchisee, investor, technology partner, joint venture

Overview

Ambee provides accurate hyperlocal air-quality data in real time, improving lives, productivity, business outcomes, and even public health and governance. Ambee's data is used in countries and industries across the world. Their proprietary data-science, backed by possibly the world's largest private air quality data set, provides solutions on a previously unseen level. Their projects and partners include insurers, health and wellness providers, Fortune 500 companies in aviation, mobility and electronics, large manufacturers, and energy majors.

"Air quality data in real time with previously-unseen levels of granularity and accuracy."

How Ambee's innovation contributes to tackling the challenge of urban air pollution

Ambee's solution provides the ideal affordable way for a concerned administration to monitor air quality. They can cover cities down to single streets – a level of accuracy never seen before. In the short-term, people can gain awareness and take immediate actions, however large or small, to mitigate and reduce air pollution. In the longer term, the air quality data can be used to change policy, make zoning decisions, plan traffic management, change school timings, and apportion resources for public health better.

Why partners should work with Ambee

Ambee's forte is the accuracy of their data. They have tested their data multiple times, and had it verified by large corporations who work with them, data customers, as well as administrations. As a tech and data company, they have deep experience in building data products, and the majority of their team is tech focused. They have also built an enviable list of exclusive partners across urban and rural India (scaling up globally soon), all of whom help in data gathering efforts, leading to better accuracy and outcomes. They are trusted by partners like Airbus, Bosch, Google, as well as leading air purifier, insurance, and wellness companies.

Case study

Ambee used mobile sensors to capture real-time air quality in Bengaluru's central business district and visualise it on Google – something that wasn't previously available. By putting sensors on for-hire vehicles such as taxis, Ubers, and delivery bikes, they captured valuable information about what a person walking down one of the streets was breathing. This was especially useful because the central business district in Bengaluru hosts multiple schools and over 30,000 children each day.

arbnco ltd.

Key facts

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Twitter: @arbnco

Industry sector:
Built environment, IoT, indoor air quality

Locations active:
UK, USA, EU, UAE, Singapore

Looking for:
Government buyer, private buyer, distributor, investor, technology partner, joint venture

arbnco

Overview

arbnco is a building performance technology company developing disruptive and scalable solutions for the global market. They provide real-time monitoring of the effects of the indoor environment on health and wellbeing and enable organisations to understand how the quality of their real estate affects occupant satisfaction and productivity. Their innovative software solutions also empower organisations and their key stakeholders to manage energy within their portfolios.

"arbn well is our award-winning hardware-and-software solution for measuring and visualising Indoor Air Quality (IAQ), which has a direct impact on the health and wellbeing of people."

How Arbnco's innovation contributes to tackling the challenge of urban air pollution

'arbn well' is a system for high-density, high-quality measurement of Indoor Environmental Quality. Their platform enables and encourages timely action on these measurements. The system is currently being integrated with building management systems for automated responses to improve air quality. The innovation lies in combining objective (measured) data with subjective data (occupant feedback) for optimal building operation. It provides facilities managers, building owners, tenants, employers and employees a means to make full use of their facilities to promote health and wellbeing.

Why partners should work with Arbnco

arbnco are an innovative company that has a track record of creating products based on cutting-edge science. They draw on a wide and deep pool of talent, with over half the workforce dedicated technical staff. In the short time they have been operational, they have successfully completed several projects and case studies involving partners of various sizes and types to enhance the value of their R&D. They are able to bring technical and operational expertise to bear on solving problems for partners, rather than forcing them to accept a one-size-fits-all solution. All arbnco products are designed to be scalable, affordable, and with low barriers to entry, which makes them ideal for mass-market application.

Case study

The solution is currently being used in several commercial, institutional, and domestic environments worldwide. One such installation is at the European headquarters of a major electrical and electronics company. It is using arbn well to achieve credits in the popular green building certification programme LEED (USGBC). The system has removed the need for expensive and cumbersome measurements using hand-held devices, measurements that may or may not represent the building's true performance.

Atmospheric Sensors Ltd. (ASL)

Key facts

HQ: East Hatley, UK

Website: www.atmosphericsensors.com

Email: enquiries@atmosphericsensors.co.uk

Industry sector:
Air Quality measurement and monitoring

Locations active:
Worldwide

Looking for:
Government buyer, distributor, technology partner

Overview

Atmospheric Sensors Ltd. (ASL) is a young company vigorously exploiting a new, digital, approach to gas sensor management – a paradigm shift in gas sensor development – that allows the aggregation of a range of sensing technologies to achieve enhanced reliability, sensitivity and selectivity. Two of the principal product lines address ambient air quality, which is monitored by fixed-site units and by wearable monitors, respectively, each deploying the multi-technology approach, which is the core signature of the company's products. The units deploy electrochemical sensors, (metal oxide sensors can optionally be included in the system), an NDIR sensor for carbon dioxide, a particle monitor, relative humidity monitoring and temperature measurement. Data can be stored locally and can be transmitted to a central management site.

"Hyper-local measurement of Air Quality and personal monitoring are critical to improving urban lives."

Dr Mike Kellaway, Founder Atmospheric Sensors Ltd

How ASL's innovation contributes to tackling the challenge of urban air pollution

ASL's products bridge the gap between highly expensive fixed monitoring and the real, personal 'hyper-local' exposure conditions experienced by urban dwellers in a cost-effective manner. The AS520 unit is a fully capable unit and weighs only 400g, fully-engineered and available for immediate deployment with full download capability, with data for all standard polluting gases, particulate matter, temperature, humidity and location (GPS). It has been shown to be highly accurate as a portable and wearable unit in multiple studies in urban environments in the UK, India and China.

Why partners should work with ASL

ASL's air quality monitoring solutions represent a practical solution to overall urban monitoring at an affordable price, compared with expensive reference equipment. Their download capability and support help partners deploy equipment quickly and obtain results for decision making.

Case study

A published, extensive and rigorous field trial study 'Characterising low-cost sensors in highly portable platforms to quantify personal exposure in diverse environment' has been carried out with the Universities of Cambridge, Beijing and others. The study demonstrates hyperlocal applications of the AS520 and quality of the data compared with 'gold standard' detectors, with better results than using only sparsely distributed outdoor fixed monitoring stations.

BuymyEV

Key facts

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Industry sector:
Mobility as a Service

Locations active:
India

Looking for:
Government buyer, private buyer, franchisee, investor, technology partner, joint venture

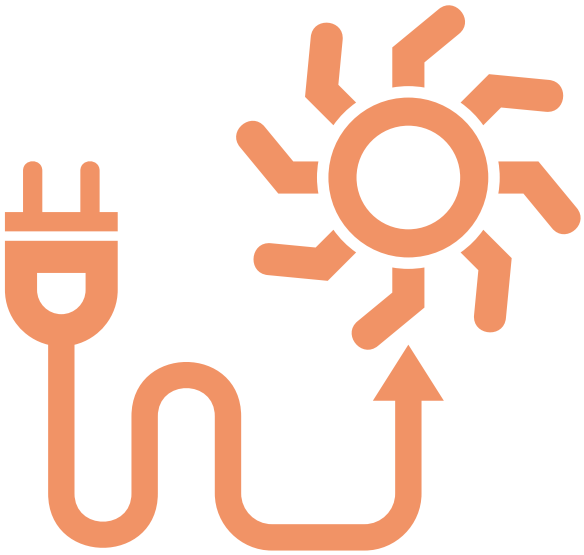
Overview

BuymyEV's IoT-enabled cloud-connected electric bikes on a subscription model provide mobility solutions for first/last/short-mile commute. Their mission is to make hyperlocal commute clean, green & tech-driven.

Urban commute simplified. Personal Mobility Solutions.
CLEAN | GREEN | ELECTRIC & CONNECTED

How BuymyEV's innovation contributes to tackling the challenge of urban air pollution

BuymyEV's eBikes are a clean mobility solution, designed for commuters with an aim to reduce carbon emissions in polluted cities. To accelerate progress in tackling the challenge of urban air pollution, BuymyEV is also looking to collect air quality data by fitting sensors on the vehicles.



Why partners should work with BuymyEV

BuymyEV's product and solution can work as PaaS (Product as a Service) as well as SaaS (Software as a service), where only an IoT solution is utilised. This ensures that partners will have access to all data generated as there is no dependency on external solutions.

Case study

BuymyEV have been able to trial their eBikes with users at Co-live (www.colive.in), a technology enabled network of fully-managed rental homes. Users switched to the eBikes for their everyday commute, following this BuymyEV were able to measure the reduction in air pollution.

BUYMYEV®

buymyEV

CityEV

Key facts

HQ: Portsmouth, UK

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Industry sector:
Built environment, IoT, EV infrastructure

Locations active:
EU

Looking for:
Government buyer, distributor, technology partner, joint venture

Overview

CityEV has been established to design and manufacture the next generation of charge points that will address the challenges faced by infrastructure providers. The company designs, manufactures and supports AC electric charging points for electrified vehicles. Headed by an experienced UK design team, they provide the infrastructure and products for public, commercial & domestic EV charging.

"CityEV provides EV charging infrastructure for lamp-post or other unmetered street furniture utilising a combination of advanced hardware & software that vastly improves on current approaches."

How CityEV's innovation contributes to tackling the challenge of urban air pollution

Toxic air has become a bigger danger to public health than tobacco smoking. Reliable and accessible charging infrastructure is critical for electric vehicles to become mainstream, which will help to improve air quality and make smarter cities a reality in the UK. To feel confident about switching from diesel or petrol to electric, drivers want to know they can find a charge point when they need one. CityEV designs smart charging technology which can be installed everywhere.

Why partners should work with CityEV

CityEV owns its IP and has substantial development capabilities in the UK. Their technology is now defined as part of the Mayor of London's EV roll out (TfL) and they have installs throughout the UK and now expanding in the EU.

Case study

CityEV has recently been commissioned by Brighton City Council in the UK to launch its chargers in several of the city's most densely populated streets. The initial deal will see the launch of 200 units in 2020, and the company hopes to continue work with the council in 2021 to set up further chargers.

EarthSense Systems

Key facts

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Industry sector:
Air Quality, Smart & Connected Cities, Built Environment, Mobility, IoT, Healthcare

Locations active:
UK, Germany, Spain, USA, Nairobi, Chile, Australia, India, Philippines, Malaysia, South Africa

Looking for:
Government buyer, private buyer, distributor, investor, technology partner, joint venture

Overview

EarthSense is a leading air quality specialist, providing expert services in air pollution monitoring, modelling and data provision. EarthSense deliver innovative solutions, enabling the world to visualise and manage its air quality issues for the betterment of human health.

Offering a complete data solution to air pollution from inception to implementation, EarthSense`s monitoring and modelling products highlight a reputation for technical excellence in air quality services in the UK and abroad.

Products include the Zephyr® air quality sensor and global modelling programme MappAir®, measuring and modelling harmful gaseous pollutants including Nitrogen Dioxide, Ozone and Particulate Matter.

"Products that enable the world to visualise and manage its air quality issues. With our air quality sensors and advanced pollution modelling, we create smart systems to inform major investments, assess historic exposure and future risk."

How EarthSense's innovation contributes to tackling the challenge of urban air pollution

Air pollution is recognised worldwide as an invisible killer with an estimated 4.2 million deaths attributed to ambient air quality every year (WHO). EarthSense provides products and services that visualise and improve knowledge of real-time air pollution around the globe. Through air quality measuring (through the Zephyr® air quality sensor) and modelling (through MappAir global air quality API), EarthSense provide the opportunity to identify the pollution hotspots and the major source areas to allow the likes of city and environmental planners, government and business to develop better mitigation strategies and encourage behavioural change.

Why partners should work with EarthSense

Born from 15 years of research at the University of Leicester, EarthSense holds a rich academic heritage specialising in environmental monitoring and modelling of air pollution data. As an organisation they are uniquely positioned having developed market leading capabilities which offer a range of flexible delivery methods through both data as a service (DaaS) and software as a service (SaaS) platforms.

Moreover, spanning both hardware and software products allows EarthSense to drive synergies between platforms meaning they can quickly scale to address new and emerging market needs at the local and global scale. They also partner with a number of key channel partners to take products and services to new markets around the world, further expanding their platform for growth.

Case study

Institute for Advanced Sustainable Studies (IASS) Berlin, Germany

The IASS used static and mobile Zephyr® sensors to inform models to understand small-scale variation of air pollution in cities to help develop building-resolved, city-level models for climate change and air quality.

Static Zephyr® air quality sensors were deployed in an urban setting at varying levels on building facades and vertical posts whilst mobile Zephyr® sensors were fitted to bicycles measuring pollution through complex urban architecture. Measuring NO2 and O3 in real-time, the detailed Zephyr® sensor data will aid the design of future cities. Data will help inform initiatives such as safe, clean and attractive cycleways as well as locate street cafes the optimum distance away from car exhausts and busy roads to minimise health risks for residents.

Electric Zoo

Key facts

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Industry sector:
Electric vehicle, ChargePoint, Mobility Service

Locations active: UK

Looking for:
Government buyer, distributor, franchise, investor

electric ZOO

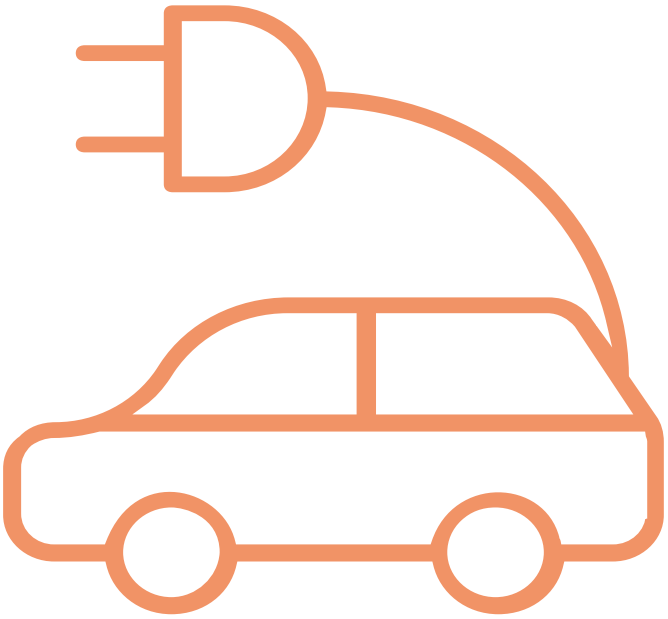
Overview

Electric Zoo have developed smart tech that analyses usage of internal combustion engine (ICE) vehicles to find the ideal electric replacement vehicle demonstrating savings in money and carbon.

"We supply ALL electric cars, charge point infrastructure and Electric Car Clubs to help you – Go Electric The Easy Way."

How Electric Zoo's innovation contributes to tackling the challenge of urban air pollution

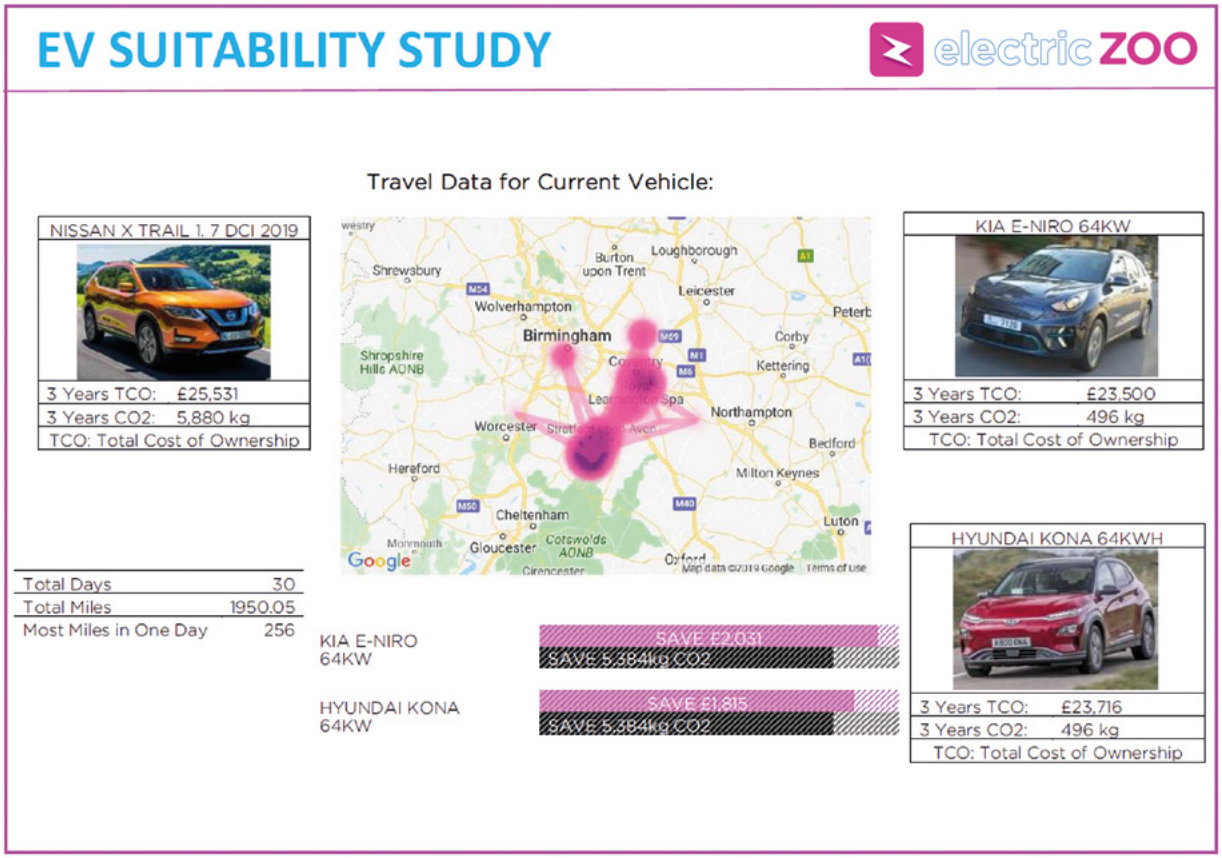
Electric Zoo's smart tech can demonstrate the savings in carbon and money by switching from internal combustion engine vehicles to electric zero emission vehicles.



Why partners should work with Electric Zoo

There is no other smart tech available in the current market which demonstrates the savings in carbon and money by analysing current usage of an ICE vehicle to find the ideal replacement electric vehicle.

Case study



Electric Zoo smart tech has helped transition businesses from ICE to EV with average savings in CO2 of 3.000kgs and average money savings of £3k per vehicle.

Elon Motors Engineering

Key facts

HQ: Ahmedabad, India

Website: www.auritabikes.com

Telephone: +919885636561

Email: info@auritabikes.com

Twitter: @aurita_bikes

Industry sector:
Urban Mobility

Locations active:
India

Looking for:
Supplier, government buyer, private buyer, distributor, franchise, investor, technology partner, joint venture

ELON MOTORS
ENGINEERING Pvt.Ltd

Overview

Elon Motors Engineering works towards creating sustainable urban mobility. They believe in pedal-assisted electric bicycles as the future of urban transportation. They develop specific use cases addressing different segments of the market. And as AURITA BIKES they create the most energy-efficient mode of transport.

Taking their name from a breed of jellyfish which is the world's most energy-efficient animal, AURITA create urban mobility solutions around energy efficiency, including their first line of solutions – the Model F and Model C Utility Electric Bikes.

AURITA F is a Folding Utility Electric Bike, and one of the most compact and lightweight folding electric bikes, which folds into a compact 120L volume using a unique patent-pending folding technique.

AURITA C is a Cargo Utility Electric Bike, suitable for all, and with 150kg payload capacity one of the most versatile and Multi-utility Cargo electric bikes out there.

"Our bikes bring together all the things people need to drive less and ride more. We believe in creating utility bikes for different use cases."

How Elon Motors Engineering's innovation contributes to tackling the challenge of urban air pollution

Mobility has a significant impact on the air pollution of an urban environment. Promoting sustainable mobility solutions by creating a use-case around a pedal-assisted electric bicycle significantly affects the air quality. It promotes clean electric mobility and cycling as a primary mode of daily commutes. Cycling has always been the most sustainable way to commute. Adding an electric drive makes it more acceptable to a wider audience. It also makes daily commutes more economical. These bikes are the most energy-efficient meaning providing more range out of a given battery with the addition of human effort by pedalling too.

Why partners should work with Elon Motors Engineering

AURITA bikes are designed for specific use cases. The design of each component stands out in performing for the proposed use-case day-in and day-out. They believe in developing utility-based bikes with a focus on rider-needs and everything they need to carry. Their designs are customizable according to the geography and the market need. Any individual worldwide living in an urban environment is a potential user. Their Folding bike and Cargo bike both have versatile designs compared to existing models with multiple features end-users require, bringing together all the things people need to drive less and ride more.

Case study

Cargo bikes support different rider heights and can be used as a family bike, or groceries shopping, or for travelling with a passenger. Last mile delivery fleets are another target user-group. Folding bikes act as mobility gadgets and can be carried on the metro, buses, cars/taxis enabling multi-mode travels. They support extensive travelling and touring around the world.

Energeo

Key facts

HQ: Coleshill, UK

Website: www.energeo.co.uk

Telephone: +447803941495

Twitter: @mikebattersby4

Industry sector:
eMobility, Renewable Energy, Low Carbon Technology, Sustainability, Air Quality, Energy Systems, Satellite Data Insights, Data Analytics

Locations active:
UK, Ireland, Germany, India, South Africa

Looking for:
Government buyer, private buyers, franchise, investor, technology partner, joint venture

Overview

Energeo create unique data for towns and cities that need to reduce carbon and other greenhouse gas emissions, generate clean energy, improve air quality and deliver Electric Vehicle infrastructure. They do this by digitally studying the built environment – using sources such as satellite imagery and LiDar – in order to automatically identify the most beneficial locations to deploy low-carbon technologies such as Solar PV, Heat Pumps and EV charge points.

We help climate, energy and mobility stakeholders build better informed strategies for emissions reduction and decarbonisation. By removing the chaos from multiple disparate data streams, and integrating unique geospatially derived insights, we provide decision makers with an evidence facilitating the ranking and prioritising of investments based on both environmental and financial returns.

How Energeo's innovation contributes to tackling the challenge of urban air pollution

Energeo utilise geospatial data and technology, alongside contemporary analytical techniques to automatically identify opportunities for the deployment of low carbon technologies, reducing the initial surveying requirements and accelerating the intelligence gathering process. This enables stakeholders to make better informed decisions faster, removing constraints from the traditionally lengthy planning process and resulting in clean technologies being installed more rapidly in complex urban areas.

Why partners should work with Energeo

Founded by a team of leading geospatial specialists, Energeo has developed a suite of award winning, climate focused data services designed specifically to accelerate the deployment of Low Carbon Technologies and expedite mass decarbonisation. Energeo's consultative approach puts their clients' needs at the heart of everything they do, and their natural instinct to solve problems through data always leads to disruptive and innovative solutions. Energeo's exploitation of contemporary geospatial data and technology enables them to deploy their services at scale globally and rapidly, providing a critical decision-support mechanism for policy makers, energy entrepreneurs, asset owners and technology developers and installers.

Case study

Working on behalf of Oxfordshire County Council in support of their ambitious Electric Vehicle (EV) strategy, Energeo have utilised a combination of geospatial data and contemporary analytical techniques to determine residential property suitability for a range of innovative EV charging solutions. Energeo also delivered intelligence on predicted hot spots for high EV uptake, and developed and deployed a Software-as-a-Service tool to facilitate desk-based survey of sites proposed for EV charge point deployment.

EV Technology

Key facts

HQ: London, UK

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Twitter: @EV_TechUK

Industry sector:
Transport, IoT, electric vehicles

Locations active:
UK

Looking for:
Private buyer

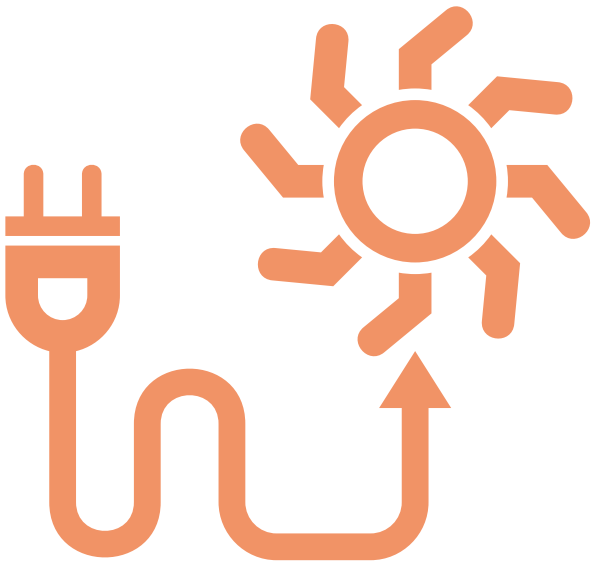
EV TECHNOLOGY

Overview

EV Technology is a consultancy and technology company focused on the electric vehicle market. Born out of the first fully electric taxi fleet in London, their aim is to make the transition of fleets to electric as easy as possible. They are EV experts and enthusiasts with a passion to enable the UK government's 'Road to Zero' strategy.

They use their domain expertise to advise customers on how to transition to electric vehicles in a value-enhancing way, from infrastructure requirements and installation to managing and monitoring their vehicles and how to train drivers in eco-driving. They analyse fleets for the propensity to use EVs, and ascertain the charging requirements of a proposed fleet and then deliver a plan to make sure the vehicles are charged when needed.

Enabling the adoption of electric vehicles at scale through the application of an IoT platform.



How EV Technology's innovation contributes to tackling the challenge of urban air pollution

EV Technology are capturing and developing ways to use data to make operating an EV simple, cheap and enjoyable for both individuals and fleets. Their system combines an Internet of Things platform, phone application and a unique, EV specific telematics system. They utilise vehicle-level data (gathered via telematics) and charge point-level data to create an EV management and monitoring system for fleet operators, displayed via their web fleet portal.

This system provides the answers to some of the fundamental issues faced by fleet operators when attempting to employ EVs, and it paves the way for greater integration across all types of industries, reducing tail-pipe emissions and driving EV growth.

Why partners should work with EV Technology

EV Technology's ultimate ambition is to become the main aggregator of data for all EV market participants. In this position, they can provide information to a range of customers including car manufactures, insurance companies, energy providers and other SMART city service companies.

They want to create a collaborative platform that enables EVs to be adopted by the mass market and make owning/using an EV easier than a combustion vehicle. Only by bringing all participants together in a collaborative rather than competitive environment can the whole market be enhanced.

Case study

EV Technology's system is currently being used by four fleets in the UK to monitor and manage their EVs. They are each working through pilot programs on how to adopt EVs across their fleets and EV Technology are providing them with the vital vehicle and charging data they need to plan the next phases of their roll outs.

GoZero Mobility

Key facts

HQ: Birmingham, UK

Website: www.gozero.in

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Email: ceo@rerise.uk

Industry sector:
E-Bicycle, E-Motorcycle

Locations active: India

Looking for:
Distributor, franchise, investor, joint venture

Overview

Engagement for Installation and operation of e-cycle docking stations at select locations, GoZero intends to create a city-wide public e-cycle sharing scheme to provide a low-cost, environmentally friendly mobility option to city residents.

E-Cycle or Cycle-sharing is a flexible system of personalized public transport. E-Cycle sharing should be a key element in every city's strategy to expand the use of sustainable transport modes. Cycle-sharing is expected to boost the use of public transport by providing crucial last-mile connectivity.

GoZero aims to connect societies to metro stations, commercial places such as main markets and multilevel car parks. The e-cycle docking stations (or "docking stations") will be located at approved sites covering the entire city and registered members will be able to procure an e-cycle at any docking station and return it any other for a nominal charge.

Manufacturer of Innovative two models of e-bicycle,GoZero Mobility UK has a partner in India with whom the design and technology of e-bicycle manufacture is shared.

How GoZero's innovation contributes to tackling the challenge of urban air pollution

Current data indicates that 40% of Bengaluru's pollution is due to vehicles and this figure is expected to worsen, growing to 74% by 2030. This basic data has triggered interest in GoZero's e-bicycle manufacturing business. Their product could play a major role in bringing changes to the habits of the general public, enabling them to adopt an alternative mode of transport which does not emit CO_2. GoZero's – who has an MoU with the University of Birmingham – will also educate and raise awareness of alternative modes of transport, especially e-bicycles.

Why partners should work with GoZero

GoZero are keen to run a pilot project and bring in changes to the current mess of air pollution. They have an Indian partner who can integrate their design and technology to make it locally available in Bengaluru. They have actively launched these bicycles in India under the GoZero brand. Furthermore, they want to pursue this venture jointly with government institutes that have planned for transformation into cycle mode across certain dedicated transport routes (e.g. where the Government could declare certain zones as only for cycles).

Case study

one

400 Wh
BATTERY

60 KM
MILEAGE

LCD
DISPLAY

1 - 5
PEDAL ASSIST

MOTOR
250 Watt

RIM
Double Walled Alloy

FRAME
Mild Steel

BRAKES
Tektro Disc Brakes

THROTTLE
Full Throttle

PAS SENSOR
12 Magnets With Dual Hall Sensor

CONNECTORS
IP65 Waterproof

SPEED
25 KMPH

FORK
Raleigh

Current operation status in India:

- 900 units sold to date
- Second largest e-bike maker in India
- Diversified team of 18 members
- 14 dealers across India
- Exclusive online partner (Amazon)
- 60% sales driven from online retail
- 20+ certified technicians

GreenEnco

Key facts

HQ: London, UK

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LinkedIn: www.linkedin.com/company/greenenco-limited

Industry sector:
Solar PV, energy storage, EV charging, optimisation

Locations active:
UK, Ireland, Sweden, Denmark, France, Netherlands, Germany, Italy, Mongolia, India, New Zealand

Looking for: Government buyer, private buyer, investor, technology partner, academic institute

GreenEnco

Overview

GreenEnco is a renewable energy advisory firm that provides strategic and risk management consulting services including technical and financial services across the complete solar PV project lifecycle and energy storage projects. GreenEnco aims to offer a smart energy solution with its energy management and energy efficiency services. Their projects are located in UK, Ireland, Sweden, Denmark, France, Germany, Netherlands, Italy, India, Mongolia, and New Zealand. Clients are global institutional investors, EPC contractors, project developers etc. and their unique Artificial Intelligence (AI) and Machine Learning (ML) algorithms demonstrated up to 10% generational gain on average in the operational solar plants.

GreenEnco has have designed an integrated solution of solar carport with energy storage & EV charging station. Our innovative lightweight structure design will integrate bifacial solar module.

How GreenEnco's innovation contributes to tackling the challenge of urban air pollution

Conventional transportation system is one of the largest contributors to air pollution and carbon emission. GreenEnco's integrated green energy solution will help develop the fast EV charging infrastructure for EV vehicles. Their solution will not only make an environmental impact but locally procured system components will help developing sustainable socio-economical eco system.

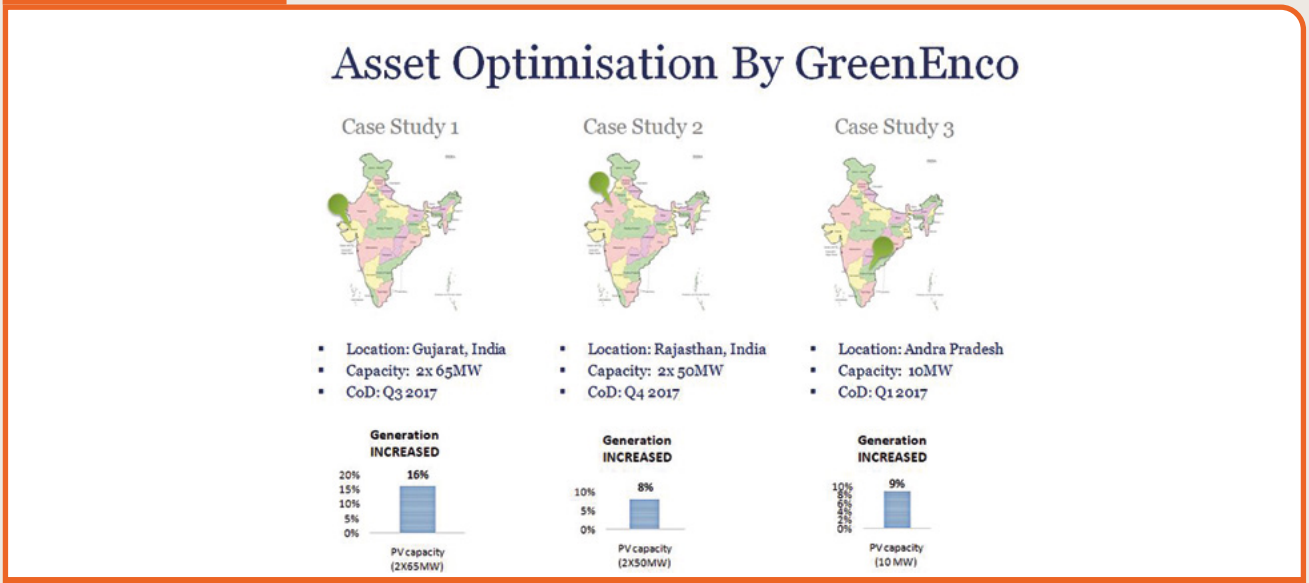
Why partners should work with GreenEnco

With significant previous experience in academia, industry and investment, the GreenEnco team has already executed over 4.5GW utility scale ground mounted PV and commercial rooftop systems across EMEA, APAC and USA.

The GreenEnco team delivered techno-commercial due diligence including contract negotiation of ca £300M M&A deal in the new built and operational solar market and their founder is a co-author of the UK Solar Standard – "IET Code of Practice for Grid Connected Solar Photovoltaic Systems" – and is a member of BSI and IEC international standard committees.

GreenEnco's AI and ML-based Asset Performance Management (APM) strategy helps solar asset owners unlocking ca £24M in ca300MW operational solar assets.

Case study



One GreenEnco solution optimises the yield of an existing solar asset. This AI and ML based analytics solution has been implemented to six solar PV operational sites in India in 2019 with a total portfolio capacity of ca 300MW and stakeholders increased the generation value of those plants in the range of 6%-16%.

Their innovative solar carport solution with an integrated energy storage and EV charging station has a significant potential to develop a sustainable eco-system.

JAL Technologies

Key facts

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Twitter: @prkruti_air

Industry sector:
IoT, environment sustainability, air pollution

Locations active:
India

Looking for:
Government buyer, private buyers, franchise, investor, technology partner, joint venture

Overview

JAL manufacture indoor and outdoor devices ("Prkruti") that use low-power IoT sensors to monitor air pollution and weather conditions. Their mission is to make citizens aware of the impact of poor air quality and help them adjust their routines to mitigate these adverse effects.

"Our world is facing rapid climate and environmental challenges that require adequate and instant measures. Real-time air pollution data to facilitate behaviour change. Our low-cost, low-power smart IoT hardware will generate long-term measurement to understand the causes of pollution & suggest action to cure it..."

Vignesh Kaneria, co-founder

How JAL's innovation contributes to tackling the challenge of urban air pollution

While most citizens are aware in abstract of the problem of air pollution, they don't understand the direct impact on their day to day lives. By installing low-cost air quality sensors (Prkruti) across cities, a clearer picture of air pollution and what is causing it can be built that will inspire citizens to 'go green'. Similar to the Swatch Bharat Abhiyan or Clean India Mission, the goal is to achieve progress through collective action. JAL's environmental AI platform processes the pollution data and provides actionable insights for policymakers and stakeholders.

Why partners should work with JAL

1) JAL provide ultra-low-power, secure, robust and highly scalable and accurate air quality devices well suited to the smart city ecosystem.

2) Their easy API integration and developer platform makes accessing the data 'plug and play' for software partners to deploy third party display

3) Highly accurate long-term data will be an asset for research agencies and data scientists who wish to impact analysis/model/predict air quality changes.

4) Currently air quality sensors are not widely accepted across locations. There is great potential for a rental business model to provide investors with a regular income.

5) Real estate partners can use JAL's sensors base hardware to measure the air quality in target locations and use this as a selling point.

Case study

15 devices were installed at Daman & Silvassa (UT) India, monitoring pollution from urban and industry sources. Data was collected for a year, generating actionable insights for authorities. The impact of these will be demonstrable over the coming months, especially in terms of achieving results in pushing back PM2.5 & NO2 to within permissible limits.

Mastiebikes

Key facts

HQ: Bengaluru, India

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Twitter: @mastiebikes

Industry sector:
Manufacturing, Mobility

Locations active:
India

Looking for:
Supplier, government buyer, private buyer, distributor, investor, technology partner, joint venture

Overview

Mastiebikes is targeting young people with an affordable, versatile and durable electric bike. By driving adoption amongst a younger demographic, Mastiebikes aims to embed a new set of transport behaviours into this generation, helping reduce air pollution and greenhouse gas emissions. Their bike, which is manufactured entirely in India, has a battery with excellent storage capacity and which is easy to swap in and out, reducing concerns about running out of charge.

"The world of the near-future will be shaped by today's young generation. If we can build enthusiasm among them towards EV through an exceptional experience, then air pollution will soon be a thing of past."

Shravan, Founder

How Mastiebikes' innovation contributes to tackling the challenge of urban air pollution

Pollution caused by road traffic is a huge contributor to urban air pollution. Helping society to transition to electric vehicles rather than internal combustion engines is a necessary and transformative step in the direction of cleaner air.

Why partners should work with Mastiebikes

With a lean, efficient and cost-effective local manufacturing process Mastiebikes are developing a product to meet the needs of a large, currently untapped segment of the Indian market.

Case study

Today in India, many under-age consumers ride two-wheeler motorbike. Mastiebikes offers an alternative that reduces risk of both injury and fines.

The lower middle-class market segments in India a large market which makes up around 60% of India are also a target market. Currently these consumers tend to purchase second-hand two-wheelers but struggle with maintenance and fuel costs. Mastiebikes offers an attractive, affordable alternative with the additional benefit of improving air quality for all.

Mastiebikes products primarily target the following markets:

- Students
- Office commuters for last-mile commute
- Small-retail shopkeepers for small local deliveries
- College/Tech-park Campuses

Ohm Mobility

Key facts

HQ: Bengaluru, India

Website: www.ohmmobility.com

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Email: Nikhil@ohmmobility.com

Industry sector:
Infrastructure, Consultancy

Locations active:
India, UK

Looking for:
Supplier, government buyer,
private buyer, investor, technology partner

Overview

Supporting businesses and fleets in India with their transition to electric mobility by broadening vehicle selection and providing charging infrastructure.

Ohm Mobility:

- support fleets in their transition to electric mobility by providing fleet analysis and consultancy services to determine if EVs are right for their operations
- provide optimised EV infrastructure solutions using the latest smart-charging and battery energy storage technologies to integrate into India's constrained electricity grid.

These two aspects are inextricably linked for emerging markets where the limited availability of reliable grid energy, and the cost sensitivity of customers, will require high levels of optimisation in vehicle charging and operations. Ohm Mobility bring world-leading experience in EV Infrastructure solutions to the unique challenges facing Indian businesses as they move to EVs.

"Ohm Mobility is building infrastructure and support services to enable resistance-free transition to an electric vehicle future."

How Ohm Mobility's innovation contributes to tackling the challenge of urban air pollution

Businesses and fleets must shift to cleaner vehicles to reduce air pollution in India's cities. With the rapid development of EV technologies globally India can leap-frog directly to zero tail-pipe emissions EVs. However, there are currently two key barriers preventing widespread adoption: consumer confidence and adequate infrastructure.

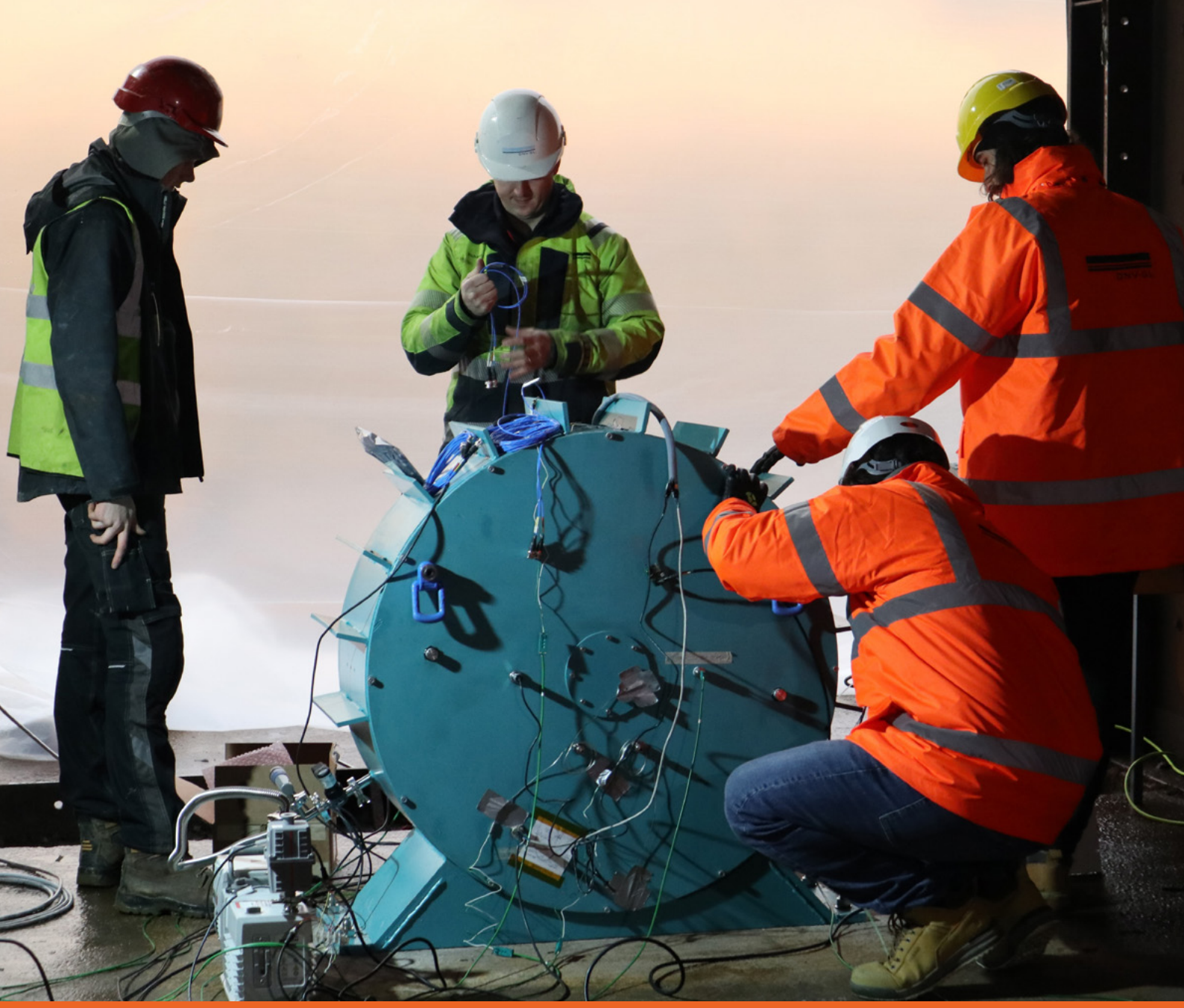
Ohm Mobility exists to support customers right from the start of their journeys to zero-emissions transport by developing the business case for fleets to transition and providing EV infrastructure. They focus on business-model and system-level innovations to accelerate the adoption of EVs.

Why partners should work with Ohm Mobility

Ohm Mobility's founding-team brings together world-leading experience in Electric Vehicle infrastructure and clean energy technology distribution. They apply this experience to the rapidly developing EV sector in India through a dedicated team in Bangalore. They are looking to work with fleets in India looking to transition to EVs, to support initial vehicle feasibility assessments, infrastructure design and implementation. Always on the lookout for the latest technology developments they are especially keen to hear from companies developing charge-points, energy storage systems or smart-charging software.

Case study

Ohm Mobility are currently developing opportunities with two automobile manufacturers in India – both of whom want to partner with Ohm in deploying charging infrastructure. They are also developing partnerships with top building development companies for deploying EV charging stations, as well as designing and testing new product that will soon be ready for deployment.



OXTO Energy

Key facts

HQ: Guildford, UK

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Twitter: @OXTO_Energy

Industry sector:
Energy, electric mobility, railways, smart cities

Locations active:
UK, Europe, Africa, Australia

Looking for:
Government buyer, private buyer, distributor, investor, technology partner, joint venture

OXTO ENERGY

Overview

OXTO Energy is an innovative energy storage company, serving the transition to a low-carbon world by stabilising electricity from renewable intermittent sources of energy. OXTO Energy has developed a new energy storage technology that will deliver safe, scalable and low-cost storage. OXTO's technology uses the principles inherited from previous successful deployments in satellite: simple design with fewest possible components, robust device with very limited maintenance over a long lifetime of 25-30 years. The design allows for working alongside any power application from wind turbines and heavy-industry to EV charging infrastructure.

"OXTO has developed a new clean mechanical battery, made of steel- totally recyclable, climate agnostic and with unlimited cycles, to deliver safe, scalable and lowest cost power storage solutions."

How OXTO's innovation contributes to tackling the challenge of urban air pollution

In India, the energy and transportation sectors generate 70% of greenhouse gas (GHG) emissions. The government targets a 30% share of sales for electric vehicles (EVs) and 40% of renewables (REN) by 2030. Flywheels will foster integration of REN by helping to balance the grid and allow REN to behave like base load alternators. Flywheels will also help support the EV charging infrastructure, whatever the grid connection. It will clearly reduce air and noise pollution. The electrification of transport will have multiple impacts, reducing:

- The energy bill of communities (switching from expensive fossil fuel)
- GHG emissions
- Noise pollution (motorbikes, rickshaw, buses etc. with petrol engines)
- Water contamination (risk of fuel leakage from petrol)

Why partners should work with OXTO

OXTO has three currently active projects related to three different applications:

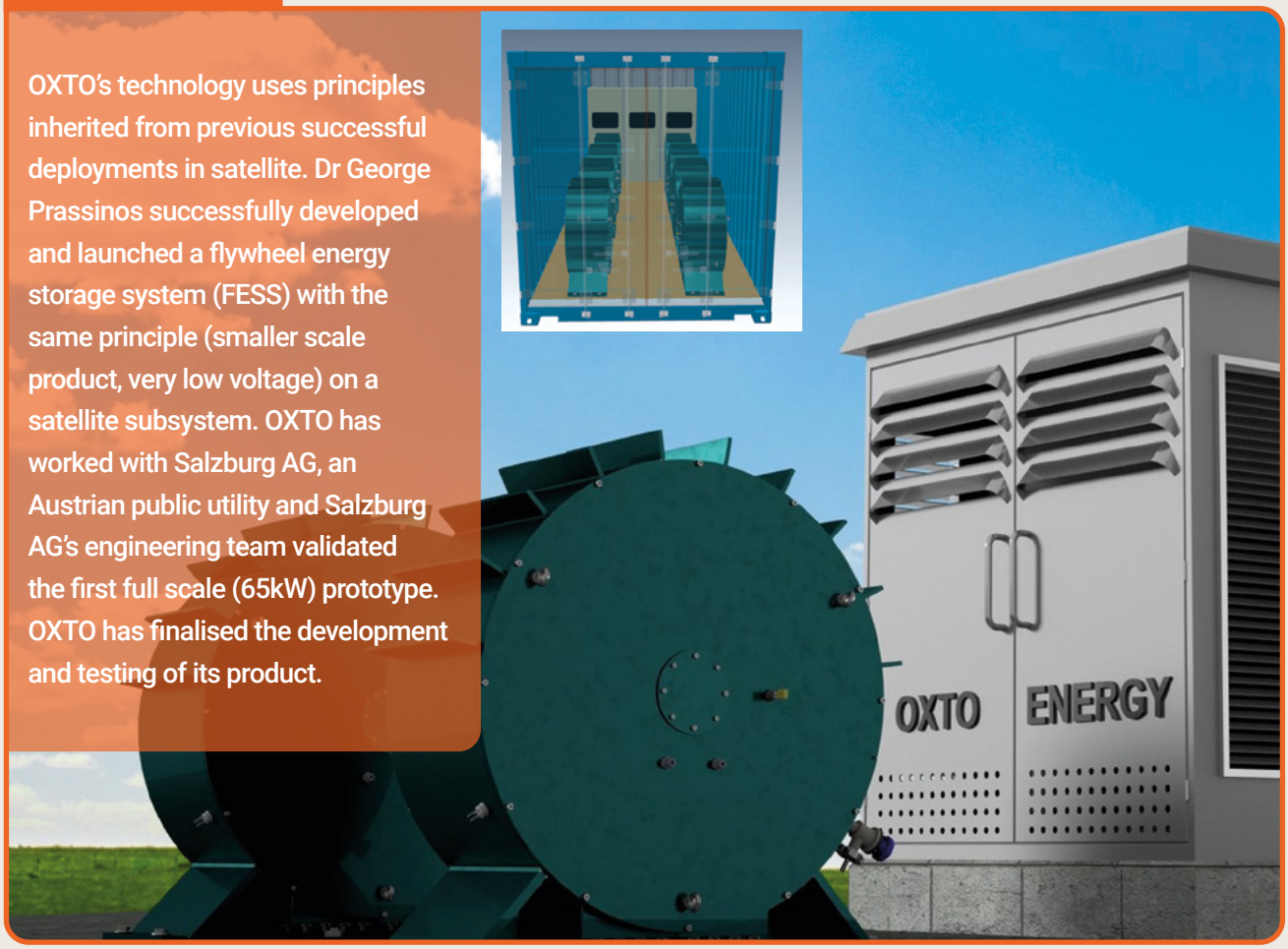
1. Energy recovery from trains to feed a railway station (with SWR in the UK),
2. UPS for industrial customers (large tea factory in Kenya),
3. Building an autonomous solar power plant with no voltage and inertia impact on the grid (in France with Enedis).

OXTO has advanced leads discussions with Engie, Salzburg AG, Shell, Everun, Gamma solutions.
OXTO has succeeded where everyone else failed:

- Outstanding technical performances. 95% round-trip efficiency
- Lowest costs (no cooling system/HVAC, limited maintenance)
- Modular system
- Simple & robust design
- Full metallic system

Case study

OXTO's technology uses principles inherited from previous successful deployments in satellite. Dr George Prassinos successfully developed and launched a flywheel energy storage system (FESS) with the same principle (smaller scale product, very low voltage) on a satellite subsystem. OXTO has worked with Salzburg AG, an Austrian public utility and Salzburg AG's engineering team validated the first full scale (65kW) prototype. OXTO has finalised the development and testing of its product.



Personal Air Quality Systems (PAQS)

Key facts

HQ: Bengaluru, India

Website: www.paqs.biz

Telephone: +919342569490

Twitter: @MyairMyhealth

Industry sector:
Hyperlocal Air Quality, AI, Health Advisories

Locations active: India

Looking for:
Investor, technology partner, joint venture

Overview

PAQS creates innovative IoT Solutions centred around Air Quality with three scales of solution:

1. Full stack solutions for B2B segments/Smart Cities
2. Indoor environment solutions for smart buildings and homes
3. Smart inhaler for individuals with respiratory illness.

"Empowering citizens with accurate hyper local (every sq.km) Air Quality/Pollution data & actionable insights, by integrating various sources of data."

How PAQS's innovation contributes to tackling the challenge of urban air pollution

The primary challenges associated with air quality measurement using regulatory grade instruments are high costs and low spatial resolution. PAQS has leveraged a combination of technologies to overcome these challenges & provide hyperlocal air-quality information:

- New generation sensors: lower in cost and providing high spatio-temporal resolution
- IoT platform: a robust platform with unique IP
- Analytics: machine-learning for pre-processing, calibration, interpolation and forecasting
- Third party integration: different open access data sources in real-time such as satellite, weather, traffic etc.

The PAQS platform and analytics layers deliver value added solutions and actionable air quality insights.

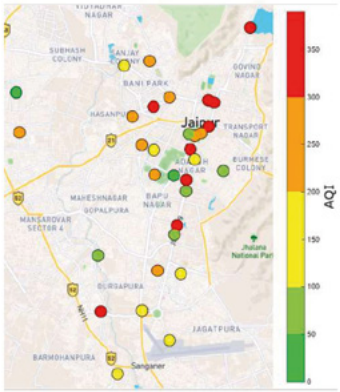
Why partners should work with PAQS

PAQS have extensive experience and domain specialization in the field of air pollution monitoring and subsequent analytics leveraging IoT/AI/ML technologies:

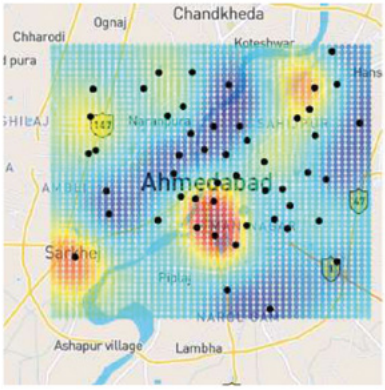
- Two US product patents with more in the pipeline. Indian patents expected imminently.
- Trademarks obtained from India/USA.
- Proven track-record of creating and commercializing products
- Extensive knowledge of working with affordable miniature environmental sensor technologies
- A robust and readily scalable backend and platform integrating multiple sources of data
- Expertise in field deployments, including routine calibration and maintenance of low-cost sensors
- Tie-ups with leading ICT players
- MoU with research institutions and NGOs

Case study

PAQS Analytics Offerings



Jaipur Hotspot



Ahmedabad Interpolation

PAQS Environmental Sensors have been deployed in 15 smart cities across India. Major cities where PAQS has been deployed include Ahmedabad, Vizag (50 devices each) and Jaipur (35+ devices). This network is used to identify hotspots and locations of interest within a city and perform analytics. This hyperlocal data has aided decision makers to make changes and reforms (for example changing a two-way street to a one-way street outside a public school to reduce children's daily exposure to air pollution).

Rerise Ventures

Key facts

HQ: Birmingham, UK

Website: www.rerise.uk

Telephone: + 447970332837

Email: ceo@rerise.uk

Industry sector:
Wireless Charging with electric buses

Locations active:
India

Looking for:
Government buyer, investor, joint venture

Overview

Rerise Ventures see strong potential for the wireless charging concept, which reduces overall bus operating costs by allowing the usage of smaller batteries. Buses typically recharge regularly at the end stations or at intersections and thus are in many cases infinitely usable. Short charging windows distributed throughout the day in addition, puts less stress on the battery, thus protecting the battery and leading to a longer useful life.

Experience has shown that the vehicles return to the depot at night with 40 to 50% State of Charge (SOC).

"The fastest and easiest way to implement wireless charging is for buses, which can easily be outfitted with receivers."

How Rerise Ventures' innovation contributes to tackling the challenge of urban air pollution

Facilitating the transition away from the internal combustion engine to electric vehicles will have a huge impact on reducing air pollution. Wireless charging can be a key part of this transition as it is more convenient (leading to easier adoption) and just as efficient as wired charging. In addition, inductive charging automatically stops when the device is fully charged, a technique that is not available in 99% of currently available adapters. The life-cycle energy, greenhouse gas (GHG) emissions and costs associated with a stationary wireless charging all-electric bus system are all lower when compared to plug-in charging all-electric bus systems.

Why partners should work with Rerise Ventures

Rerise Ventures UK Ltd is well positioned to exploit the Indian market via its 100% subsidiary company RERISE IPT in India. They seek partnerships with public sector highway authorities for deployment of charging solutions and are already in discussion with partners to identify dedicated highway routes with distance from 150km onwards for electric vehicle operation with wireless charging.

Case study

RERISE have various case studies from around the globe. A selection of which can be seen in the below videos:

Wireless Charged Electric Bus Milton Keynes
https://www.youtube.com/watch?v=GoC4TU3rDnw

IPT Charge Colours of IPT
https://www.youtube.com/watch?v=ntJW4i-AlTc

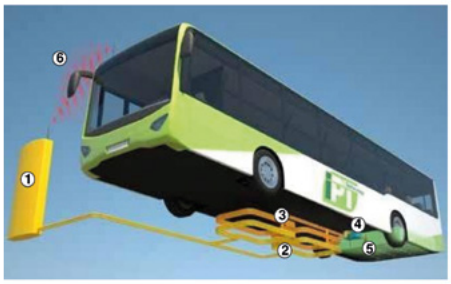
Public Transport - getting the power onboard
https://www.youtube.com/watch?v=TyV58uM1TUk

Effizienzhaus Plus Berlin | IPT Technology
https://www.youtube.com/watch?v=vi0NahH9A20

Urban Solution |
https://www.youtube.com/watch?v=_S4JDY3yWPc

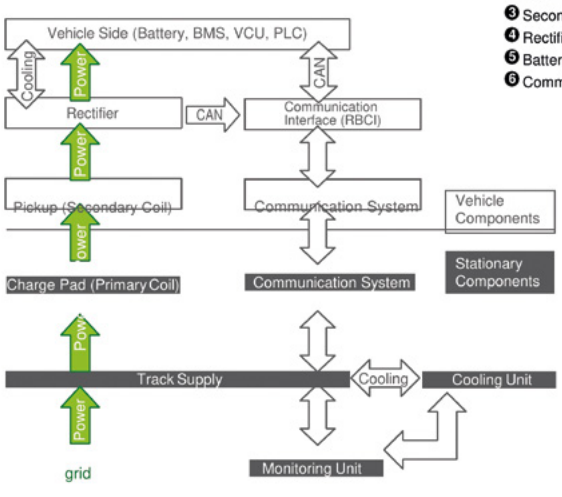
IPT® Charge for Buses

IPT® Charge Bus is a wireless power transfer system that allows electrical energy to be supplied to consumers without any electrical or mechanical contact or intervention. Charging can be made possible at virtually any opportunity.



Principle of Operation

Each IPT® Charge Bus system consists of two parts, primary and secondary, which are magnetically coupled, similar to a conventional transformer. The primary or stationary side consists of a Charge Module and one or more Primary Coils. The secondary or vehicle side consists of one or more Pickups (Secondary Coil) and Rectifiers, installed onboard a vehicle. Unlike a conventional transformer, where primary and secondary are tightly mechanically coupled, IPT® Charge Bus is a loosely coupled system that operates over an air-gap.



Transvahan Technologies

Key facts

HQ: Bengaluru, India

Website: www.transvahan.com

Telephone: +919980034599

Industry sector:
Electric Vehicles - Mobility Transformation.

Locations active:
India

Looking for:
Supplier, technology partner, joint venture

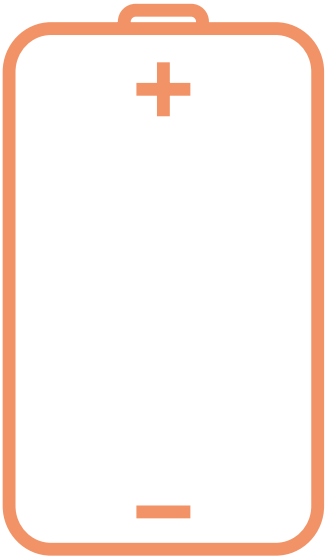
Overview

Transvahan Technologies is a growing business engaged in providing sustainable mobility solutions: manufacturing battery operated electric vehicles and automotive components, as well as offering consulting and training solutions in the automotive, clean-tech and aerospace sectors.

"We offer green transport solutions designed with societal needs in mind. Our E-Carts have now been modified for new applications such as solid waste management and use in food courts."

How Transvahan Technologies' innovation contributes to tackling the challenge of urban air pollution

Manufacturing and supplying battery operated electric vehicles targeted at lower income consumers encourages uptake and thereby results in fewer polluting vehicles on the roads (as well as reducing noise pollution).



Why partners should work with Transvahan Technologies

A growing SME with all statutory approvals relevant to their sector Transvahan Technologies have a manufacturing facility strategically located in Bangalore with a strong network and good market access.

Case study

Transvahan's E-Rickshaws are currently used at the Indian Institute of Science in Bengaluru for movement of students, faculties, residents and visitors around the campus. There are 15 E-rickshaws on the campus, which can be tracked via an app. The E-rickshaw fits four people and users pay via digital app.

VEICOLNET

Key facts

HQ: Cranfield, UK

Telephone: +447514824748

Email: s.gariuolo@cranfield.ac.uk

Industry sector:
Connected and Autonomous Vehicles, IoT, Mobility as a Service

Locations active:
UK, Europe

Looking for:
Government buyer, private buyer, investor, technology partner, joint venture

Overview

VEICOLNET's mission is to give everyone the power to create smart services uniquely enabled by in-vehicle data, instantly, effortlessly and without barriers. They provide an innovative technology platform to develop automotive IoT applications in smart cities and cities that aspire to be such around the globe, and more generally in all areas where it is possible to monetize vehicle data, like insurance and fleet management, at scale. Their technology transforms existing road vehicles into smart and connected sensing devices, allowing the live collection of data that would otherwise be impossible to access. This data is used for the development of smart services to face grand transportation and mobility challenges in a cost-effective way and without any modification to urban infrastructure.

"We firmly believe that vehicle data has immense untapped potential, which could be used to reduce costs and increase reliability of services and, above all, improve people's quality of life."

Salvatore Gariuolo, CEO

How VEICOLNET's innovation contributes to tackling the challenge of urban air pollution

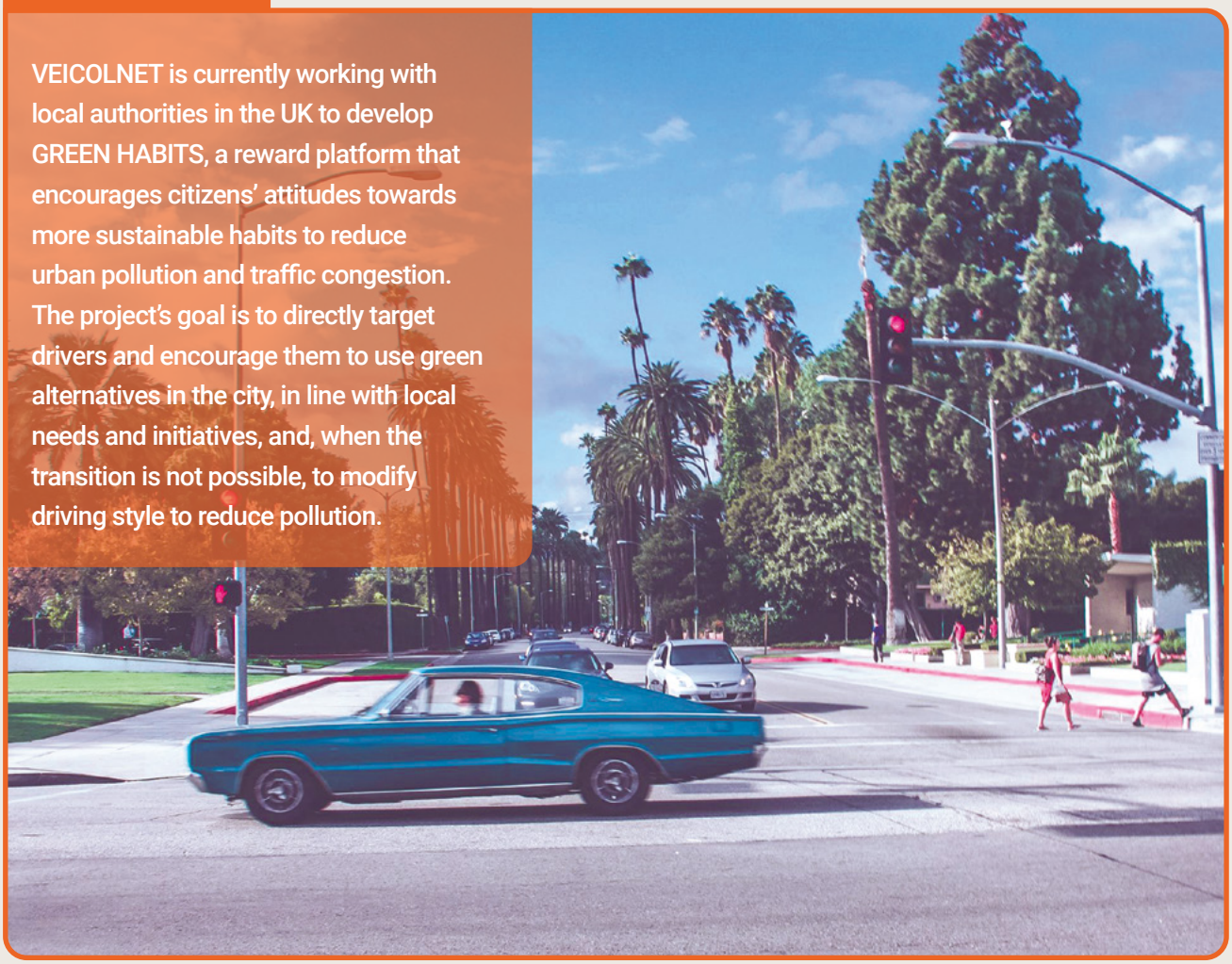
VEICOLNET's uniqueness is their ability to estimate, in real-time and with extreme accuracy, the emissions produced by a vehicle from on-board data, taking into account the vehicle type, the driving style and the traffic situations. This leads to a real-time vehicle pollution monitoring system that does not require the installation of expensive sensors throughout the city. The resulting information can be used both by local authorities as a decision-making resource and by citizens, to increase awareness of the pollution problem and act accordingly. This information can also be used to implement ground-breaking services, like emissions-based vehicle routing algorithms and gamification platforms.

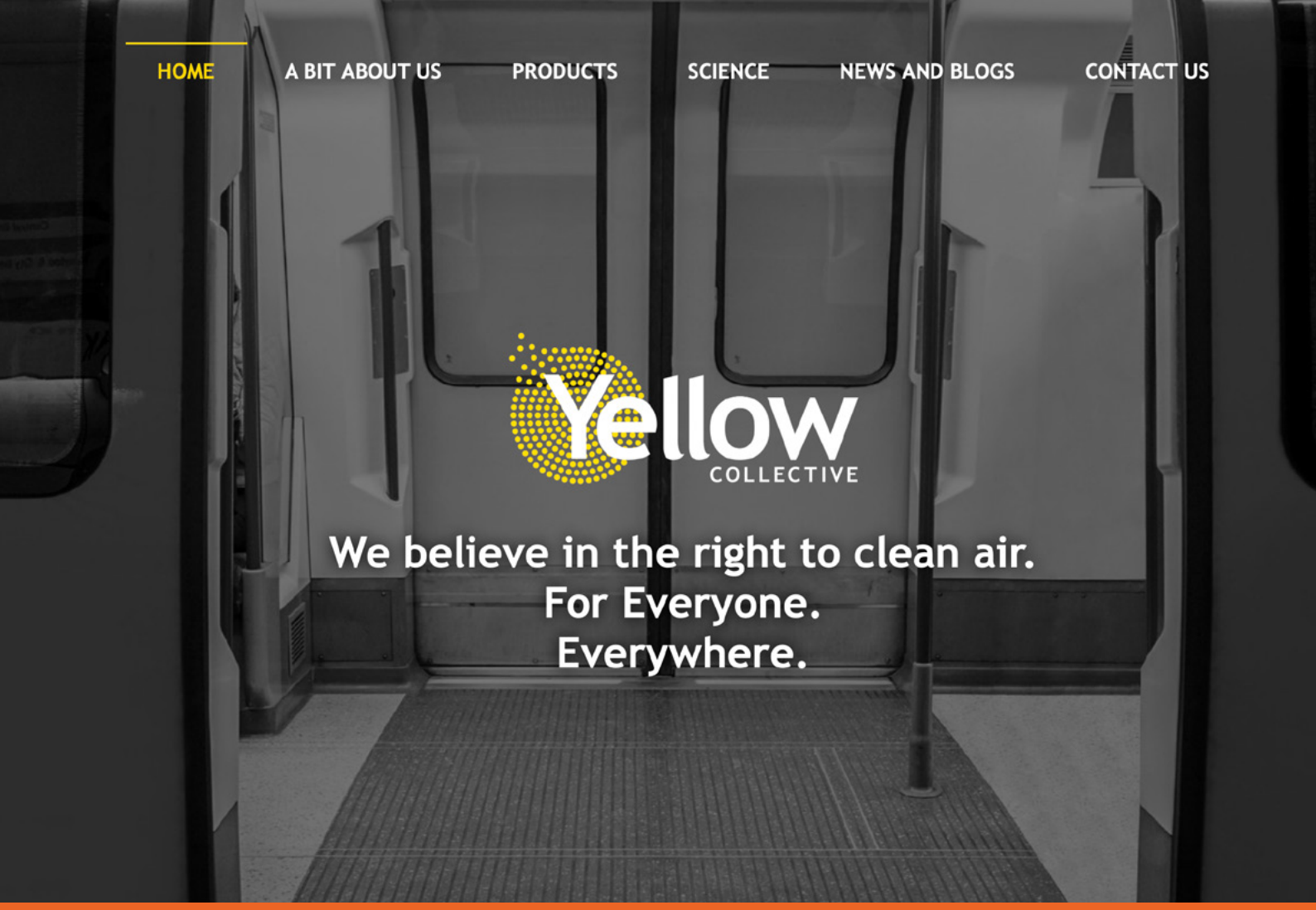
Why partners should work with VEICOLNET

VEICOLNET is an outstanding player in today's market as it is able to manage the entire technological infrastructure for the creation of smart services based on in-vehicle data, in a way that is totally independent from OEMs or third parties. They employ their own proprietary dongle for the extraction of data from all types of vehicle, whose features can be adapted to the application requirements, and they use highly innovative algorithms for processing the data. They also support data management operations of the extracted data in cloud infrastructure, the services' business logic, and the integration of the resulting information into web and phone applications.

Case study

VEICOLNET is currently working with local authorities in the UK to develop GREEN HABITS, a reward platform that encourages citizens' attitudes towards more sustainable habits to reduce urban pollution and traffic congestion. The project's goal is to directly target drivers and encourage them to use green alternatives in the city, in line with local needs and initiatives, and, when the transition is not possible, to modify driving style to reduce pollution.





Yellow Collective

Key facts

HQ: Lancing, UK

Website: www.yellowcollective.net

Telephone: +447528773624

Email: mark.cusack@yellowcollective.net

Industry sector:
Air cleaning, built environment

Locations active: UK

Looking for: Government buyer, private buyer, distributor, franchise, investor, joint venture

Overview

Indoor and Outdoor filterless air cleaning of pollution, pathogens and combatting CO_2.

"Indoor and external filterless technology cleaning the air of pollution, pathogens, harmful chemicals & combatting CO_2.Our stand-alone devices are plug & play and the tech can also be retrofitted."

How Yellow Collective's innovation contributes to tackling the challenge of urban air pollution

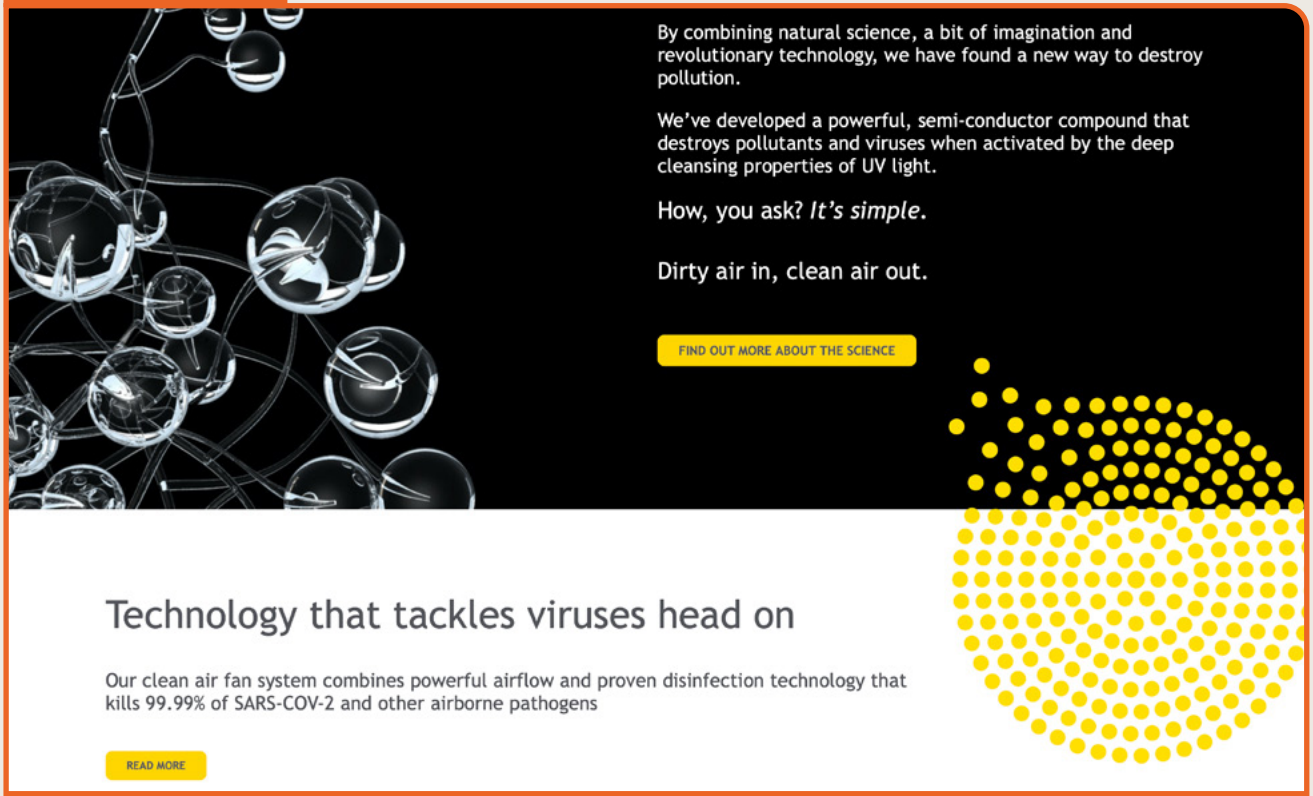
Yellow Collective's tech instantaneously decomposes pollution, including PM 0.1, combats CO_2, kills pathogens (including Covid19) and VOC's, leading to numerous positive impacts economically, on population health, healthcare systems. Their commercial model makes their tech as widespread as possible to promote widespread adoption throughout society. Clean air is a right not a privilege.

Their scalable and filterless air cleaning device has a dual method for destroying Covid19 through the use of UV light, a well-known germicidal remedy, and a highly reactive and novel photocatalytic irradiated matrix, which can be deployed to suppress any future infections, from the common cold to new novel infections, "pandemic interruption".

Why partners should work with Yellow Collective

Environmental Control Coatings are a start-up with a patent pending recombinant innovation that does good. They seek to embrace the circular economy and want to drive local economy and partners in a way that benefits society and the local economy.

Case study



Yellow Collective have tested their catalysts and devices in both university their own labs, and in real-life conditions with specific challenges such as cigarette smoke, gas hob and ambient air. The product is new to market with patents applied for.

Featured companies

This UK-India Green Business Portfolio is part of the Innovating for Clean Air Programme and has been curated and designed by the Connected Places Catapult.

The Catapults would like to express their gratitude to the following organisations that kindly spared their time for the purposes of this project:

- **Bengaluru Traffic Police**
  http://www.bangaloretrafficpolice.gov.in/default.aspx
- **Climate Centre for Cities (c-cube)**
  http://niua.org/c-cube/node/38
- **CSTEP**
  https://www.cstep.in/
- **British Deputy High Commission in Bengaluru**
  https://www.gov.uk/world/organisations/british-deputy-high-commission-bangalore
- **C40 Cities**
  https://www.c40.org
- **Citizens for Sustainability**
  https://cifos.weebly.com
- **Confederation of Indian Industry**
  https://www.cii.in
- **Directorate of Urban Land Transport, Bengaluru**
  http://www.urbantransport.kar.gov.in/
- **Enzen**
  https://www.enzen.com/global/
- **Everything Eco**
  http://everythingeco.in/
- **EY**
  https://www.ey.com/en_uk
- **Fields of View**
  https://fieldsofview.in
- **Global Business Inroads**
  https://www.globalbusinessinroads.com
- **HSBC**
  https://www.hsbc.com
- **India Energy Storage Alliance**
  https://indiaesa.info
- **Indian Institute of Science**
  https://www.iisc.ac.in
- **Indian Institute of Information Technology, Benagluru**
  https://www.iiitb.ac.in
- **India National Institute of Urban Affairs**
  http://www.niua.org
- **India Smart Grid Forum**
  https://indiasmartgrid.org
- **Karnataka State Pollution Control Board**
  http://kspcb.gov.in
- **Niti Aayog**
  https://niti.gov.in
- **Project Lithium**
  https://project-lithium.com
- **Quanzen**
  https://www.quanzen.com
- **Rocky Mountain Institute**
  https://rmi.org
- **SELCO Foundation**
  https://www.selcofoundation.org
- **Sensing Local**
  https://www.sensinglocal.in/
- **Shakti Sustainable Energy Foundation**
  https://shaktifoundation.in
- **Shell E4 Programme**
  https://e4.shell.in
- **TechUK**
  https://www.techuk.org
- **The Automotive Research Association of India**
  https://www.araiindia.com/home
- **UK India Business Council**
  https://www.ukibc.com
- **Urban Morph**
  https://urbanmorph.wordpress.com
- **Valluri Tech Accelerators**
  https://www.vallurita.com
- **World Resources Institute**
  https://www.wri.org

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