

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085595	Mid	12	442335	349282
Admin Lead		Technology Lead	All Organisations	
OPEN ENERGY LABS LTD		OPEN ENERGY LABS LTD	OPEN ENERGY LABS LTD, Strathmore University, University of Ca	
Project Title				
Energy Makers Academy: A mobile learning platform for universities to train rural energy innovators				
Public Summary – Provided by applicants				
<p>The number of people without access to electricity in Africa dropped from almost 860 million in 2018 to 770 million in 2019 (IEA et al., 2021). However, without more sustained efforts, it is predicted that 650 million people will still live without access to electricity in 2030, despite universal access to affordable, reliable, and sustainable electricity by 2030 being a key Sustainable Development Goal (United Nations, 2015).</p> <p>Despite Kenya's goal of 100% access to electricity by 2022, over 40% of people living in rural areas still don't have access to electricity. Expansion of national utility grids to rural areas in is neither economically nor technically feasible in the short-to-mid-term (KNES, 2018) because of highly dispersed populations in rural areas (e.g. Kenya, &gt;30 people per square kilometre in Northeastern areas; English et al., 2018). Thus, governments in the region will rely on decentralised, off-grid energy solutions, such as Solar Home Systems; SHS). Solar Home Systems are stand-alone units, which include a photovoltaic panel (electricity generator), a battery and charge controller (energy storage and distribution), and electrical appliances (the energy load), providing at a minimum "Tier 1" electricity access for task lighting and phone charging (ESMAP, 2015). Solar panels with 1 -- 10 W output can be used to power lights to replace kerosene lamps in households. However, deployed solar panel systems have high failure rates (Feron, 2016); for example, reported failure rates of 65% in Laos (IRENA, 2014). These high failure rates result from lack of maintenance or after-sales service, and harsh operating conditions (Van Diessen, 2008).</p>				

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With funding from Innovate UK, Open Energy Labs (UK SME), TEA-LP (a network of African universities), and Strathmore University will develop our existing technology to be suitable for universities to teach rural/remote/disabled students how to design, build and maintain a solar home system. Thereby directly addressing a key barrier for the uptake of renewable energy technology in sub-Saharan Africa; namely, the need for locally skilled people to design, install, operate, manage, and maintain household systems. We will test our updated software training platform and hardware with 100 users in Kenya to ensure that we develop a desirable, fit-for-purpose solution.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10072919	Late	36	4391184	1976033
Admin Lead		Technology Lead	All Organisations	
MOBILE POWER LTD		MOBILE POWER LTD	PYROGENESYS LTD, Agsol Limited, MOBILE POWER LTD	
Project Title				
Integrating Sustainable Technologies to create a 'Distributed Renewable Energy System' for Clean Cooking, Milling and Cooling in Nigeria and DRC.				
Public Summary – Provided by applicants				
<p><b>VISION:</b> Ensuring the clean energy revolution reaches the poorest and most marginalised in Nigeria and DRC through integrating innovative clean energy technologies within Mobile Power's energy ecosystem to replace fossil-fuel generators and wood-biomass for cooking, creating a 'Distributed Renewable Energy System' (DRES)</p> <p><b>OBJECTIVES:</b> This experimental development project will demonstrate a solution that integrates generation, distribution and use of clean-energy in rural settings. This requires new technology - a multipurpose 'MOPO PowerBox' - and incorporation of household and productive use appliances within the Mobile Power business model. Mobile Power has an established presence serving 53,000 frequent customers in 180 communities. The objective of this project is to see if it is possible to acquire and combine existing technological, market knowledge and business models with the aim of providing services to rural customers. Pyrogenesys' waste-to-energy technology will generate electricity that will be distributed by Mobile Power's innovative battery storage technology to power:</p> <ul style="list-style-type: none"> <li>* clean cooking in partnership with Gamos/MECs,</li> <li>* grain milling in partnership with AgSol</li> </ul>				

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\* sustainable cooling- refrigeration and fans using Mobile Power's smart modular inverter.

## INNOVATION:

1. Mobile Power has a unique power delivery ecosystem and business model through installing solar-powered battery charging Hubs (MOPO Hubs). Batteries are rented via a 'pay-per-use' model at 70-80% lower cost than fossil fuel alternatives. Our secure, smart battery ecosystem remotely tracks MOPO Batteries through the entire rental cycle making losses to theft negligible.

2. Pyrogenesys have a proprietary pyrolysis technology for producing electricity from agricultural waste. In addition to solar, MOPO Hubs will be charged using Pyrogenesys's technology to enable battery charging at night.

## 3. DC Appliances

\* AgSol has a low-cost, high-efficiency MicroMill for grain milling. The MicroMill can process food 50x faster than a human can, thereby transforming a one hour manual task, or a time-wasting journey to the nearest mill, into a quick and easy job.

\* MECs/Gamos have developed an affordable low-cost Electric Pressure Cooker (EPC). Mobile Power will integrate these appliances to be powered by MOPO Batteries through developing a 'MOPO PowerBox'; a multi-battery docking system enabling three battery configurations needed to power different size appliances.

AREAS OF FOCUS: These integrated technologies will be demonstrated in 100 rural off-grid communities in new markets (Nigeria and DRC, the two largest African markets) in real life operating conditions, iterating the business model to demonstrate a commercially scalable product and services that will unlock future sales and further investment.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10076185	Mid	24	1161206	887165
Admin Lead		Technology Lead	All Organisations	
POWER ROLL LIMITED		POWER ROLL LIMITED	The Energy and Resources Institute , POWER ROLL LIMITED, On Call Africa	
Project Title				
ePowerCart - Affordable Mobile Clean Energy for Remote Communities in Rural Sub-Saharan Africa and India				
Public Summary – Provided by applicants				
<p>Although progress towards energy access for all is being made in developing regions, 675m people worldwide are still living without access to modern energy services \[Tracking SDG7, The Energy Progress Report, 2023\]. Hundreds of millions more people live with unreliable or expensive electricity. Following the Covid-19 pandemic, Sub-Saharan Africa's share of the global population without access rose from 74% to 77%. Since only 26% of SSA's rural population had access to electricity pre-pandemic, remote rural communities continue to lack energy access and are at risk of being left behind.</p> <p>People living without clean energy, depend on biomass and diesel fuels, which are highly detrimental their health and the environment. Moreover, lack of affordable and reliable energy access is a key barrier to economic and human development in emerging economies. Power Roll Ltd, The Energy and Resources Institute, India (TERI) and On Call Africa (OCA), will develop a mobile energy solution, specifically designed bring to clean, reliable and affordable energy access to underserved, isolated communities in remote areas of Sub-Saharan Africa and South Asia. We will work with rural communities and organisations in India and Zambia to ensure our solution is carefully designed, considering end-user needs and potential impacts on Gender Equality and Social Inclusion (GESI).</p> <p>Power Roll Ltd has developed a unique, ultra-low-cost, ultra-light weight, photovoltaic (PV) thin-film based on highly innovative micro-groove architecture. We will bond our flexible PV film to pop-up fabric trailer-tents, and combine this with remotely managed energy storage to produce an affordable, transportable and pop-up, ready-to-use energy system, 'ePowerCart'.</p>				

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We will design and build ePowerCart prototypes for electrical/mechanical performance testing performance and field trials in India and Zambia including:

- \* Girls' school/college, Mukteshwar (India) powering IT resources (improving connectivity), and electric lighting (extending study time)
- \* Chalimongela/Kanyanga's mothers' shelter (S.Zambia), enabling health/sanitation education outreach, vaccination programmes, and mobile ultrasound unit (improving health and mother/baby mortality rates)
- \* Community/agricultural solar water pumping (displacing water collection)

Post-project, initially, Power Roll Ltd will produce ePowerCarts in the UK and manage distribution. Subsequently, ePowerCart will be produced for suppliers by local, in-country manufacturers via a licensing model.

Successful project delivery will accelerate affordable, reliable clean energy access for our field trial participants and other remote Sub-Saharan African/Indian communities with similar climates and terrain. This will bring positive health, economic and environmental impacts to the most isolated, underserved and marginalised communities.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10084724	Mid	24	1471971	1133905
Admin Lead		Technology Lead	All Organisations	
ACEON BATTERY SOLAR TECHNOLOGY LTD		ACEON BATTERY SOLAR TECHNOLOGY LTD	Liverpool John Moores University, Nevadic Limited, IN2TEC LIMITED, ACEON BATTERY SOLAR TECHNOLOGY LTD	
Project Title				
Development of a HIGH Capacity FLEXible Energy Storage System for Mini-Grid Application in Sub-Sahara Africa (HIGHFLEX)				
Public Summary – Provided by applicants				
<p>This collaborative project will <b>**develop and demonstrate**</b> a new technology (HIGHFLEX) that consists of a high-capacity flexible energy storage systems (HIGHFLEX ESS) integrated with innovative Battery Management System (BMS); Power Conditioning Unit (PCU) and intelligent monitoring and performance management system (Digital Twin) for mini grid applications in hot climates. The new technology is a portable and scalable system that facilitates:</p> <ul style="list-style-type: none"> <li>* Quick development of mini grids in SSA.</li> <li>* Storage of high-capacity energy generated from clean power sources during peak hours for off-peak utilisation.</li> <li>* Delivering reliable and affordable power system through innovative solutions e.g., Digital twin, second life battery, real-time performance management and heat control system.</li> </ul> <p>The project's vision is to rapidly accelerate access to affordable off-grid electricity from clean energy sources in SSA. The project taps into the expanding global mini grid markets to offer affordable energy access for social mobility and inclusion in SSA communities not served by main power grids. HIGHFLEX will facilitate steady supply of electricity to rural and unserved areas and reduce energy access gaps between rural and urban communities in SSA where inaccessibility to affordable electricity is one of the main drivers of poverty to over 600 million people.</p> <p>This project has chosen Nigeria as a case for deployment of HIGHFLEX technology because of its over 200 million population and majority of its rural population (48% of its total population) do not have access to affordable and low carbon electricity.</p>				

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The project addresses barrier (access to electricity) to adoption of advancements in healthcare system; developing new technologies for agriculture, commerce, education; and entrepreneurship. HIGHFLEX makes it possible to deliver low carbon electricity to unlock sustainable economic development in SSA communities. This will empower women and children to lead more productive lives and have a better wellbeing. This will in turn encourage gender equality by learning digital and modern skills, which gives girls and women equal access to education, healthcare and enterprise.

Furthermore, access to clean energy via mini grid will reduce crime and social unrest, since majority of the population would be productively engaged (Bloomberg 2020). This will lead to improved human security and cohesive communities and societies driven by mutual objective for sustainable development. HIGHFLEX will accelerate access to affordable and low carbon clean energy from bio-diesel, solar and wind (SDG 7), which lower environmental impacts from continued use of diesel-powered generators in Nigeria (world's leading generator consumer) to combat climate change effects (SDG 13).



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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10073042	Mid	24	676017	467897
Admin Lead		Technology Lead	All Organisations	
SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD		Soleil Power	SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD, Soleil Power, Regenerators Limited, Zembo Motorcycle SMC Ltd	
Project Title				
Li-Ion Battery Storage Circularity For Africa By Africa for Low-Carbon E-Mobility E-Agriculture and Minigrids				
Public Summary – Provided by applicants				

Kampala, Uganda has the 17th worst air pollution in the world, with an abundance of motorcycles contributing with unregulated emissions. 75% of Ugandans are rural farmers, living off of subsistence farming with energy access rates below 10%. Meanwhile, the two-wheeled EV (2WEV) market is taking off in the region, poised to help reduce air pollution but introducing a looming e-waste problem caused when their lithium-ion batteries reach the end of their service life.

Taken separately, these are problems. But together they represent an opportunity to turn e-waste into e-resources, increase energy access and agricultural productivity, and boost the uptake of clean energy solutions. To this end, Soleil Power and STI4D are implementing a project to build high-quality 2WEV batteries designed for efficient repurposing into affordable and scalable 2nd-life products for energy access customers. We want to get ahead of the curve by enabling a circular battery value chain right from the start. Li-Ion batteries have a long total life-span but they are removed from EV service once they are depleted to 80% of their original capacity. Thereafter, whilst they are no longer optimal for EV use, they still have very high potential value in stationary applications such as mini-grids and institutional ESS. To capture this value, STI4D and Soleil will also design affordable 2nd-life products that can be deployed off-grid or as backup-power.

Soleil will build on existing partnerships to test these innovative products. E-mobility company Zembo, building 2WEVs and battery swapping/charging infrastructure, sees high value in procuring their batteries domestically as well as having a partner to offtake them after they have completed their service. E-Ag partner Regenerators, who are working to increase smallholder productivity through the introduction of an electric tractor will also pilot the EV battery.

Soleil's experience shows that much of the cost associated with the repurposing of EV battery products depends on the complexity of disassembly, testing and rebuilding used battery-modules. The new designs will streamline and accelerate this process to reduce e-waste and facilitate circularity whilst increasing access to clean and affordable energy. A better understanding of the battery circular economy in East Africa is critical to finding optimal ways to incentivize commercial investment, so STI4D and Soleil will also use the project as a case study on which to conduct a value-chain analysis, developing and collecting data on sustainable business models including for combining energy access systems with battery-charging as anchor loads.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085796	Mid	24	287241	226224
Admin Lead		Technology Lead	All Organisations	
CHALLENGES CATALYST LTD		CreativEnergie	CREATIVENERGIE, CHALLENGES CATALYST LTD, Community Energy Malawi	
Project Title				
Bitesize Energy Portable Productive Power for Enhanced Energy Access and Productivity				
Public Summary – Provided by applicants				
<p>Despite its potential, Malawi's Mini-grid market remains in its infancy, facing barriers to realising full impact. These include, most notably, accurately forecasting Average Revenue per User (ARPU) and Average Weekly Time of Power (AWTP) when assessing potential locations, and initial low energy demand during evening hours, increasing battery storage costs.</p> <p>Building upon existing hardware and software developed by CREATIVenergie during Energy Catalyst 7, our approach stimulates impactful community demand for energy by integrating portable small-scale productive applications into a rental model that incorporates pay-per-use battery swapping, simultaneously generating local data on ARPU and AWTP to support accurate load projection analysis and de-risk prospective minigrid investments.</p> <p>To sustain operations, we will employ a two-tier 'franchisor-franchisee' model. As franchisors, Challenges Catalyst will partner with local aspiring mini-grid developers (MGDs) to act as 'franchisees', procure hub equipment, manage branding and set quality standards. Franchisees will own and operate the pay per use battery swap and PUE model, collecting ARPU and AWTP data and acting not only as the frontline for customer interactions, but also as community advocates for present and future energy needs.</p> <p>Guided by Malawi's Integrated Energy Plan, we will target communities where minigrids have been identified as the preferred electrification option. As we expand, we will also target more remote off-grid communities, inclusively recruiting and training local franchisees.</p> <p>This project includes the following key work packages:</p>				

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- \\* Hardware and software development involves updating electronics hardware design, software design, casing design, prototyping, and testing for battery rental and management.
- \\* During the demonstrator implementation phase, tasks include installation, manufacturing hardware for trials, deploying and commissioning hubs, commissioning portable productive loads, installing communication systems, conducting trials, and data collection. Ongoing operation, maintenance, and data collection are also part of this phase.
- \\* Commercial implementation involves conducting baseline community and energy needs assessments, establishing franchisee relationships with MGDs for franchised hubs, providing commercial and franchisee training, mentoring, community marketing, implementing the hub model, and monitoring and evaluating hub performance.
- \\* The project focuses on MGD and government engagement, including convening a stakeholder technical advisory board, assessing data needs, developing an MGD value proposition, and establishing a complementary go-to-market strategy.
- \\* Franchise model development activities include establishing a franchise structure and legal framework, designing the franchisor business and revenue model, codifying operations and quality systems, optimising franchisee training and support programs, developing a marketing and branding strategy.
- \\* The development of a comprehensive business and financial plan.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085992	Mid	24	972072	680451
Admin Lead		Technology Lead	All Organisations	
P.A.K. ENGINEERING LIMITED		P.A.K. ENGINEERING LIMITED	P.A.K. ENGINEERING LIMITED, GAMMA MEON LTD, 3 Sisters Adventure Trekking P. LTD & Empowering Women of Nepal - EWN, Nepal Electric Vehicle Industry (P). Ltd. (NEVI), ENABLING PROCESS TECHNOLOGIES LTD	
Project Title				
Project GANESHA - Getting power Access to rural-Nepal through thermally cooled battery Energy storage for transport and Home Applications				
Public Summary – Provided by applicants				

\_Project GANESHA\_ focusses on development, manufacture and implementation of an innovative battery module solution for powering Nepal rural-based small passenger vehicles and off-grid low-power home energy systems. Solar-power installations will be constructed to pilot our innovation in two separate rural-Nepal pilot sites with marginal-/zero-power access.

Our consortium including three-UK and two-Nepal organisations, was formed to assist solution-development for commercial challenges faced by the \_Nepal Electric Vehicle Institute (NEVI)\_ in achieving its ambition to provide Nepal-wide zero-carbon public-transport/power access. NEVI were established in the mid-1990s when growing urban-population densities led to exponential-increase in urban-internal combustion engine (ICE) vehicle registrations/pollution. NEVI were pioneers in retrofitting Nepal-ICE-rickshaws to EV, and developing battery-solutions to power these vehicles. It rents batteries to marginalised-/low income-communities through its affordable model, to facilitate their independent-income-generation (60% of its work-force being female).

Limitations of Nepal's rural-/urban-location power grid/distribution restrict EV-rollout across the country. NEVI are forced to depot-recharge EV-rickshaws during night-periods when power-demand is low and risk of powercuts are minimised. Limited depot-space and grid-power restrictions limit EV-rickshaws numbers NEVI can provide each location's public-transport market. NEVI wish to access solar-power to charge vehicle battery packs and envision a removable solution similar to products currently marketed in India and Sub-Saharan Africa to expand its service to rural-communities where solutions are most needed (aligning with its original mission). However, current module-products are recharged at low C-rates and require large capital-investment. To supply a public-transport EV-fleet NEVI would require large module-stocks and high-area solar-arrays. Our projects innovation/case study-sites resolve this dilemma.

A new module will be designed, manufactured, and mobilised incorporating \_PAK-Engineering Ltd's\_ robust-/lightweight-heat exchanger technology. PAK's system facilitates high C-rate charging and design-versatility enabling PAK to adapt/optimize its function to suit multiple environmental-conditions. \_EPT Ltd\_ will design module-incorporated state-sensor/communications technology so module-function is optimized, and location tracked when in use. \_Gamma-Meon Ltd\_ will design, adapt and incorporate a specialised payment systems platform that EV-rickshaw operators and users will use to access NEVI services. Our solution will reduce mentioned-capital investment-requirements, and enable rollout to two rural-communities with marginal-/zero-power access in project-timescales.

NEVI via partnership with Nepal-famed gender/social-equity pioneer \_3 Sisters Trekking Group\_ will construct two rural-solar arrays for charging our-modules, for powering 8-10 EV-vehicles adapted to location-conditions, and provide home-energy-kits for lighting and small-device charging for improving life-quality in these locations.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10078883	Early	12	299971	213555
Admin Lead		Technology Lead	All Organisations	
University of Edinburgh		HyperGen Ltd	MALAWI FRUITS, University of Edinburgh, HYPERGEN LTD	
Project Title				
3D-printed gas turbines for efficient conversion of biogas to power in rural communities of the Global South				
Public Summary – Provided by applicants				
<p>HyperGen through this project aims to adapt a novel design of Micro Gas Turbine (MGT) for use with biogas from Anaerobic Digestion (AD) by developing a Multi Fuel Injector (MFI) that can handle a variety of fuels, e.g., pure biogas, BioLPG, or diesel. The HyperGen MGT (HMGT) is aimed at competing with Piston Engine Generators, particularly diesel (DPGs) in small scale applications (&lt;500kW). MGTs are simpler, lower maintenance, cleaner emission, and easier to multifuel. HyperGen's platform goes further by providing a basis for significantly higher efficiency and adopting a wide array of fuels, whilst providing consumers with affordable, reliable, low carbon electricity.</p> <p>This project focuses specifically on working with biogas and developing resilience to the corrosive biogas combustion gases through material testing and less interference between biogas and corrodible surfaces. The MFI is critical in ensuring a smooth transition to low carbon fuels given the dearth of availability of small-scale engines for operation on pure biogas without added diesel. The MGT could provide an alternative to DPG in minigrids, including solar PV ones in developing countries. Biogas storage is cheaper than batteries and cleaner than diesel for peak or back-up generation.</p> <p>This project will focus on farm cooperatives in Malawi that are supported by our partner Malawi Fruit. These communities currently have very limited access to electricity. Malawi Fruits will provide a consumer view on competing technologies and assess how access to 24/7 clean power from MGT could change the lives of these farmers. Production of biogas for cooking and fertilizer from Anaerobic Digestion is also a likely side benefit that could be deployed early on.</p>				

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The project will

- 1) Deliver a working MFI and conceptual design of Balance of Plant around the MFI/MGT (from biogas to heat and power) adapted to the feedstocks for biogas available on Malawian cooperatives.
- 2) Investigate methods allowing the MFI/MGT to handle the corrosive biogas, while maintaining energy efficiency. This may include biogas purification e.g., zinc oxide bed, filtration, the challenge being that these methods must be adapted if applied in the field in Malawi or ODA countries in a continuation project.
- 3) Assess resources, energy needs and attitudes of Malawian farming community through surveys and workshops conducted by Malawi Fruits. This will inform Gender Equality and Social Inclusion (GESI) when specifying the whole plant around feedstock availability and collection, as well as uses for the biogas and waste heat beyond power generation.



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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10081314	Mid	18	540315	426011
Admin Lead		Technology Lead	All Organisations	
ACHELOUS ENERGY LIMITED		HelioRec SAS	Cranfield University, Gerbang Multindo Nusantara, PT, PT. Orela Shipyard, PATTIMURA UNIVERSITY, HelioRec SAS, ACHELOUS ENERGY LIMITED, Institut Teknologi Sepuluh Nopember (ITS)	
Project Title				
Solar2Wave Mid Stage: Demonstration of a Floating Solar Farm in Indonesian Ocean Waves				
Public Summary – Provided by applicants				

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Indonesia has a population of approximately 273.8 million, of which 4 million still lack access to energy. These people live on remote islands, relying on diesel power generation which is expensive and polluting. The high cost dictates that the island residents to have limited electricity.

The Solar2Wave project will carry out a Floating PhotoVoltaic (FPV)-based innovation to solve the energy-access issue of Indonesia's remote islands. An FPV farm is fully scalable, as it consists of small individual solar panels. Different sizes of FPV farms can be placed along the coastal line of an island and connected to residents. In particular, the Solar2Wave innovation can ensure that FPV panels remain intact from incident ocean waves, and thus provide a sustainable solution. By providing energy access to Indonesia's remote islands, Solar2Wave will bring improvements to the economy, working conditions, education, health services, and hazard resilience. In this Mid Stage Energy Catalyst project, we will construct and operate Indonesia's first FPV site in the ocean, alongside a series of innovations such as incorporating the solar power plant with an ice-making system and seafood farm, an AI-based smart energy management system to manage the energy consumption and storage, and a novel floater material to reduce the cost. We will conduct a trial operation of the system, build robust partnerships and achieve system and cost optimisation through the experience.

Based upon this pilot, Solar2Wave will demonstrate the potential to be deployed for more than 6,000 inhabited islands in Indonesia. The innovation will make FPV an appealing solution to replace the country's current 86% of power generation that uses fossil fuels. We can foresee a long-term development of FPV in Indonesia whose coastline is longer than that of any other country, stretching 157,000 km. Eventually, Solar2Wave will boost the world's trend of extrapolating FPV from lakes to seas. The project will help us achieve the Net-Zero goal and mitigate climate change.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10073041	Early	12	166967	141847
Admin Lead		Technology Lead	All Organisations	
SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD		SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD	SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD, Orkonerei Maasai Social Initiatives	
Project Title				
LARA: Locally-Appropriate Rural Aquavoltaics for Cost Reduction and Increased Impact for Solar Energy Access in East Africa				
Public Summary – Provided by applicants				

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Our project aims to address challenges faced by larger solar productive-use power and minigrid solutions in achieving commercial sustainability, affordability, and ease of installation for end-users. Based on our experience implementing community minigrids and powering boreholes and milling machines in Africa, acquiring the necessary infrastructure components, specifically mounting systems for solar panels, proves to be the most difficult aspect due to specialised skills required for welding and fabrication, and complex procurement and installation in remote rural areas.

The cost of mounting hardware for panels constitutes 40-50% of the total panel cost, and transportation and installation expenses amplify this burden. Surprisingly, there is limited competition in the supply of mounting systems compared to readily available equipment.

Our solution involves developing and testing a simple, locally-appropriate approach: floating panels above specially-dug ponds. This cost-effective solution, suitable for small rural minigrids, fills the gap left by expensive and complex floating mounting solutions designed for marine environments.

Implementing this solution costs only 5-10% of traditional metal racking, reducing the overall system cost by 10-20%. Shaded water surfaces in ponds maintain temperatures between 20-25 degrees Celsius, increasing panel efficiency by 6-10% according to Suntech specifications.

The integration of aquaculture in Tanzanian communities through our solution presents significant economic benefits for local farmers. By leveraging the shaded pool area surrounding the floating solar panels, farmers can engage in fish farming activities, creating an additional source of income and livelihood. The revenue generated from aquaculture provides farmers with a diversified income stream, enhancing their financial resilience and contributing to the overall economic development of the community. Additionally, the availability of fish locally offers food security and reduces reliance on external sources, further supporting the sustainable growth of Tanzanian farmers.

We anticipate that this cost-effective solution will drive greater adoption of clean energy systems in Tanzanian communities and beyond.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085216	Early	12	285990	240990
Admin Lead		Technology Lead	All Organisations	
Northumbria University		Eco Research Ltd (ERL)	National Textile University, Prime Eurotech (Pvt) Limited, Pakistan, Northumbria University, ECO RESEARCH LTD	
Project Title				
Improving access to sustainable energy in rural Pakistan using food and fiber agro-waste as a renewable fuel (SAFER)				
Public Summary – Provided by applicants				
<p>Our project, "Improving access to sustainable energy in rural Pakistan using food and fiber agro-waste as a renewable fuel (SAFER)," is a bold initiative aimed at tackling the dire lack of electricity in rural areas of Pakistan especially for off-grid communities. It harnesses the immense potential of agro-waste generated from fiber production to create a sustainable and accessible source of energy. Despite Pakistan's abundant renewable energy resources, more than 50% of people in rural areas still live without electricity, heavily reliant on energy imports and fossil fuels. With only 7% of energy generation coming from renewables, there exists a significant deficit in meeting the country's energy needs.</p> <p>Our innovative approach combines two cutting-edge technologies to establish a true sandpit technology, forging a circular model based on food, fiber, and energy while generating zero waste.</p> <ol style="list-style-type: none"> <li>1. SAFER leverages NTU Pakistan's indigenous technology, which efficiently produces high-quality textile fibers using agro-waste from bananas. Remarkably, the fiber production process generates a second round of agro-waste, allowing us to maximize resource utilisation.</li> <li>2. SAFER utilises ERL UK's Patent-pending and advanced thermo-chemical conversion technologies to deploy sustainable and clean energy solutions in remote areas of Pakistan. By converting agro-waste into renewable fuel, our project offers affordable and accessible energy to local industries and communities, alleviating the burden on Pakistan's overstretched energy sector. Through gasification technology, we harness the power of agro-waste to generate syngas, which are then used to produce electricity.</li> </ol>				

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Beyond energy production, SAFER also targets the improvement of Pakistan's textile sector, a vital industry that serves as the country's largest exporter and employs millions of individuals. In SAFER, we utilize agro-waste, such as banana peels, to manufacture high-quality textile fibers, biochar/biofertilisers, and electricity. This not only creates value-added commodities but also facilitates effective waste management. Our approach curbs the industry's environmental footprint while mitigating the adverse effects of declining cotton production caused by environmental changes.

To ensure the commercial viability of our solution and effectively address Pakistan's energy crisis, we adopt a holistic approach to integrate systems (Food, Fiber, fertiliser, Energy) and ensure compatibility with multiple market routes and technical solutions. With SAFER, we envision a brighter future for rural Pakistan, where access to sustainable energy becomes a reality through the transformation of agro-waste into value-added products. Through these efforts, we empower local communities, contribute to Pakistan's sustainable development, and pave the way toward a brighter and more prosperous future for all.

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085889	Early	12	267825	200337
Admin Lead		Technology Lead	All Organisations	
MAT ZERO HEAT LIMITED		MAT ZERO HEAT LIMITED	Pahar Trust Nepal, Swansea University, SOLAPAK DEVELOPMENT LIMITED, MAT ZERO HEAT LIMITED, GLOBAL REFUGEE LED NETWORK CIC	
Project Title				
MatZero: Clean energy and heat solution for refugee communities				
Public Summary – Provided by applicants				

There are c103M refugees in the world (UNHCR 2022), with c33M need life-sustaining heating in locations where the temperature drops below 10°C in the winter months or during night hours (InfoMigrants 2022). The impact of the cold weather is enormous, with numerous life-threatening health impacts.

6.3M refugee households need safer, better, greener heating (UNHCR 2022). Current heating methods include diesel heaters, burning of materials such as kerosene and firewood and gas canisters which lead to fires, release toxic fumes and are harmful to the environment. UNHCR reported 1100 deaths from refugee camp fires in 2021 alone. Current heating methods are very expensive, at cUSD300/refugee household/year (IEA 2022). Alternatives such as firewood are cheaper but use vital resources, are high in CO2 impact and present safety and exclusion risks for women collecting the wood (Erin 2007)

Removing the need to burn firewood in refugee camps would save c1.5m tonnes CO2/year (UNHCR 2020). Solar PV systems can reduce CO2 emissions by an 45 to 70gCO2/kWh compared to fossil fuel-based solutions (IEA 2021). With PV costs dropping by 80% between 2010-20 (IRENA 2021), opportunities to unlock clean power for heating solutions are becoming financially viable.

Mat Zero can alleviate these issues through its innovative solar-powered heating solution. The feasibility study will target Nepal.

The goals of the feasibility study:

- \\*Validate prototype system with mat design and construction complete with guides to potential assembly in Nepal
- \\*Feedback from users in Nepal and UK on performance and feasibility of successful use in field
- \\*GESI report to shape how to maximise the social impact the product achieves in Nepal and beyond
- \\*Create a business plan to provide a planned route to market



## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10081283	Mid	24	1499644	1088087
Admin Lead		Technology Lead	All Organisations	
AQUATERA LIMITED		Toshiba Europe Limited	Hitachi Energy (Thailand) Limited , University of Exeter, Queen Mary University of London, AQUATERA LIMITED, TOSHIBA EUROPE LIMITED, Eco Wave Power, The University of Manchester	
Project Title				
Islanded Wave Powered Microgrid Pilot for Remote Islands in Thailand				
Public Summary – Provided by applicants				

This project is a building on and adding to our successful Energy Catalyst R8 early-stage project, demonstrating good feasibility of the proposed concepts in enhancing the efficiency of onshore wave energy converters (WECs) and developing advanced wave-powered microgrids (WPMG) in the selected remote islands of Thailand with limited or no grid access which currently use expensive, polluting diesel generators (DEGs) as the main supply.

The unit cost of the electricity generated by WPMGs can be significantly reduced by advanced predictive optimal control strategies to improve the wave power output of the WECs in a range of sea states with state-of-the-art power electronic components and novel microgrid energy management systems (EMS). The EMS can significantly reduce the power conversion/distribution losses and use deep-learning-based algorithms to forecast the stochastic loads in varying weather and wave conditions. Moreover, the microgrid provides a reliable and secure source of electricity using distributed and remote EMS services. In this mid-stage project, we aim to systematically demonstrate the efficacies of the whole concept to pave the way for sea-trial testing validation at the final stage. The consortia will integrate all the key components into one hybrid system-level wave-to-wire (W2W) WPMG simulator to validate the functionalities of the microgrid efficiently and economically in various scenarios close to real sea conditions. The wave prediction will be enabled by the latest Radar-based technology to provide shutdown signals for detrimental waves and to increase the survivability of the WECs. We aim to increase the technology readiness level (TRL) of the proposed WPMG technologies to build up a stand-alone microgrid in the final stage. Overall, the project aims to provide inclusive community-based renewable energy (sensitive to gender equality and social inclusiveness) that addresses the lack of energy access in Thailand's remote and isolated islands and eventually in other SE Asia countries like the Philippines and Indonesia. The project consortia include key industrial players, including Aquatera, Hitachi Energy, Toshiba, EcoWavePower, and major universities QMUL, Manchester & Exeter, for successfully delivering the project objectives. Following our successful workshops in the early-stage project, we will hold further technical and training workshops for the technology transfer in the SE Asia region, especially for female professionals, to promote gender equality in the renewable energy sector.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085539	Mid	24	688203	481742
Admin Lead		Technology Lead	All Organisations	
HELIX POWER LIMITED		HELIX POWER LIMITED	HELIX POWER LIMITED, WILLEND ASSOCIATES LIMITED	
Project Title				
UNIQUE STEAM TO POWER GENERATOR SYSTEMS FOR DECENTRALISED THERMAL PLANTS AND SMALL WASTE INCINERATORS				
Public Summary – Provided by applicants				
<p>Nigeria and other ODA countries have limited and unreliable grid electricity supply which limits industrial growth and productivity. As a result of power intermittency and being offgrid, many industries are reliant on highly polluting costly diesel generators. Heliex Power manufactures a unique energy recovery technology based on twin-screw steam turbine, which is easy to retrofit, install and operate in industrial applications that produce waste heat. Saturated wet steam is common in these thermal processes, and industries benefit from a Heliex TST unit as its innovative expander technology is unique in working with saturated wet steam to generate power. Current version of Heliex has sold over 85 units across Europe, but requires reliable grid connectivity to operate, and so is unsuitable for ODA countries. The aim of this project is develop the electrical and control systems to allow offgrid/decentralised operation. Project developments include modifications to the electrical part of the unit, its control to the new system requirements, modifying steam components as identified during an engineering review, plus testing and certification of the equipment.</p> <p>The solution offers an alternative to replace or reduce the power generated from diesel generators by industry with clean power generated by the Heliex unit. This cost-effective solution will also make it affordable for industrial customers to run their factories, especially with the removal of government diesel subsidies in Nigeria.</p> <p>Long term, Heliex with our local distributor in Nigeria, and in other ODA countries will further promote the installation of our equipment in industry significantly reducing carbon emissions.</p>				

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10081469	Mid	18	699212	524921
Admin Lead		Technology Lead	All Organisations	
INNOVATION CONSULTANCY & ENTREPRENEURSHIP LTD		OTASKI ENERGY SOLUTIONS LTD	WAVE INSIGHT LTD, EDO STATE GOVERNMENT, MUNIG ENGINEERING SOLUTIONS LIMITED, Moneda Investment Limited, OTASKI ENERGY SOLUTIONS LTD, INNOVATION CONSULTANCY & ENTREPRENEURSHIP LTD	
Project Title				
Decentralised Energy Market Access And Co-finance (DEMA2C)				
Public Summary – Provided by applicants				

# ENERGY CATALYST



UNSDG 7 targets to achieve universal energy access by 2030, unfortunately, based on the current trajectory there is still a gap and it may be growing. This is so given that globally, about 789 million people (597 million of whom are in sub-Saharan Africa SSA) do not have access to energy. Moreover, limited coverage, high interconnection costs, high energy and unreliable supply are the primary challenges of using conventional grid connections for both rural and urban areas. This would have been the opportunity for decentralised grids e.g. solar to fill the gap, especially off-grid communities completely cut-off from the main grid, unfortunately, renewables intermittency and high upfront costs are strong deterrents, moreover, there is a low affinity for financing micro-grid generation because investors struggle to track their ROI. The current set-up/technologies supporting DERs particularly solar are yet to overcome the peak generation and peak consumption mismatch nor track ROI.

The DEMA2C consortium including Innovation Consultancy & Entrepreneurship (lead Partner), OtaskiES, Wave Insight, Moneda, MAD and Edo State Ministry of Infrastructure will be developing a technology that will enable the creation of a unified renewables-based grid that can supply on-demand green energy to off-grid communities. The technology will bridge the intermittency of the renewable delivering on-demand energy supply by optimising the link between generation and consumption without additional panels, high storage bank costs nor resorting to fossil-fuelled generators. It will also offer an energy-as-a-service model supported by an innovative payment platform with real-time ROI tracking for investors. This will stimulate investment into DERs to meet SDG 7 target by attracting investors that up to now have been shying away from investing in renewables-based micro grid. Successful deployment of DEMA2C will also enable prosumers are able to get an ROI 5X faster than when they would be just self-consuming their generated capacity. The clean energy DEMA2C enabled micro-grid will facilitate the avoidance of e1.04CO<sub>2</sub>kg/kW in emissions by replacing the use of generators.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10079774	Early	9	218345	168661
Admin Lead		Technology Lead	All Organisations	
ACHELOUS ENERGY LIMITED		ACHELOUS ENERGY LIMITED	Cranfield University, ACHELOUS ENERGY LIMITED, Entrepreneurs Du Monde Pteah Baitong Co., LTD., Northumbria University, The Energy Laboratory Limited	
Project Title				
FITS Power Plant - Cambodia Island Community				
Public Summary – Provided by applicants				

# ENERGY CATALYST



Achelous Energy Limited's (AEL) "FITS" technology is an innovative power generation plant that generates clean, affordable electricity using a combination of water flow energy and solar energy. It is able to provide low-cost electricity to both small and large off-takers. FITS technology has been demonstrated at full-scale under a previous EC7 project, and a pilot project is now underway to supply a FITS-supplied mini-grid to an off-grid rural community in Nepal.

With its rich river resource, and growing electricity demand driven by high GDP growth, Cambodia represents a significant potential market for FITS. This project seeks to conduct a detailed feasibility study for a pilot deployment of a FITS platform at an island village location in the Mekong river, that will enable the future development of a distributed energy project there using FITS power generation. The project encompasses several scopes of work, including: river survey at the island, electricity use and socio-economic survey of the islanders, engagement with local and national level government to determine permitting and licencing requirements. It will also consider an innovative dual use case for the electricity provided, serving domestic electricity use during the day and early evenings, and water pumping for irrigation overnight.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086246	Mid	15	498068	364892
Admin Lead		Technology Lead	All Organisations	
CABLE COATINGS LIMITED		CABLE COATINGS LIMITED	CABLE COATINGS LIMITED, Practical Action Nepal Office	
Project Title				
RASSCOL Nepal: Retrofit Application of Spectrally Selective Coatings to Overhead Lines				
Public Summary – Provided by applicants				
<p>The project aims to demonstrate discontinuous cost savings in upgrading transmission and distribution capacity via the application of capacity-enhancing coatings to overhead lines.</p>				



## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10080796	Mid	24	977963	684574
Admin Lead		Technology Lead	All Organisations	
PILIO LIMITED		PILIO LIMITED	PILIO LIMITED, SAMA^Verte	
Project Title				
Cotton Footprint: transitioning the carbon intensive cotton and textiles industry to renewable infrastructure through a whole supply chain approach				
Public Summary – Provided by applicants				
<p>A collaboration to deliver affordable energy solutions in rural Pakistan communities who are integral to the farming and production of global cotton supplies. The Affordable Clean Energy Farm (ACE-Farm) is a novel insetting scheme that aims to redistribute capital via investments by fashion brands, textiles manufacturers and clean cotton networks to reduce the impact of their own carbon consumption.</p> <p>This project will continue the work delivered by UK energy management company, Pilio, and Pakistan energy infrastructure company, SAMA^Verte, under an Energy Catalyst 8 funded feasibility study.</p> <p>Within this continuation project, we will demonstrate the economic model that aims to bring clean and affordable energy access to Pakistan's 10m cotton workers. Our focus is on creating a multiplier effect via a range of ecosystem services, including household energy access, productive energy on industrial cotton farms (ginners) and enabling micro-enterprises to offer energy services and create new markets. Within this project Pilio will develop our technology platform, that measures the investment brands make in terms of carbon reduction and affordable energy uptake, as well as economic terms including ROI.</p> <p>This project will be delivered in close working partnership with WWF Pakistan and global sustainability experts, Better Cotton.</p> <p>To participate in the project as an energy solution provider or as a fashion retail or manufacturing company thinking about insetting the cotton supply chain, contact Catherine Bottrill on [catherine@piliogroup.com][0].</p> <p>[0]: <a href="mailto:catherine@piliohroup.com">mailto:catherine@piliohroup.com</a></p>				

**ENERGY**  
CATALYST



## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10079506	Early	12	298365	224445
Admin Lead		Technology Lead	All Organisations	
AFRICA POWER LTD		AFRICA POWER LTD	Loughborough University, AFRICA POWER LTD, Kua Solar Limited	
Project Title				
Testing of new designed highly efficient small Solar fridges for Africa				
Public Summary – Provided by applicants				
<p><b>Problem Statement</b>            Most SSA countries suffer food shortages and malnutrition (36% under-fives are stunted in Africa, with highest-prevalence in East Africa). 54% of under-five's mortality is due to malnutrition and related complications. Uganda's milk consumption is 65litres/annum, well below WHO recommendations (210litres/annum)            In order to expand agricultural production and reduce wastage by the Productive Use of Energy (PUE), off-grid fridges are urgently needed in rural areas where grid expansion is not economically viable.            Most (&gt;90%) dairy production is provided by smallholder farmers (with &lt;5 cows each). Unlit roads and lack of refrigeration mean that the night milking (50% of production) cannot be sold in the formal milk-chain and either feeds the family, local people (unpasteurised and hence less safe) or is wasted together with milk which arrives at the depot with too high a bacterial content. As the Government expands breeding programmes to cross-breed local varieties with European high-yield strains, this wastage weakens the economic viability for such programmes and does not help farmers already too far from collection centres, lessening the impact of such modern livestock management programmes.</p> <p><b>Outcomes</b>            We will design and test a suit of solar-powered, high-efficiency fridges.</p>				

# ENERGY CATALYST



These off grid powered cooling solutions will improve small-holders dairy revenue and offer retail opportunities for food & drink sales, hence

- \* increasing farmers' livelihoods,
- \* increasing the value of milk products
- \* Increasing the "life" of foods and drinks
- \* decreasing malnutrition.

We will use phase-change materials and high insulation to eliminate batteries from the fridges, reducing power costs, and allowing us to develop cost-effective refrigeration units. Longer storage times will reduce milk wastage and allow more remote farms to sell the milk.

Uganda already has twice the milk processing capacity compared to its current milk collection volume.

Solar powered phase-change refrigerators in shops will increase dairy and meat sales in rural areas where malnutrition is concentrated.

Women are already active in the dairy production chain but are under-represented in some higher value jobs, especially in milk transportation and at management levels in the farmer-owned milk cooperatives. We seek to change this through training; and developing ergonomically designed products with their needs in mind at the follow on pilot/field trial stage (via future funding).

Our solutions are zero-net-carbon solutions, with no recourse to using scarce unsustainable resources. This project will demonstrate that increasing nutrition and reaching net-zero-carbon products are not mutually exclusive. This project benefits both targets.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085818	Early	12	228497	191850
Admin Lead		Technology Lead	All Organisations	
ARC RIDE LIMITED		ARC RIDE LIMITED	Strathmore University, University of Strathclyde, Africa E-mobility Alliance, ARC RIDE LIMITED	
Project Title				
Green on 2 Wheels (Go-2W): translating low-carbon energy into low-cost mobility				
Public Summary – Provided by applicants				
<p>Go-2W will trial a <b>token-based incentive system</b> to match electricity demand from battery swap stations (BSSs) for electric 2-wheelers (E2Ws) to on-site solar and surplus renewable electricity in Kenya.</p> <p>In Go-2W, E2W riders will be rewarded for using <b>green batteries</b> charged from low-carbon sources via in-app tokens redeemable for future battery swaps. Rewards will be based on the relative costs of peak (dominated by fossil fuels), off-peak (dominated by geothermal/hydro) and on-site solar electricity used to charge the batteries. Although the Kenyan energy regulator introduced an e-mobility tariff with peak and half-price off-peak rates in April 2023 (<a href="https://tinyurl.com/bdm33dmj">tinyurl.com/bdm33dmj</a>), there is currently no mechanism to translate these rates to differential costs as seen by riders using BSSs, and therefore no incentive for the end user to use the low-cost low-carbon electricity on offer.</p> <p>Without intervention, the growth in electricity demand from e-mobility risks being added to the existing peak, stressing the power system and demanding more fossil fuels. The innovative token system developed in Go-2W will take advantage of BSSs' flexibility to utilise low-cost renewables, thereby reducing the cost and carbon footprint of ARC Ride's charging solutions.</p> <p>Go-2W will install 10 solarised BSSs at key sites across Nairobi, which were shortlisted as part of previous work. A 4-month trial will be designed and conducted with 100-150 participants, targeting in particular boda-boda (motorcycle taxi) riders and female commuters (who are likely to have care-giving responsibilities, and face other barriers to the use of 2-wheelers for mobility). Data will be collected from the BSSs (electricity demand; solar generation; battery swap activity) and the riders (surveys; interviews) to produce learning on:</p>				

# ENERGY CATALYST



- (i) **To what extent BSS demand can be matched to low-carbon sources using incentives designed around their low cost, given the constraints of local travel habits;**
- (ii) **How the benefits of such a scheme are distributed amongst its user groups;**
- (iii) **What the monetary savings are translated into amongst its user groups; and**
- (iv) **(based on (ii) and (iii)) what can be done to promote such a scheme to new users in future markets.**

The innovations from Go-2W will increase the **affordability of clean energy amongst low-income groups in Kenya**. Whilst the trial would take place in Nairobi, the recommendations would be applicable for scaling up across other sub-Saharan African cities. With a booming 2-wheeler market and a newly released e-mobility tariff, Kenya is a natural test-bed for these innovations.

[0]: <https://tinyurl.com/bdm33dmj>

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10082419	Mid	15	671113	464330
Admin Lead		Technology Lead	All Organisations	
ENEE.IO LTD		ENEE.IO LTD	ENEE.IO LTD, Aspire Power Solutions Ltd.	
Project Title				
Energy Intelligence: smart insights for affordable clean energy				
Public Summary – Provided by applicants				
<p><b>**enee.io the fitness tracker for energy systems.**</b></p> <p><b>**enee.io increases access to reliable and affordable energy by improving the life and efficiency of energy systems.**</b> Through plug-and-play sensors, mobile phone applications and web-based reporting, enee.io provides customers with the information they need to optimize energy usage, improve energy system health and safeguard backup power supplies.</p> <p>We focus on helping people in developing countries who pay disproportionately high amounts for energy and suffering from pollution caused by diesel generators. enee.io is the fitness tracker for energy systems</p> <p>The enee.io product is a low-cost plug-and-play intelligent energy monitoring system (iEMS). The iEMS consists of simple proprietary IoT sensors that are installed on each source of energy generation (solar, grid and diesel generators), storage (batteries) and consumption (residential or commercial &amp; industrial premises). The collected data from the sensors is transmitted to the enee.io cloud based servers where data analysis is provided through our proprietary algorithms. Alerts, insights, and energy performance information is provided through our mobile and web applications.</p> <p>The EC10 project will incorporate AI into our platform to combine data to allow users to fully optimise their energy system. These include how to increase energy availability and resilience; identification of maintenance required to extend asset life and improve performance and total energy cost analysis.</p>				

# ENERGY CATALYST



The iEMS is affordable and simple to use, representing a quantum leap as a data-driven enabler for households and businesses. We estimate savings of \$1900 over 5 years for an \$160 investment.

The iEMS will increase access for millions of people, to reliable, affordable, and clean energy by providing users with the information they need to optimise their energy system. Allowing them to 'right size' their energy assets and minimise operational costs. Ultimately reducing the reliance on costly and highly polluting diesel generators.

There are no other products available on the market that provide this combination of low-cost and cutting-edge technology



## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10083184	Mid	24	858118	648459
Admin Lead		Technology Lead	All Organisations	
ACELERON LIMITED		ACELERON LIMITED	University College London, SMART VILLAGES RESEARCH GROUP LTD, EASVRM, ACELERON LIMITED	
Project Title				
Kawi Nafuu - Better Energy				
Public Summary – Provided by applicants				
<p>Farmers in Kenya lose \$662m (80%) of value annually is lost along the value chain from post harvest to market). This does not only materially impact the farmers but also is impactful on the environment due to wasted water and overuse of fertilizers. Secure access to energy is critical to ensure this doesn't happen. Both through more sustainable and consistent cold-chain but also through ensuring crops get to market faster using clean mobility. This problem is significant in wider sub-Saharan Africa too (ca. 23% of sub-Saharan Africa GDP is from farming and ca. 60% of the population farms). Generally, smallholder farmers have 1.5 acres of farmland and don;t possess the purchase power to improve there route to market.</p> <p>Project KAWI NAFUU intends to deploy a world-first Agr-E-Hub which will offer community level energy (solar+battery), can be integrated into cold-chain to provide cooling, will support and manage a fleet of community e-trikes to sustainably get crops to market much faster than carrying crops on foot and will promote use of swapping battery for productive use applications through integration with the on-board mini-grid.</p> <p>KAWI NAFUU aims to lower the barrier to energy access in rural Africa and globally. Taking this HUB approach helps overcome individual technology issues (eg. minigrids require base load to be profitable, batteries in isolation are expensive, e-trikes need high range for e-logistics) which synergistically creates a sustainable, affordable and impactful model to meet the energy trilemma. This can then be scaled across sub-Saharan Africa.</p>				

# ENERGY CATALYST



By making energy affordable, KAWI NAFUU addresses a larger population and creates sustainable business models that will foster lasting impact in the community

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086869	Early	12	293437	248130
Admin Lead		Technology Lead	All Organisations	
SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD		SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD	SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD, Orkonerei Maasai Social Initiatives	
Project Title				
Rural Offgrid Dairy Value Chain for Energy Access and Income Generation				
Public Summary – Provided by applicants				

# ENERGY CATALYST



Milk is traditionally a woman's asset in the Maasai culture of Northern Tanzania. But traditionally, other than for immediate consumption, milk was not valuable, since it would go off very quickly in the intense heat of the day. Seeking to change the fortune of women in the community, STI4D's Tanzanian partner organisation, community NGO OMASI, started local offgrid dairy businesses throughout the Maasai region some 15 years ago.

The results were remarkable. From a position of having relatively little family 'bargaining power', women who sold their milk to the dairy were suddenly empowered and were appreciated in their families. They were able to sell their milk and buy family essentials in nearby shops, rather than needing to ask their husbands or fathers for the money to do so. They were able to invest some of the funds in school fees for their children. And suddenly the men in the community were in the position of asking their wives for money, rather than the other way round.

In order to operate, the dairies are critically dependent on reliable power. The twin chiller units in the dairy consume 10kW each, and the heaters for cheese and yoghurt making consume up to 50kW when operating at high volumes. Each dairy was therefore powered by a 63kW diesel generator.

Cost and reliability of power are now the biggest issues keeping them from re-opening. The dairies need reliable power since so much capital is tied up in maturing product like cheese, or stored product like yoghurt, which will quickly spoil if refrigeration fails. The grid supply is notoriously unreliable throughout the region, so even the few dairies that are connected, cannot rely on continuity of connection. Restarting operations is therefore a risk.

Clean energy, eg in minigrids, is known to be more reliable as a power source, but it is very hard to power a load as large and as variable as a dairy from a minigrid. Peak demand is high, but overall load factor would vary so much as to make traditional minigrid technology uneconomical. Together, STI4D and OMASI intend to develop new technology to more cost-effectively provide clean and reliable power to the dairies, and allow them to begin operations again in a long-term sustainable model. The same technology approach will also be appropriate for many other high-power productive use anchor loads in communities, and could be used to cost-effectively complement local minigrids.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10082282	Mid	24	1497365	1182601
Admin Lead		Technology Lead	All Organisations	
STRAW INNOVATIONS LTD		STRAW INNOVATIONS LTD	Takachar, Aston University, STRAW INNOVATIONS LTD	
Project Title				
Project RICE (Renewable, Inclusive, Carbon-positive Energy)				
Public Summary – Provided by applicants				
<p><b>**PROBLEM**</b></p> <p>Modern agriculture is so critically dependent on fossil fuel inputs that they often outweigh energy outputs from the food produced. Hence modern farming has been described as "the use of land to convert oil into food". Undoubtedly, diesel-powered mechanisation has greatly reduced backbreaking drudgery for countless millions of farmers, and conversion of natural-gas into ammonia/nitrogen fertilisers is currently feeding a third of humanity. Nevertheless, the downsides are painfully obvious:</p> <p>* <b>**Input Costs:**</b> Centralised production/distribution of fossil fuels mean farmers in remote areas across Africa and Asia often pay more than double for diesel-fuel/N-fertilisers. Those who cannot afford them are stuck in cycles of hard labour/low-yields/poverty. Those who can afford them lose around 60% at point-of-use(waste-heat from engines, or leaching/volatilisation from N-fertilisers).</p> <p>* <b>**Food Prices:**</b> Food uses around a third of all energy globally, so when fossil-fuel prices rise, food prices follow, creating political instability and hardship for the world's most vulnerable(urban-poor and farmers in developing countries).</p> <p>* <b>**Greenhouse Gas(GHG) Emissions:**</b> Agricultural emissions continue to rise, accelerating climate change, disproportionately impacting farmers in developing countries.</p> <p><b>**VISION**</b></p> <p>Development of efficient agricultural technologies powered by renewable energy to lower emissions whilst increasing farmer productivity and profitability in developing countries. Our focus is on the world's number 1 food crop: rice.</p>				

# ENERGY CATALYST



\* Known as a "Poverty Crop"(low-margins for smallholder-farmers).  
\* Responsible for 48% of all crop GHG emissions.  
\* 91% of rice is produced/consumed in Asia.  
\*\*\_Straw Innovations("SI")\_\*\* (British SME operating in the Philippines) has pioneered a suite of technologies for collecting rice straw at harvest-time, avoiding field-burning/rotting that accounts for almost half of rice emissions. In this project, they will convert their "straw-catcher" machine to run on solar-PV electricity/batteries instead of diesel.  
\_\*\*Takachar\*\*\_ (multi-award-winning Indian SME) has developed a cost-effective mobile biochar production unit that can transform rice straw from a major pollutant into a vast carbon sink. They will make a 10x scaled-up version and send it to SI, who will tap the waste process heat for the first time to dry rice, instead of diesel/kerosene.  
The char will then be returned to the farmers' fields as a more efficient fertiliser/soil-amendment, incorporated by the same SI electric "rice/straw-collectors" that harvested it. SI will also send their machines from the Philippines to India mid-project and the two countries will test out different business models for farmer adoption/benefit.  
\_\*\*Aston University\*\*\_ (home of SUPERGEN Bioenergy Hub) leading sustainability specialists will invite stakeholder feedback and also calculate GHG savings from the new system.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10078726	Early	12	298497	219154
Admin Lead		Technology Lead	All Organisations	
University of Oxford		Astonfield Solar	Astonfield Solesa Solar Kenya Limited, University of Oxford	
Project Title				
Solar Hospital Energy Leasing Demonstrator (SHIELD)				
Public Summary – Provided by applicants				
<p>Kenya's public hospitals struggle with electrical power. They experience blackouts, instability in provision and have to pay variable and often quite high costs. The results of this are disastrous. When the power fails, so do the fridges and this breaks the 'cold chain'. Vaccines can be lost and expensive medicines perished, but even worse, surgeries have to be cancelled or abandoned. Even though the power is not reliable, it is still expensive and hospitals must pay significant sums each month to keep the lights on.</p> <p>Unfortunately, things are likely to get worse: as the climate changes extreme weather is likely to cause more significant impacts and this will cause closures and disruptions to service. Public hospitals in Kenya serve the most vulnerable populations - those who have no other options. Hence, reducing their access to healthcare has devastating consequences and can hold back the development of the cities, and towns that rely on these important healthcare providers.</p> <p>More positively, onsite solar energy generation provides a technological solutions with huge potential to address these key issues. We aim to install a solar system at one of Kenya's most important public hospitals. We will show that the installation can offer huge advantages to the hospital in terms of cost, reliability and stability, with the positive result that they are able to be a more effective healthcare provider to desperate patients in need of care.</p> <p>Solar is currently perceived as being a private sector solution, but we will work with stakeholders to show that the benefits far outweigh the risks for large consumers of energy such as hospitals. We will install a system at Meru Teaching hospital - a well known Level 5 facility - and collect a range of data on how much energy can be generated, how it is used, what operational effects it has, and how much</p>				

# ENERGY CATALYST



carbon and money is saved . We want to share this data through a representative steering group with the government and other stakeholders so that they can make better choices about how energy is funded.

We believe this project will make Kenya's hospitals more resilient so that they can save more lives and work through the extreme weather they face in the years ahead. We want to use this project to show other hospitals in Africa that installations such as this can be cost-effective and value-adding.



## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10084608	Early	12	299991	170477
Admin Lead		Technology Lead	All Organisations	
BIOMASSTERS (UK) LTD		Mimi Moto	BIOMASSTERS (UK) LTD, Mimi Moto B.V.	
Project Title				
Transitioning pellet stove production: China to Rwanda				
Public Summary – Provided by applicants				
<p>BioMassters and Mimi Moto are seeking funding to de-risk and accelerate the rollout of a new version of a tier-4 advanced biomass stove that was developed by Mimi Moto. The new version will use the same core technology as the existing model but will be domestically assembled and then installed into kitchens, as opposed to the existing fully imported and portable stove model. Mimi Moto will need to send less materials from China while more local materials and labour will be used. This transition of stove production from China to Rwanda will have three key benefits: 1) It will drop the price of the cookstove, reducing or eliminating the barrier to adopting this solution, 2) It will create green jobs in Rwanda and contribute to knowledge transfer and economic development, and 3) It will allow for customisation of stove body design, leading to greater customer satisfaction.</p> <p>As the first WHO tier-4 clean burning gasification stove to run on biofuel, the portable Mimi Moto model was an important innovation in clean cooking. We are thus taking this a step further with an inbuilt, installed version, produced in Rwanda. The novel aspects of the installation, including customisation, have received positive feedback from a pilot initiative, including with several Village Chiefs. By building trust and connections with these gatekeepers of the community, BioMassters are uniquely placed to open people up to replacing traditional methods with the innovative pellet fuel and stove system.</p> <p>Pellet fuel is roughly 30% cheaper than charcoal and the pellet fuel and stove combination uses 90% less biomass compared to charcoal cooking. In addition to that, its clean burn significantly reduces harm to the user. Since cooking in Rwanda is carried out by mostly</p>				

# ENERGY CATALYST



women and girls, BioMasters have a positive impact on both the environment, and women's health. Funding would enable the introduction of the cheaper model, allowing these benefits to accrue to low-income groups, particularly women and girls.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10072866	Mid	24	1286585	900610
Admin Lead		Technology Lead	All Organisations	
SMART VILLAGES RESEARCH GROUP LTD		Aptech Africa	Aptech Africa Ltd, SMART VILLAGES RESEARCH GROUP LTD	
Project Title				
Electrical Storage Systems for Sustainable Uninterrupted Clean Energy and Water Supply to Hospitals and Communities in South Sudan				
Public Summary – Provided by applicants				
<p>This is a combined ElectricalStorageSystem (ESS) and SolarWaterPumping project. It will supply 24/7 power and water to 2 hospitals and 1 school in selected countries. We are combining the service to the institution with community based water kiosks, and the earnings from water sales will pay for system upkeep and cover lifetime replacement costs.</p> <p>The innovation of this project is to test the combination of different existing technologies to provide services with excellent social returns, and with a sustainable finance model included.</p> <ul style="list-style-type: none"> <li>* Installing solar energy systems means schools and hospitals have uninterrupted daily energy; sufficient ESS capacity ensures 24/7 availability.</li> <li>* Solar powered water pumping, with ESS backup, provides clean water 24/7, from multiple access points, supplying the local community as well as the schools and hospitals in this project.</li> <li>* The erratic costs of running and maintaining diesel generators are eliminated by the minimal maintenance requirements, and these costs are covered by income from sales of water.</li> </ul> <p>The project will be delivered in South Sudan. We have selected this country because of the implementation challenges posed due to recent socio-political activity, and because this is a place with the greatest need. This technology will be a model for hardest-to-reach countries and locations. Aptech has a strong presence in South Sudan, and is one of the few companies that has the capacity to implement this project in partnership with SVRG.</p>				

# ENERGY CATALYST



South Sudan has been devastated by war and disease. Access to clean energy and water is critical to the improvement of educational and medical services within South Sudan, where less than 50% of people have access to water resulting in low life expectancy and very high infant mortality rates.

Access to electricity and water in institutions in these countries is under 20% resulting in load sharing and power outages of at least 8 hours, which disrupt services.

We will monitor the impact of the project on the community and establish the sustainability and replicability of the system in additional institutions.

Aptech has consulted with both the government of South Sudan and local NGOs to identify institutions to launch this pilot project, and they are very supportive of our plans. Once we have proof of concept, we will present our findings to NGOs, private institutions, and the governments to promote the replication of the system, through collaborative partnerships, and to expand access to electricity and water for institutions all across each respective country.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10078529	Mid	18	1049835	727311
Admin Lead		Technology Lead	All Organisations	
INGINE WAVE ENERGY SYSTEMS LTD		INGINE WAVE ENERGY SYSTEMS LTD	INGINE INC., University of the Highlands and Islands, SolarBK, INGINE WAVE ENERGY SYSTEMS LTD	
Project Title				
An Open-Water Demonstration of INWave Wave Energy Converter Power Plant in Vietnam				
Public Summary – Provided by applicants				
<p>INWave, the onshore-type Wave Energy Converter, is suitable for shoreline and remote islands. IWES's business goal is to offer clean, affordable and reliable Wave Energy Converters, with a Simple, Scalable &amp; Sustainable technology. The technology has been proven to be feasible at prototype level since 2015, with a Seal of Excellence award by European Commission's Horizon 2020 programme in 2016, MEA (Marine Energy Alliance) award achieving TRL 6-7 evaluation in 2019, and a successful Energy Catalyst Round 9 funding in 2022\.</p> <p>INWave provides the unique approaches of:</p> <ul style="list-style-type: none"> <li>* deploying the power generation device onshore,</li> <li>* harvesting wave energy from the shallow nearshore water, and</li> <li>* using the whole range of wave movements.</li> </ul> <p>It ensures durability, safety and affordability. This reduces costs and time, enabling sustainable supply for the smaller scale local market needs.</p> <p>INWave innovation brings access to clean and affordable energy to the coastal community. It is competitive with expensive diesel generators, which are commonplace in fishery harbours and remote coastal areas in Vietnam. In particular, in remotely scattered islands in the South China Sea (Vietnamese East Sea), meeting energy demand is very expensive relying on fossil-fuel based energy, due to the logistic and volatile cost conditions. Diesel generators, kerosene lamps and burning wood cooking are common occurrences.</p>				

# ENERGY CATALYST



There is huge potential ocean energy in Vietnam and in Asia-Pacific Ocean countries that could be utilised to generate electricity. One of the beneficiaries of planned wave power plants are coastal communities from relatively traditional fishery, farming and aquacultural communities. This innovative technology will provide them with increased energy security at a lower cost and with largely reduced CO2 emissions.

The object of the proposed project is to complete and demonstrate the successful construction and commissioning of a Wave Energy Pilot Plant in the selected site in Vietnam. Through appropriate project assessments, the pilot power plant is expected to yield significant impacts in technical, social, economic, and environmental aspects.

The proposed innovation to be installed in a remote island is an onshore-type WEC technology. Onshore, because as opposed to most other offshore WECs under development, its power generation unit is located on the shoreline and not at sea. This design enables system stability, significant cost reductions and makes clean energy infrastructure investment more affordable. We will maintain collaborative partnerships with all relevant government stakeholders, which ensure project adequation with the country's sustainable development targets and regulatory framework, such as PDP8\.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086500	Mid	24	697270	550770
Admin Lead		Technology Lead	All Organisations	
TIWAKIKI CONSULTING LIMITED		TIWAKIKI CONSULTING LIMITED	Mbarara University of Science and Technology, TIWAKIKI CONSULTING LIMITED	
Project Title				
Solar And Biogas Off-grid Power (SABOP) for Rwenjeru Agrotourism and Demonstration Farm, Mbarara, Uganda.				
Public Summary – Provided by applicants				
<p>In this project, we will integrate of 2 well-established technologies (solar photovoltaic power and biomethane from biodigestion of waste biomass) to create a 24-hours' all-weather electricity supply minigrid that will tackle the colossal lack of access to energy in Uganda (particularly Rwenjeru Agrotourism and Demonstration Farm).</p> <p>Also, we will implement a renewable milk chiller as a productive use of energy at Rwenjeru. Furthermore, we will conduct a market analysis and develop a business plan for the viable and affordable deployment of the project outcome and for future scale-up beyond the project.</p> <p>Our waste-to-energy anaerobic digestion system will help to process food and agricultural waste that will otherwise pollute the environment, into clean renewable energy (24hrs) for an agrotourism business and &gt;1,000 farmer's household.</p> <p>By performing initial socio-economic appraisal, we will assess the affordability of potential end-users and the viability of the SABOP energy platform. We will leverage on the intrinsic waste-to-energy approach of the SABOP system to match the affordability of Ugandans. The implementation of a smart minigrid allows us to accurately measure loading and generation capacity of SABOP and to effectively plan for expansion into neighbouring communities. We will engage with local and national stakeholders to ensure buy-in and share outcomes from the project to improve energy policy in Uganda.</p>				

# ENERGY CATALYST



The use of biomethane as an alternative to gasoil is expected to improve local air quality, with regards to NOx and particulate matter. We will reduce Rwenjeru's dependence on highly polluting diesel and petrol powered electricity generators. By generating electricity with solar power instead of fossil fuels, we can dramatically reduce greenhouse gas emissions, particularly carbon dioxide (CO2). Our stakeholders and community engagement (workshops, social media, and flyers) will increase environmental awareness and prompt end-users to be more resource efficient in other parts of their daily life. Reliable electricity supply from the SABOP system will improved street and community lighting which will enhance security in Rwenjeru. By increasing the productivity and profitability through energy access, as well as providing cheaper biofertilizer to farmers (76% women), households will be able to improve the quality and quantity of food in the homes with positive impact on the general health and well-being of people.



## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10078601	Early	12	189974	132982
Admin Lead		Technology Lead	All Organisations	
ORB CONNECT LTD		OPEN ENERGY LABS LTD	OPEN ENERGY LABS, ORB CONNECT LTD	
Project Title				
Star-Light: Smart Street lighting for safety and security to women and girls in sub-Saharan Africa.				
Public Summary – Provided by applicants				
<p>Now that days are getting shorter, sufficient public lighting is something most of us have to count on. The streetlights by the sidewalk might be taken for granted but when walking in an area where a lightbulb is broken or flickering, many of us get an unnerving feeling. Good public lighting makes people feel safe and can help to reduce the risk of gender-based harassment and violence. Historically cities have been planned and designed by men with little knowledge or concern for how their decisions affect women. Street lighting systems (SLS) are an extension of this marginalisation and are still planned and designed without considering gender-differentiated uses of urban spaces.</p> <p>These issues are exacerbated in many developing regions including sub-Saharan Africa (SSA), where cities are dimly lit due to the use of non-efficient street lighting technologies, financial challenges, deficient operation, maintenance and limited in-country technical capacity for planning and operations.</p> <p>Our innovation (Starlight), addresses the above challenges with our solar-powered low-cost, flat pack and easy-to-assemble street lighting with motion sensors like in most modern hallways in our apartment buildings and offices. These features help to conserve energy and reduce the financial burdens on Municipalities.</p> <p>Our innovation -- Starlight, uses smart light-emitting diodes (LEDs) because they provide clear economic and environmental performance advantages over traditional high-intensity discharge (HID). Starlight's LEDs cost 79% less than traditional incandescent SLS with an aggregate lifetime of 45,000 hours (~80% greater than traditional systems) due to our motion sensing technology.</p>				

# ENERGY CATALYST



This project will allow us to demonstrate the relationship between Streetlighting and Gender-Based Violence in Zambia and SSA. Our mission with Starlight is to ensure the safety of local residents, especially women. Starlight will enhance the relationship and trust between the urban poor and the local authorities in Zambia and SSA.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10076422	Mid	24	919485	725965
Admin Lead		Technology Lead	All Organisations	
AEON ENERGY LTD		AEON ENERGY LTD	University of Plymouth, CELTIC SEA POWER LIMITED, Pacific Community - SPC, AEON ENERGY LTD	
Project Title				
Fiji WAVEFLOW				
Public Summary – Provided by applicants				
<p>With the increasing demand for clean energy in island nations to achieve the ambitious decarbonisation goals for a net-zero future, where limited land availability poses a significant challenge for onshore renewable solutions, our ocean-based technology provides a game-changing solution that also tackles the challenges in offshore renewables deployment.</p> <p>Our innovative wave energy solution is designed to work seamlessly with existing floating wind systems, delivering clean, reliable, and affordable energy to land-constrained island nations facing energy access and energy equality challenges. Combining wind and wave power optimises energy production, reducing overall costs. This cost-effectiveness makes clean energy accessible to a wider population, helping bridge the energy gap and promoting equality among communities. This compatibility also allows for efficient use of infrastructure and capitalises on established offshore wind installations. We maximise efficiency and minimise installation and maintenance costs by leveraging these synergies. We are also committed to minimising the environmental impact associated with energy production. Our wave technology harnesses the power of nature without disturbing marine ecosystems, ensuring a harmonious coexistence between renewable energy generation and marine life preservation.</p> <p>By deploying our wave technology alongside floating wind systems, island nations can overcome energy challenges and pave the way for a cleaner and more sustainable future. Our solution brings a transformative change, empowering communities and contributing to a more equitable and environmentally conscious world.</p>				

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10078832	Mid	24	824864	643128
Admin Lead		Technology Lead	All Organisations	
VIVIDGRD LTD		VIVIDGRD LTD	University of Strathclyde, VIVIDGRD LTD, Self Help Africa	
Project Title				
Scaling Energy Access through Interconnected Mini-grids - SEAM				
Public Summary – Provided by applicants				
<p>The United Nations SDG7 goal was set as a result of the 760M people around the world who have no access to electricity. 75% of those people live in sub-Saharan Africa (SSA). As well as acutely limiting the quality of life, energy poverty limits the number and variety of business ventures possible, stifling economic development and disproportionately disadvantaging women and children. The absence of energy in schools and health facilities negatively affects the quality of service, student outcomes, and staff retention.</p> <p>Malawi exemplifies this challenge. The country's National Grid serves only 14% of the population, almost entirely focused in urban areas, while 85% of Malawi's population lives in rural areas where only 1% have electricity access. 62% live below the international poverty line, while 22% are ultra-poor.</p> <p>Mini-grids are off-grid electrical generation and storage installations located in the communities they serve. Powered by renewable energy sources such as solar and micro-hydro, they are acknowledged as an essential means of providing power and jobs to these communities where national grid expansion is unexpected to reach. Our vision is to accelerate the scale-up of mini-grids to provide dependable and resilient power to everyone. We aim to achieve this by applying new technology to assist in operating multiple mini-grid installation sites together on an interconnected distribution network, similar to the local distribution grids we are familiar with. This will improve system reliability by removing single points of failure and make it much easier to scale services by adding and connecting additional sites over time. Scaling will also unlock additional value in the energy assets, reducing the energy cost to end-users and helping drive private sector investment in projects ensuring longevity and removing the reliance on donor funding.</p>				

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## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10073159	Mid	24	814627	603346
Admin Lead		Technology Lead	All Organisations	
BIOPOWER TECHNOLOGIES LIMITED		BIOPOWER TECHNOLOGIES LIMITED	Brunel University London, TAHA, SEMATICS LIMITED, SESCOM Ltd, BIOPOWER TECHNOLOGIES LIMITED, AGRIFOOD X LIMITED	
Project Title				
SolarSaver2 (SS2) Low Cost Energy Solution in Africa Energy Catalyst Round 10: Mid Stage				
Public Summary – Provided by applicants				
<p>SOLARSAVER2 focuses on delivering a sustainable business model for using innovative low carbon off grid drying solutions. The project aims to create value for small- and large-scale sub-Saharan agricultural producers and other stakeholders by adding a new sustainable technical and processing solution delivered at a pricing level suitable for deployment in Africa and Asia to create highly nutritious products and reduce food waste.</p> <p>Fruit and vegetable products are of high moisture content. The key target is to significantly reduce the energy consumption, operating costs and carbon footprint of conventional drying techniques using an innovative low-temperature drying process. The sustainable delivery of low cost drying has a significant impact on the different sections of society such as the poor (majority of farmers) and women (about 50%) are catered for. Extensive operations and trials are planned with partners in Tanzania including local manufacturing. The processing solution is such that it can be easily deployed on-farm at different degrees of decentralisation and in centralised small, medium and large-scale industrial sites.</p>				

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085314	Mid	18	404782	310326
Admin Lead		Technology Lead	All Organisations	
ENSO TRADING LIMITED		ENSO TRADING LIMITED	FREE RUNNING BUILDINGS LIMITED, Enso Ventures Ltd, ENSO TRADING LIMITED, Bountifield International	
Project Title				
Energy Innovation for Reducing Post Harvest Loss				
Public Summary – Provided by applicants				
<p>The project uses patented heat recovery and airflow technology, coupled with solar thermal technology for agri-processing in Kenya. Working with producers and processors in value chains such as Moringa and mango - the project will deliver value for smallholder farmers by reducing post-harvest losses that occur when products are spoiled before they can reach the market. The project will demonstrate the effectiveness of solar-thermal drying for Moringa processing by designing, building and commissioning a high capacity dryer able to operate 24/7 powered entirely by renewable energy at a Moringa facility that serves 500 farmers. The solar thermal system has considerable benefits in comparison to existing technology - including faster drying, the delivery of a constant temperature that can be remotely monitored; lower cost and ease of installation. This will facilitate the production of higher-quality products that meet the quality requirements of international buyers looking to expand supply chains in the East-African region. Besides this, the project will carry out capacity building and training, including practical demonstrations of the solar thermal drying systems to increase awareness of the potential for renewable energy to deliver economic and social benefits in agricultural value chains.</p>				

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10080632	Early	12	152688	119784
Admin Lead		Technology Lead	All Organisations	
University of Leeds		University of Leeds	GreenHeat Uganda, University of Leeds	
Project Title				
Powering Uganda's Clean Energy Future: Biomethane Technology and Innovation for Clean Cooling in Rural Uganda (BioCool)				
Public Summary – Provided by applicants				
<p>Uganda's population was estimated to be around 47.8million people in 2021\ . The vulnerability of Uganda to climate change is a significant driver of food insecurity in the country. Considering a relatively high population growth rate of approximately 3.28% (World Bank, 2021), up to 2.5million people have been projected to face high levels of acute food insecurity in 2023 in Uganda (The Independent Magazine, 2023).</p> <p>Food insecurity is worsened by a gross lack of electricity among the rural population. Only 10% of the rural population has access to electricity. This hinders the use of efficient irrigation systems, storage facilities, and processing equipment, resulting in post-harvest losses and reduced food availability (Tröger et al., 2020)\*. Post-harvest losses and food insecurity in Uganda can be tackled by improved cooling systems (Amjad et al., 2023)\*\*.</p> <p>AD produces biomethane, a low-cost and low-carbon fuel that can be effectively adapted for rural communities. With biomethane, we can power cold storage units, providing a reliable means of preserving perishable goods. Notably, biomethane production is versatile. Various organic materials can be utilised, such as animal manure and market wastes. By harnessing the vast reserves of organic waste, we can generate biomethane and effectively operate refrigerators (Lsoto, 2020)\*\*\*. This renewable energy source offers a sustainable and cost-effective solution for off-grid supply.</p> <p>Uganda is one of the few countries in sub-Saharan Africa (SSA) that is exploiting AD technology to provide household cooking and electrification, with over 30,000 digesters installed. However, techno-economic issues like insufficient feedstock supply and</p>				



operating/maintenance know-how by rural households limit its long-term application and widespread adoption. For example, about 60% of digesters have become non-operational due to water and manure scarcity (Smith et al., 2013) [0].

The BioCool project will tackle this need by implementing an Energy as a Service (EaaS) business model, shifting the techno-economic responsibilities to the energy provider. This approach not only guarantees improved livelihoods for the rural population but also ensures that customers only pay for the fuel they consume. By doing so, it provides them with enhanced access to reliable, affordable, and low-carbon fuel options. Additionally, the BioCool Project will incorporate co-digestion and the use of a slurry separation technology to facilitate water recirculation back into the AD system, further enhancing its efficiency.

[0]: <https://doi.org/10.1016/j.geoforum.2020.02.017>

[1]: <https://doi.org/10.1093/ce/zkad015>

Lsoto Dorothy (2020). Evaluating Biogas Chiller Performance and Adoption in Eastern Uganda (Kumi District) Master's thesis, University of Wisconsin-Madison.

Final Report. DFID NET-RC AO6502.

[0]: <https://doi.org/10.1016/j.geoforum.2020.02.017>

[1]: <https://doi.org/10.1093/ce/zkad015>

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10074185	Early	12	299954	253116
Admin Lead		Technology Lead	All Organisations	
SMART VILLAGES RESEARCH GROUP LTD		Energy Research Centre	Energy Research Centre, National University of Lesotho, SMART VILLAGES RESEARCH GROUP LTD, Mos-Sun Clean Energy Technologies (PTY) Ltd , Kiima Foods, Orkonerei Maasai Social Initiatives	
Project Title				
Innovative Low Voltage Single Wire Earth Return (SWER) for Affordable Microgrid Distribution Infrastructure in Africa				
Public Summary – Provided by applicants				

# ENERGY CATALYST



A typical village in rural Uganda might have 225 houses, consume an average of 0.3kWh per day from a minigrid, and require 8km of distribution infrastructure (poles and cables) to connect all the spread out houses. The village in the UK in which we are based has 1250 houses, consuming (conservatively) 10kWh a day, and requiring just 4km of (identical) distribution infrastructure because of our high housing density. Our electricity tariffs are roughly the same (at \$0.20/kWh).

The UK village pays a combined total of just over \$900k a year for electricity, which repays the cost of the distribution system within 2 weeks. The households in Uganda pay just under \$5000 a year for electricity usage, and will therefore need more than 16 years to repay just the cost of the poles and cables, without even factoring in the cost of the electricity generation itself.

More than anything else, it is the cost of distribution that kills the commercial viability of minigrids, and prevents remote households from being connected to electricity systems in offgrid rural communities in Africa. There has been little to no innovation in distribution to match the significant recent advances in generation and storage technologies and affordability.

Single Wire Earth Return is a promising technology used for high voltage rural connections in the electricity grid in the US, Canada, South Africa, Mozambique, Laos, Brazil, Australia and New Zealand. In this feasibility study we propose to adapt the technology to low voltage (230V) use in last mile connectivity in rural minigrids and test its performance in multiple locations and climate/soil conditions, collecting data to demonstrate its cost effectiveness and safety for users and the community in rural energy access. We estimate the technology could save as much as 70% of the cost of traditional distribution systems.

We will also engage with local regulators and the international energy access community to introduce them to this technology, and encourage its uptake to enable wider energy access in remote communities and households, and lower energy tariffs in these communities.

Partners SVRG (>20 innovative rural energy systems in sub-Saharan Africa), MOSCET (foremost sustainable energy company and minigrid installed in Lesotho), Kiima Foods and OMASI (rural development NGOs with experience of >40 community technology solutions) and electrical engineering experts National University of Lesotho Energy Research Centre are collaborating on this project to trial the technology in three communities and evaluate safety and cost-benefit.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10078878	Mid	24	597604	441389
Admin Lead		Technology Lead	All Organisations	
QBOTS ENERGY LTD		QBOTS ENERGY LTD	HT Vietnam Engineering and Technology Joint Stock Company, QBOTS ENERGY LTD, EASTERN INTERNATIONAL UNIVERSITY	
Project Title				
VIETPULSE - Vietnam Intelligent Energy Trading Platform for Upscaling Local energy Storage and EV				
Public Summary – Provided by applicants				
<p>With the target to phase out coal by the 2040s and the commitment to reach net-zero emissions by 2050, renewable energy is key to Vietnam's energy transformation. But the electricity grid transmission lacks capacity to export energy from wind farms and solar fields to consumption hotspots. As a result, the power industry has temporarily suspended the connection of new projects and reduced the capacity of existing projects. Households and industrial zone developers are now more and more interested in setting up rooftop solar systems for self-consumption. This VIETPULSE project will contribute to enabling the next frontier of electrification in Vietnam, guaranteeing uninterrupted and quality power to all households, enterprises and livelihoods with a smarter electricity grid utilising data and digital technologies.</p> <p>Led by UK based Qbots Energy, VIETPULSE project combines distributed smart control along with renewable energy through innovative localised smart energy marketplace platform to make it affordable &amp; sustainable; overcomes barriers with innovative energy service models utilising low-cost Internet of Things (IoT) technologies. For this Industrial research project, Qbots will be collaborating with Eastern International University (EIU) (research lead &amp; pilot-site) and HTENATECH (deployment and commercialisation support). Qbots' addressable &amp; serviceable markets comprise of business/industrial parks in Vietnam with electricity meters and owner-occupiers (like Becamex-EIU) with net-zero targets. After addressing this initial market we could then offer it to the tenant businesses within these business parks by working with management companies responsible for their utilities.</p>				

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The innovative aspect of VIETPULSE project is the Federated Power Plant (FPP) technology developed by Qbots combining the value of Peer-to-peer (P2P) energy trading system with efficiencies of aggregation of energy assets including battery storage. In the FPP, an optimisation algorithm with predictive control will be developed and implemented to coordinate the energy usage, generation and battery storage to balance the demand and supply at a local network level, while grouping assets for grid level services for improving reliability.

The outputs include successful trials of the VIETPULSE platform, delivering a validated smart energy trading & optimisation platform with at-least 9 sites, 3 generators (75 kWp on block 4, 10kWp each on Block-5 and Garage EV-hubs), 60kWh of energy storage, 5 EV chargers and 21kWh bi-directional battery swapping station for Electric motorcycles. The impact will be measured through KPIs - Cost savings for customers buying energy through VIETPULSE; Increased income from on-site solar and battery storage; Reduction in carbon emissions for the energy consumed (kg/kwh).

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085853	Mid	24	1328741	1002441
Admin Lead		Technology Lead	All Organisations	
HUBL LOGISTICS LTD		HUBL LOGISTICS LTD	HUBL LOGISTICS LTD, ENGINEERONICS LIMITED, Modern Farming Technology (MFT), Aston University, ENTERPRISE PROJECTS VENTURES LIMITED, MALAWI FRUITS	
Project Title				
CoolRun Malawi				
Public Summary – Provided by applicants				

# ENERGY CATALYST



Agriculture is the key industry in Malawi; however, given the sub-tropical, climate, the cold supply chain for fruit, vegetables and other temperature sensitive goods is lacking. In most of Malawi, the electricity supply is unreliable, and the increasing cost of fossil fuels makes it expensive to operate internal combustion driven generators and compressors. The lack of a reliable, affordable, and available cold supply chain leads to high levels of wastage up to 50% of some crops harvested. In rural areas, farming is mostly on a subsistence basis and a female occupation. Farmers either sell their produce directly (or via resellers) at markets or roadside walking up to 2 hours to reach their pitch. Because the crop is not chilled, it cannot be easily sold to shops or supermarkets where higher prices could be realised. Our innovation is to develop a micro, affordable, mobile, sustainable refrigeration system comprising a modular refrigerated box cooled by Phase Change Material (PCM) panels. The crop is pre-cooled at a central location using a solar powered refrigeration unit that also cools the PCM panels. Temperature integrity is monitored via sensors that monitor GPS position and temperature and the data is transmitted to a cloud database for verification by supplier and customer alike.

The design and development work will be undertaken by Aston University in conjunction with its SME partners Hubl Logistics, Enterprise Projects Ventures Limited (EPVL), Malawi Fruits and Engineeronics Ltd in the UK and Modern Farming Technology (MFT) in Malawi. EPVL will supply the systems and the prototype will be evaluated in the field by MFT and Malawi Fruits. MFT will assess any gender related issues with the design. A digital twin of the design will be developed at Aston and performance of the prototype will be compared to the digital twin which will inform the final design. Aston University will conduct studies of the impact of the technology on gender and unrepresented groups.

Fruit and vegetable farming and selling in Malawi are activities divided based on gender with land ownership male dominated with females relegated to farming and sales. The technology is being developed with farming and selling enterprises in Malawi in mind to empower women to develop their enterprise and social standing by adding value to their activities. CoolRun enables users to cut waste dramatically providing more to sell and reach markets where prices are higher thereby generating greater returns.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085902	Mid	24	830931	581652
Admin Lead		Technology Lead	All Organisations	
CHALLENGES CATALYST LTD		African Clean Energy B.V. (ACE)	CHALLENGES CATALYST LTD, African Clean Energy BV, ACE Energy Solutions (U) Ltd.	
Project Title				
ACE DELIVERS: Distribution of Energy to the Last-Mile through an Inclusive Value-Chain Ensuring Responsible Services				
Public Summary – Provided by applicants				
<p>African Clean Energy (ACE), in collaboration with The Challenges Group, seek to establish a scalable, decentralised and digitised distribution model for transitioning households from harmful charcoal usage to sustainable local fuel options. ACE has demonstrable demand for its sustainable briquettes, however, the existing method of ordering and delivering fuels through local agents becomes impractical and unsustainable as ACE expands its geographical market penetration.</p> <p>This project will demonstrate the advantages of developing an inclusive approach to reconfiguring and incentivising Uganda's current physical infrastructure -- including local retailers serving as satellite suppliers, and motorcycle riders -- to promote efficient and cost effective decentralised last-mile delivery. By then overlaying this infrastructure with a digital framework, the approach will enhance access to affordable sustainable cooking options. This will, in large part, be accomplished by further enhancing ACE's proprietary app, ACE Connect.</p> <p>The project's innovativeness revolves around the following three components:</p> <ol style="list-style-type: none"> <li>1\. Digital Technology: Inspired by companies like Jumia Foods, ACE will utilise digital technology to engage and incentivise decentralised distribution value chain players and drive the transition to sustainable energy.</li> <li>2\. Hybrid Finance Model: ACE will implement a hybrid finance model that utilizes measured carbon offset revenue and scalable digital systems. By utilising digital tools to measure, collect, and monetise impact data, the project aims to disrupt existing practices by introducing positive incentives and commercial operations that consider both the "ability to pay" of end consumers and the "willingness</li> </ol>				



to pay" of Carbon Offset Buyers. This approach aims to alleviate the financial burden on the poorest households while ensuring their active engagement in the project.

3\ Value Chain Replication: The project will ensure replication the innovative decentralised and digitised value chain approach in different contexts (including humanitarian, development and conservation) through partnerships with third parties. This strategy enables scalability and financial viability in multiple locations, promoting sustainable growth.

Given 92% of energy consumed in Uganda comes from biomass, primarily charcoal, used for home cooking, this project is extremely timely. Uganda has experienced a significant loss in tree cover due to charcoal production, prompting recent executive orders to ban charcoal production in Northern Uganda. ACE's responsible approach to catalysing a just transition from the charcoal value chain will have a lasting impact on affordable, reliable and low carbon energy access in sub-Saharan Africa and beyond.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10074578	Mid	18	573776	401643
Admin Lead		Technology Lead	All Organisations	
GOMMYR POWER NETWORKS LIMITED		GOMMYR POWER NETWORKS LIMITED	Coseer Energy Suarl, GOMMYR POWER NETWORKS LIMITED, New Sun Road, Solbox Energia Lda, Captive Power	
Project Title				
GoHubs Mozambique Green Fishing and Cold Chain Hubs				
Public Summary – Provided by applicants				
<p>GoHubs Mozambique is a transformative network of solar-battery microgrid hubs serving the artisanal fishing sector in coastal communities of Mozambique. The primary objective of GoHubs is to provide smart reliable renewable energy solutions, infrastructure and equipment to unlock market access, reduce fish losses, and bolster the local fishing sector.</p> <p>The artisanal fishing industry plays a crucial role in Mozambique, accounting for 90% of the total catch and with over 15% of households depending on it for their livelihoods. However, inadequate energy and transport infrastructure in coastal areas restrict the availability of resources such as ice, cold storage, and access to non-local markets. These limitations lead to significant fish losses and reduced incomes within the sector.</p> <p>To address these challenges and create new opportunities, GoHubs introduces a pioneering business model that combines significant technological and commercial innovations. From a technical perspective, GoHubs integrates energy-intensive operations like ice production, cold storage, water pumping, and electric refrigerated transport into an integrated hub, powered by an on-site solar-battery microgrid. Smart control and load management system, ensures a reliable and efficient power supply and optimises across the critical loads. The entire systems is also integrated onto a single monitoring platform to simplify operations.</p> <p>From a commercial standpoint, this bundling approach ensures that a continuous reliable cold chain from boat to market is effectively and sustainably established. Furthermore, this strategy facilitates economies of scale, resulting in lower unit costs for ice and services. GoHubs not only sells ice and cold storage services but also supports the trading of local fish, providing electric refrigerated transport to</p>				

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larger markets. The business model also enhances resilience by diversifying revenue streams, and by including electric vehicle charging reduces the impact of volatile fossil fuel costs on transportation. By providing ice and services instead of selling energy units, GoHubs mitigates the uncertainty associated with the current regulatory environment.

GoHubs is a pilot deployment in Inhambane Province on a public-private partnership model with a community fish market. GoHubs expects to improve the livelihoods of the fishing sector workers and the broader community through improved catch quality, better and reliable market access, and reduced losses and wastage and replicate the model across Mozambique and other countries where renewable and reliable cold chain can unlock green growth.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086283	Late	36	4800369	2145143
Admin Lead		Technology Lead	All Organisations	
MANDULIS ENERGY (UK) LTD		MANDULIS ENERGY (UK) LTD	Husk Ventures (Cambodia) Co LTD, MANDULIS ENERGY (UK) LTD, Technology Edge, Pandamatenga Commercial Farmers Association, Accenture (South Africa) (Pty) Ltd, REPARLE	
Project Title				
BioEnergy Powering Agriculture and Rural Livelihoods Enhancement- BEPeARLe				
Public Summary – Provided by applicants				

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According to the International Energy Agency, 770 million people worldwide do not have access to electricity today, primarily in Asia and Africa. Energy insecurity is one of the biggest problems in rural areas because poor grid infrastructure and connections are a significant contributor to the lack of access to power, which impedes socioeconomic development. Rural electrification will not only spur economic growth but also narrow the urban-rural divide. How can we address energy infrastructure on a budget when high-capacity batteries are (mostly) prohibitively expensive? Solar photovoltaics (PV) is already a tried-and-true method of producing electricity off-grid. Our vision is to provide all three components of the energy trilemma - affordability, reliability, and sustainability of clean energy access - to marginalized communities in five target countries -- Botswana, Cambodia, Nigeria, Uganda and Zambia, via our Agrivoltaic Solar - Biomass Gasification - Biogas Hybrid system. Mandulis, through its zero-waste circular economy model, generates clean energy solutions from waste, enabling smallholder farmers to access clean electricity for powering their households and businesses, clean cooking fuel, energy-saving cookstoves, agricultural processing services, and soil enhancers. The uniqueness of our circular economy model, leveraging on and revalorizing residues and byproducts of the process, makes all these goods and services affordable, reliable, and sustainable for smallholder farmers, having a great positive impact on poverty alleviation, climate resilience, and biodiversity protection. This project will demonstrate the economic benefits that can be achieved by integrating agriculture and energy. As a core business objective of Mandulis Energy, bringing these two sectors together will foster cross-sectoral engagement, stimulate business opportunities, and partnerships between smallholder farmers in the targeted areas with larger economic players. It will also develop locally the skills necessary to put these multifunctional technologies into use and keep them maintained. To disseminate knowledge, comprehend end-user requirements, and develop a supply-chain integration strategy, we will work directly with local communities, energy developers, and SMEs in all target countries as we implement: 12 PV - biomass gasification - digestion systems in Uganda (6 sites - 100 kW, 1 site - 500 kW), Botswana (1 sites - 100 kW), Nigeria (1 site - 100 kW), Zambia (1 site - 100 kW) and Cambodia (1 site - 100 kW), generating low carbon, reliable, affordable and productive renewable energy to drive post-harvest processing, clean cooking fuel and biofertilisers.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10078524	Early	5	97457	68220
Admin Lead		Technology Lead	All Organisations	
SDG CHANGEMAKERS LTD		SDG CHANGEMAKERS LTD	SDG CHANGEMAKERS LTD, Kioa Island Community Organisation (KICO), UNDP Fiji MCO	
Project Title				
Feasibility Study to increase access and affordability of clean-energy - A Case Study of Kioa Island, Fiji				
Public Summary – Provided by applicants				
<p>Our mission for this early-stage project is to help solve the Ayrton Challenge priority area of leaving no one behind, ensuring the benefits of the clean energy revolution reach the poorest and most marginalised, including people in humanitarian contexts.</p> <p>Our area of focus is the Pacific Island Countries. These Island nations are among the most vulnerable regions to the impacts of climate change. Rising sea levels, increased frequency and intensity of extreme weather events, and ocean acidification pose significant threats to their ecosystems, infrastructure, and livelihoods. According to the Intergovernmental Panel on Climate Change (IPCC), small islands face unique and disproportionate risks, making them priority areas for climate change adaptation and mitigation efforts.</p> <p>The Pacific island countries are particularly exposed to rising sea levels. For example, the Republic of Kiribati and Tuvalu have average elevations of just a few meters above sea level. According to the Pacific Climate Change Science Program, sea levels in the Pacific region are rising at a rate of approximately 7-10 mm per year, significantly faster than the global average. This places coastal communities at risk of inundation, saltwater intrusion, and erosion, necessitating urgent action to mitigate and adapt to these challenges while also ensuring energy and food security.</p> <p>Despite their vulnerability to climate change, many Pacific island countries still heavily rely on imported fossil fuels for their energy needs, resulting in high energy costs and carbon emissions. According to the International Renewable Energy Agency (IRENA), only about 15% of the Pacific islands' energy supply comes from renewable sources. Enhancing access to clean energy in these countries is essential to reduce greenhouse gas emissions, enhance energy security, and foster sustainable development.</p>				

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The focus of this Feasibility Study will help to speed up access to affordable and clean energy by partnering and collaborating with communities, UN departments and micro-financing providers to explore clean-energy-generating productive use solutions for food production and processing and sustainable business models can optimally improve the socio-economic potential of communities, ensuring everybody gets to live a dignified and fulfilled life through access to affordable, reliable, sustainable and modern energy solutions\_ . (1)\_

(1)Lal, R., & Kumar, S. (2022). Energy security assessment of small Pacific Island Countries -- Sustaining the call for renewable energy proliferation. \_Energy Strategy Reviews\_, \_41\_, 100866\ . <https://doi.org/10.1016/j.esr.2022.100866>

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Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10081836	Early	12	297195	244946
Admin Lead		Technology Lead	All Organisations	
AFRICA POWER LTD		AFRICA POWER LTD	AFRICA POWER LTD, Solar Sister Inc., Solar Sister (Tanzania)	
Project Title				
Women Entrepreneurs Powering Communities with Productive Use of Renewable Energy in Tanzania				
Public Summary – Provided by applicants				
<p>Affordable, reliable, and efficient electricity increases productivity, generates jobs, and enhances living conditions and socioeconomic success. Despite this, 774 million people globally lack access to energy, with 597 million of those individuals living in sub-Saharan Africa and women and children disproportionately bearing the brunt of its negative impacts. They are disproportionately impacted by energy poverty because women can spend up to 10 hours a week collecting fuel for energy use, often also leading to young girls being removed from school for firewood collection and preventing women from participating in other income-generating activities. Walking great distances for fuel, leaves women vulnerable to physical attacks. Cooking with these fuels, and inhaling the toxic smoke, endangers women's and children's health. In Tanzania, 38 million people don't have access to electricity, 30 million people live below the extreme poverty line, and women are 28% likely to have less opportunities as men.</p> <p>Solar Sister trains and supports women to become entrepreneurs to build sustainable businesses in their own communities, with the opportunity to earn an income and communities to benefit from enhanced climate resilience, food security and the financial, education, and health benefits of clean energy. To date, Solar Sister has recruited, trained and supported more than 9,000 women entrepreneurs who have gone on to mitigate more than 1.2M CO<sub>2</sub>e, impacting the lives of more than 3.8M beneficiaries across Nigeria, Tanzania and Kenya.</p> <p>Africa Power develops, deploys and sells off-grid solar solutions for Africa and is active in Tanzania, Uganda and Zambia. It has developed a range of productive-use-of-Energy (PUE) products, some of which were developed under EC6\.</p>				



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This project is catered at the nexus of women's empowerment, energy poverty, and climate resilience. Through this partnership, Solar Sister's existing last-mile distribution networks in Tanzania will be trialled to drive access to appliances and productive use technologies (PUE) to last-mile communities using a gender inclusive approach.

Solar Sister's tried and tested business model for distributing innovative renewable PUE products that can improve climate resilience and food security (using fishing lights, solar-powered food dryers, mills, refrigerators and clean cooking solutions). We will develop new avenues, and new software, to provide credit to low-income consumers to ensure our solutions are affordable to those who need it most. This process will simultaneously address multiple drivers of climate adaptation, mitigation and food security in sub-Saharan Africa: poverty, gender inequality, lack of innovative technologies, and food insecurity caused by climate change.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10077791	Late	36	2200977	990440
Admin Lead		Technology Lead	All Organisations	
FARADION LIMITED		FARADION LIMITED	FARADION LIMITED, Ultracarb Pvt. Ltd	
Project Title				
Sodium-ion batteries for BESS in South Asia utilising a local materials supply chain				
Public Summary – Provided by applicants				
<p>Battery Energy Storage System \[BESS\] are needed to maximise the utilisation of renewable energy sources, to support the functioning of electrical grids and to provide energy access to those in locations not yet grid-connected.</p> <p>Faradion's Sodium-Ion Battery \[SIB\] technology represents a lower cost, more sustainable alternative to existing lithium-ion or lead acid battery technologies normally used in BESS. Building on over a decade of SIB technology development and delivering low-voltage packs for residential applications, further innovation at Faradion in this project aims to develop a high-voltage BESS suited to manufacturing at a scale appropriate to the burgeoning demand in South Asia.</p> <p>In Sri Lanka, Ultracarb will specifically design a hard carbon material optimised for performance in SIBs. Using a sustainable waste by-product as the precursor for this material will allow the costs of SIBs to be reduced further and will encourage investment in cell manufacturing and related industry in the region. The anode developed by Ultracarb will then be incorporated in SIBs.</p> <p>SIBs containing the developed material will be integrated into a high-voltage BESS demonstrator unit that will undergo field trials in India. The challenging operating environment in India provides valuable information to inform future product development and will demonstrate the reliability of this technology in the South Asia region</p> <p>This project will enable the partners to establish local supply chains for materials and components in order to serve the rapidly expanding energy storage market in South Asia.</p>				

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10073777	Mid	24	926143	731591
Admin Lead		Technology Lead	All Organisations	
SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD		Kainos Projects Africa	CREATIVENERGIE, INCLUSIVE ENERGY LTD, SOLAR TRAINING RENEWABLE ENERGY & ENTREPRENEURSHIP CENTRE, SCIENCE TECHNOLOGY AND INNOVATION FOR DEVELOPMENT LTD, Kainos Projects Africa	
Project Title				
VUTSELA: Sustainable Farm-based Biogas Systems with Community Impact in Eswatini				
Public Summary – Provided by applicants				

VUTSELA means "keep burning" in Siswati.

Energy access in Eswatini is limited and very dependent on neighbouring countries with 80% of electricity being imported from South Africa and Mozambique. Liquefied petroleum gas availability is declining sharply with production facilities in South Africa closing down. The bulk of the population (78%) are based in rural areas, contributing to the crisis of ensuring viable and sustainable supply of energy to households. Decentralised energy supply solutions such as solar PV and biogas are suitable solutions to this problem. Biogas may be particularly well suited for adoption in Eswatini as 71% of the land is agricultural and feedstock for digestion is readily available. Biogas generated sustainably from waste could satisfy household or light-industrial heating requirements, which form the majority of energy needs.

Farms would be an appropriate route to market entry as digestion provides the added benefit of waste disposal and fertiliser production in addition to energy savings from biogas production. As 37% of the economically active population of Eswatini is employed in agriculture, targeting farms aids the economic survival of a backbone of employment in the country. Moreover, it effectively exposes a large proportion of the population to a new technology (biogas generation through anaerobic digestion) which aids in education and wider scale later adoption.

This project aims to roll out 100 digesters (plus an initial 15 prototypes) to low income farms in Eswatini and the bordering regions of South Africa. Eswatini is targeted due to the reasons stated, and South Africa is seen as a potential market expansion in neighbouring regions with a similar context. This project period will be used to gain valuable market feedback through community engagement and the established methods of Smart Villages Research Group to understand and define the real needs of the local farms and communities and use this information for design revisions before future commercial rollout and continued operation.

The project will be executed with a local tertiary training centre, STREEC, aimed at equipping Eswatini youth with technical skills in renewable energy and entrepreneurship. Small commercial farms will be chosen for initial sites within a 100km radius of the training centre for ease of monitoring, training, and engagement hubs for wider groups of low income farmers to introduce the technology and understand the specific needs and value to the community. Innovation will be largely focused on technology adoption and developing a viable and sustainable business model.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086514	Late	24	2592376	1166569
Admin Lead		Technology Lead	All Organisations	
STEAMA COMPANY LIMITED		STEAMA COMPANY LIMITED	STEAMA COMPANY LIMITED, Kumudzi Kuwale LTD, Differ Community Power AS	
Project Title				
Empowering impactful development across rural Malawi through clean Energy HUBs				
Public Summary – Provided by applicants				
<p>Malawi is one of the poorest countries in the world, and the country faces severe challenges in multiple aspects of the society. Only around 16% of the population aged 25 and above have completed secondary school, 70% of Malawi's population between 15 and 29 are not employed by formal organisations. Only 18% of the Malawi population has access to electricity services. And the lack of a culture for operation and maintenance often results in that for instance installed solar energy systems are not taken care of and stop functioning after just 2-3 years while their technical life-time is often 15-20 years.</p> <p>Differ Community Power is specialised in providing reliable energy services to schools and health facilities in developing countries. In Malawi, DCP, with SteamaCo, has more than 100 sites in operation, and at all of these sites there is excess energy available during daytime that currently is not used. This project seeks ways to use this excess energy to solve some of the challenges mentioned above, including earning money to do O&amp;M on the solar energy systems at the health facilities.</p> <p>We are doing this by selling electricity services to off-takers. These off-takers must afford paying for the energy, and this ability to pay is the main risk to whether we are able to create a viable business. Examples of off-takers and related businesses are:</p> <ol style="list-style-type: none"> <li>1. Water Services for agriculture irrigation: Using excess energy to pump water into water tanks during daytime and farmers can use irrigation systems and gravity for water feeding the soil during nighttime. 80% of the population is involved of agricultural activities, and providing water so that the farmers potentially can have more than one harvesting season, is promising.</li> </ol>				

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2. Cooling service for agriculture proceeds: Using excess energy to offer cooling services for the agriculture proceeds. The loss of proceeds and value will be significantly reduced
  3. Energy services for households: Using excess energy to charge batteries that are rented out to households that cannot afford their own solar home system.
  4. Milling services for farmers: Using excess energy to run maize mills the farmer so far have been using diesel generators for.
- All of these services imply selling electricity and if successful, the impact will be very positive on several of the SDGs, e.g. on health services (SDG3), education (SDG4), clean energy (SDG7), economic growth (SDG8) and climate change (SDG13).

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10083777	Mid	21	565365	373847
Admin Lead		Technology Lead	All Organisations	
ORXA GRID LTD		ORXA GRID LTD	Kilembe Investments Ltd, ORXA GRID LTD, SCOPE T&M Pvt Ltd	
Project Title				
Grid Analytics Platform				
Public Summary – Provided by applicants				
<p>In Sub-Saharan Africa, the lack of electricity access and high energy losses pose significant challenges. According to the International Energy Agency, nearly 600 million people in the region lack access to electricity. Operational inefficiencies result in electricity utilities losing 23% of the energy they produce, amounting to annual losses of £29 billion. This situation forces residents to resort to expensive and environmentally damaging alternatives such as diesel generators or traditional fuel sources like wood or dung.</p> <p>To tackle these pressing issues, OrxaGrid, SCOPE, and Kilembe Investments Limited (KIL) are collaborating on the development of an innovative solution called the Grid Analytics Platform (GAP). Building upon their previous partnerships, the project aims to address utility inefficiencies and enhance energy access in Sub-Saharan Africa.</p> <p>OrxaGrid, based in the UK, will lead the project by developing a software orchestration platform that creates a digital twin of the utility grid. This innovative platform provides network visibility and enables prompt detection of outages and losses, revolutionising electricity distribution. SCOPE, based in India, will design rugged low-cost IoT grid management devices that can be retrofitted into existing infrastructure. KIL, located in Uganda, will serve as the test bed for the implementation of this system in their rural Western Uganda grid network.</p> <p>GAP replaces manual estimation of energy losses and outage readings with an intelligent IoT system that predicts and alerts utilities about losses and outages in a cost-effective manner. GAP also offers a consumer onboarding platform to expedite connecting new</p>				

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consumers to the electricity network. This system offers a more efficient alternative to the current labour-intensive processes and presents a smarter, affordable alternative to the expensive SCADA systems commonly used in more developed utilities.

Once successfully implemented on KIL's network, the GAP solution has the potential to address the energy trilemma by improving reliability through reduced power outages, enhancing affordability through decreased energy losses, and promoting sustainability through integrating renewable energy sources and promoting energy conservation through consumer training.

By targeting these challenges, the GAP project aims to transform the electricity distribution landscape in Sub-Saharan Africa, providing reliable and affordable power to millions of people while contributing to the region's economic, social, and environmental progress.



## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10084084	Mid	24	1227342	859139
Admin Lead		Technology Lead	All Organisations	
FUTURES ADVISORY LIMITED		Zonke Energy	Zonke Energy, The Sustainability Institute Innovation Laboratory (Pty) Ltd, FUTURES ADVISORY LIMITED	
Project Title				
Piloting Basic Solar Energy Grants for Equitable Access to Energy				
Public Summary – Provided by applicants				
<p>Like many emerging markets, South Africa has a fast-growing urban population, resulting in the proliferation of informal settlements on land often unsuitable for grid electrification. Nevertheless, under South African law, municipalities have a legal obligation to provide basic services, including energy, to all households but prioritising the poor. While existing national policies do allow for alternative (off-grid) energy services, these policies were not initially intended for urban informal settlements and are thus not fit for that demographic. A number of municipalities are thus exploring how to develop their own policies to meet this need. For example, the City of Cape Town is considering implementing a grant for eligible low-income households that do not have grid electricity. The monthly grant could be put toward an energy service of each household's choice. An advantage of such a grant is that it would provide affordable and varied options for consumers, and would stimulate innovation and competition amongst potential service-providers.</p> <p>Before implementing such a policy the city is seeking evidence to help establish an optimal grant-value that ensures a high level of inclusivity. iShack and Zonke Energy have been providing off-grid solar energy services (via Solar Home Systems and Solar-Towers, respectively) for a number of years in various informal settlements around Cape Town. They have tested a range of financial and operating models, and have shown conclusively that for the South African informal settlement context, private enterprise alone cannot fill the gap of energy access due to a lack of affordability. Thus, some form of state support is needed. In this project a Basic Energy Grant (funded by Energy Catalyst Round 10) will be implemented in one large community in order to demonstrate its effect on inclusivity, as well as build the case for viable business models. iShack and Zonke will collaborate to provide a choice of basic solar energy services. The</p>				

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project will run for two years, during which each participating household will have the benefit of the grant, which they can use towards the purchase of a Solar Home System or access to Solar-Tower electricity. A programmatic community engagement element will support a co-productive relationship with the community as well as promote energy democracy and capacity building, gender equality and inclusivity. Progress and outcomes will be monitored by Future Advisory Ltd who will conduct communications to disseminate the results of the pilot to relevant stakeholders, in particular to municipalities.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10081024	Mid	24	1476268	1143049
Admin Lead		Technology Lead	All Organisations	
ALTA VISION LTD		ALTA VISION LTD	University of Surrey, University of Sri Jayewardenepura, ALTA VISION LTD, LARGE MINORITY LTD.	
Project Title				
REACT Mid-stage - Renewable Energy Access for the Conversion of Tuk-tuks				
Public Summary – Provided by applicants				
<p>Following the successful early-stage project, this project aims to further develop the innovative technologies and business models that together will improve energy access to hundreds of thousands of Sri Lankan three-wheel tuk-tuk drivers. Tuk-tuk-drivers -- male and female - rely on their vehicles as an important source of income but currently lack access to energy which is affordable, reliable and carbon free. The project will convert internal combustion engine tuk-tuks to electricity and power them with clean and renewable solar energy.</p> <p>Tuk-tuks are the main light transport method in Sri Lanka and other adjacent countries such as India, Thailand and Indonesia - there are over 1.2 million tuk-tuks in Sri Lanka which generate considerable air pollution. The vast majority of these vehicles are powered by out-of-date two or four stroke petrol engines. In addition, the recent fuel price rise and severe supply instability has affected the tuk-tuk drivers' community who are subsisting on low-incomes.</p> <p>Following the innovative concept of tuk-tuk conversion and battery subscription scheme developed from the early-stage project, we aim to mature the user-centred technology and business model in this mid-stage project and address several technical and business challenges, to pave the way for successful exploitation. The design of the conversion kit including mechanical, electric and electronic components, will be reiterated and improved towards final products; long-term strategic suppliers will be identified and the partnership will be developed; partnerships with local garages and fuel stations (charge stations) will be developed; data will be collected and new business opportunities will be identified; training courses will be developed to ensure the safe and efficient operation of the vehicles. A</p>				

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large trial will be conducted to prove the concept and collect valuable data. The team will also work with the local authorities to promote the technologies and businesses.

The Technology lead for the project is an industrial firm, Alta Vison (Pvt) Ltd (AVL) who have a rich experience in renewable energy system installation and operation, and energy storage system development. Another business partner Large Minority who has valuable experience and connection with end-users will join the team. They are supported by two academic partners with sound track records and knowledge in mechanical and electric system design, electric and hybrid vehicle research and development. The team has both a strong technological and business background, as well as good understanding of the local market and the policy landscape in Sri Lanka.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10085837	Mid	24	1183710	931206
Admin Lead		Technology Lead	All Organisations	
TECHNOVATIVE SOLUTIONS LTD.		Nanoé	THE POWER HUB LTD, University of Leicester, TECHNOVATIVE SOLUTIONS LTD., Nanoé, TWI LIMITED	
Project Title				
Towards a new power infrastructure development path for rural Africa (PowerPath)				
Public Summary – Provided by applicants				
<p>Nanoé is a French-Malagasy social business moved by the ambition to amplify energy access and employment creation in rural Africa through the implementation of a new electrification model based on renewable energies, digital technologies and local entrepreneurship, named Lateral Electrification.</p> <p>In the PowerPath project Nanoé collaborates with Technovative Solutions Limited, the University of Lancaster, TWI Limited and The Power Hub Limited and seek funding to develop a first of a kind progressive technological concept that clusters smaller power infrastructures (from solar nanogrid, to DC microgrid, to DC/AC minigrid) to deliver more intense energy services (like motor or thermal uses) in a way that ensures stable, abundant energy access through solar.</p> <p>Further to technological development, the business model of PowerPath addresses a plurality of challenges related to the deployment and maintenance of the technologies related to the nanogrids/microgrids as they focus to the training and strong participation of not-skilled community members without gender discrimination to become technically skilled agents of the energy expansion.</p> <p>In this context the project addresses sustainable development goals: SDG-7 (access to energy), SDG-8 (access to employment) and SDG-13 (development of sustainable energy practices).</p>				

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10082775	Mid	24	575623	454712
Admin Lead		Technology Lead	All Organisations	
SMART VILLAGES RESEARCH GROUP LTD		SMART VILLAGES RESEARCH GROUP LTD	SMART VILLAGES RESEARCH GROUP LTD, COMET , Energy Action Partners	
Project Title				
Renewable ENergy Demand Assessment and eNtrepreneurial Growth (RENDANG) for Energy Access in Malaysia				
Public Summary – Provided by applicants				
<p>Our project addresses challenges and opportunities in rural electrification, particularly for remote Orang Asli communities in West Malaysia. Despite the country's considerable urban development and high electrification rates, about 200 of these villages remain under-electrified.</p> <p>A critical challenge in deploying distributed systems in communities is assessing and growing demand for electricity. Current approaches in distributed systems involve surveying communities, then designing and installing systems such as mini-grids based on this initial assessment. Mini-grid construction can be a slow process, and during the wait, communities may lose interest or trust in the electrification process. When the mini-grid eventually comes online, demand can be disappointingly low, as the community is only just starting to develop their productive use businesses and grow their payment behaviour.</p> <p>We propose to address this problem by integrating the Community Energy Toolkit (COMET), a community engagement software tool to assess demand, and a mobile mini-grid to provide quick and temporary electrification to build demand, while deploying more permanent solutions. Our project involves a collaboration between Smart Villages Research Group (SVRG), Energy Action Partners (ENACT), and the COMET team, to develop an integrated model that merges COMET's predictive capabilities with the immediacy of mobile mini-grids in Pos Titom located in the state of Pahang, Malaysia. This approach will accurately assess energy needs to be met by cost-effective Clustered Solar Home Systems (CSHs), foster demand for productive uses of energy using the mobile mini-grid, and encourage sustainable income via targeted capacity building for village-based enterprises enabled by these systems.</p>				

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This innovative model aims to bridge the gap between the initial community engagement and the installation and commissioning of a distributed energy system. It will help maintain community interest and grow energy demand gradually, a crucial step for scaling distributed energy systems sustainably.

We expect the combination of the two technologies to be widely scalable. Whilst we will be validating the approach in Malaysia, the successful demonstration of the impact will allow us to apply this innovative suite of tools to improving minigrid and energy access development worldwide, where for example latest estimates (World Bank ESMAP, 2022) forecasts a need for at least 200,000 more minigrids to be able to meet SDG energy access targets in Africa alone.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10077389	Mid	24	908575	697990
Admin Lead		Technology Lead	All Organisations	
TERRA POWER LTD		TERRA POWER LTD	Loughborough University, Nexus3, Zest Associates DMCC, TERRA POWER LTD	
Project Title				
Safely transforming phytoremediation crops into bioenergy				
Public Summary – Provided by applicants				
<p><b>**Public description**</b></p> <p>This project will optimise technology to efficiently and safely produce biogas using plants grown on contaminated land. Terra Power is based in the UK and was founded to develop this technology. The project involves partners in the UK, UAE, and Indonesia.</p> <ul style="list-style-type: none"> <li>* Our UK partner, Loughborough University, brings research expertise, AD capabilities, and all required lab equipment. Terra Power worked with Loughborough to deliver a successful proof-of-concept project, and published results in a co-authored paper in the peer-reviewed International Journal of Phytoremediation (June 2020)</li> <li>* Our UAE partner, Zest Associates, brings cleantech commercialisation expertise, green finance expertise, start-up incubation experience and project leadership capabilities critical for successful delivery.</li> <li>* Our Indonesian partner, Nexus3, brings access to test sites, skills in site characterisation, toxics management, and testing the production of mercury-absorbent polymer locally, maintaining relationships with target communities, policymakers and local subcontractors.</li> </ul> <p>This project supports the production of cost-effective and locally secure low-carbon energy for the energy-poor in countries affected by site contamination, tackling the energy trilemma. The project also delivers co-benefits including reduced carbon emissions, valorising remediation activities, improving health, especially of women and children, restoring soils, create local economic development, in turn</p>				



# ENERGY CATALYST



addressing Sustainable Development Goals 1, 5, 7, 8, 9, 10, 12, 13 & 15, and supporting compliance with the UN Minamata Convention on Mercury.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10084277	Mid	24	1488287	1094680
Admin Lead		Technology Lead	All Organisations	
INTERNATIONAL LEAD ASSOCIATION		INTERNATIONAL LEAD ASSOCIATION	Loughborough University, ULTIMA FORMA LTD, Renew'N'Able Malawi, Monbat AD, INFLO LTD, INTERNATIONAL LEAD ASSOCIATION	
Project Title				
Modular Energy Storage with Clean Hydrogen (MESCH)				
Public Summary – Provided by applicants				

# ENERGY CATALYST



## \*\*MODULAR ENERGY STORAGE WITH CLEAN HYDROGEN (MESCH).\*\*

The MESCH project will develop and deploy a new category of battery and hydrogen production technology (a battolyser) within a modularised hybrid energy storage system. MESCH can be used for electricity supply, cooking, or to support education and employment. During our 2-year project, project partners will develop, deploy, and validate a pilot MESCH installation at a hospital in Malawi. We will also investigate the needs of Malawi end-users, train local operatives to ensure upskilling, and develop a business plan to enable rollout of MESCH to other communities, first focusing on socially and economically critical organisations, in particular hospitals, schools, community centres, and small businesses. Our longer-term plan will include deployment in other African and Asian regions.

Motivations for our development of the MESCH system are manifold: Over 800 million people have no reliable access to electricity, particularly in sub-Saharan Africa. Approximately 2.6 billion people worldwide lack access to clean cooking and the responsibility for household food provision falls disproportionately on women. Organisations in Malawi face particularly fierce issues: Blackouts, reliability issues, and affordability issues are commonplace, impacting social welfare and economic development negatively.

MESCH will involve technical, business, and academic partners in the UK, Malawi, and Bulgaria, who are well positioned to support our long-term goals and enable mass-manufacture of MESCH components, systems, and solutions. Our innovative solution is low cost and works with renewable energy--it will accelerate clean energy access to meet UN Sustainable Development Goals SDG7 and SDG13).

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086009	Mid	18	1372186	960530
Admin Lead		Technology Lead	All Organisations	
WELLSPRING DEVELOPMENT CAPITAL LIMITED		Agsol Limited	Agsol Limited, Viktoria Solutions Limited, Agsol Kenya Limited, WELLSPRING DEVELOPMENT CAPITAL LIMITED	
Project Title				
Solar Powered Milling: pioneering efficient and affordable staple food processing in Africa				
Public Summary – Provided by applicants				
<p><b>**Project vision**:</b> To develop a solar milling solution that can out compete one of the largest single stationary uses of fossil fuels in off-grid areas of rural Africa -- diesel powered mills. The project will test and prepare for the rapid scaling of the most efficient, smart, and affordable solar grain milling machine ever developed -- the Agsol _MicroMill_ -- by removing technical, commercial, and financial bottlenecks. The MicroMill functions as an anchor load to a Tier 4 solar system that can deliver a range of other energy offtake benefits.</p> <p><b>**Key Objectives:**</b> To scale the MicroMill, we need to 1) optimise product design; 2) prepare for mass manufacturing to drive down costs 3) design the hardware and knowledge for a fair financing product to make it accessible to the financially excluded, and 4) prepare a commercial go-to-market strategy.</p> <p><b>**Focus areas:**</b> The experimental project will develop Agsol's manufacturing capabilities to prepare for mass manufacturing scales of economy, and develop and test IoT integrated product financing tools. These trials will initially focus on Kenya, and then expand during the project into 5 additional countries.</p> <p>The results of this project will support a commercial business case and product roadmap that can attract investment capital to scale beyond the project period. During the 18 month project over 500 MicroMills will be manufactured and sold under financing, delivering over 300 kW of new installed solar capacity, avoid nearly 400,000 litres of diesel, 1,000 tonnes of CO2, liberate 3 million hours of women's time, and provide a host of other social impact benefits.</p>				

# ENERGY CATALYST



**\*\*Project innovation:\*\*** This project will take the most innovative small solar grain milling machine to the next level ready for commercial scale-up. Along with finalising the core product design for mass manufacturing, the project will develop the hardware, software and knowledge that enables novel 'pay-as-you-earn' capabilities. Integrated smart tech and IoT technologies will monitor power consumption in real-time, being a proxy for income generation, and apply a variable financing mechanism so that high utilisation users pay faster than low utilisation customers. This approach caters for a broad customer base, especially those from lower socioeconomic areas. We are not familiar with any other productive use appliance company offering such customer-centric inclusive financing.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10083206	Mid	24	934065	736794
Admin Lead		Technology Lead	All Organisations	
RE 5 LIMITED		SUN HARVESTER LIMITED (ZHYPHEN)	Thar Kunwaa Foundation, Salateen Syndicate, SUN HARVESTER LIMITED, RE 5 LIMITED, Brunel University London	
Project Title				
SolarERA (Solar Electrification of Rural Areas)				
Public Summary – Provided by applicants				
<p>The people of Thar Desert have little to no electricity access. Those that have access, use diesel polluting generators to produce this electricity, while fuel supply is unreliable and intermittent. The Thar is the most populous desert in the world, with approximately 16.6m people living there. Tharis are far behind the Pakistani average on economic skills. They rely predominantly on agriculture/livestock and "Thari crafts" (ornate embroidered/sewn garments such as quilts and cushions) to survive. The Thari women who make these crafts are extremely hardworking and talented, spirited and committed. Empowering women can change the destiny of Tharparkari people. However, the unavailability of electricity needed to power productivity enhancing stitching/sewing machines, means these women must make every stitch painstakingly by hand. As such, garment making is incredibly slow, laborious, and they are unable to leverage their skills to benefit their families and the wider village community.</p> <p>By the end of 2026, SolarERA systems will be ready to provide a unique electrification solution that will benefit these people by affording them access to off-grid electricity and in turn electric sewing/craft machines, and in doing so revolutionise their current economic situation. As a result, Thari-crafts can form the bedrock of the economic model that will provide microfinance institutions with the confidence to offer the initial investment to fund the SolarERA pico-grids. From this key initial electrification enabler, further downstream benefits can flow in relation to Health and Well-being, Education and Learning, Communication and Connectivity etc. Additionally, SolarERA will serve to preserve the age-old Thari crafts skills of these women, passed down by successive generations for centuries.</p>				

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The benefits to project partners are clear, major growth in jobs (25-UK, 125-PAK) and economic activity (£22.5million in revenues) by 2031\ . Kunwaa Foundation will be able to achieve its aim of improving the lives of the Thar people more easily and faster. SALATEEN will become a leader in the supply and installation of pico-grids across Pakistan and neighbouring countries. Zhyphen will see a significant boost in exports of critical technology for the enablement of low-cost off-grid solar solutions, enhancing it and Brunel-University-London's reputation as leaders in this area

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10079411	Mid	24	1389910	1079223
Admin Lead		Technology Lead	All Organisations	
FETU LIMITED		FETU LIMITED	Regen Renewables (Pvt) Ltd, University of Moratuwa, Sri Lanka, University of Bristol, University of Bedfordshire, FETU LIMITED, City University of London	
Project Title				
Off-Grid Renewable Energy Production and Storage with Organic Rankine Cycle, Solar and Waste (RESORCS)				
Public Summary – Provided by applicants				



According to the International Energy Agency, around four percent of the world electricity supply comes from solar electric cells. \*\*Solar energy is abundantly available in South Asia and in Sub Saharan Africa that is not harnessed\*\* nowhere near its full potential. The conventional technologies that harness solar energy are solar thermal and solar electric cells. \*\*Solar electric cells have a low conversion efficiency compared to solar heating cells and other thermal based energy conversion methods\*\*, for example an IC engine. Despite having a recycling efficiency of around 95%, recycling of solar electric cells is currently an expensive process. \*\*RESORCS\*\* project aims to \*\*design, construct and test an off-grid renewable energy production technology with a novel high output Rankine engine\*\*, local waste and solar energy harnessed with a concentrated solar collector.

A \*\*concentrated solar collector\*\* can collect thermal energy efficiently and relatively cheaply. Collected thermal energy is used to propel a Rankine Cycle engine based rotary turbine generator to generate electricity. Thermal energy collected can be boosted using thermal energy produced with waste combustion and bio-gas generated using waste. This hybrid combination can produce high grade thermal energy that will also increase thermodynamic efficiency of the prime mover, in this case, the \*\*FeTu turbine\*\*. Thermal energy collected during day is stored in a \*\*thermal energy reservoir\*\* that can be regulated based on demand. Electricity generated can be used directly, fed to the grid or stored in a battery bank for night time use or during high demand. It can also be used to power sustainable clean transport systems such as electric cars. The system can be used either as a standalone application or a grid connected system. The system is suited for a cluster of households or a small-scale enterprise.

In summary, the project aims to:

1. \*\*design and optimise\*\* a concentrated solar collector system with environmentally friendly materials and technology for optimal efficiency;
2. \*\*develop\*\* a thermal energy storage system and a Organic Rankine Cycle engine based turbine generator which is suitable for the concentrated solar collector system;
3. \*\*design\*\* electricity generation and control system with the concentrated solar system Stirling engine generator with grid connectivity;
4. \*\*design and integrate\*\* a waste combustion system to boost energy;
5. \*\*prototype\*\* the combination system and test its performance in different modes of use; and
6. \*\*investigate the design\*\* and impact of the system, pre and post design and construction

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10080435	Mid	24	1103868	677274
Admin Lead		Technology Lead	All Organisations	
ION VENTURES LTD		Zembo Motorcycle SMC Ltd	Zembo Motorcycles SMC Ltd., ION VENTURES LTD	
Project Title				
Automatic battery swapping cabinet development for scalability of e-mobility in Uganda				
Public Summary – Provided by applicants				
<p>Uganda is one of the 10 fastest growing economies in Africa with a GDP growth rate of 6.5% (2019) and its capital's population is projected to reach 4.1M by 2024\). Motorcycle taxis, known in East Africa as boda-bodas, are the most popular form of transportation in the country, as they are fast and easily accessible. About 70% of the population uses them on a regular basis. They are currently up to 200,000 boda-bodas in Kampala, a number expected to nearly triple by 2050\). Apart from demand, falling battery prices are contributing to the rise in e-mobility in Africa. Country policies and laws are adapting to the changing environment and are favourable to an environmentally conscious alternative to petrol vehicles.</p> <p>Petrol motorcycles have unwelcome downsides. They are expensive to run due to the ever-rising cost of fuel, giving decreasing returns to the owner who cannot always increase his price due to economic hardships currently faced by most Ugandans. The motorbikes are noisy and emissions from the exhaust are polluting and contribute significantly to global warming.</p> <p>To address these challenges, Zembo is introducing electric motorcycles in Uganda. Zembo is using the innovations from Solar PayGo model in the urban mobility sector. Zembo provides affordable electric motorcycles to self-employed drivers. Their battery-as-a-service model allows riders to swap their batteries anytime at given battery swap stations and reduce the cost of their motorcycle. The company provides a battery for free to each driver but Zembo remains the battery's owner. It operates a network of 30 swap stations, comprising solar, hybrid and grid-connected recharge stations where batteries are charged. The batteries are mostly charged with hydropower (from national grid) and solar (connected to PV).</p>				

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This project comprises developing a network of automatic battery swap stations where swaps can be done faster to increase swap efficiency, scale-up operations and expand the solar recharge station network. The batteries will be stored in a charging cabinet, where they will be charged with a combination of solar and grid energy. The automatic swap stations will be strategically located across the Kampala metropolitan area. This will enable all Zembo riders to swap their batteries as conveniently as possible; making swapping batteries simple, easy, and efficient.

This project will be the first in Uganda to install digital swap stations, accelerating the transition to electric vehicles, mitigating air pollution and CO2 emissions in African cities, with lower operating and maintenance costs.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086377	Mid	24	1048106	717104
Admin Lead		Technology Lead	All Organisations	
KULA FOODS LIMITED		Greenage Technologies Power Systems Ltd	DRE PARTNERS LTD, Greenage Technologies Power Systems Ltd, Nithio	
Project Title				
Ubuntu Energy				
Public Summary – Provided by applicants				
<p>This project aims to build community resilience in sub-Saharan Africa using Energy Ubuntu as a vehicle. It is akin to the 'Uber of Energy', democratising power sharing, transforming wasted energy into community power, and empowering communities to drive their development through sustainable means. It seeks to transform waste energy to community power for productive use. It addresses the developmental challenges of lack of modern and clean energy access, energy poverty and the harmful effects of global warming by improving access to clean and reliable electricity and deriving new business and economic change models, and building capabilities and contributing to SDGs 1,3,4,5,7,8,9,11,12,13\.</p> <p>Nigeria's electricity sector faces a problem. Its Distributed Energy Resources (DERs) are sub-optimally utilized and substantially wasteful, while it has deficient electricity access of ~60%. Solar photovoltaic (PV) systems are up to 400% oversized or lack the mechanism required to utilize their generation potential. Some PV systems are up to 80% used during the weekdays but are 20% utilized on weekends. Rural communities only utilize about 5% of the potential PV energy. Yet, 85 million Nigerians have no electricity access, costing Nigeria \$26 billion annually for self-generation using carbon-intensive generators, causing excessive carbon emissions and energy waste because excess generation cannot be fed into the grid.</p> <p>To address this challenge, Energy Ubuntu delivers a design and pilot of a smart grid (SG) peer-to-peer (P2P) energy-sharing framework that enables the distribution of excess generation potential to energy consumers to enhance PV capacity utilization and minimize energy waste while providing clean and affordable electricity. It improves PV usage by incentivizing individuals or businesses to sell energy to</p>				

# ENERGY CATALYST



potential consumers in a peer-to-peer system. The consumers will be SMEs and homes near solar PV systems in rural and urban communities.

The project will be implemented over two years with critical deliverables of smart grid design, energy trading software, energy data mining and machine learning models for energy supply, deployment of smart circuitry in 200 sites, energy trade, and the evolution of new business models and community resilience initiatives. It will be implemented by four teams, Greenage Technologies (Technical lead), Nithio (Technical partner), Oxford EPG (research lead), and DRE Partners Ltd (formerly Kula Foods) (Admin Lead).

Some co-benefits can be derived from Energy Ubuntu, including sustainable community development and carbon emission reduction leading to improved standards of living while significantly decreasing CO2 emissions.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10074210	Mid	24	499760	394745
Admin Lead		Technology Lead	All Organisations	
SMART VILLAGES RESEARCH GROUP LTD		SMART VILLAGES RESEARCH GROUP LTD	SMART VILLAGES RESEARCH GROUP LTD, Orkonerei Maasai Social Initiatives	
Project Title				
End-to-End Solar Borehole Business Models and Data Collection to Extend Sustainable Access to Energy and Water in Rural Tanzania				
Public Summary – Provided by applicants				
<p>SVRG and OMASI collaborated on a Energy Catalyst 9 grant on a project in Tanzania to develop technology to encourage communities to make their regular repayments for solar borehole power systems, by being able to cut off power in cases of non-payment. Preexisting diesel generators are on site, so there is no question of the communities being without water. And communities are used to pay-as-you-go technology that cuts off when payments are missed, and accept them. The technology and business models we are currently trialling should result in repayments being completed after two years, after which time the system provides water pumping free of charge. While completing initial community engagement work and site selection for the ECR9 project SVRG and OMASI noticed that water access was consistently being mentioned by communities as their single highest priority, either for more water in communities that already have a borehole, or water availability in communities that do not. The only way to get more water, especially in communities with no access to water at the moment, is to drill new boreholes. This is a high risk and expensive process however, that is usually carried out either by the government agency for water (RUWASA) or by NGOs. Since our technology can ensure repayments are made, it is possible it could also be used to repay the costs of drilling and installing boreholes as well, moving the whole process into the private sector for the first time. With suitable technology, financial models and risk mitigations we estimate it might be possible to recover the whole costs of such a project in five years based on current water prices and diesel costs, which is just about possible with current commercial capital financing products.</p>				

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More immediate high impact is possible in completing sites that have already drilled boreholes, but lacked the funds to make them operational (ie no generator or pump). We can use the same models and technologies that we aim to develop in this project to finish those systems, and have the community repay within 3-4 years.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10077932	Mid	24	711007	497705
Admin Lead		Technology Lead	All Organisations	
SMART VILLAGES RESEARCH GROUP LTD		SMART VILLAGES RESEARCH GROUP LTD	SMART VILLAGES RESEARCH GROUP LTD, NjordFrey	
Project Title				
Renewable Energy Agro-Processing Hubs for Energy Access and Economic Development in Rural Rwanda				
Public Summary – Provided by applicants				
<p>Our project, REAP (Renewable Energy Agro-Processing) hub, is a transformative initiative aimed at empowering rural communities by providing sustainable access to renewable energy and enhancing their food production capacities. Through the integration of innovative technologies and community-driven approaches, we seek to create lasting social, economic, and environmental impact in underserved regions.</p> <p>At the heart of our project is the vision to address the energy poverty prevalent in remote rural areas, where communities face challenges due to lack of reliable and affordable energy. By harnessing the power of renewable energy, we can unlock tremendous potential, enabling these communities to improve their quality of life and drive sustainable development.</p> <p>We begin with robust community engagement and needs assessment to truly understand the energy requirements and aspirations users. By working closely with the target communities, we ensure that our solutions are tailored to their specific needs and integrate seamlessly into their daily lives.</p> <p>Through strategic partnerships (Smart Villages Research Group and NjordFrey), we will deploy renewable energy technologies to support high yield fish/vegetable production with value addition (cooling/food drying). Intelligently monitored and coordinated through a digital monitoring system, the REAP hub will automatically balance the energy and production demands to increase efficiency and reduce energy and production costs.</p>				



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The REAP project extends beyond energy access. We recognise the vital role of productive systems in rural communities, such as agriculture and small-scale enterprises. By incorporating energy into these systems, we unlock new opportunities for income generation, value-chain development, and market access. This integrated approach fosters economic growth, creates employment, and reduces poverty, ensuring long-term sustainability.

Furthermore, our project aligns closely with the Sustainable Development Goals, particularly SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). By promoting renewable solutions and mitigating greenhouse gas emissions, we contribute to combating climate change.

The impact of the REAP project last far longer than our project implementation. The knowledge, skills, and partnerships developed throughout the project will serve as a catalyst for replication and scaling up to 2,000 hubs across Sub-Saharan Africa, fostering widespread adoption of renewable energy solutions and transformative development models.

Through collaboration, innovation, and a deep commitment to sustainable development, REAP aims to empower rural communities, unlock their potential, and create a brighter future for all. Together, we can build resilient communities, promote Gender and Social inclusivity, and achieve a greener and more prosperous world.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10083562	Late	36	1900081	1119142
Admin Lead		Technology Lead	All Organisations	
SMART VILLAGES RESEARCH GROUP LTD		SMART VILLAGES RESEARCH GROUP LTD	SMART VILLAGES RESEARCH GROUP LTD, Kiima Foods, FRES Uganda Limited	
Project Title				
Innovative Agricultural Cross-Subsidised Financing of Access to Clean Energy and Sustainable Cooling with Smart Agri-Centres in Uganda				
Public Summary – Provided by applicants				
<p>In an EnergyCatalyst7 project, SVRG with Ugandan partners developed a game-changing approach to rural energy-access, economic-empowerment and agricultural-productivity.</p> <p>The SmartAgri-Centre(SAC) combines a50kW centralised solar-power plant with an integrated set of community productive use and agri-value-addition services, in a large central community hub.</p> <p>Feedback from the local community shows the social impact the Centre has brought, including improved environment, knowledge of farming practices, income, savings and positive impact on family life and education. In the first year of operation, analysis showed that the SAC services helped farmers quadruple average annual earnings (up from \$800 to \$3100), increase yields across a variety of crops, and reduce input costs by 30%. Across the community, in that year, the centre generated additional value of \$211,500\.</p> <p>GESI impacts were also apparent: the majority of the 110members of the newly-formed agricultural cooperative are women, and female farmers reported positive impacts from the SAC. 40% of Co-op board members, and 40% of the business committee are female.</p> <p>The SAC is designed to address specific priorities and needs of a community, so each is subtly different. But the average cost to SVRG and partners of providing the infrastructure, and years of community support/training is around\$250,000\.</p> <p>The data we have collected suggests that communities should be able to afford to repay this cost in less than 2 years from their increased earnings. Our challenge in scaling this solution is to determine the best business model and community engagement strategy for the community to be able to repay the costs of providing the SAC from their agricultural income.</p>				

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According to the data we have collected, the community earns enough to repay the costs in under 2 years. However, the mechanism for this is far from obvious. Individual farmers in these communities are highly risk-averse (as well as lacking financial skills and creditworthiness). Entering into contractual arrangements with 100+ separate farmers to ensure repayment would be unworkable. Alternative models (operating the centres ourselves and collecting revenues and taking a cut of agricultural earnings as a "benign middleman", or establishing/empowering a community cooperative to do the same, have other risk factors and disadvantages). In this project, SVRG and partners will construct and operate 6 of the SACs in new communities, trialling different business/repayment models, to establish the ones that will allow us to scale the roll-out of the technology to rural communities with the highest amount of success, impact and commercial return.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10075447	Late	36	878236	395206
Admin Lead		Technology Lead	All Organisations	
SOLARISKIT LTD		SOLARISKIT LTD	Suka Wind & Solar Energy Ltd, MUNYAX ECO, SOLARISKIT LTD	
Project Title				
Unlocking the Potential of Solar Heating in sub-Sahara Africa: Optimising Product Design and Establishing Local Manufacturing Capacity				
Public Summary – Provided by applicants				
<p>Solar thermal technology, where sunlight is converted into heat is vastly untapped in Africa despite its abundant sunshine and potential to make positive impact. The African continent is currently dependent on the use of traditional biomass fuels like wood and charcoal for heating which has led to devastating levels of deforestation and carbon emissions. This project aims to tackle a number of key barriers which currently exist preventing the wide scale adoption of solar thermal products in Africa helping to realise the following benefits:</p> <ol style="list-style-type: none"> <li>1. lower heating related greenhouse gas emissions by lowering dependence on charcoal and wood via the market implementation of a new, lower cost solar thermal collector.</li> <li>2. Build solar collector manufacturing capacity in Rwanda and Ghana, reducing dependence on imported products while creating local employment and support to build the solar thermal industry,</li> <li>3. Establish an impactful and scalable business model which supports long term partnership between SolarisKit in the UK and its partners in Africa, focusing on knowledge transfer/sharing and capacity building activities.</li> </ol> <p>SolarisKit in the United Kingdom have developed the world's first flat-packed, self-assembled solar thermal collector. A device which can be assembled in approximately 30 minutes without any tools. It can be manufactured locally in Africa with low capital investment to create jobs supporting local economic development, can be easily transported (even by bicycle/motorcycle), and will not reach dangerous temperatures (&lt;80 degrees Celsius) making it ideal for wide scale implementation into the the global south. This project aims to take the successfully demonstrated design developed by SolarisKit and develop both supply and value chains to build the solar</p>				

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industry. This is essential to unlock the vastly untapped potential of solar energy in Africa and other sunbelt regions, benefiting people (lowering energy costs and improving quality life) and the planet (reduction in heat related greenhouse gas emissions).

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086067	Late	18	4933126	1233281
Admin Lead		Technology Lead	All Organisations	
AFRICA GREENCO GROUP LIMITED		GreenCo Power Storage Limited	AFRICA GREENCO FOUNDERS LTD, AFRICA GREENCO GROUP LIMITED	
Project Title				
Hybrid Lithium-ion and Iron Flow Battery Energy Storage System (BESS) in Zambia for integrating variable renewable energy into the national grid and the Southern African Power Pool (SAPP)				
Public Summary – Provided by applicants				
<p>Although there is a significant demand for renewable energy (RE) projects in Southern Africa and a strong interest from developers, investors, and lenders to provide funding, the growth of RE in the region is hindered by the absence of bankable Power Purchase Agreements (PPAs) and concerns from grid operators about integrating variable renewable energy (VRE).</p> <p>GreenCo, a company funded by InfraCo Africa, IFU (Denmark), and EDFI ElectriFI, aims to address these challenges by offering bankable PPAs to Independent Power Producers (IPPs). GreenCo is a buyer and trader of RE in the Southern African Development Community (SADC) and the first market participant member of the SAPP. GreenCo has secured offtake agreements for 25MW and 85MW from solar PV projects in Zambia ("Solar PV Pilot") and South Africa, respectively.</p> <p>GreenCo is developing a 14MWh Battery Energy Storage System (BESS Pilot) at the Solar PV Pilot site. The BESS Pilot will integrate into the grid, redistribute energy during peak hours when it is most needed, and support other applications to enhance profitability. It will combine fast-response Lithium-ion cells (3.2MWh) and long-duration Iron Redox Flow (10.8MWh) batteries, demonstrating the techno-commercial viability of Iron Redox Flow technology in a hybrid configuration. These batteries aim to overcome the limitations of the dominant Lithium-ion technology, including limited availability of Lithium and the environmental and social challenges associated with mining, disposal, and recyclability of Lithium-ion cells.</p>				

Securing grant funding from Innovate UK is necessary for GreenCo to achieve commercial viability for the BESS Pilot. The success of this pilot project will instill confidence in investors and lenders, leading to further development of BESS projects in the SADC region and facilitating an inclusive energy transition.

With its regional presence and membership in the SAPP, GreenCo can quickly replicate and scale up BESS projects across the SADC. GreenCo is also in discussions to join the global BESS Consortium being formed by the Global Energy Alliance for People and Planet and the World Bank Group. This consortium will enable GreenCo to actively promote the adoption of BESS technologies in the SADC by coordinating both the supply and demand value chains.

To support the implementation of the BESS Pilot, GreenCo is collaborating with K&M Advisors to conduct a feasibility study. The study, funded by USTDA, aims to optimize the design of the BESS Pilot, identify financing options, and assess the regulatory reforms required in Zambia to enable widespread implementation of BESS.

## Results of Competition: Energy Catalyst Round 10

Project Number	Stage	Duration	Proposed project costs	Proposed project grant
10086733	Late	30	1260481	567216
Admin Lead		Technology Lead	All Organisations	
THE SURE CHILL COMPANY LIMITED		THE SURE CHILL COMPANY LIMITED	THE SURE CHILL COMPANY LIMITED, GreenPower Overseas Ltd	
Project Title				
Powering the Future: Revolutionising Access and Efficiency through Integrated and Sustainable Energy Solutions				
Public Summary – Provided by applicants				
<p>SureChill and GreenPower Overseas Ltd are leading companies in the off-grid refrigeration and power solutions markets, respectively. SureChill specializes in providing affordable refrigeration solutions using revolutionary technology that ensures consistent cooling even without electricity, while GreenPower focuses on delivering cutting-edge power and energy solutions.</p> <p>Under the joint initiative titled "Powering the Future: Revolutionizing Access and Efficiency through Integrated and Sustainable Energy Solutions," we are dedicated to empowering underserved communities with reliable, clean, and affordable cooling and lighting solutions. Our shared objective is to create transformative impact, stimulate economic growth, foster sustainability, and ultimately create a future that is inclusive for all.</p> <p>In Nigeria, communities in underserved regions in the country face significant challenges in accessing cooling and lighting solutions. World Bank reports from 2020 reveal that in Nigeria, the electrification rate stood at approximately 57%, leaving over 85 million individuals without dependable access to grid electricity. Consequently, these individuals resort to alternative options like generators and other unconventional power sources. This reliance on alternative means underscores the considerable proportion of people who lack access to essential services such as lighting, cooling, phone charging, television, and fans. We recognize these barriers and have developed two innovative solutions to address them.</p>				



# ENERGY CATALYST



Solution v1 combines the SureChill SDD fridge energy harvesting system with a Solar Home System (SHS), optimizing energy utilization and ensuring reliable access to electricity. This solution diverts excess energy for later use, providing power to essential appliances and improving the quality of life for businesses and communities.

Building on the success of solution v1, solution v2 takes energy access and management to the next level. By integrating the energy harvesting system, remote controller, and a unique payment model into an Energy Management System Control Hub, users gain real-time control over their energy consumption, remote access to appliances, and flexible payment options tailored to their specific needs. To achieve our objectives, we will conduct rigorous testing and validation of solution v1 while simultaneously investing in intense research and development for solution v2. By piloting both solutions, we will test the efficiency and effectiveness of the solutions in diverse communities, paving the way for seamless integration.

By funding the collaboration between SureChill and GreenPower, Innovate UK will support in creating a future where underserved communities will be empowered, new economic opportunities will be unlocked, and a sustainable and inclusive society for all will be fostered.