

# Solar Mini-grids in Rural Nigeria

## TECHNOLOGY

Nigeria

## PROJECT LOCATION

Rural Electricity & Energy Access PV solar

## MATURITY OF PROJECT

Operational

## INVESTMENT ASK

**34**

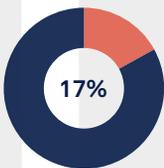
million US\$ equity

## EXIT OPTION

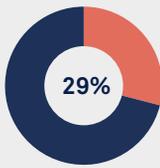
**5**

years

## INDICATIVE RETURN US\$



Project IRR



Equity IRR

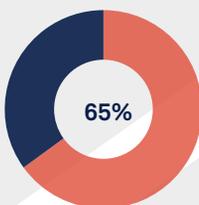
## USE OF FUNDS

Project expansion and development

## ANNUAL GHG REDUCTION (TONS)

178,043

## AVERAGE REDUCTION IN HOUSEHOLD ENERGY EXPENDITURE AS A RESULT OF MOVING TO SOLAR MINI-GRIDS



## OVERVIEW

This project is working to install off-grid mini-grid solar plants (34kW-100kW each) in rural and peri-urban communities in Nigeria, at an average site deployment rate of 27% over a six year period. Already completed are 12 projects (with a cumulative capacity of 503kWp). A first phase of expansion (650kWp) is ongoing. The proposed investment ask will fund the second to sixth phases of expansion, which will install a cumulative capacity of 17.8 MW. The project estimates that, at its full level of implementation, it will reach 1.5 million people.

## MARKET

There is a potential market of 100 million people – 60% of the population of Nigeria.

## VALUE PROPOSITION

This project features a multi-phased rural electrification scheme that seeks to provide reliable and affordable clean energy solution to off-grid communities in Nigeria. The plants are designed to be modular, require minimal maintenance and have an immediate, tangible impact on communities. The mini-grids also feature innovative energy storage technology, which means less energy is wasted, and a remote monitoring and control system.

## STRATEGY

The next phase of the project will be to build 48 new plants, each of a capacity of 2MWp, for which the sites have already been identified, local government support secured and MoUs signed with communities. Revenue is collected through prepaid metering technology.

## EXPERTISE

The management team have backgrounds in engineering, project management, FinTech and finance. They have accumulated over 10 years of experience in GIS Rural Electrification planning, and the Managing Director has won a Future Awards Africa Prize in Business and previously been awarded the title African Energy Leader of the Year. The management team are supported by a dedicated workforce of 20 engineers and 27 technicians.

## IMPACT

The project will catalyze substantial reductions in greenhouse gas emissions through the displacement of traditional energy sources such as candles, kerosene, gasoline and diesel generators, and has the potential to completely replace them. Ultimately, it will bring great social benefits as it will directly create 920 jobs, with another 5000 created indirectly, and provide electricity access to 1 million people. This will boost rural and socio-economic productivity and curb rural-urban migration, and enable a better quality of education and healthcare for target populations.

# Li-Fi Lighting and Internet in Ivory Coast

## TECHNOLOGY

Wireless optical networking – using LEDs for data transmission and internet

## PROJECT LOCATION

Ivory Coast

## MATURITY OF PROJECT

Operational

## INVESTMENT ASK

**5**

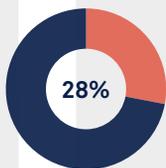
million US\$  
equity

## EXIT OPTION

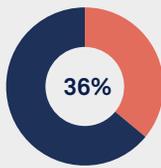
**6**

years

## INDICATIVE RETURN US\$



Project IRR



Equity IRR

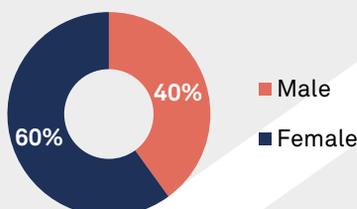
## USE OF FUNDS

Purchase and installation of a factor, working capital

## ENERGY SAVINGS PER YEAR

26,316,000 MWh

## GENDER RATION OF SHAREHOLDERS



## OVERVIEW

Li-Fi is a wireless networking technology that uses light, in this case LEDs, to transmit data between devices. Its end use is similar to Wi-Fi. Essentially, light bulbs are turned into internet routers. The Ivory Coast start-up featuring at the Forum is the first African company to specialize in the integration of Li-Fi solutions for the deployment of intelligent lighting networks and digital communication media. It combines the generation of renewable energy from solar sources with the provision of connectivity and electricity, in order to light up rural and semi-urban communities and connect them to the rest of Africa, and the world.

## MARKET

There are currently 281 million Internet users in Africa, with an average internet access rate of less than 23%. Therefore there is a large market that could be reached by Li-Fi technology.

## VALUE PROPOSITION

This Li-fi solution offers key advantages to remote communities – it is more economical than more conventional technologies, 30 times faster than Wi-Fi and self-sufficient.

## STRATEGY

The project targets rural communities which lack access to electricity and the internet. The company generates revenue through a pay-as-you-go system which provides customers, both households and businesses, with access to light and the internet. Revenue is also generated through concessions with public entities and international and development organizations. The project boasts a variety of products, such as standalone solar kits for individual households, solar street lamps, VSAT (very small aperture terminal) technology and smart Li-Fi, which allow the diffusion of an internet connection. A key product is the community kit package, which facilitates rural electrification, the provision of connectivity for a whole village and a community Li-Fi terminal, which displays information and online content on a TV screen.

## EXPERTISE

The management team are young, dynamic and experienced, and committed to improving lives in communities throughout Africa. Heads of departments were chosen due to their specialized expertise in their fields.

## IMPACT

Globally, over 800 million people do not have access to electricity and 1.5 billion do not have internet access. The project aims to illuminate and connect and educate with best educational contents isolated communities, in order to revolutionize daily life and boost economic and social development. A combination of light and the internet can massively improve the quality of education for students and pupils, and provide agricultural resources to modernize local economies.

## The World's First Gender Equal Bio-refinery in Belize

### TECHNOLOGY

Sugarcane bio-refining system for production of lowest carbon bio-products

### PROJECT LOCATION

Belize. Scalable/adaptable for global deployment.

### MATURITY OF PROJECT

Due to start operation in 2022

### INVESTMENT ASK    EXIT OPTION

# 60

million US\$ equity

# 3

years

### INDICATIVE RETURN US\$



Equity IRR

### USE OF FUNDS

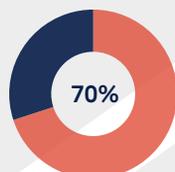
Building a 50 million gallon capacity bio-refinery, developing a 17,500 acre sugarcane plantation, procuring sugarcane logistics and harvest equipment, project development, bio-refinery equipment, EPC and plant site.

### ANNUAL GHG REDUCTION (TONS)

290,000

### CO2 EMISSION REDUCTION (MINIMUM)

(compared to crude oil based counterparts)



### OVERVIEW

This project features a 70% women-owned company in Belize, which is proposing a 50-million gallon sugarcane bio-refinery. The project responds to the opportunity of strong, long-term demand for lowest-carbon bio-products to replace high-carbon crude oil products, and is designed to adapt to market pull. Initially focusing on the production of ethanol, the project will eventually move on to additionally produce bio-plastics, bio-jet fuel and bio-diesel.

### MARKET

Belize sugarcane-based products have tariff-free access to the underserved and growing US, Canada, CARICOM and EU markets. By 2022, demand for bio-plastics will increase by US\$46 billion. In 2017, there was a shortfall of lowest carbon ethanol (cellulosic and sugarcane) of 9 billion gallons (BG). By 2022, the forecast shortfall will be 21 BG.

### VALUE PROPOSITION

Bio-refineries are the only proven and cost-effective technology with the potential to *replace* oil refineries. This potential is not being met by the global leader in sugarcane bio-refining (Brazil) because Brazil's bio-refineries produce sugar, in addition to ethanol. Sugar production increases CO2 emissions and the environmental footprint and diminishes financial returns. This project's bio-refinery is innovative because it will not produce sugar, so will achieve 360% more CO2 reductions, have 1/3 of the environmental footprint and generate 400% more Free Cash Flow to equity.

### STRATEGY

The company's creative approach will increase revenues and reduce costs. Low costs are assured by performance-based profit sharing to active participants. Knowledge transfer will be applied and integrated using proven, state-of-the-art technologies, practices and methodologies from similar industries. In addition, key trends in technology innovation will be utilized, such as "smart" systems, artificial intelligence (AI) and cloud computing. Continuous improvement and waste elimination methodologies will ensure high efficiency, cost-effectiveness and environmental compliance.

### EXPERTISE

The company was started by project managers and optimization experts from BP crude oil refineries in the USA who have partnered with Belizeans. The leadership team has over 100 years of collective experience in project execution and operations, and the CEO has more than 20 years of experience in oil and gas refining and other continuous process industries. The team is engaged with expert Brazilian partners with 20 years of experience in the Brazilian sugarcane bio-refining industry.

### IMPACT

The project has minimized the carbon impact of its value chain. It is one of a rare few projects where climate change adaptation and mitigation interventions actually increase Equity IRR. It will lead to revenue increases of 34%, since a higher volume of product is produced from the same volume of sugarcane, and will foster economic development in Belize, and create 450 jobs and 800 contracts for suppliers.

Of these opportunities, 50% will go to women. Employees will get equal pay and suppliers will get equal contracts. The project is women-owned and 50% of the C-Suite are women, including the CEO.

# Solar-Powered Water Purification in India

## TECHNOLOGY

Solar photovoltaic-powered water purification in India

## PROJECT LOCATION

Haryana, India

## MATURITY OF PROJECT

Operational

## INVESTMENT ASK

**3**

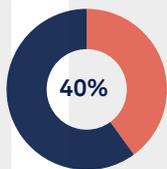
million US\$ equity

## EXIT OPTION

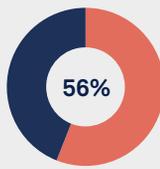
**4**

years

## INDICATIVE RETURN US\$



Project IRR



Equity IRR

## USE OF FUNDS

Geographic expansion (ASEAN), development of new products, strengthening of current operations

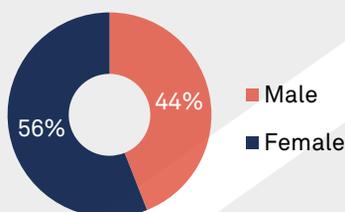
## ANNUAL GHG REDUCTION (TONS)

15,000

## ANNUAL SINGLE USE PLASTIC ABATEMENT 5000 (Tons)

5000 (Tons)

## GENDER RATIO OF SHAREHOLDERS



## OVERVIEW

This project features the only smart IoT-driven water purification solution with option of solar photovoltaic-power on the Indian market – it is dedicated to providing affordable clean drinking water for local communities. The company has installed 400 systems in 15 Indian states and over 180 machines at railway stations throughout India.

## MARKET

The water purification market in India is worth USD 4 billion, growing at CAGR of 30%. Over 20 million households could benefit from the project in India alone.

## VALUE PROPOSITION

The project serves communities with integrity and innovation, solves a critical problem of clean drinking water while placing social and environmental sustainability at par with financial growth

## STRATEGY

Central to the project's approach is its focus on areas which lack piped water and/or electricity. Target markets are remote rural areas, urban slums, and out-of-home urban populations. Markets are reached through the operation of water vending machines at high footfall areas such as railway stations and implementation of water purification systems in communities with especially poor water supplies. Revenue is generated through two outlets – machines sales and maintenance, and water sales. Customers include local consumers, corporate social responsibility funds and governments.

## EXPERTISE

The management team boasts a variety of academic and industry backgrounds, with upwards of 30 years of experience in business development, and extensive expertise in engineering and systems, solar energy, electrical engineering and operations management. The team have accumulated business experience across the globe, in Asia, the Americas, Europe and the Middle East, and were educated at a variety of world-class institutions, such as Indian Institute of Technology, Penn State University and Ecole Polytechnique France.

## IMPACT

Over three million people in the world die of water-related diseases each year. India faces an acute water problem – the UN ranks it 120 out of 122 nations in terms of water quality.

Point-of-use water purification systems lessen the water scarcity problem through providing safe drinking water at a fraction of the cost of bottled water.

This project's water purification system is 40% more energy efficient than other reverse osmosis systems. Greenhouse gas emissions are mitigated through the use of solar rather than conventional power and reduced transport-related emissions.

# IoT toolkit to empower 1 billion people in South East Asia

## TECHNOLOGY

Plug and Play Smart DC Micro-grids

## PROJECT LOCATION

South East Asia (Cambodia, Philippines & Indonesia)

## MATURITY OF PROJECT

At the pilot to scale up stage

## INVESTMENT ASK      EXIT OPTION

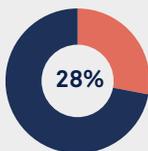
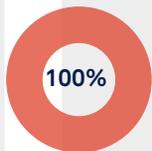
**1.5**

million US\$ equity

**4**

years

## INDICATIVE RETURN US\$



**128%** project IRR

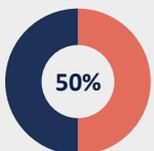
## USE OF FUNDS

Geographic expansion and scale-up, product development, reduction of manufacturing costs, process optimization, product diversification

## ANNUAL GHG REDUCTION (TONS)

2,900

## % LOSS OF GENERATED POWER



Competing technologies



The project's micro-grid network

## OVERVIEW

This project features an Australian technology company with its operational HQ in Phnom Penh Cambodia, which has created a unique IoT device that enables houses to be connected together into a fully modular DC microgrid. On top of this, the company provides a service platform software that enables mobile payments, smart grid management and remote monitoring. Currently the system is deployed in 101 households in Cambodia and on the brink of commencing projects in Indonesia & Philippines.

## MARKET

The Total Addressable Market for off-grid micro-grids will be \$2.35 billion in 2020. In the countries in which the project plans to operate (Philippines, Indonesia and Cambodia) there are 51.4 million off-grid households.

## VALUE PROPOSITION

Compared to traditional AC microgrids, this technology's installed cost is roughly 1/3. Additionally the system is fully plug & play, enabling anyone to install, operate and maintain its networks. Its smart analytics also provide predictive maintenance alerts that enable the grid operator catch issues before they cause blackouts for the households. Currently operational networks boast 99.79% uptime.

## STRATEGY

The main beneficiaries of the project are those communities lowest on the energy ladder, where individuals typically earn less than \$5/ppp. Communities are reached and served through Distributed Energy as a Service Companies (DESCOs). The company generates revenue through the sale of the system controllers and Software as a Service (SaaS) fees to the DESCO. The DESCO owns network revenues and performs all installation, operations and maintenance activities. A b2b approach enables the company to leverage expertise of local DESCOS to scale in multiple markets while focusing on what it does best – developing innovative technology.

## EXPERTISE

The management team has experience in fields such as energy, development economics, artificial intelligence and IoT. On board are advisors who have managed over \$100M in assets, and a CEO who has run multiple start-up ventures. The multinational team includes Australians, Americans, Russians and has deep ties to the Chinese manufacturing sector.

## IMPACT

The project facilitates the easier electrification of off-grid areas and the replacement of diesel electricity generation with solar power. It works towards the social objective of providing affordable and accessible energy to all by 2030. The goal is to provide a productive level of energy that can foster productive load use, which will in turn lead to an increase in income generation and the provision of social utilities.

# Energy Efficient Radiant Heat Cooking Technology in India

## TECHNOLOGY

Energy Efficient Radiant Heat Applications in LPG, Natural Gas & Bio-Gas

## PROJECT LOCATION

India, Bengaluru

## NUMBER OF EMPLOYEES

50

## MATURITY OF PROJECT:

Growth stage

## INVESTMENT ASK

**3.5**

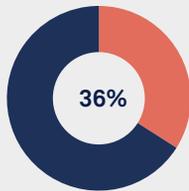
Million US\$ Equity

## EXIT OPTION

**6**

Years

## INDICATIVE RETURN US\$



Equity IRR

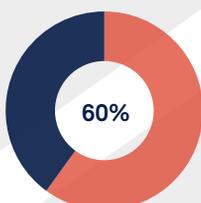
## USE OF FUNDS

Capacity building and market expansion, development of facilities, working sales capital, infrastructure

## ANNUAL GHG REDUCTION (TONS)

An average of 3,760 by 2024

## PROJECT TARGET MARKET SHARE BY 2024



## OVERVIEW

This award-winning start-up from Bengaluru, India has developed a ground-breaking commercial multi-fuel gas burner that produces flameless, smokeless and noiseless radiant heat. Extreme heat and carbon soot cause huge problems in kitchens in many developing countries. Apart from solving these problems, the innovative technology helps to preserve the food's nutritional value, and conserve LPG (liquefied petroleum gas), NG (Natural Gas) and BG (bio-gas), water, detergent and electricity. The project has already acquired high-profile clients such as ITC Hotels, Infosys and Radisson Blu.

## MARKET

In India, 250 million customers currently use LPG. The number is growing by 10 million each year. The total potential market for the technology in commercial kitchens is worth more than 10 billion US\$ in India alone.

## VALUE PROPOSITION

Cooking on LPG, NG and BG normally uses blue flame whereas this innovation uses radiant heat. In LPG, the technology has a thermal efficiency of 69%, compared with conventional burners rating between 36-45%, which makes it cleaner and also reduces the ambient heat levels in kitchens.

## STRATEGY

The go-to-market strategy revolves around direct customer contact. The initial focus is to directly sell and provide service to high-end commercial kitchens with a strong resolve to bring down their carbon footprints. The majority of equipment is outsourced in order to maintain a lean asset base.

## EXPERTISE

The management team has over 20 years of experience in various backgrounds, including the cooking industry, and 2 years experience in manufacturing energy saving devices. They oversee a 50-strong workforce, who specialize in project implementation, marketing and financial management.

## IMPACT

The project has a positive environmental impact as it leads to substantial reductions in greenhouse gas emissions, emits no carbon soot, and saves significant amounts of fuel, water, detergent and exhaust power. It improves both water quality, as it reduces the levels of detergent that get back into water sources, and air quality, due to lower levels of ambient heat and the absence of carbon soot. It will substantially improve health and working conditions in commercial kitchens, and therefore has a comprehensive social impact.