Oorja: Empowering Rural Communities

Mumbai, IndiaBahraich, India

Clementine Chambon

https://www.youtube.com/watch?v=KMQqLkOMuMQ

Year Founded:
2014
Organization type:
for profit
Project Stage:
Start-Up
Budget:
$100,000 - $250,000
Website:
http://oorja.strikingly.com
Facebook:
https://www.facebook.com/oorjakic/

- Climate change
- Renewable energy
- Rural
- Sustainable agriculture

Project Summary

Elevator Pitch

Concise Summary: Help us pitch this solution! Provide an explanation within 3-4 short sentences.

Lack of access to modern energy and crop failure are the major drivers of poverty in rural India. Our mission is to empower 1 million people in rural communities to transform crop waste into reliable and affordable electricity and biochar, leveraging a scaleable micro-franchise distribution model.

WHAT IF - Inspiration: Write one sentence that describes a way that your project dares to ask, "WHAT IF?"

What if we could use the 200 million tons of crop waste available each year across India to light 1 million people's lives while also improving food security, reducing carbon emissions and accelerating local economic development?

About Project

Problem: What problem is this project trying to address?

In rural Uttar Pradesh, 77% of households are off-grid. After darkness, shops must close, women feel unsafe and children can't study. They rely on kerosene and diesel for light and commercial power. Both are expensive and harmful to health and the environment. 75% of people are engaged in agriculture and experience crop failures caused by soil degradation due to frequent droughts and floods, that are exacerbated by the effects of climate change.

Solution: What is the proposed solution? Please be specific!

Oorja will provide decentralized, easy to operate mini power plants that will produce reliable and affordable electricity and biochar from agricultural waste. This scalable innovation will power off-grid villages in Uttar Pradesh. Biochar will help restore degraded soils and increase crop yields by improving water and micro-nutrient retention. Both these products will help displace fossil fuels and fertilisers and improve food security, sequestering carbon and improving the lives of people at the BoP. Oorja plants will be operated by local micro-entrepreneurs and women's self-help groups which will bring new skills, income and employment to local communities. Our solution will help promote gender equity, access to education and healthcare.

Awards

• Echoing Green Climate Fellowship, 2015; • WISE Tech Start-Up Award, 2015; • Althea-Imperial Prize (Runner-up), 2015; • Climate-KIC Greenhouse, 2015; • Best Climate-KIC Business Idea, 2014

Impact: How does it Work

Example: Walk us through a specific example(s) of how this solution makes a difference; include its primary activities.

In May 2015, during a field survey, we met Lakshmi, one of 200 million women in rural India whose village has no access to grid power. Her family is poisoned by toxic smoke released by burning kerosene and firewood used for lighting and cooking. She told us her husband, a small-holding farmer, tried to commit suicide as a result of debt which he is unable to pay because of repeated crop failures. Clean and affordable Oorja electricity will displace kerosene to light Lakshmi's home and enable her children to study after dark. Biochar will improve crop yields in her family's farm and provide long-term food security by improving resistance to drought and floods. The family's increased income will allow them to switch to clean cook stoves.

Impact: What is the impact of the work to date? Also describe the projected future impact for the coming years.

Our solution will have enormous impact as it tackles energy poverty and agricultural productivity with associated socioeconomic benefits. Clean and reliable energy will help increase the time children can study, extend business hours beyond daylight and reduce health hazards caused by burning kerosene. Biochar will improve soil quality resulting in higher crop yields while farmers gain knowledge in new farming techniques. Our project will spur economic development through creation of new jobs, micro-enterprise development and increase in farmers' income. Our products will displace fossil-derived fuels and fertilisers and store carbon in the soil, saving over 500 tons of CO_2 per village per year. In five years, our market reach will be 250 plants covering 1,250 villages and impacting 1 million marginalized people, and we will have removed 1 million tons of CO_2 from the atmosphere.

Spread Strategies: Moving forward, what are the main strategies for scaling impact?

Oorja plants will be operated by micro-entrepreneurs and women's SHGs. The local franchisee will help establish the last mile linkage to end consumers in 4-5 nearby villages. Our distribution model that leverages the knowledge, existing network and relationships of the micro-entrepreneur with local communities to bring our innovation to the end consumers gives us a competitive advantage, allowing us to scale up rapidly. We are piloting in densely populated UP and will expand in other Indian states with abundant agricultural waste and low grid penetration using our feedstock agnostic technology

Sustainability

Financial Sustainability Plan: What is this solution's plan to ensure financial sustainability?

Electricity distribution will be a 'pay for use' service and biochar will be sold directly to farmers. Energy will be supplied to households and businesses in villages that require 15 kW or more to keep distribution cost low. We will use smart meters to monitor usage and keep payment defaults to a minimum. Revenues will accrue in exchange for annual maintenance contracts. We will avail subsidies covering up to 66% of CAPEX from the Government.

Marketplace: Who else is addressing the problem outlined here? How does the proposed project differ from these approaches?

There are only a handful of competitors, namely Husk Power Systems and DESI Power, using biomass for power generation in India. We have a technological edge over them because we combine pyrolysis and combustion to produce electricity and biochar, filling an unmet need of improving soil fertility. Another differentiating factor is Oorja's lean supply chain and distribution model. These companies operate in Bihar whereas our operations will be in UP with over 160 million people living off-grid. There is no competition in the distributed biochar production market to reach small-holding farmers.

Team

Founding Story

This idea was conceptualized in August 2014 during a Climate-KIC workshop aimed at equipping young people with the knowledge and tools to develop solutions to combat climate change. This is where I met my co-founder Amit Saraogi, an Indian social entrepreneur specialized in development and poverty alleviation. Knowing the enormity of the problem of access to clean energy in the developing South and having witnessed extensive social exclusion during my travels in rural China, it was natural for me to leverage my education and experiences in a meaningful pursuit professionally. Amit and I promptly embarked upon building a MVP to address the challenges of access to energy and soil fertility.

Team

Amit Saraogi (Master's in International Development, Columbia University), co-founder and CEO, is responsible for business strategy and partnership development. He has more than 10 years of experience consulting organizations and social enterprises. He also has entrepreneurial experience of launching a company to provide affordable clothing to low-income families. A fellowship in social entrepreneurship as a CSR consultant gave him the opportunity to better understand frameworks in social enterprise development and effective ways of capitalizing on CSR funds. These endeavors helped him build a strong network of colleagues and equipped him with skills like strategy development, fundraising, partnership development and effective communication, assets in attracting money and people to accomplish our mission. I, Clementine (M.Eng in Chemical Engineering, University of Cambridge), a researcher in pyrolysis and biomass conversion to biofuels, am CTO and responsible for design, construction and deployment of the technology. My background in chemical engineering and my PhD research in waste-to-energy has equipped me with a thorough understanding of biomass conversion, techno-economic analysis and decentralized energy systems. My academic network within the University of Cambridge, Imperial College, UC Berkeley and other esteemed institutions is a key asset to help Oorja gain technical assistance. Rose Chaparro (MSc in Local Economic Development, London School of Economics), is our Communications & Impact Evaluation Manager. She is a postgraduate developmental economist and has eight years of experience working in gender and local economic development. We are being assisted by two part-time interns: Flore Bazin, Master's in Chemical Engineering, a project engineer with three years of experience in project feasibility assessment and detailed process design for agricultural waste-based projects; and Philip Sandwell, MSc in Physics and PhD candidate with expertise in energy demand analysis and rural electrification using micro-grid technologies. Our board comprises Prof S. Bhattacharyya, De

Montfort University; Dr. N. Sai Bhaskar Reddy, author of 'Biocharculture'; Bruno Cotta, Imperial College; and Nicola Armacost, Arc Finance. We plan to recruit a Chief Engineer and an Operations Manager and some business interns to assist with grant writing, techno-economic analysis and operational assistance and will likely consult a part-time agricultural expert to assist with soil condition assessment and biochar application.

Background

Please confirm how you heard about the Unilever Awards:

Althea-Imperial Programme

Please confirm your role in the initiative (eg Founder/co-Founder) and your organisational title:

Co-Founder and Chief Technology Officer

Which of the 8 UN Global Goals (Sustainable Development Goals) pre-selected for this competition does your solution relate most closely to? [select all that apply]

Gender Equality, Affordable and Clean Energy, Climate Action.

Leadership and the Unilever Awards

Please provide examples of any previous entrepreneurial initiatives you have pioneered.

I have prior experience of fundraising for the Southern African Fund for Education during my time at the University of Cambridge. This endeavour helped me build strong knowledge of social challenges, a network of colleagues engaged in social development and equipped me with critical skills in fundraising, partnership development and impact evaluation. I have strong interpersonal skills supported by cross-cultural competencies and proficiency in six languages including Mandarin, French, German and Spanish. I have also received training from business experts during a 5-week Climate-KIC workshop focused on training young entrepreneurs to build sustainable, for-profit enterprises that will combat climate change. I have been mentored for the past year by Bruno Cotta, Director of Enterprise Strategy at Imperial College London, and now have a better understanding of business strategy development for rural markets. In the year since Oorja was founded I have honed my pitching skills to raise over US$100k and supervised a team of undergraduate students at Imperial College on the design, construction and testing of the Oorja prototype.

Beyond your existing team, who else are you working with to achieve your objectives, eg partners, advisors, mentors?

I am being mentored by Bruno Cotta, Director of Enterprise Strategy at Imperial College; James Allen, investment manager and advisor focused on the agriculture, cleantech and responsible investment sectors, and Leah Stern, Portfolio Manager at Echoing Green. I am also being advised by Lukas Lukoschek, co-founder and CEO of Meshpower, a solar micro-grid company operating in India with similar goals to Oorja. I am currently in conversations with several potential technical partners who will provide assistance with technological development. These include Prof S Dasappa at the Indian Institute of Science (Bangalore), technology developer for low-cost gasifiers; Dr Hari Sharan, Chairman of DESI Power and rural electrification expert; Dr N. Sai Bhaskar Reddy, CEO of E-GEO, rural energy specialist and expert in biochar application. I also receive additional technical support through my PhD supervisors, Dr Jason Hallett and Dr Paul Fennell, as well as the wider academic networks that I am part of at the Grantham Institute for Climate Change and the Environment at Imperial College and the Joint BioEnergy Institute in Berkeley.