

# Fourth **African Union - European Union** Agriculture Ministerial Conference





**Solar-powered cold storage for developing countries**  
designed to greatly reduce post-harvest loss for 470 million  
small farmers in Africa, Latin America, and Southeast Asia

# INTRODUCTION

## Nnaemeka C. Ikegwuonu

Farmer, innovator, leading social entrepreneur; Founder/CEO of the Smallholders Foundation Ltd./Gte (2003) – ColdHubs (2015)

Created Smallholder Farmer Rural Radio, The Agriprenuership Academy, The Smallholders Seed Store, Smallholders Microcredit, and GrainStore polypropylene bags (grain preservation bags).

Highly honored within the agricultural development space with more than 30 local and international awards - Ashoka Fellow 2008, Rolex Awards 2010, Fast Company's 100 Most Creative in Business 2012, Nigeria's Young Person of the Year 2011, Niigata International Food Prize Laureate, 2012 and 2013 Laureate of the Yara Prize for Green Revolution (Japan).



A man with a beard and short hair is wearing large black headphones. He is looking down at a document he is holding with both hands. A red microphone is positioned in front of him. In the background, there is a green wall and a white electric fan with the brand name 'Century' visible on its front. A fluorescent light fixture is mounted on the wall above the fan. The overall scene is a rural radio studio.

# Smallholder Farmers Rural Radio Studio



# PROBLEM



**In Nigeria, 45% of food spoils due to lack of cold storage...**



**...this causes 93 million small farmers to lose 25% of their annual income.**

Source: Rockefeller Foundation; Food Waste and Spoilage Initiative 2014



**Refrigeration extends shelf life but is non-existent in Nigerian farms clusters, aggregation centers and marketplaces.**

**X Most solutions are not rugged enough to withstand harsh conditions**

**X Power grids are not capable of delivering reliable energy**

**X Most equipment is too costly for the average farmer to purchase**





# SOLUTION



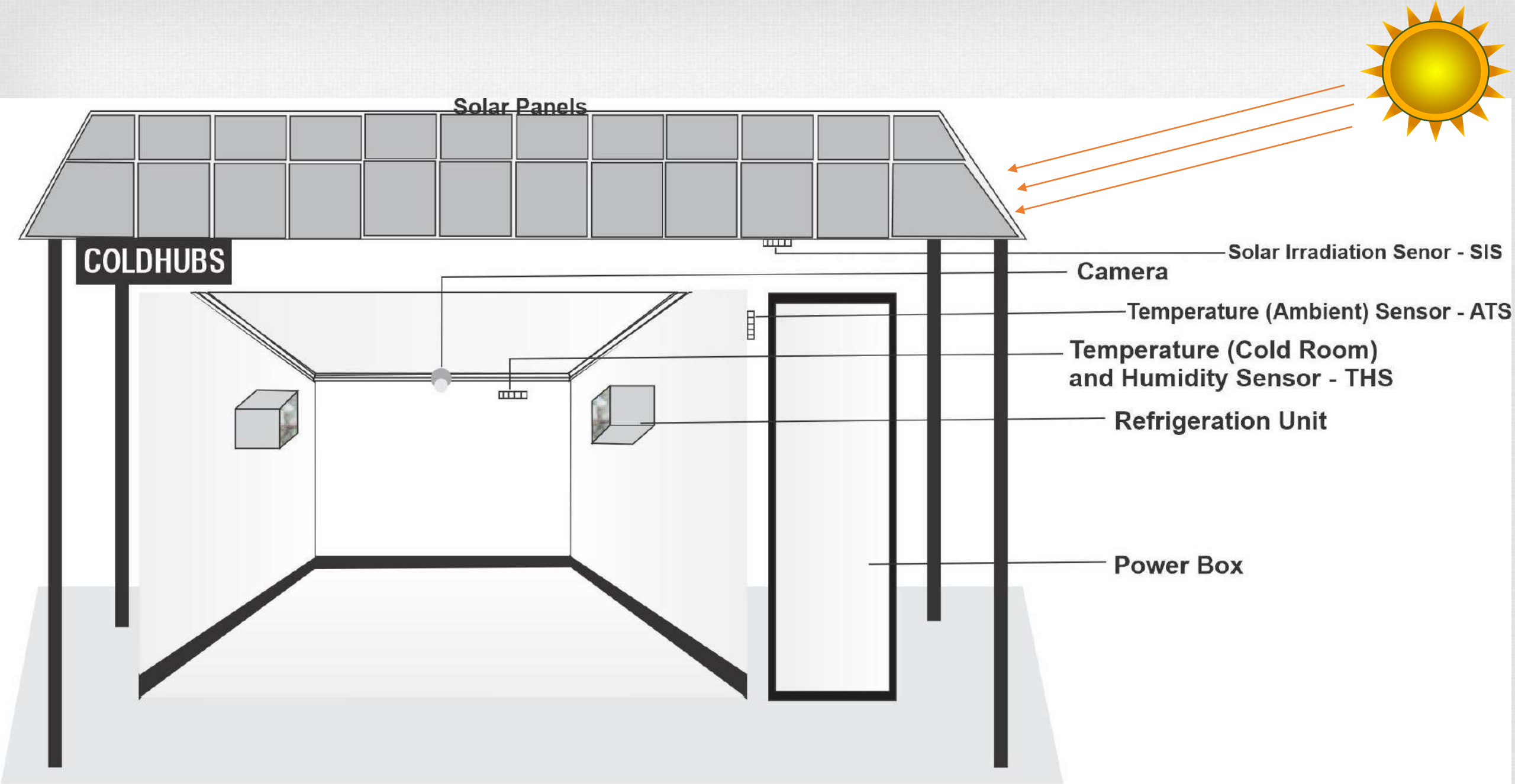
In 2015, we launched ColdHubs; 100% solar-powered walk-in cold stations for 24/7 storage and preservation.



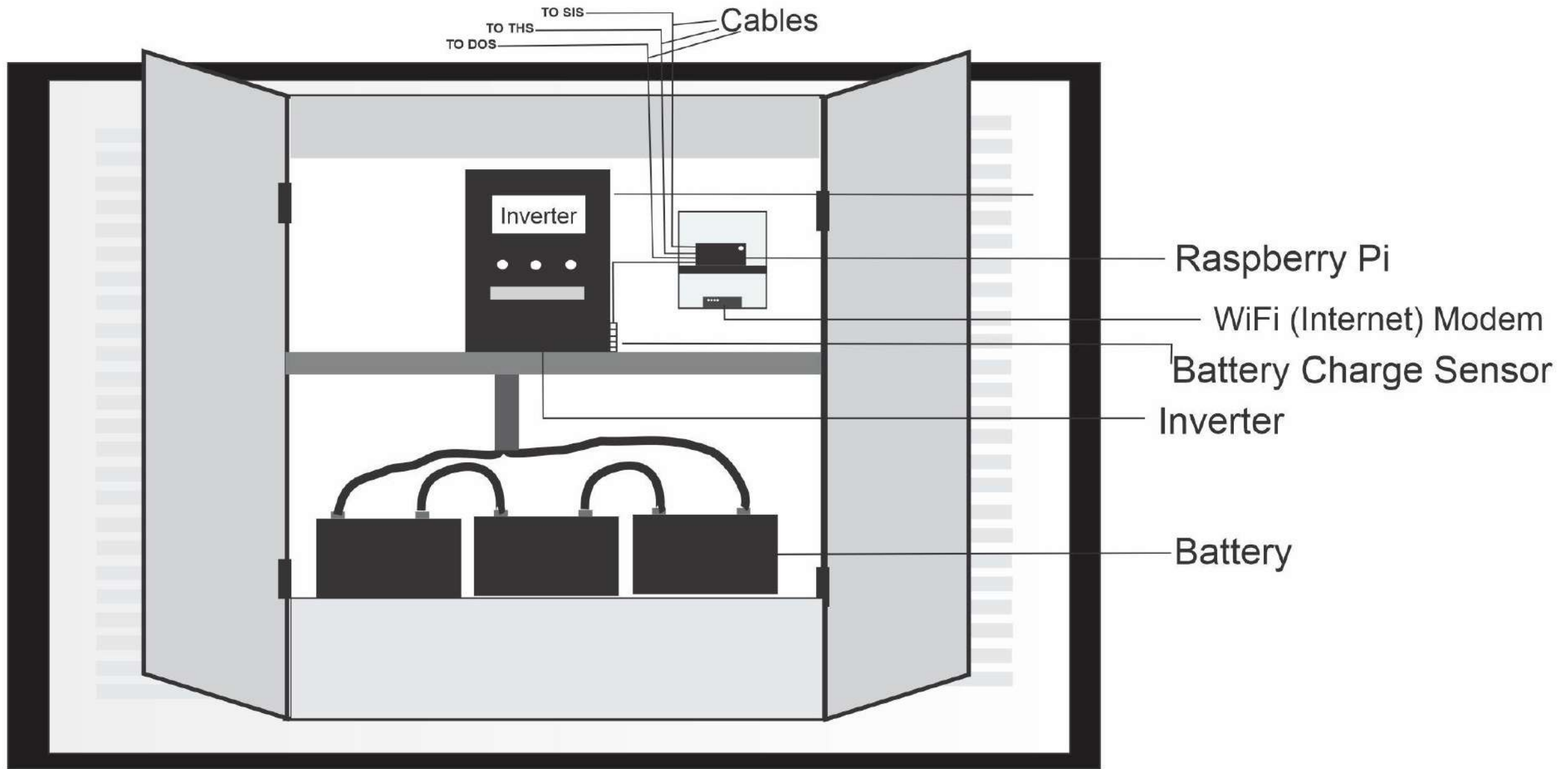
Well designed for specific locations, weather conditions. R290 Refrigerant.

## Things measured

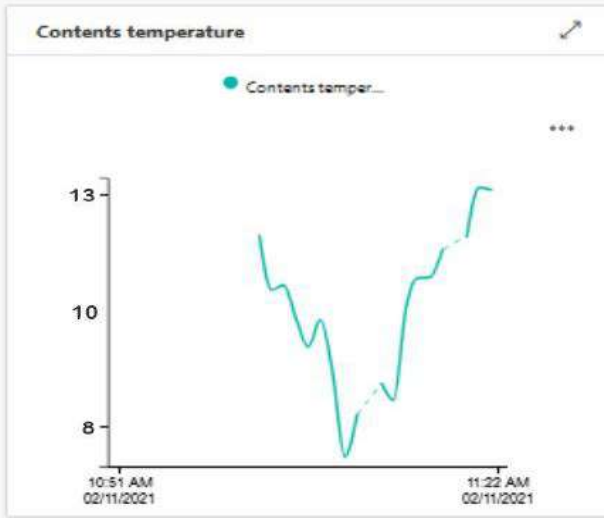
- Solar Irradiation
- Ambient Temperature
- Door Opening
- Cold Room Temperature
- Energy Storage
- Loading and off-loading of food



**COLDHUBS (OPEN/INTERIOR)**



**POWER BOX (OPEN)**



### Cooling system state

Timestamp	State Name	Value
now	Cooling system s...	on
now	Cooling system s...	on
now	Cooling system s...	on
now	Cooling system s...	on
now	Cooling system s...	on
now	Cooling system s...	on
now	Cooling system s...	on

### Hub State

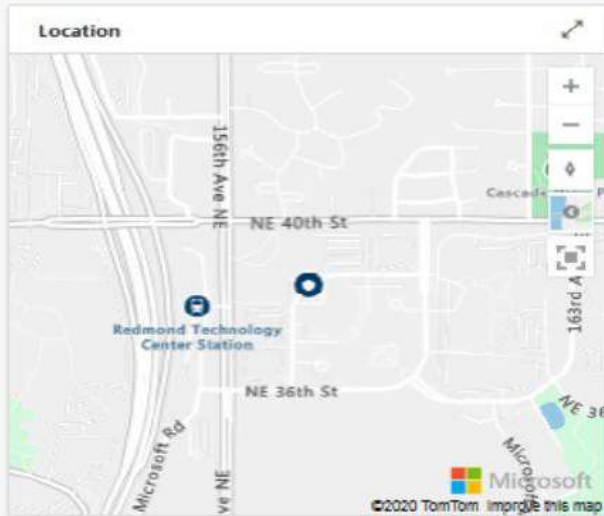
Timestamp	State Name	Value
now	Truck state	ready
now	Truck state	ready
now	Truck state	ready
now	Truck state	ready
now	Truck state	ready
now	Truck state	ready
now	Truck state	ready

### Optimal Temperature

Optimal Temperature	10°C
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### Event

Waiting for data



### Contents state

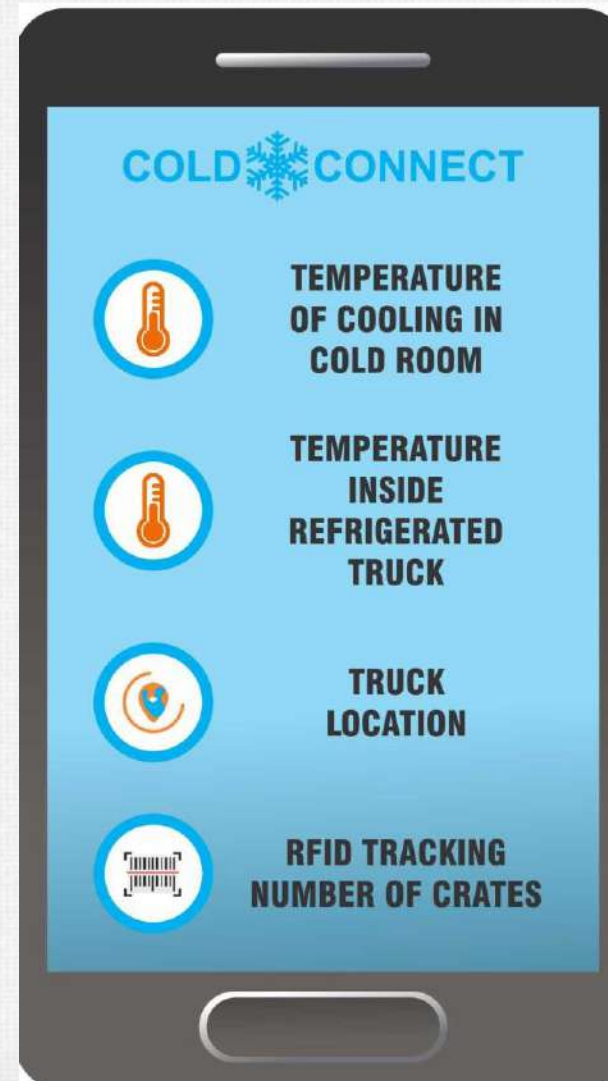
Timestamp	State Name	Value
now	Contents state	cooling
now	Contents state	cooling
now	Contents state	cooling
now	Contents state	cooling
now	Contents state	cooling
now	Contents state	cooling
now	Contents state	cooling

### Hub ID

Hub ID	Hub number 0025 <small>read only device property</small>
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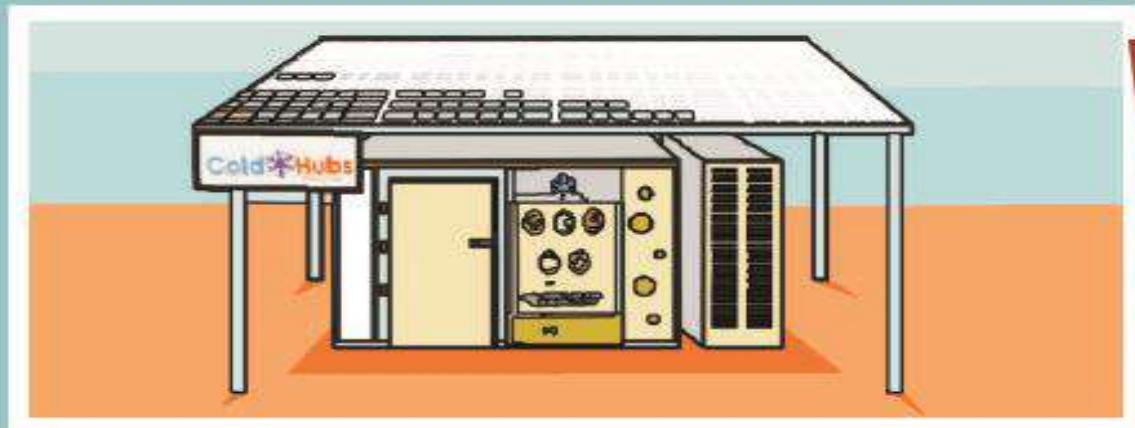
# COLD CONNECT APP





Cold\*Hubs

**POSTHARVEST  
EDUCATIONAL  
MANAGEMENT (PHM)  
COMIC**



**Educational Comic for  
PostHarvest  
Management Programme**

BY SMALLHOLDERS FOUNDATION & COLDHUBS

**Offers education for post harvest management**



**Extends the shelf life of perishable food from 2 days to 21.**





SHOT ON A56  
itel DUAL CAMERA



2021/2/8 20:25



Solar powered ice blocks for cooling drinks; vaccines etc

# REVENUE MODEL



**We charge up to 0.26 USD/night to rent 1 plastic 20kg crate of produce  
1.32USD/night for meat & fish storage  
Each station holds 150 crates - up to 75 – 198 USD/day in revenue**

# OPERATIONS

Cold Hubs

SERVICE CHARGE LIST

A crate of tomato	N 50
Soft drinks	N 50
	N 50
	N 50
	N 25



VEGETABLES



FRUIT



MILK



FISH



MEAT

POWERED COLD STORAGE

Run by One Lady Hub Operators and One Lady Market Attendant per ColdHub.



# 4 YEAR IMPACT OF 54 HUBS



**42,024 tons of  
fruits and  
vegetables  
saved  
from spoilage**



**5,250 farmers,  
retailers and  
wholesalers have  
increased their  
income to US  
\$120**



**66 jobs created  
for women as Hub  
Operators and  
Market Attendants**



**1,040,688kg  
tons of CO2  
saved**

# EXPANDING

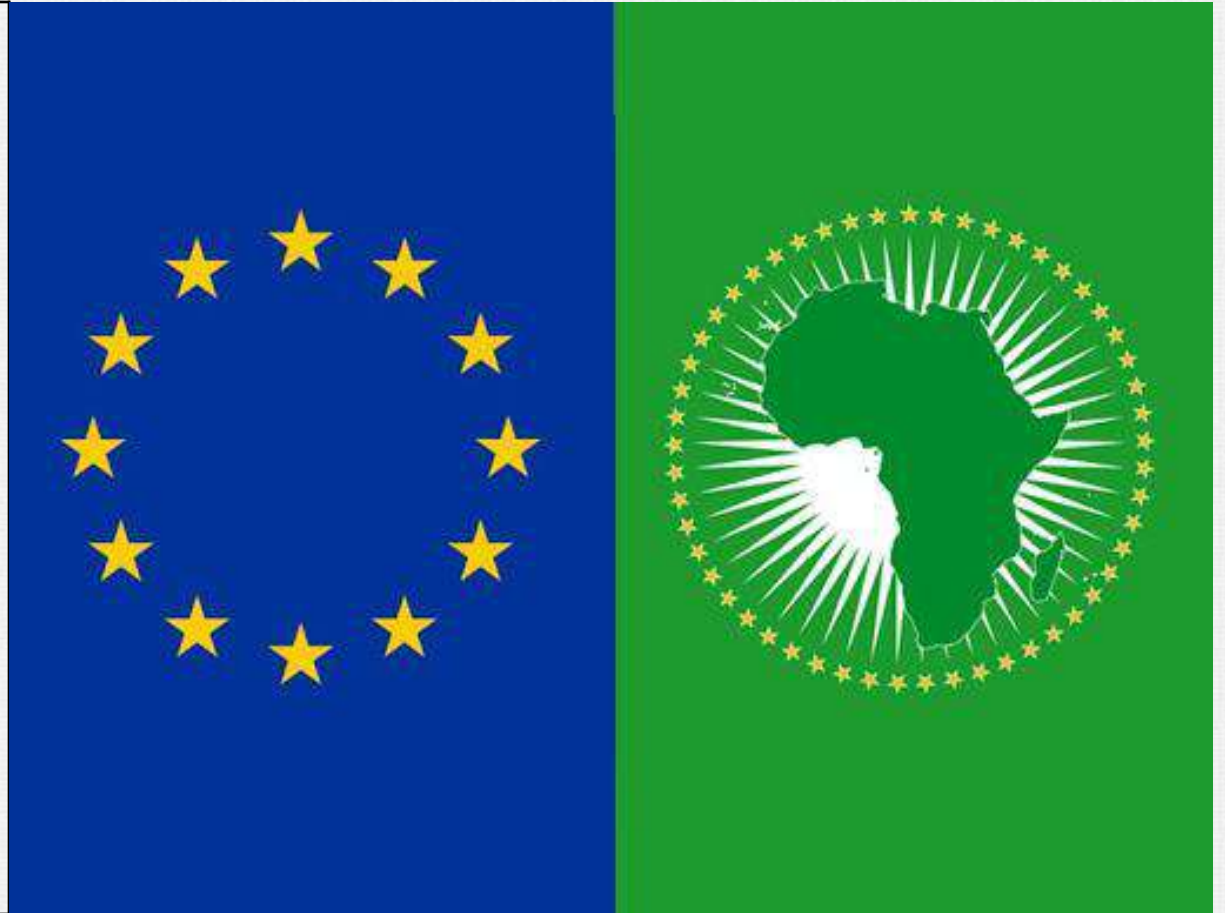
**Owns and operates 54  
ColdHubs, across Nigeria**

**Projecting at least 100 new  
ColdHubs and 20 IcePoints  
by the end of 2020**



# Seeking partnerships with AU and EU Countries to pilot ColdHubs Technology and Service

*Remote/rural communities, farm clusters, farmers  
markets, fishing clusters, meat abattoirs, outdoor  
food markets, produce aggregation centers, food  
banks , IDP camps etc.*



# THE TEAM



**Bright Benjamin Igbokwe**  
COO

Experienced business development manager with extensive expertise in agribusiness startups, rural logistics, distribution, commercial strategy, contract negotiations, business processes, and team building.

Masters in Business Administration  
Imo State University, Nigeria



**Chidubem Maxwell**  
CTO

Electrical and electronics engineer, with extensive knowledge and expertise in clean energy, solar cells, batteries, air conditioning, cold room design, and refrigeration.

HND, Electrical & Electronics  
Engineering, Federal Polytechnic  
Nekede, Owerri, Nigeria



**Terence Usibe**  
Finance and Admin

Experienced office and finance administrator managing our accounts within local and international standards.

HND in Accounting  
Imo State Polytechnic Umuagwo

# BOARD



**CJ Uzoho**  
**Commercial Manager Gas**  
**Aggregation Company of**  
**Nigeria**

energy economist, business development expert with extensively knowledgeable and experience in energy related transactions.

Masters in Energy Economics  
University of Dundee



**Osayuki Eguasa**  
**Financial Manager, All ON**  
**Energy Impact Investors**

economist with expertise in financial Planning / Forecasting , budgeting Budgetary Controls , Stakeholder Engagement and Corporate Finance.

BSc Accountancy,  
University of Benin, Nigeria



**David Ruben**  
**Advisory Board**

Consultant to The Rockefeller Foundation Food Initiative,

BSc in International Business (Copenhagen Business School), an LLM in Public International Law (Stockholm University), and an MSc in Foreign Service (Georgetown University).



World Food Programme



gain  
Global Alliance for Improved Nutrition



Swiss Re

FACTOR[e]  
VENTURES



Energy innovations.  
Powerful collaborations.



JAPAN GOV  
THE GOVERNMENT OF JAPAN



GLOBAL COLD CHAIN  
ALLIANCE®

ILK Dresden



Institut für Luft- und Kältetechnik  
gemeinnützige Gesellschaft mbH



Microsoft

GLOBAL  
CITIZEN®



KING BAUDOUIN  
FOUNDATION



Department  
for International  
Development



USAID  
FROM THE AMERICAN PEOPLE



Global  
Maker  
Challenge

# Cold Hubs

**[nnaemeka@coldhubs.com](mailto:nnaemeka@coldhubs.com)**

**+234 806 0292346**

**[www.coldhubs.com](http://www.coldhubs.com)**