

TECHEMERGE TEMPERATURE-CONTROLLED LOGISTICS - NIGERIA

December 2020

In partnership with



Think Logistics. Think Kobo360.



IFC

**International
Finance Corporation**
WORLD BANK GROUP

Creating Markets, Creating Opportunities

TECHEMERGE SUSTAINABLE INNOVATION



TechEmerge brings technologies to new markets—accelerating sustainable innovation in emerging economies, where it is needed most.



After success in the health sector in India and Brazil, the TechEmerge match-making program is expanding to vital cooling markets, including temperature-controlled logistics (TCL) in Nigeria.

WHY FOCUS ON TEMPERATURE-CONTROLLED LOGISTICS?

Temperature-controlled logistics is essential for economic development, human health, and food security.

It delivers perishable goods to shops and shipping ports and keeps medicines and vaccines from spoiling as they are transported to clinics, pharmacies, and hospitals.



Globally,
broken cold
chains spoil 1
in 4 vaccines

TCL enables access
to the \$10+ billion
global market for
perishable
products

30-50% of post-
harvest losses
are due to a lack
of cooling





COOLING IN A WARMING WORLD

10% of greenhouse gases come from cooling and **15% of global energy** is consumed by cooling. TCL is a big part of that.

Energy used for cooling will **triple by 2050** if business as usual continues.

Demand for TCL is rising due to **income growth**, and **urbanization**—especially in fast growing, warm cities in **emerging markets**, like Nigeria.

THE GOOD NEWS

Cooling innovation offers one of the most effective ways to mitigate climate change

Alternate cooling for refrigerated trucks can be 40% more efficient than conventional solutions & produces no direct CO2 emissions

Off-grid, mobile, solar-powered cold rooms can cut harvest losses up to 90%, dramatically increasing incomes for farmers

Smart software with dynamic controls can reduce energy use by 50% and GHG emissions by 20%

THE TECHEMERGE SOLUTION

TechEmerge aims to demonstrate that state-of-the-art technologies and new business models can make TCL efficient, effective, and economical in Nigeria.

TechEmerge will match innovators across the world with leading companies in Nigeria to pilot sustainable cooling solutions that reduce losses in cold chains, strengthen access to TCL-dependent products and markets, and build commercial partnerships.

The project is a collaboration with Kobo360—an e-logistics platform operating across Africa that connects truckers to customers.



BRINGING INNOVATORS & ADOPTERS TOGETHER



WHY NIGERIA?

- Nigeria is Africa's largest economy, and with over 200 million people, it is the most populous country on the continent.
- Much of the TCL technology currently in use in Nigeria is old, energy-inefficient, and carries a high environmental cost.
- Inadequate cold chains contribute to the loss of more than 30 percent of all food produced in Nigeria .
- Agriculture accounts for roughly 20% of GDP and 50% of jobs in Nigeria, but to reduce reliance on food imports and unlock export potential, it needs efficient cold value chains, including TCL.
- In 2017, the TCL market in Nigeria was valued at \$63 million, driven by fish and seafood (56%), fruits and vegetables (17%), meat (12%), pharmaceuticals (11%), and dairy (4%). The TCL market for processed foods and beverages is currently small but has significant potential for growth.



HOW DOES TECHEMERGE WORK?

- 1** Through a competitive process, we issue open calls and select companies with affordable, sustainable, scalable innovations for temperature-controlled logistics.
- 2** We match innovators of proven TCL technologies with leading companies in Nigeria to pilot these solutions on the ground and build commercial relationships.
- 3** We provide financial and advisory support for market-entry to offset financial, operational and adoption risks. Pilot projects can access grant funding from a total pool of USD 1 million.

TECHEMERGE SUSTAINABLE COOLING GOALS

- 1 Adoption of state-of-the-art TCL technologies that improve quality, increase access, and/or reduce costs of products/services in emerging markets, where they are needed most.
- 2 Reduced energy consumption and greenhouse gas emissions.
- 3 Commercial contracts between innovators and tech adopters.
- 4 Facilitation of financing to scale the adoption of efficient, affordable, climate-smart TCL solutions.



AREAS OF OPPORTUNITY IN NIGERIA

23+ companies have already expressed interest in partnering with TechEmerge innovators to pilot new TCL solutions.



**Transport/
Logistics**



**Solutions for
Truck Owners**



**Insulated
Container/
Refrigeration
Units**



**Innovations
for TCL Buyers**

SPECIFICATIONS: AMBIENT / GENERAL CONDITIONS

- Nigeria has tropical climate semi arid in north and rainier as you go southwards.
- The maximum ambient temperature in south is in range of +32-35 °C.
- The maximum temperature in extreme north can go as high as +40 °C.
- For purpose of designing the refrigeration system we suggest take +35 °C as max ambient.
- The humidity varies from place to place but the port cities have average humidity of 85%RH.
- The road conditions are poor & the average speed for truck movement on long distance trips can be taken as 15-20 km/hr.
- The cities are generally crowded and well known for Go-slow or traffic jams.
- Most of the trucks and trailers are second hand imported in Nigeria with all kinds of makes and body dimensions.

SPECIFICATIONS: LONG DISTANCE TRANSPORTATION

Options	Ambient Temperature	Min Temperature	Max Temperature	Applications / Example
General / multipurpose	(+) 35 °C max	(-)20 °C	(+) 20 °C	May carry either chilled or frozen on different legs of the journey. For Example: Frozen fish at (-)18 °C on one side of journey and chilled dairy products at +8 Decg C in return journey. Multi-temperature options for any of the above temperature application may also be required
Frozen Application	(+) 35 °C max	(-)20 °C		For Only Frozen Food transportation on both side of Journey. For Example: Frozen Poultry on one side of Journey & ice cream in return journey
Chilled Application	(+) 35 °C max	(+) 2 °C	(+)20 °C	For Chilled transportation on both side of Journey. For Example: Dairy on one side of Journey at +8 °C & Vegetables at +15 to 20 °C
Comfort Application	(+) 35 °C max		(+)20 °C	For F&V transportation one or both side of Journey with empty leg carrying dry cargo. F&V transportation at air-condition like temperatures. See comments on next slide.
Air Cooled Application	(+) 35 °C max		(+)25 °C	For F&V transportation one or both side of Journey with empty leg carrying dry cargo. F&V transportation at air-cooled temperatures. See comments on next slide.

Typical Journey Time:

1. The transit times are generally in range of 48-60 hours however due to traffic jams; we must provide for 72 hours. Extreme north may even take 100 hours to reach.
2. Most of these trips are point to point but some may be multi-drop however there will be possibility of cooling the container before release from one location to the next one.
3. Multi temp units for multiple type of products may also be needed on case-to-case basis.

SPECIFICATIONS: LONG DISTANCE TRANSPORTATION OF F&V

- For long distance transportation of F&V following options to be explored:
- For insulated container with low cost refrigeration system suitable for creating air conditioning type environment with temperature range of around +20 °C.
- For metal body container mildly insulated using plywood panelling with low cost evaporative cooling system creating air-cooled type environment with temperature range of around +25 °C assuming ambient temperature in range of +32 to +35 °C.
- For open body trucks with canvass type tarpaulin covering capable of providing evaporative cooling system in order to cool the F&V in the load body.
- Cooling using special heat reflective paints/coating in order to reflect the heat may also be evaluated.
- Companies in insulation manufacturing can also suggest low cost insulation options for transportation of perishables.

SPECIFICATIONS: SHORT DISTANCE TRANSPORTATION

Options	Min Temperature	Max Temperature	Applications / Example
General / multipurpose	(-)20 °C	(+) 20 °C	Intercity/short distances but both sides with some load chilled or frozen
Frozen Application	(-)20 °C		Intracity/Intercity for short distance but for single type of products on one way basis with multi-drop option
Chilled Application	(+) 2 °C	(+)20 °C	Intracity/Intercity for short distance but for single type of products on one way basis

Typical Journey Time:

1. The transit times are generally in range of 8-10 hours however due to traffic jams; we should provide for 12 hours.
2. Most of these trips are multi-drop with no possibility of cooling the container before returning to base again.
3. Refrigeration equipment should be desinged for 6-8 drops with no sweating. Multi-compartment may be recommended if necessary.
4. Multi temp units for multiple type of products may also be needed on case-to-case basis.

SPECIFICATIONS: ENABLING TECHNOLOGIES

- Independent proposals from suppliers of Data Loggers capable of measuring and recording the temperature in range of +30 to -25 °C.
- Multi probe option with 2 measurement points.
- Interface able with a GPS system capable of communicating on GSM/GPRS network.
- Supporting software with alarm/alert systems for any deviation from the set parameters.
- Online reporting system providing live data of the journey as well as records for future analysis.



THE TECHEMERGE PROCESS



Assess

Identify challenges & gaps and cooling needs in Nigeria and identification of program partners (adopters).

September 2020



Source

Launch an open call for innovators from around the world with market relevant solutions to apply to join the program.

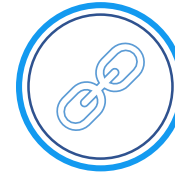
Dec. 8 2020–
Jan 31 2021



Select

With the support of a network of expert advisors, we select high-performing innovators with proven technologies that can meet the needs of participating local organizations.

February 2020



Match

Through a carefully curated process, we arrange virtual events and meetings for the shortlisted innovators to meet local organizations, demo their products, and discuss the potential to pilot projects together.

March 2021



Pilot

With IFC and Kobo360 support, selected innovators and participating organizations partner to test technologies in a local setting.

2021–2022



Commercialize

If the pilot is successful, the local company and innovator may decide to enter into a commercial contract.

BENEFITS FOR INNOVATORS

- ✓ Access to a network of potential users/buyers of cooling technology, products, and services in Nigeria, and Africa more broadly.
- ✓ Access to a pool of up to USD 1M in funding to support pilot projects (competitive selection).
- ✓ Guidance from the TechEmerge team and global network of advisors to develop pilot implementation and market entry strategies.
- ✓ Potential investment from IFC.

SELECTION CRITERIA



Priority will go to proven products installed in at least one commercial setting, but innovations at the product development stage will also be considered.

Privately owned company, typically with less than 50 employees and less than USD 100M in venture capital funding (with some exceptions).

Meets the TCL needs of Nigerian businesses.

Demonstrated managerial capacity and scalability.

Ability to allocate time and resources to participate in the project, including participation in periodic virtual events and meetings, and implementation of field testing/pilot project in Nigeria.

TECHEMERGE TEMPERATURE-CONTROLLED LOGISTICS IN NIGERIA

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ANNEX



APPLICATION: KEY SECTIONS

- **Company profile including information on investors and latest round of finance raised**
- **Product (innovation/technology) description [innovators can apply with different products]**
- **Key benefits of applying your technology vis a vis traditional one**
- **Typical use case for your product (technical, financial and economic parameters and type of end users). Names and locations of clients you implemented your product.**
- **Typical pricing structure**
- **Key markets served now and your interest in Nigeria/Africa specifically**
- **Delivery model for Nigeria including any supply chain considerations. Description of your operational capacity to pilot and work in Nigeria.**

APPLICATION: TECHNOLOGY FAMILY AREAS

1. Alternative Cooling

- Absorption Chilling
- Thermo-acoustic Refrigeration
- Liquid Desiccant
- Solid Desiccant
- Magnetic Refrigeration
- Barocaloric Cooling
- Evaporative Cooling
- Hybrid Cooling
- Peltier Effect
- Immersion Cooling
- Thermo-elastic Refrigeration
- Air Cycle/Air Handling
- Vacuum Cooling
- Solar Cooling
- High-pressure, two-phase cooling
- Water-activated passive cooling
- Spraying Cooling
- Duplex Stirling
- Heat Transfer Fluid
- Cold Networks/LNG cold recovery

2. Thermal storage

- Cryogenics
- Ice
- Other Phase changing materials (PCM)

3. Vapor compressed cycle

- Air handling
- Compressors
- Heat exchangers
- New cycles
- Refrigerants

4. Cooling Demand reduction and management

- Insulation
- Shade/Reduced Solar Gain
- Coatings and Treatments
- Heat reduction/rejection/radiation

5. Enabling technologies

- IoT
- Temperature Control and Monitoring

6. Other

- Other

LDPs

- ✓ **LDPs enrollment:** Kobo360 is looking for interested LDPs in five categories (engineering firms, manufacturers, labs, distributors and innovators)
- ✓ **LDPs shortlist:** Kobo jointly with IFC will prepare shortlist targeting to have 4-5 companies present
- ✓ **Participation in Matchmaking:** confirmed LDPs will be invited to participate in match-making meetings and explore business partnerships with innovators and adopters.
- ✓ **Participation in Pilots:** having an LDPs will be critical part of grant application for the pilots



ROLE OF LDPs

- ✓ Key to success for non-Nigerian based innovators to be able to implement pilots (specifically in COVID 19 travel restricted environment)
- ✓ Critical for innovators to either scale up or localize post pilots
- ✓ Local (trustworthy, same culture and language, knowledge of local regulations and business requirements) partner for adopters