Retrofitting dry trucks to refrigerated trucks for cold chain logistics

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What is Cold Chain Logistics?

- The cold chain involves the transportation of temperature sensitive products along a supply chain through thermal and refrigerated packaging methods and the logistical planning to protect the Integrity of these shipments. There are several means in which cold chain products can be transported, most importantly refrigerated trucks.

Source: affreighterlogistics
Cold Chain Logistics Market Size

The global cold chain logistics market size is estimated to reach $447.5 billion by 2025, according to Grand View Research Inc. To keep up with consumer demand, there will continue to be technology enhancements in everything from packing, processing and cold storage procedures.
Overview of Post-Harvest Losses in Nigeria

Where the losses and leakages are positioned in the value chain

- This is the current value chain flow of the agro-perishable produce post-harvest to sales.
- The flow also shows where the leakages occur.
- As a result to the leakages, the society is suffering from rising food prices, food insecurity, and limited availability of hygienic food.

Central Aggregating Hub for the harvested produce from various smallholder farmers awaiting pick-up for transportation.

Trucks are sent from the main markets by the middlemen/broker between the smallholder farmers and the market merchants, to pick up aggregated produce from the Farm Gate.

The broker off-loads the trucks and sells the produce to various market merchants at an agreed price that is based on the condition(s) of the produce at a point of sale.

<5% is lost/wasted due to the use of raffia baskets, and lack of cold storage facility

<40% lose up to 60% of its market price/value at point of sale due to the deteriorated condition of the produce from the use of raffia baskets, and lack of refrigerated truck
Production and markets - Transport flows

- Large product flows (arrows 1 and 2) from production to commercial centres in Benin and Nigeria
- Seme is a main border crossing for both formal and informal trade to the Lagos area
  - Eastern production areas in Ketou, Pobe and Ifangi facilitate informal cross border trade
- Pineapples are a regional export commodity for Benin
- The northern region of Nigeria (Jos plateau, Kano) is the main production region and features a substantial concentration of trade intermediaries

Source: BCI/LARES/Valued Chain/BBagoo based on survey results (2015)
Food losses in the value chain

Activities where food losses occur

- Most food losses occur during transport and at the production site
  - Total agro-logistics losses range from 20-50% of total losses
- Causes of food losses in each activity:
  - Production site: inappropriate inputs and manual handling
  - Transport: poor road conditions and transport conditions (heat and ventilation)
  - Warehouse and storage: inappropriate storage facilities, exposure to heat and sun
  - Losses at market places due to unsold products/surplus during harvest season and unloading/handling
  - Cold storage facilities are not available at ports/airports

Source: BCI/LARES/Valued Chain/BBagoo based on survey results (2015)
VOLUME OF POST HARVEST LOSS

• An estimated 15million metric tons of Nigeria grown perishable goods, including onions, potatoes, tomatoes, peppers, okra, ginger and carrots are lost annually due to poor logistics infrastructure and high transportation cost through spoilage and product damage.

Source: ships & ports Lt
VALUATION OF POST HARVEST LOSS

• According to the above estimate 1,250 million metric tons will be transported on a monthly basis, 41,666 thousand of 30 tons refrigerated truck can preserve perishable goods from post harvest loss monthly.
VALUATION OF WASTAGE

• Approximately a third of the food produced goes to waste before it even arrives in your kitchen. In fact 40% These waste statistically is believed to occur between the transit and the market.
STOCK OF COMMERCIAL VEHICLES IN NIGERIA

According to the data, Nigeria has a total of 11,547,236 motor vehicles in the country,

The data also reveals that Nigeria has a total of 6,749,461 commercial vehicles which is about 58.4% of total vehicle population in the country. In terms of vehicles per 1000 population, a total of about 34.9 vehicles are available per 1000 Nigerians.

The Director General of the Federal Institute of Industrial Research, Oshodi (FIIRO), recently in Lagos, lamented that the country post-harvest losses have risen to over $9 billion annually.
ESTIMATION OF POST HARVEST FOOD LOSSES ON HORTICULTURAL PRODUCE AS SUCH TOMATOES

• Estimates of post-harvest food losses in the developing countries e.g. (Nigeria) from mishandling, spoilage, transport and pest infestation are put at 45%.

• And pre-harvest and during harvest losses is at 25%. This means that half of what is produced never reaches the consumer for whom it was grown.

• Horticultural products such as tomatoes are quickly perishable, and if care is not taken in their harvesting and storage, they will soon decay and become unfit for human consumption.
In SSA, the physical loss of food has been approximately estimated as 37% or 120–170 kg per year per capita (FAO 2011). The World Bank et al. (2011) estimate the value of postharvest loss per year in SSA for all grains to be about $4 billion, which is more than the value of food aid received in SSA over last decade.
BENEFITS OF REFRIGERATED TRUCKS IN RETAIL DISTRIBUTION

• **Reliable** – the user / consumer is assured the products conveyed by the refrigerated truck will not loss their value.

• **Safety** – ensuring that the quality of the product is maintained having a particular temperature to stay safe.

• **Cold and heat** – refrigerated truck usually have both heating and cooling options so that a steady temperature required to maintain the product in the correct condition depends upon the individual products needs.

• **Design and customization** – the refrigerated systems that are used to carry your products can be available in different sizes, two of the most prominent refrigerated systems are the nose-mounted and roof mounted system
Survey carried out on post harvest food losses in some communities in Nigeria revealed that as 30-50% of root and tuber and usually high percentage of fruits and vegetables are lost with a substantial amount recorded during Storage.

(Mijinyawa, Y.2002)
Largest Refrigerated Warehouse Companies, Locations and Capacity, 2018

Americold Logistics
Locations - Argentina, Australia, Canada, China, New Zealand, United States
27.07 Million m³

Lineage Logistics
Locations - Belgium, Netherlands, United Kingdom, United States
21.72 Million m³

Swire Cold Storage
Locations - China, Sri Lanka, United States
10.14 Million m³

AGRO Merchants Group
Locations - Australia, Austria, Brazil, Chile, Ireland, the Netherlands, Poland, Portugal, Spain, United Kingdom, United States
7.45 Million m³

Nichirei Logistics Group, Inc.
Locations - France, Japan, the Netherlands, Poland
4.93 Million m³
Kloosbeheer B.V.
Locations - Canada, Germany, France, the Netherlands, Norway, South Africa, Sweden, United States
4.69 Million m³

NewCold Advanced Cold Logistics
Locations - Australia, France, Germany, the Netherlands, Poland, Great Britain, United States
3.98 Million m³

VersaCold Logistics Services
Location - Canada
3.75 Million m³

Interstate Warehousing, Inc.
Location - United States
2.84 Million m³

Cloverleaf Cold Storage Co.
Location - United States
2.37 Million m³

Emergent Cold Storage
Location - Australia and Vietnam
2.16 Million m³
Nigeria does not have 1% of these companies capacity for cold storage

Nigeria capacity is only 200,000 m3
VARIOUS TECHNOLOGIES IN COLD CHAIN LOGISTICS

• 1. CONVENTIONAL MECHANICAL REFRIGERATION EQUIPMENT
• 2. EUTECTIC PLATES
• 3. ICE BATTERIES
• 4 LIQUID NITROGEN
CONVENTIONAL MECHANICAL REFRIGERATION EQUIPMENT

THERMOKING COOLING
LIQUID NITROGEN

• The system works by initially allowing the liquid nitrogen to expand becoming a gas. This absorbs heat from the chilled area, the gas is then combined with a warm water/glycol mixture in the motor which provides the necessary pressure to operate the pistons. The water / glycol mixture is recycled while the nitrogen gas is vented to the air.

• One tank of liquid nitrogen will last for approximately two days and pull down time from plus 15 to minus 21 degrees Celsius is approximately 30 minutes once the door is closed.
FRISAV REFRIGERATED TRUCKS

• Frisav is a Turkey based cooling company and specialized majorly in retrofitting of dry trucks to refrigerated trucks.

• The company which has many references both domestically and abroad offers its experience with on board refrigerated casing and thermo boxes.

• FRİSAV products stand out in the optional structure with different designs, durable, ergonomic, light weight, high heat holding ability and economic pricing.
EUTECTIC PLATE

Eutectic plate is a system that can absorb energy and keep the energy they absorb for a long time by means of special solutions inside. Eutectic cooling systems are special plates designed for use in containers and cold rooms for freezing and frozen food distribution.
FRISAV EUTECTIC PLATES

BENEFITS OF EUTECTIC PLATES

- Zero emission
- Low failure rate
- Low maintenance cost
- Environmentally friendly system
Refrigerated vehicle bodies are not intended for cooling; it is designed to protect the coldness of the refrigerated product during transportation.
THE FOLLOWING COLD CHAIN PRODUCTS ARE VERY POPULAR:

- Fruits and vegetables
- All fresh foods
- Floral market
- Dairy products
- Pharmaceutical products
- Meat market
- Seafood market
IMPACTS OF COLD CHAIN

These includes:
❖ Can Reduce Product Spoilage
❖ Can help Reduce Transport Costs
❖ Can also Eliminate Crisis Management Costs
❖ Higher Efficiency Rate
❖ Increases Output
❖ Increases Business Profit Level
❖ Decrease Cost Effect
INSULATED SANDWICH PANEL FOR CONSTRUCTION OF COOLING TRUCK BODY
Lange and Grant is a manufacturing company of insulated sandwich panel made with polyurethane foam, for commercial project and low cost housing using modular building technology and pre-engineered system.

We service various industrial sectors by providing much needed early works infrastructure on projects and temporary accommodation; these sectors are Agriculture, Oil & Gas, Pharmaceutical, Low cost Housing, Aviation and Telecomm.

Our innovation and expertise has earned us international recognition and we are among the proud winners of the all world Nigeria fast growth 50 award winners founded by Prof. Michael Porter of Harvard University.
Our new install line capacity of 1 million square meter per annum as a result of assistance and intervention by bank of industry ( BOI )
USES OF INSULATED SANDWICH PANELS

Insulated panels are the building blocks for any cold chain system to retain required temperature either hot or cold.
CONSTRUCTION OF COOLING TRUCKS FOR STORAGE AND LOGISTICS
TRENDS IN COLD CHAIN LOGISTICS 3PL

The cold chain logistics industry is always changing! And the supply chain for popular refrigerated and frozen foods is always evolving. When consumers change their habits and companies adapt to meet growing needs, the management system of a cold chain logistics operation must adapt too.
SOME TRENDS IN COLD CHAIN LOGISTICS INCLUDE:

• Improving Speed

As consumer demand climbs, so does the speed in which refrigerated and frozen products must move on the cold chain logistics chain.

• Improving Visibility

These days, customers want to watch their cold chain products in every facet of the logistics process, to ensure there is no “weak link” in the chain.

• Outsourcing is King

Food suppliers always want to consolidate their business reach. Always look for partners willing to handle logistics and work around your business and not the other way around.
Think Globally

The consumer market is demanding products on the other side of the pond. Always consider your options for a cold chain logistics provider that can handle things on the ground and overseas.

Remember Regulation Increases

With all this demand for food comes some downfalls. Increased cold chain deliveries means an increase in food safety regulations, particularly for refrigeration standards.

An example of that is the pharmaceuticals market. Years ago, pharmaceuticals only had to stay at the mandated temperature in storage facilities. Many pharmaceuticals now require constant temperature mandates for door to door delivery.
Rein in Costs to Save Money

Many cold chain logistics companies strive to control costs while helping customers achieve cold chain constant temperature satisfaction. An example of that is using better truck insulation to hold in the temperature while saving money on truck energy costs.

Improved Packages

Packages with better insulation material are superior for logistics companies shipping food and pharmaceuticals.
COLD CHAIN LOGISTICS OF FRUITS AND VEGETABLES
FRESH FRUIT AND VEGETABLES

• These include the leafy green vegetables, fleshy fruits and modified flower parts (e.g. cauliflower, pineapple). The storage potential of these is very limited under ambient conditions. They quickly deteriorate because of their fast respiration rates, which cause rapid heat buildup and the depletion of their high moisture content.
FINANCING RETROFITTED TRUCK

Financing required to retrofit the refrigerated trucks at an average of N2million – 5million depending on the brand will cost 2,000,000 x 50,000 trucks = ₦100,000,000,000
INCENTIVES TO ENCOURAGE INVESTMENTS IN COLD CHAIN

1. TAX WRITE-OFF FOR ANY INVESTMENT IN COLD CHAIN
2. 50% SUBSIDIES FOR ANY INVESTMENT IN COLD CHAIN BY FARMERS.
3. TRAINING & RESEARCH INTO ALTERNATIVE ENERGY SOURCES
4. WAREHOUSE TRUST RECEIPTS FOR PERISHABLES
5. MICROFINANCE LOANS ASSET FINANCE FOR COLD STORAGE INFRASTRUCTURE
AN EFFECTIVE ASSET FINANCE ECOSYSTEM

2nd tier investors: Provide seed capital to early stage asset finance innovators, and scale up models where all three success factors are present.

DFIs, donors, foundations: Co-finance technical assistance for reducing credit risk and guarantees for early stage asset finance.

Financial service providers (FSPs): Finance quality assets with well defined and secure cash flows and well diversified SGBs.

Capacity developers: Support SGBs to measure and monitor cash flows, access markets and manage credit risk.

Technology companies and vendors: Target viable customers and provide technical support to them.
Proposed Funding Structure
Framework and Process

1. SME approaches the financial advisers for proposed financing of an eligible project.

2. The financial advisers assess the bankability of the proposal in line with eligibility criteria of the BOI funds.

3. Subject to satisfactory review of the proposal, the financial advisers submits its report to Institutional guarantor and fund provider for their independent review.

4. Institutional Guarantors provide guarantee cover of the funds in order for fund providers to provide funding to the SMEs.

5. BOI provides the required funding to the eligible and proposed projects/enterprises.

Overview

SMEs / Co-operative Societies

- Cold Storage Facility
- Refrigerated Truck
- Plastic Crates

Financial Advisers

- BOI-ITC
- SME

Potential Guarantors

- Development Bank of Nigeria
- Commercial Banks
- Multi-lateral Development Finance Institutions

Commercial Banks Development Banks

- Term loan
- Asset finance
- Working Capital
Thank You!

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