



**AFRICA 20
WORKS! 22**
Innovation for Resilient Growth

FOOD SECURITY AND SAFETY FOR COLD CHAINS



Government of the Netherlands

MODERATOR



MS. FEMKE BOS

**Director Business Development,
Strategy and Impact**

Invest International

Introducing Invest International

We invest in **Dutch solutions**
for **global challenges**

Femke Bos
Director Business Development,
Strategy & Impact

**Invest
International**

Agri-Food



Our impact themes in the five sectors

in which the Netherlands
has a lot to offer

Agri-Food

Sustainable
value chains



Energy

Transitional and
renewable energy



Healthcare

Improving
people's health



Water and infrastructure

Green
infrastructure



Manufacturing

Sustainable
manufacturing





What we do

We offer tailor-made financing and project development expertise to bring international projects to completion.

Finance

Project Development

Connecting



Why we do it

1. Create an impact on the UN sustainable development goals - SDGs.
2. To fill a funding gap for international projects which can be risky and are outside the remit of mainstream investors and lenders.
3. To contribute to the Dutch economy and its future earning capacity.

Who we work with

LMIC country governments

Start-ups and SMEs

Mid and Large Corporates

Investors

Overview of Running Projects



1 billion committed to infraprojects in emerging markets



About **300 million** committed loans



Of which **200 million** SME loans



About **30** projects in development

Invest
International

We invest in
Dutch solutions
for **global challenges**

investinternational.nl



PRESENTATION 1



MR. JEROEN BOS

Programme Director

Flying Swans



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INTRODUCTION FLYING SWANS PROGRAMME

AFRICA WORKS! 2022



Invest International & Flying Swans Partnership



Develop agrologistic value chains in emerging markets.



Unlock the market potential for export and local trade of perishable goods.



Create opportunities for Dutch business.



Less food loss and carbon emission reduction.



Job growth and fair living wages for farmers.



OBJECTIVES: SUSTAINABLE DEVELOPMENT GOALS IMPACT



<p>2 ZERO HUNGER</p>	<p>Improve availability of nutritious food for vulnerable populations</p>	<ul style="list-style-type: none"> • Up to 5,000 tonnes additional fresh produce to the domestic market • Creating annual incomes for emerging farmers of up to € 8.5 million by 2035
<p>8 DECENT WORK AND ECONOMIC GROWTH</p>	<p>Job growth, fair living wages and economic prosperity</p>	<ul style="list-style-type: none"> • Facilitating economic growth of up to € 20 million per year • Creating up to 5,000 jobs • Gender equality and women empowerment (farming, packhouse & management)
<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	<p>Build resilient infrastructure to unlock sustainable industrialization</p>	<ul style="list-style-type: none"> • Repurposing existing infrastructure instead of building greenfield site • Over 175,000 tonnes by rail, avoiding almost 6,000 truck journeys
<p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>	<p>Better use of the natural environment and resources</p>	<ul style="list-style-type: none"> • Reduce post-harvest losses through cold chain development by up to 30%, equivalent to over 2,000 tonnes in 2035
<p>13 CLIMATE ACTION</p>	<p>Reduce greenhouse emissions to align with 1.5 degree pathway</p>	<ul style="list-style-type: none"> • Annual savings of 34,000 tonnes of CO2 through modal shift from truck to rail by 2035

EXAMPLE IN EAST-AFRICA: ETHIOPIA-DJIBOUTI CORRIDOR



IN ASSOCIATION WITH:



COOL PORT ADDIS – END-TO-END SOLUTION FOR LOCAL GROWERS AND EXPORTERS



Fixed cool wagons to supply Djibouti market

Also accessible for small trucks

Reefer stack for availability of reefers

Fully integrated in rail terminal for maximum efficiency & product quality

IN ASSOCIATION WITH:



PRESENTATION 2



MS. LIEKE VERHOFSTAD

**Business Development Manager,
Global Food and Agri Networks**

Rabobank



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The Cool Move

An Agro-logistic solution for Emerging markets



Urgency &

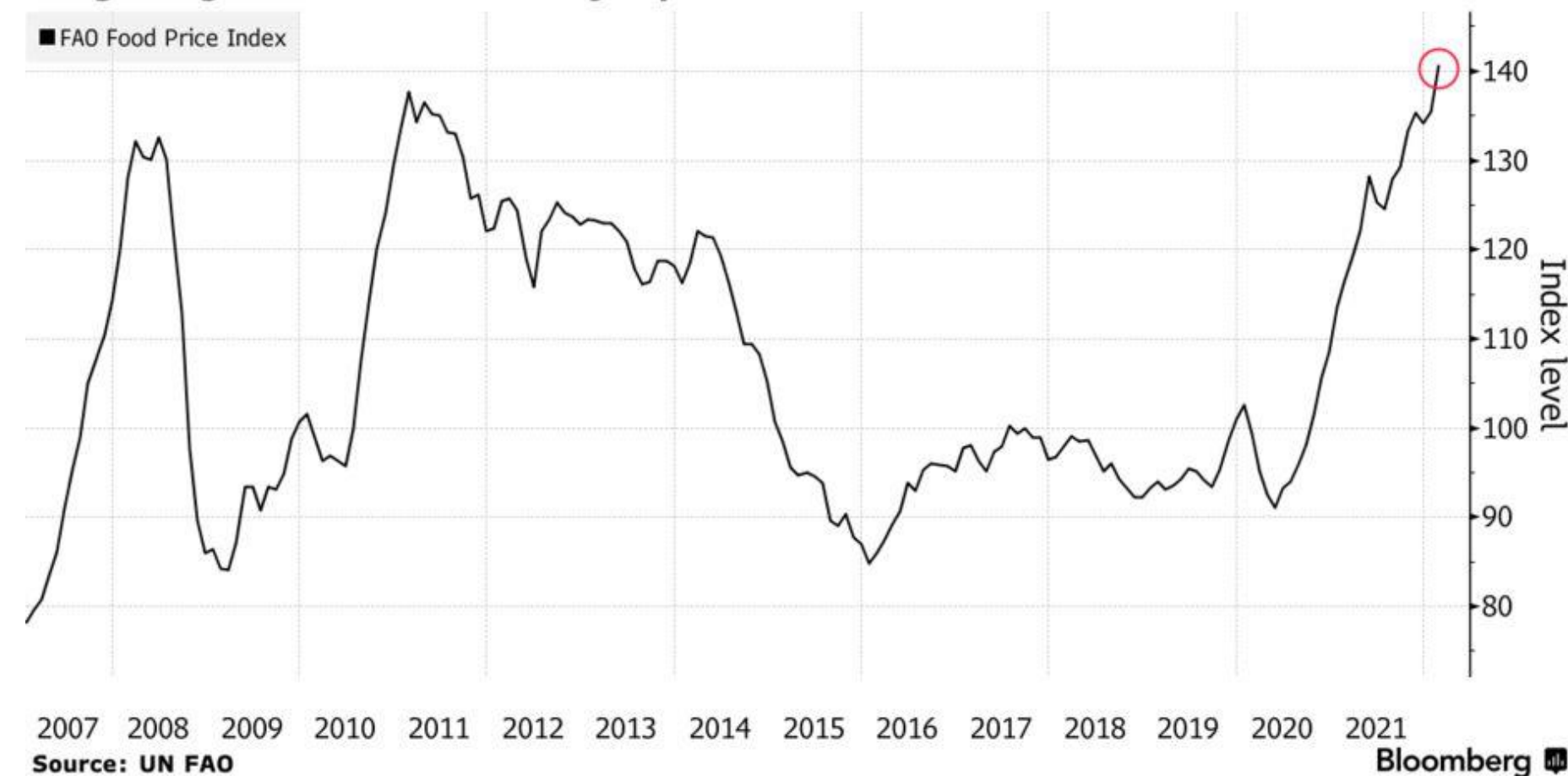
Motivation

- **Research** shows **cold chain** as an important solution for reducing FLW in emerging markets and therefore increase **food security**
- **COVID-19, Russia/Ukraine conflict, fuel and fertilizer costs & climate change** caused lower production and disrupted value chains (*especially of perishables like fresh produce & animal protein*)
- **The looming Food Crisis** especially affects low-income countries
- The **FAO Food Price Index** has hit rates last seen a decade ago. This price spike increases the risk of food insecurity and hunger.

So, let's start to stop throwing away 1/3 of all food produced!

Record Food Price

Gauge of global food costs has jumped to a record



Data Source: [UN FAO](#); Image Source: [Bloomberg](#)

Main Problem

Cold chain accessibility & utilization in rural areas

Cold storage is virtually non-existent in rural areas. Therefore smallholders generally are not storing their produce, infecting the quality and quantity of produce and causing post-harvest losses. The main reasons for lack of cold storage in rural areas is:

1. Poor Cold Chain Infrastructure (*professional organisations*)
2. Lack of Proper Finance and Investment (*due to lack of proper viable business models*)
3. Lack of Access to Markets and price incentives (*including regional trade*)
4. Lack of Access to Knowledge and Technology

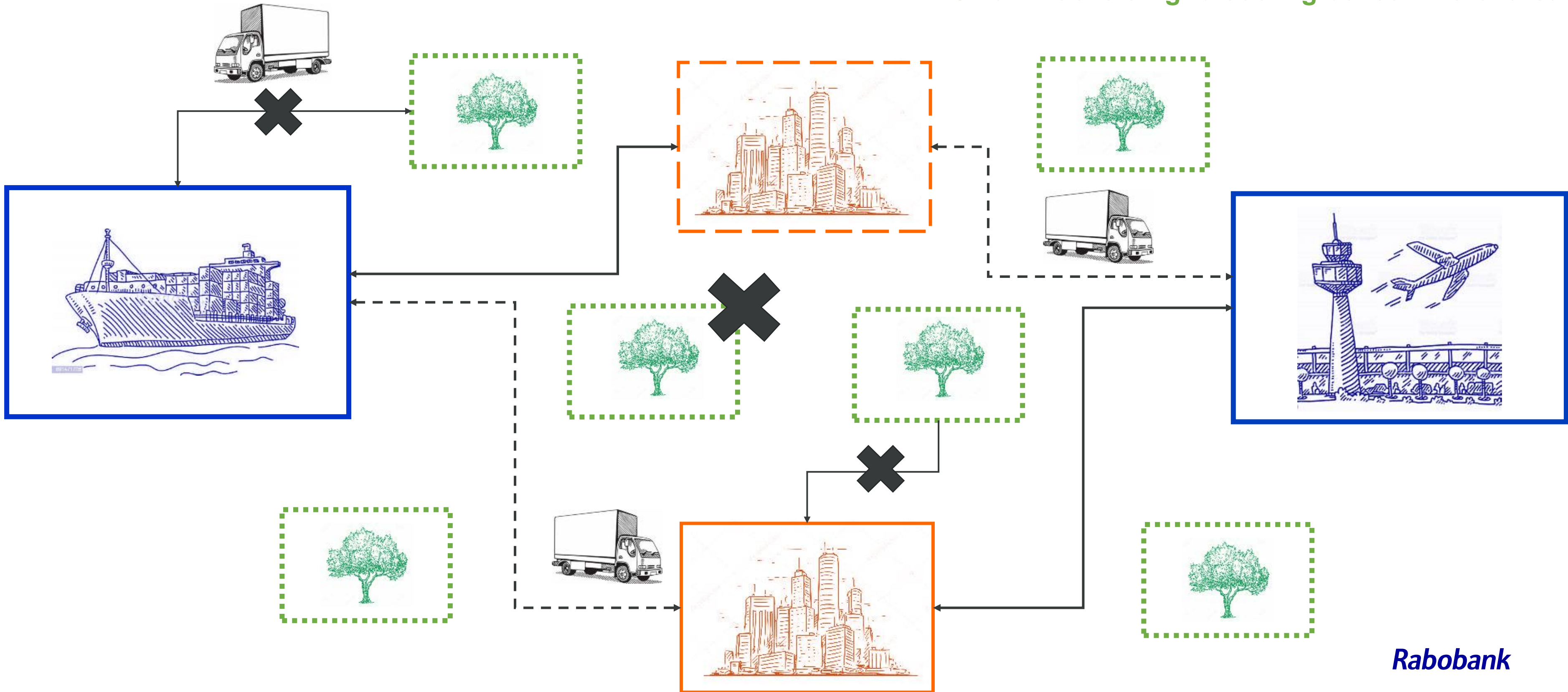


Current cold chain situation

———— Large cooling boxes at national harbours & airports

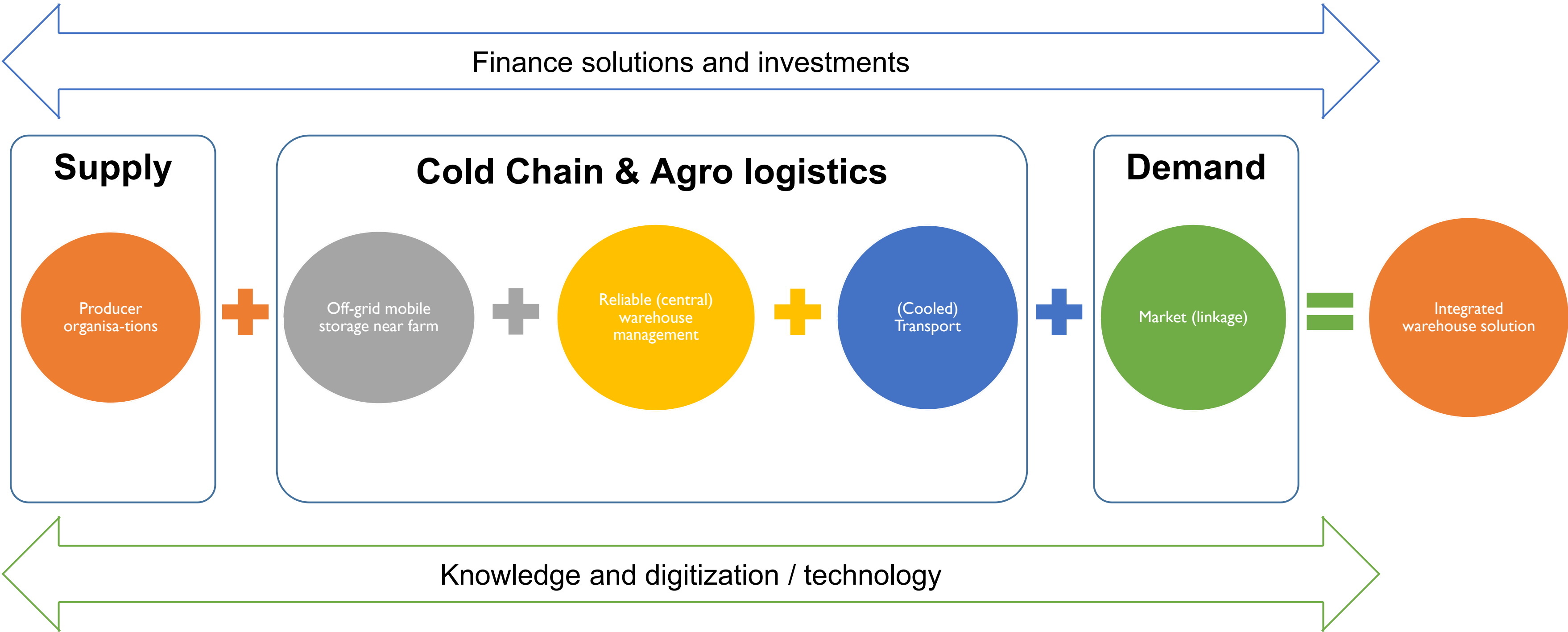
- - - - Mid-size cooling boxes in in-land cities

..... Small mobile off grid cooling boxes in rural area



We need a systems approach

Across the value chain



Key success factors

1) Business model development

- *Select the most scalable business models, create pipeline*

2) 'Re-organise' the value chain

- *Including TA, equipment / technology, data and market linkage*

3) Financial solutions

- *Deployment of a funding mechanism that will finance the development, use and growth of cold storage solutions through preferably local banks*

4) Data collection & Impact measurement

- *Cold chain database to quantify stocks, understand gaps and project scenarios, by collecting data on a.o technologies, food loss, energy and economics*

Goal of the Cool Move:

Promoting the development of cold chain solutions (both accessibility and utilisation) in rural areas, based on bankable business models, via appropriate financial solutions and backed by market linkages.

Impact focus areas

The Cool Move will:

- Secure quality and quantity of highly nutritious food in rural areas, for cities and for exports
- Reorganize value chains of perishables, in most cases produced by smallholder farmers
- Empower SMEs (storage managers, logistics providers, producers, traders and retailers) and create off farm-jobs for youth
- Increase access to off-takers and enhance market linkages
- Raise investments and implement finance solutions for cold chain and other agro-logistics
- Deploy technology and scale up successful business models (including digital techs, renewable energy based techs), such as increasing solar-powered cold hubs/systems near farm
- Reduce post-harvest losses substantially in affected value chains by 2023

The Cool Move contributes to the following SDGs

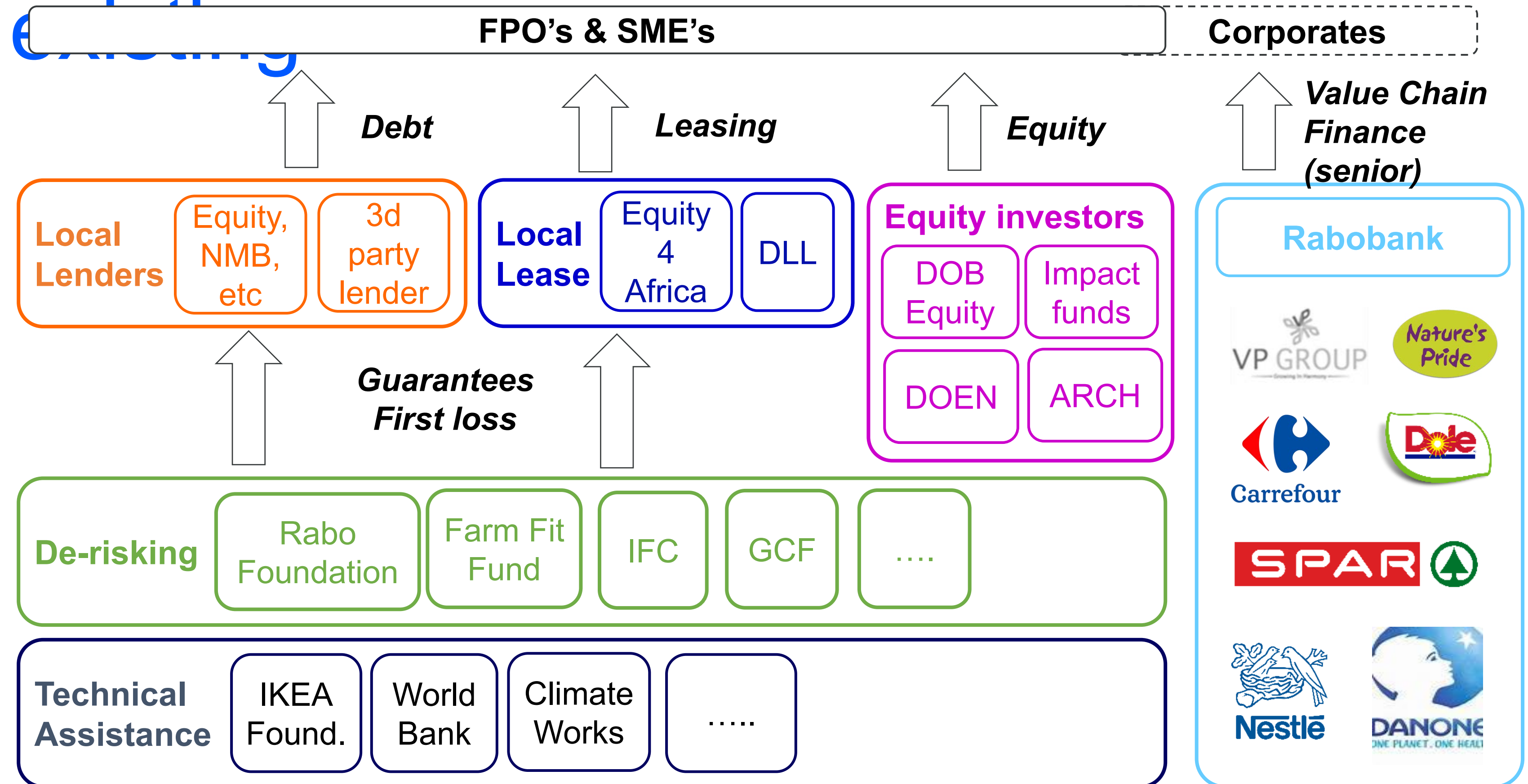


Thank you for
your attention



Appendix

Not another fund, but leveraging



PRESENTATION 3



MR. RENS ELFERINK

Sales Manager

Celtic Cooling



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Food safety & Refrigeration

Controlling the Cold Chain

by Rens Elferink, Sales Manager, Celtic Cooling

28 June 2022

About Celtic Cooling

- ▶ Headquarters in Nieuw-Vennep, The Netherlands
- ▶ Established in 1997 by Joost Van Klink (MD)
- ▶ 70 % export
- ▶ 5 Branche offices
- ▶ Focus on Africa with 3 branch offices (Ghana, Kenya & Ethiopia)
- ▶ Also branche offices in Kazakhstan and Uzbekistan
- ▶ Worldwide approx. 110 employees

- ▶ Works with several international partners for Agriculture, Horticulture, Meat- Poultry and Fish production, Solar, Pharma and other turn-key solutions

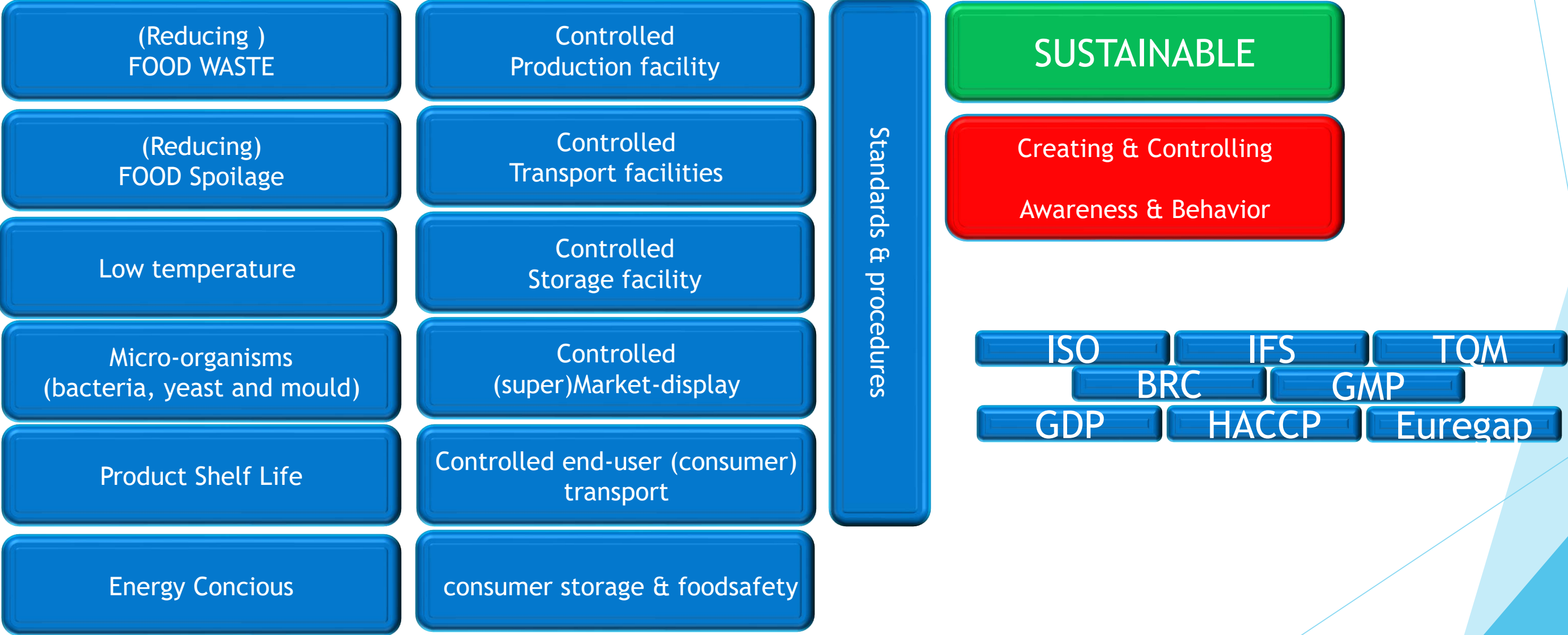
What we do

- ▶ A Dutch supplier and installs cooling and freezing solutions for storage, precooling, controlled air, and climate technology, with a large international mindset and 25 Years of experience.
- ▶ Works include design, projectmanagement, supply, erection of isolated structure, installation of components, commissioning, preventive maintenance and corrective services
- ▶ Our Markets are Agriculture, Horticulture, Warehousing & Logistics, Meat-, Poultry- or Fish production, Retail related and Airconditioning
- ▶ Some examples out of the world wide built +1500 projects
- ▶ Freezing / cooling storagerooms,
- ▶ shock- / blast freezing / forced (fast)cooling
- ▶ Food processing rooms
- ▶ Vacuum cooling / Controlled Air / ULO
- ▶ HVAC equipment



Controlling the cold chain

“uninterrupted series of refrigerated production, storage and distribution activities, along with associated equipment and logistics, which maintains quality under a product-specific temperature range”



FOOD SPOILAGE

- **Changes in the quality of organic goods with a high water content, which include a large number of nutrient, may be caused by 5 factors:**
- Infestation with micro-organisms (mold and rot)
- Biochemical changes, in particular respiration and ripening processes
- Physical changes, in particular in the form of drying-out (shriveling, weight loss)
- Postharvest diseases
- Mechanical damage during handling and transport
- Chilling or Frostdamage

STORAGE OF PRODUCTS UNDER CONTROLLED TEMPERATURE

▶ PRODUCT

Each product has its own storage temperature and its own maximum shelf life

▶ DESIGN

Type of system
Storage future ready
Reliable components
Availability of spareparts
Sustainable

(operational excellence / routing / expansions)
(think of back-up / Murphy's Law)
(penny wise pound foolish)
(refrigerant type) & energy conscious

▶ OTHER influences

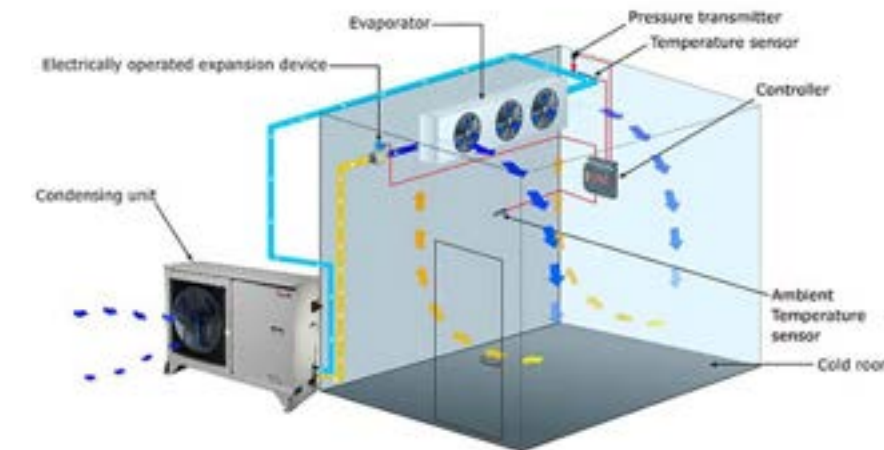
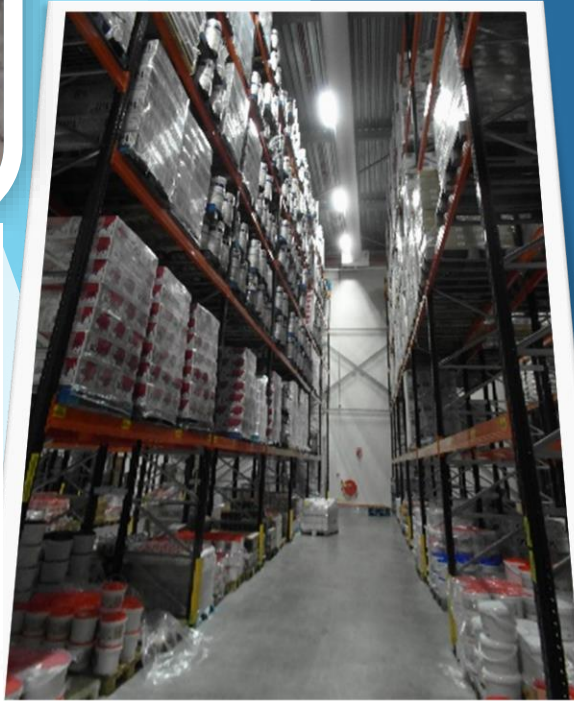
Field heat be extracted as quickly as possible?
Humidity, AIR or CO² be controlled?
Ripening or vacuumcooling?

▶ Controlled temperature

Think of temperature monitoring, registration & visualization

▶ STAFF

think about the (Working) environment of your staff (temperature wise & ventilation)



PRECOOLING

- ▶ *“By quick pre-cooling your fruits and vegetables both respiration & transpiration can be reduced by quickly removing field heat. Pre-cooling is the rapid removal of field heat from fruits and vegetables as soon as possible after harvesting”*
- ▶ *“Drastic increase in quality preservation and maximal shelf life, with a strong decrease of cooling down time (35% of time)”*



Mobile suction wall - precooler

To be placed in coldstorage room by forklift or castorwheels
No refrigerating installation = Uses capacity of coldstore
Precool up to 12 pallets

EXAMPLE of pricing: FCA Netherlands - €16.000,=
Mobile precooler



Fixed suction wall - precooler

Permanently placed in coldstorage room
No refrigerating installation = Uses capacity of coldstore

EXAMPLE of pricing: FCA Netherlands - €45.000,=
Storageroom 10 x 10 x 4 mtr
Storage refrigeration equipment (31,5 kW)
Precooling fixed wall in 7 cabinets (for 100 flowerboxes)



PRECOOL CELL (TARP)- precooler

Permanently placed in coldstorage room
Own refrigerating installation

Example of pricing: FCA Netherlands - €110.000,=
Precooling cell 16 x 4 x 4 mtr
cooling installation (63 kW)
28 Pallets each 540 kg Blueberries (1.000 x 1.200 x 2.250)

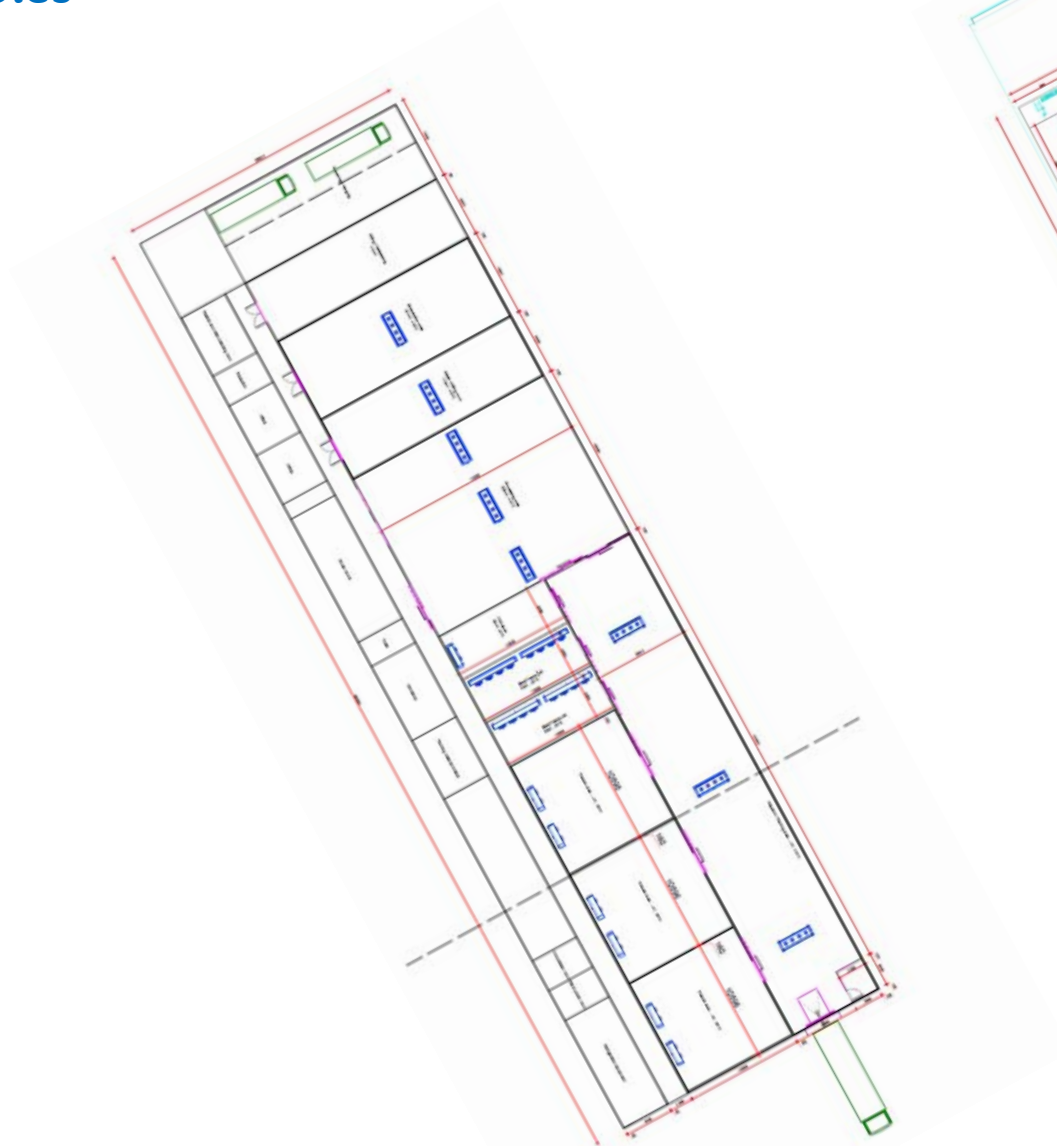
STORAGE, some examples



Chicken slaughterhouse 500 BPH

Slaughterhouse in existing building, 25 x 12 mtrs
Including insulated panels & refrigeration installation
Excluding slaughterline

€ 185.000

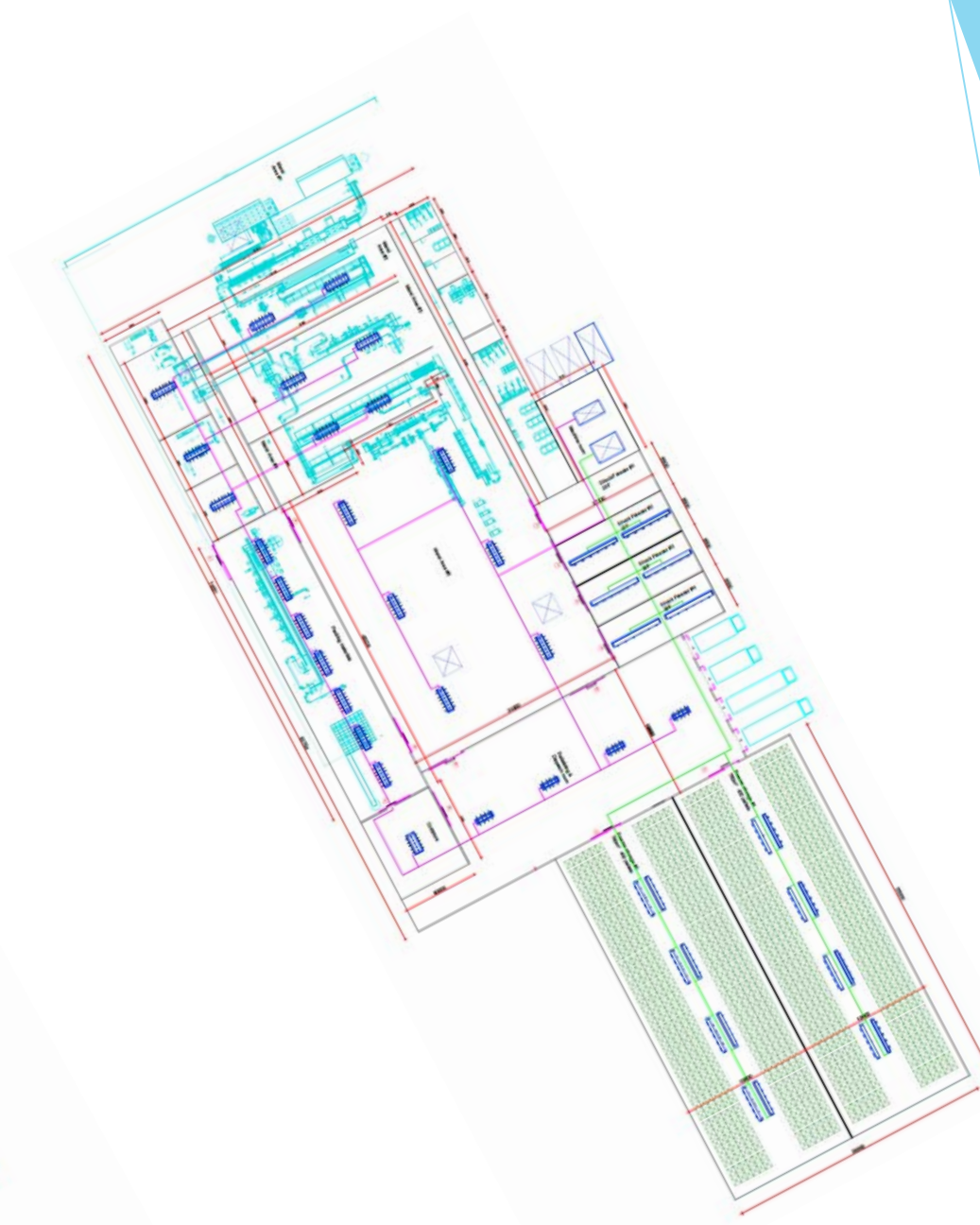


Chicken slaughterhouse 3000 BPH

Slaughterhouse in existing building, 86 x 42 mtrs
Including insulated panels & refrigeration installations & ventilation
Chiller for (water)spinchiller

storage capacity frozen 2 weeks
Excluding slaughterline
Excluding offices & airconditioning

€ 1.250.000



Chicken slaughterhouse 6000 BPH

Slaughterhouse in existing building, 150 x 65 mtrs
Including insulated panels & refrigeration installations & ventilation
Chiller for spinchiller
Flake ice machine
Redundant installation
Expandable for future benefits

storage capacity frozen 2 months
Excluding slaughterline

€ 4.000.000

RELIABLE ENERGY

Either to prevent risk of losses (operational/product) by powersurges or to control expences due to high energyprices, additional sources for reliable powersources could be “obtained”.

GENERATOR

EMPLOYEE TRAINING

SOLAR



CENTRALE PV/DIESEL HYBRIDE DE 136,5kWc / MALI
(POUR EXPLOITATION D'UN CENTRE DE FORMATION)

LA FOURNITURE ET L'INSTALLATION D'UNE CENTRALE PV/DIESEL SOLAIRE HYBRIDE
SUPPLY AND INSTALLATION OF A PV/DIESEL SOLAR HYBRID POWER PLANT



TRANSPORT

- ▶ Product quality from door to door by temperature controlled distribution
 - ▶ For fresh, Frozen and Pharma** distribution (-20 °C to +25 °C)
 - ▶ small cars/ vans / trucks / Trailers - a solution for each entrepreneur



Important for selecting:

Service dealer network (preventive & Repair)
Spare parts availability
Temperature registration during distribution



STILL GOING STRONG YOUR RELIABLE PARTNER

It's a GREAT discovery

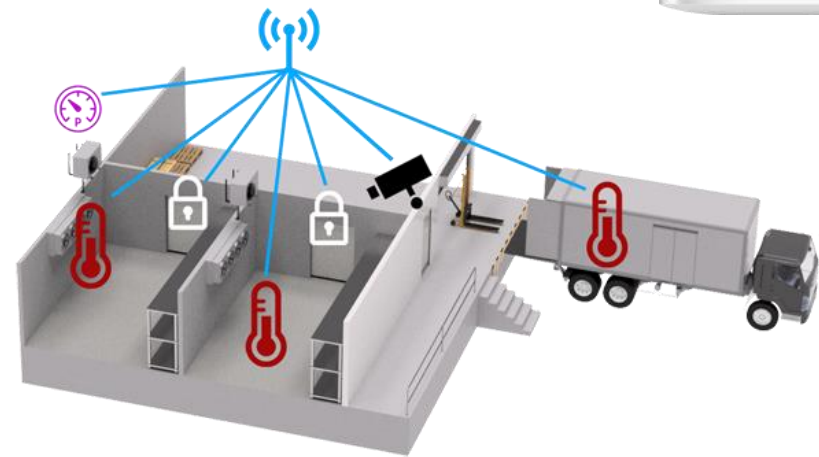
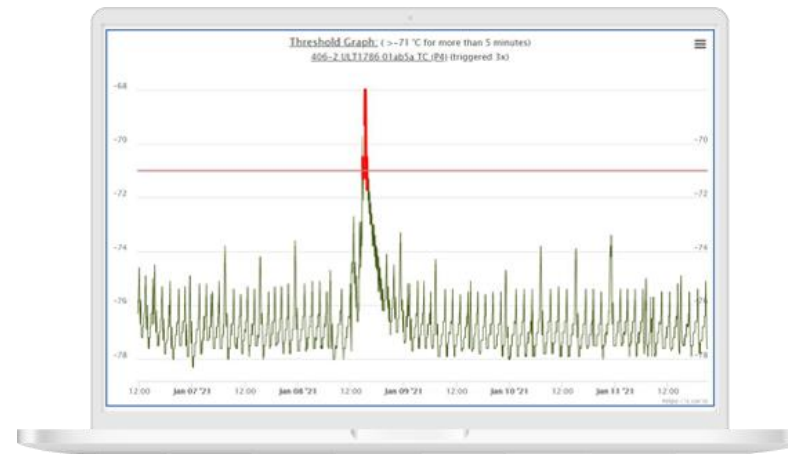
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Peter Merol
Area Sales & Servicemanager - South and East Africa



TEMPERATURE MONITORING

Register temperature measurements / date / time / batch
Post Harvest / arrival (infeed)
Precooling & Storage
Processing
Transport
Display / impuls



ACCES TO ACTUAL & HISTORICAL SENSORDATA

VISUALISATION & OTHER SERVICES

CERTIFICATES & VALIDATION

BACK-UP & POWERFAILURE

Maintenance

Any mechanical installation needs MAINTENANCE

- PREVENTIVE MAINTENANCE (regularly maintenance)
- CORRECTIVE MAINTENANCE (repairing breakdowns)
- PREDICTIVE MAINTENANCE (replace before expected product life)

- (DEEP) CLEANING OF COMPONENTS

- REGULAR HEALTH CHECKS

- ANNUAL VALIDATION / CALIBRATION OF SENSORS

- Lower Running costs, more reliable, less operational/business risks, validity of certificates (Audits)

REMEMBER TO KEEP CONTROLLING

OUR COLD CHAIN





**THANK YOU FOR
YOUR ATTENTION**

**DO YOU HAVE ANY
QUESTIONS?**

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