IFC-UK Sustainable Cooling Innovation Summit

OCTOBER 3-5, 2023 // Birmingham UK

TECH EMERGE COOLING

AN INNOVATION OF IFC International Finance Corporation WORLD BANK GROUP

UKaid from the British people

UNIVERSITY OF BIRMINGHAM

Day 1: IFC TechEmerge Sustainable Cooling Pilot Experience and Lessons

Agenda

9:00-9:30am	Welcome Remarks
9:30-10:15am	Large-Scale Commercial Cooling: Lessons from the Hospitality Sector
10:15-10:30am	Break
10:30-11:15am	Space Cooling: Residential and Small-Scale Commercial Operations
11:15-11:30am	Break
11:30-12:15pm	Storage and Off-Grid Solutions
12:15-1:30pm	Lunch
1:30-2:15pm	Advances in Long to Medium-Haul TCL
2:15-2:30pm	Break
2:30-3:15pm	Short-Haul and Last-Mile Innovations
3:15-3:45pm	Wrap-up and Takeaways from Day 1
4:00-5:00pm	Campus Tour
6:00-8:00pm	Dinner

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Welcome Remarks

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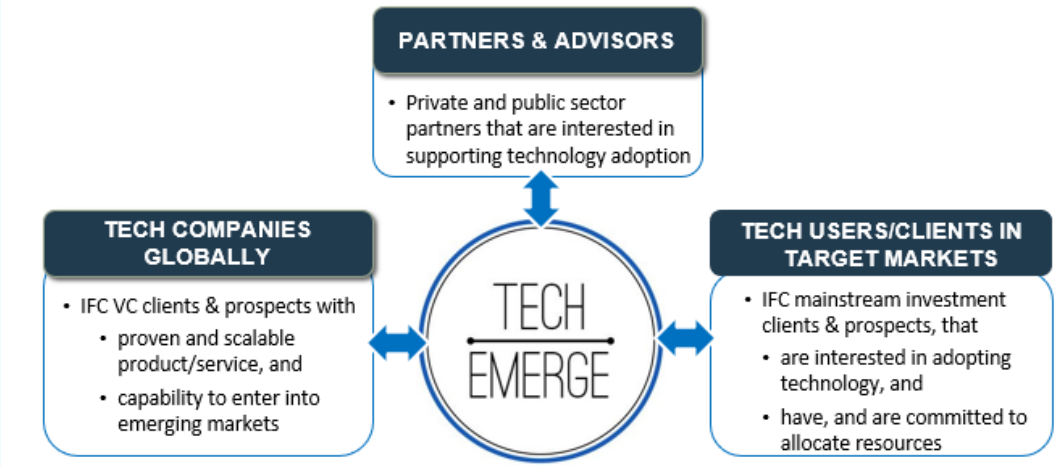
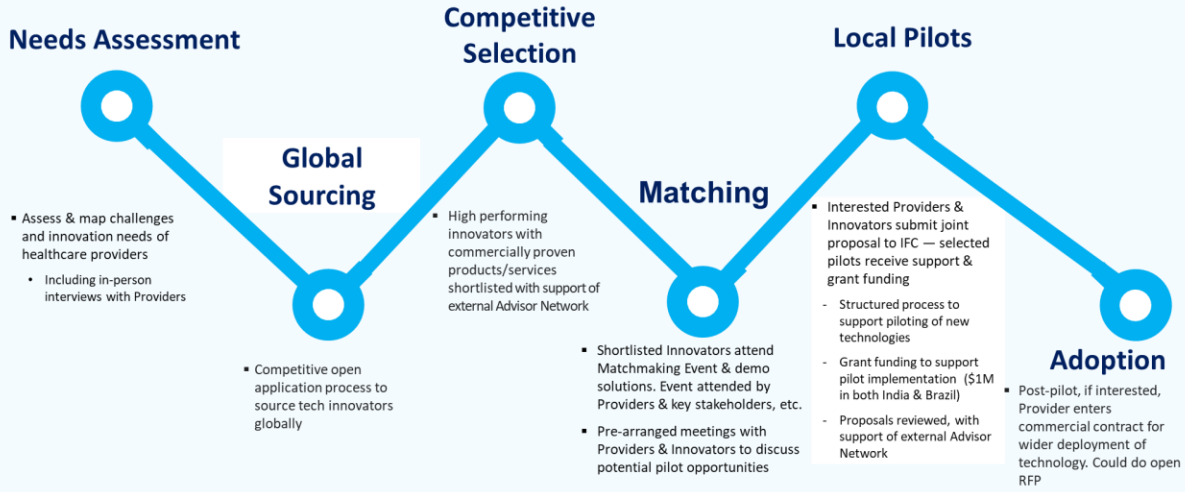
TechEmerge – Accelerating adoption of technologies in emerging markets

TechEmerge brings together a wide range of stakeholders interested in adoption of innovative technologies in a specific sector, and…



…facilitates and supports their collaboration through a curated process for accelerating the adoption of new technologies



Financial Support | **Technical Support**

- **Needs driven:** Technologies are screened and selected based on existing and future challenges and needs of the future users (corporates)
- **Fair and impartial: The** technologies are pre-screened and evaluated by a wide network of experts to minimize bias and conflict of interest

- **Confidence and risk mitigation:** Curation and the follow-through support enables both the innovators and the adopters to increase confidence and minimize risks
- **Leadership and support:** IFCs involvement as a convener, curator, matchmaker, financier and advisor delivers results and increases potential for business

Health

Sustainable Cooling Innovation

Disaster Resilience

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4 years of experience > 5 regional project

Cooling Cities Mexico & Colombia

22 pilots / 18 co's / 14 tech

Climate-smart solutions in retail, pharma, agriculture, education, logistics, and space cooling

Hospitality, India

12 pilots / 2 co's / 9 tech

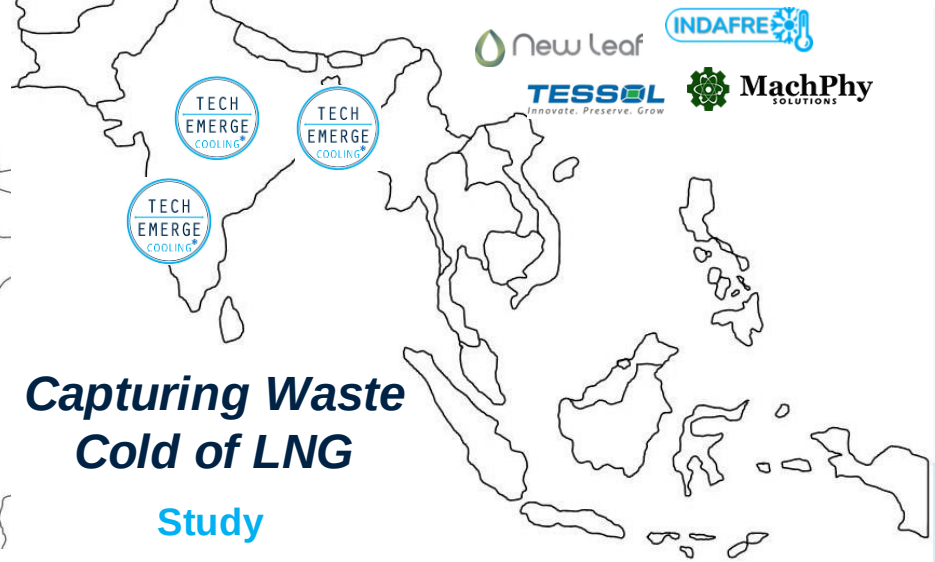
Climate smart cooling solutions for hotels

Greffisol
DRI
IOTomation
PAHARPUR
ELGRESSY
zenatix
ate

Retail Cold Chains South Asia

8 pilots / 3 co's / 5 tech

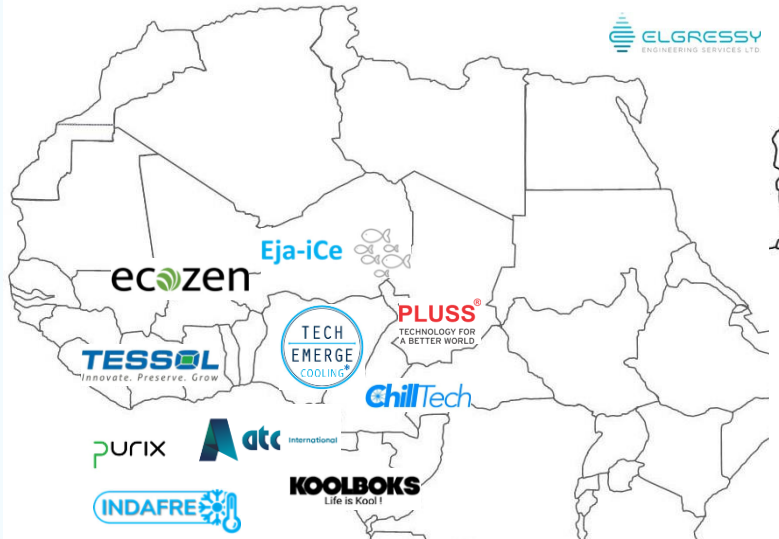
Improve transport, storage, control, and monitoring of perishable products



Temp Controlled Logistics Nigeria

21 pilots / 15+ co's / 18 tech

Improve transport, storage, control, and monitoring of perishable products and pharmaceuticals



Capturing Waste Cold of LNG

Study

Feasibility of capturing the waste cold energy of LNG receiving terminals

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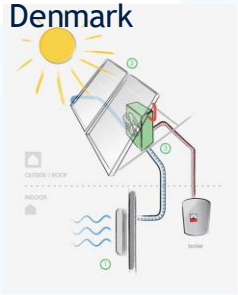
COLD CHAINS

Purix Denmark



Storage

- Solar Thermal + Storage
- Scalable 2.5 – 160kW
- 2-3 days autonomy @ 10ºC - 15ºC
- 100% off-grid

ChillTech United Kingdom

- Waste heat absorption
- Scalable 18 – 300kW
- 5ºC - 15ºC
- 40% – 50% cost reduction

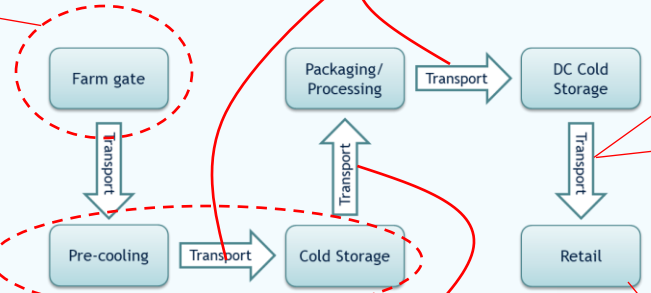
GreenCHILL™ India

- Biomass powered refrigeration unit
- Scalable up to 20MT storage
- 0ºC - 15ºC
- 90% electricity consumption reduction demonstrated

TESSOL Viable. Reliable. Sustainable

Medium Haul

- Eutectic/PCM
- 5 & 10 MT truck
- -18ºC - -5ºC
- 12 – 16 hours transit time without need for energy



atc International Turkey

Long Haul

- Solar/Eutectic Hybrid
- 50 ft Reefer Trailer
- -18ºC - -5ºC
- 70+ hours transit time without need for energy
- Test underway for frozen products in Nigeria

TESSOL Viable. Reliable. Sustainable India

INDAFRE Colombia

Eja-iCe Nigeria

BIOFRESHTECH INNOVATION & SOLUTION Spain

First/Last Mile

- PCM (passive/active)
- 10 – 1.000 Liters
- -18ºC - +5ºC
- 12 – 70 hours transit time without need for energy

Last Mile

- Solar PV + Battery
- 500 Kg
- -18ºC - +5ºC
- 6 – 12 hours transit time without need for energy
- Tests in Nigeria, India, Bangladesh, Mexico, Colombia

Retail

- PCM (active)
- 100 – 200 Liters
- -18ºC - +5ºC
- Solar PV and/or Grid Hybrid
- 12 – 70 hours autonomy

Spain

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SPACE COOLING

Cooling (Towers)

PAHARPUR India

evapco USA

OT Services S.A.S

Greffisol Green Efficient Solutions

PURIX Denmark

- Low approach (< 2°C) cooling towers
- **Alternative cooling**
- Initial test runs prove,
  - 20% - 70% energy savings
  - **15% - 35% GHG Avoidance**

IoT / AI

India

IOTomation

zenatix A Hero Electronix Venture India

- Advanced BMS system with 40+ nodes being monitored / controlled
- Initial test runs prove,
  - **10% - 20% energy savings**
  - **>15% GHG Avoidance**

25,000 Stores

OXXO

300 Hotels

30,000 Rooms

IHCL TAJ

CHALET HOTELS

2,800 Rooms

9 Hotels

Air Handling & (IAQ)

ate

DRI Innovative Air Solutions India

- Air Purification System with heat exchanger
- Initial test runs prove,
  - ~5% energy savings
  - **~90% reduction of PM2.5**
  - ~50% **reduction of PM10**

Cooling Water Treatment

ELGRESSY ENGINEERING SERVICES LTD Israel

CET ENVIRO COOLING EFFICIENCY TECHNOLOGIES India

- Chemical free water treatment
- Test runs prove,
  - 5% - 15% energy savings
  - **2x – 3x recycle of water (CoC)**
  - Elimination of chemicals
  - Discharge water reused for alternate purpose (irrigation)

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RESULTS so far globally….

30+ *Tech Companies*

40+ *Adopting Companies*

45+ *Technologies*

60+ *Pilots / Field Tests*

$8+ million *Financial & Tech Support*

15% - 80% energy/cost savings
Achievable w. new technology

2+ million tons GHG
Unearthed potential avoidance

$65+ million
Financing raised by innovators

$2+ million
commercial contracts under negotiation

30+ business relations
formed between participants

$100 million District Cooling
investment platform in India (Tabreed:$75m + IFC: $25m)

40+ tech progressing in TRL
One patent filed

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Challenges still remain!

- Access to reliable and sustainable energy supply
- Need a paradigm shift: Energy is More Than Electricity

- Cooling Tech vs. "Cooling Systems"
- Requires good engineering
- "mission critical" environments not conducive for testing

- Skills is a big barrier for scaling adoption
- Skills gap persist at all levels (engineering, technician, users)

➢ **Needs and gaps is much higher than other climate change technologies**

Innovation and R&D	Commercialization	Scale-Up
➢Innovation is scarce -> Need more entrepreneurs	➢Testing ➢Refine	➢Growth Finance
➢R&D in Cooling Technologies ➢ Processes ➢ Materials	➢Integration "valley of death"	➢Cooling-as-a-Service (CaaS) ➢Long Term Financing ➢Blended/Concessional Finance ➢Transition public subsidy

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1. Engage - Talk
2. Share - Learn
3. Collaborate to innovate !!

THANK YOU
for joining us in making
COOLING SUSTAINABLE !

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Session 1.1

Large-Scale Commercial Cooling: Lessons from the Hospitality Sector

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Session 1.2

Space Cooling: Residential and Small-Scale Commercial Operations

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Channelizing the Power of Technology

Pilot: Technology transfer and co-design of HMX's DAMA integrated with TECAM's Air-Handling Unit (AHU).

The core technology of the HMX's innovative solution is based on the next-generation ***Dry Air and Moist Air* (or DAMA™)** heat exchanger, which is a cross-flow plate-type polymeric exchanger. Pre-cooling of warm (ambient) air takes place in two steps: **Indirect evaporative cooling (IEC)** in the DAMA followed by **Direct Evaporative Cooling (DEC).**

The HMX-DAMA integrated hybrid air handling unit (AHU) at the TECAM pilot site in Cali, Columbia.

TECAM is a Colombian manufacturer of air conditioners and refrigeration systems and has a presence in over 10 countries across the Central and South America.

- Efficiency of AHU improved up to **38%** depending on climatic conditions
- Great potential for application in dry climatic conditions across Andean region
- Can even completely replace refrigerants
- Cooling applications in commercial and industrial settings

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Cooling & Air-Conditioning: Powered by Nature

Off-grid (solar based)
absorption cooling systems

Pilot: installation of the Purix solar based system at convenience shop

Modular 2.5 kW capacity, multi split Purix solar cooling system.

Installation at convenience store of 120 m2 in size:

1. Installation (retrofit) 15 kW Purix solar thermal absorption cooling system (six modules, ea. 2.5 kW)
2. Integration of a patented 60 kWh PCM based thermal energy storage system (Direct-Contact technology)

- Reduction of energy consumption by cooling system by **70%**
- Phasing out the R410 = > **46%** reduction in GHG (8.1 tones CO2e per annum)

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Network & Partners in Mexico

PURIX sustainable cooling & thermal energy storage systems

epsol	Engineering	Commercial	DELTA VAPOR Y CALENTADOR
Genertronics	Engineering & turn-key	Commercial	INGUSA grupo
MóduloSolar mr	Commercial	Supplier	Rotoplas más y mejor agua
MÉXICO SOLAR Energía para la vida	Commercial	Supplier	DAIKIN
GRUPO CIRCA	Commercial		
CASOLAR	Commercial		

purix

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System Combination of Solar Based Air-Conditioning

Pilot: installation of the system in 3 CUCS buildings (COVID and Pathology Labs and Language Center Classroom)

OT Services S.A.S
Energía y vida

Innovation: **system combination** of solar based air-conditioning with DC compressor, use of lower GWP R32 refrigerant and bi-polar air ionization system.

UNIVERSIDAD DE GUADALAJARA

CUCS

71 schools and 156,324 students : HVAC represents **> 80%** of the energy consumption.

- Reduction of energy consumption in HVAC by **58-83%**
- Better air conditions for students
- Improved air quality control for lab
- High replicability potential in rural schools with hot weathers and good sun irradiation

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Session 2.1

Storage and Off-Grid Solutions

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A Biomass Powered Refrigeration Unit

Pilot: Cold Store with adsorption cooling by biomass

New leaf

GreenCHILL™stand-alone biomass-based refrigeration for short or long-term storage, aggregation or ripening of F&V and flowers. The absorption technology combined with a biomass gasifier to provide hot water to drive the adsorption cycle with R717 refrigerant. This is a natural refrigerant with zero ODP and zero GWP and can maintain a temperature range between 0°C – +25°C

Installation of a GreenCHILL™ units of 14KW cooling system

bigbasket

Bigbasket is one of India's largest online food and grocery store and is owned by Tata Group. The company operates in more than 30 cities in India and processes around 15 million orders per month

- Reduction of energy consumption by cooling system by **90%**
- No CFC gas = > Reduction in GHG (160 tones CO2e per annum)

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Harnessing the Power of Sun to Cool

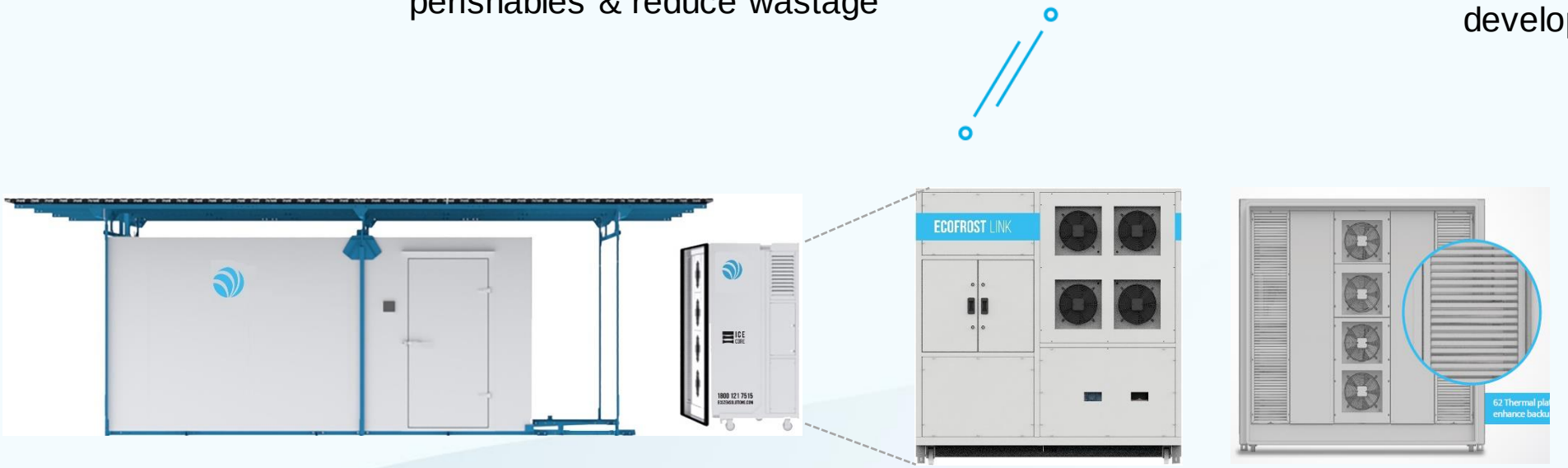
Pilot: Mobile cold store and precooler powered by solar with thermal energy storage system

ecozen

Ecofrost Solar powered cold room solution with IoT helping farmers to extend life of perishables & reduce wastage

Agvest

Agvest is an agri-financing company providing support to the farming sector specially for infrastructure development



Ecofrost 5 MT Cold Store and Precooler

Trailer mounted Ecofrost 5 MT Cold Store, Precooler, and solar panels in the farm at the Agvest pilot site

- Improvement in freshness of crops and extension of shelf life by 7 days
- **Zero** energy consumption

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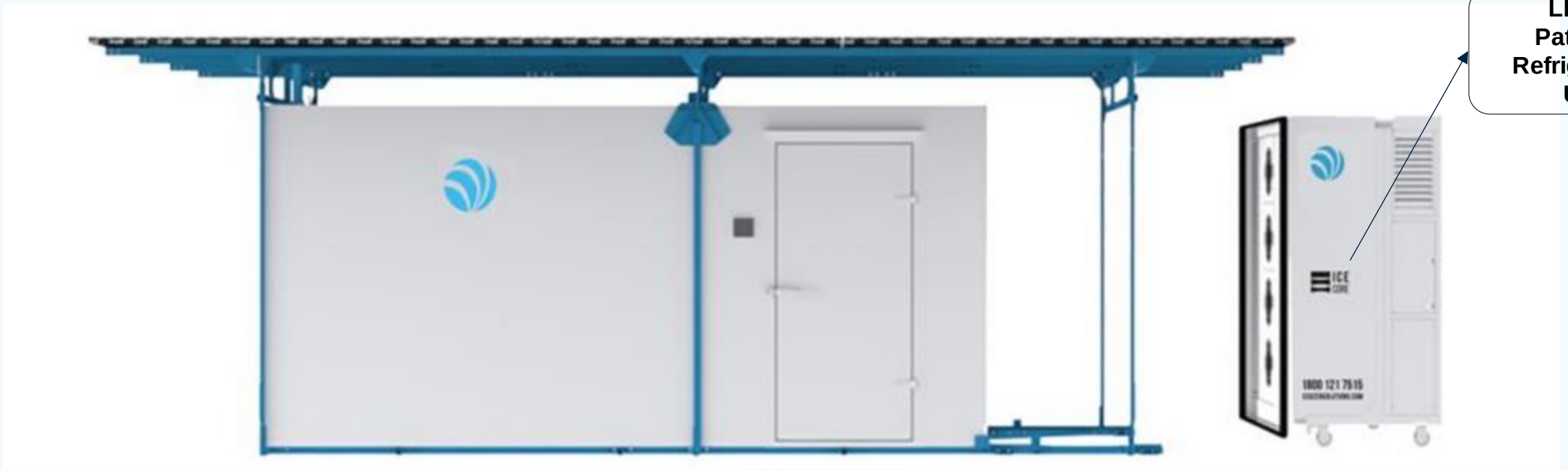
ecofrost

Smart IoT enabled solar cold room ensures **reduction in food waste**, **increase in shelf life**, **market reach expansion** and **higher earnings**.



SOLAR POWERED WITH HYBRID OPTION

TEMPERATURE CONTROL -10°C ~ 15°C

HUMIDITY CONTROL 65% ~ 95%

UP TO 30HRS BATTERYLESS BACKUP

CAPACITY RANGING FROM 2MT TO 10MT

TRULY PORTABLE COLD ROOM

REMOTE SENSING & CONTROL

PREDICTIVE ANALYTICS & DIAGNOSTICS

Success Story (IFC Unit – Ogun, Nigeria)

With ecofrost Solar Cold Room, Farmer's produce was kept fresh and able to fetch better price

Packing

- Commodity is packed in plastic crates and bags

Storage

- Farmers have stored tomatoes and cucumbers so far inside the unit

Market

- Market has well accepted the commodity from the cold storage.
- Farmers have sold commodity in Mile 12 market

Value Proposition

Storage of commodity inside the cold storage when glut situation observed at Market

Value Proposition

Storage of commodity inside the cold storage when road conditions are not good because of continuous rain

Irawo Farming Community in Ijebu-Ode axis of **Ogun State** is getting benefits of Solar based Cold Room solution.

Affordable Farmgate Cold Store

Pilot: Extension of shelf life of yam in low-cost cold store

KSR & a local construction company **Penuel** designed a low-cost and readily deployable storage facility for cold storage of perishable produce. The facility has been built using adobe bricks, known for being durable, fireproof, and having high thermal mass.

1. 150 Sqm Adobe building
2. Temperature range +13 to +17 deg C
3. Crated Storage
4. Power backup

Cold store in an Adobe building

TAK Logistics Ltd is part of TAK Group, a value chain service provider (including manufacturing, commodity trading, logistics, storage etc.) in the agro-industry in Nigeria

- Extension of shelf life of Yam by 4 months
- Wastage saving of **42%** as compared to control barn representing 19MtCO2 savings
- More testing underway

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Cooling Powered by Waste Heat

Pilot: Cold store with absorption cooling by waste heat of generator with LPG standby

ZERO2COOL By ChillTech

An **Air-cooled Absorption Chiller**, powered by waste heat from the exhaust of a generator, microturbine, or biomass burner, delivering free cooling, heating and water-making

Multi chamber store of 120 m^2:

1. Installation of a 17.6kW ZERO2COOL absorption cooling system
2. Chilled water "entropic storage®" for power optimization
3. Storage suitable for cooling as well as fresh air circulation/air handling

ZEERO2COOL schematic diagram

TAK LOGISTICS

TAK Logistics Ltd is part of TAK Group, a value chain service provider (including manufacturing, commodity trading, logistics, storage etc.) in the agro-industry in Nigeria

- Reduction of energy consumption by cooling system by **95%**
- Zero GWP/ODP refrigerant = No CFC gas/forever chemicals = > Reduction in GHG

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Session 2.2

Advances in Long to Medium-Haul TCL

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Cooling Longer with Combined Sustainable Technologies

Pilot: Long-Haul solar powered trailer with PCM based thermal storage system

The refrigeration technology is based on PCM technology, charged at a loading station (the thermal batteries can operate approx. 20-24 hrs. on a full charge). A primary power backup system (for charging the thermal batteries once depleted): Li-Ion batteries, initially charged from the grid at the loading station. A secondary power backup system (for charging the Li-ion batteries once depleted): a PV system, installed on the top of the container.

The ATC hybrid technology truck at the pilot site.

With 250 vehicles in its fleet, **TAK Logistics** is continuously expanding its distribution network and its services in the cold transportation and storage sector.

- **33%** Reduction of energy/fuel consumption
- Long journeys of 1000 km without cold chain interruption

One of the leading dairy companies in Nigeria, testing the ATC technology for ice cream products transportation.

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Cooling More Sustainably with Phase Change Material

Pilot: A Phase Change Material Based Refrigeration for Short and Medium-Haul Cold Transportation & Cold Storage

PLUSS® TECHNOLOGY FOR A BETTER WORLD

Refrigeration based on PCM technology charged at a loading station. The thermal batteries can operate approx. 20-24 hrs. on a full charge without any support of fossil fuel or electricity

L&Z

L&Z Integrated Farms Ltd. is a dairy company that sets up dairy farms and milk processing facilities along with distribution of dairy products across Nigeria

KCCL

Kennie-O-Logistics is a logistics company focused on storage and transportation of perishable commodities

Amo Farm Sieberer Hatchery

Amo Farm Sieberer Hatchery Ltd. is part of Amo Group and produces high-quality day-old chicks and point of cage pullets & processed poultry products

aliar S.A.

Aliar is a Colombian agri-industrial company that produces pork and beef, from early stages to processing and retail under the **La Fazenda** brand

PCM plates mounted on a transportation truck for medium haul

- Integrity of cold chain for the full transportation duration of 12-24 hrs
- **100%** Reduced fuel consumption on cooling system in route
- Full autonomous operation of cold store on solar power, maintains the freshness of F&V
- Reduced dependence on diesel generator by 100% in cold store

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Sustainable Cooling in refrigerated Container Transportation

Pilot: A Phase Change Material Based Refrigeration for Short and Medium-Haul Cold Transportation

The solutions from **TESSOL** were installed on three 14-foot refrigerated delivery trucks. The trucks were operated in Delhi, Mumbai, and Kolkata to test performance across divergent weather conditions.

TESSOL PlugNChill Solution

Snowman Logistics Limited, India's leading integrated temperature-controlled logistics service provider, specializes in providing warehousing, distribution, and other value-added services

- Eutectic (PCM) vehicles used for deliveries to be made within 12 to 14 hours with multiple drops or 20-24 hours for single drop
- These vehicles are suitable for temperatures as low as -25C for ice cream to temperatures as high as 16C to 25C for chocolates

- Energy savings and corresponding operational expense savings of up to **70%**
- Increased efficiency with longer delivery runs optimizing the use of PCM stored energy

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Session 2.3

Short-Haul and Last-Mile Innovations

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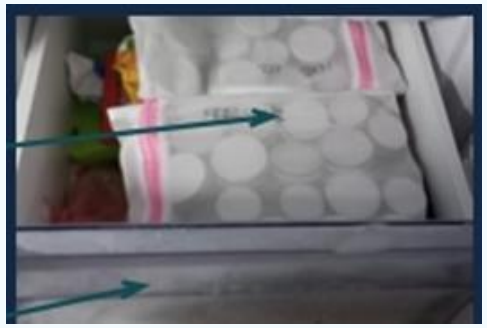
Air-conditioning Powered by Nature

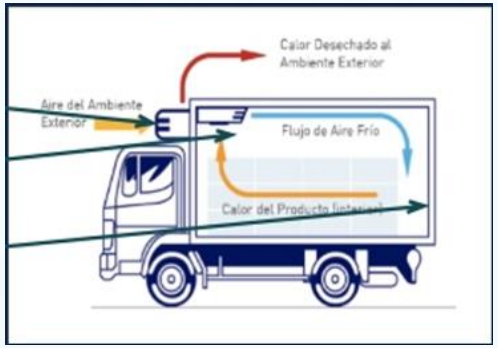
Pilot: Testing PCM at three types of application (last mile TCL, restaurant, outlet)

Proprietary PCM material (liquid form) for different solutions

Starr has used the PCM to provide autonomy to the freezers in retail outlets and restaurants.

Starr has also used it for temperature-controlled intercity logistics for pharma products





Pharma fridge (above) and self-contained cooler

Restaurants and retail outlets:

- **48 hours** of autonomous freezing for the restaurant/outlet requirements (with only 3-4 hours of charging)
- **30%** of energy cost reduction

Last Mile:

- **70 hours** of autonomous work maintaining range of 2 to 8ºC

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Solar Power on the Go for Cooling

Pilot: Solar powered refrigeration for tricycle for last mile delivery of various temperature-controlled products

Eja-iCe

Cold chain solution based on solar powered refrigeration for last mile delivery

L&Z

Fan Milk

FOODCONCEPTS

L&Z for delivery of yoghurt in Kano

Fan Milk for delivery of ice cream to its retail vendors

Food Concepts for delivery of frozen pie to its Pie-Express outlets

Tricycle mounted with refrigerated container with solar panels, Li-ion battery & pay load of 400 kgs

- **100%** Reduction of energy/fuel consumption for cooling system
- Reduction of food waste and improved access in rural areas

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Passive Cooling with Phase Change Materials

Pilot: Use of PCM based thermal batteries for short and last mile temperature-controlled logistics

TESSOL
Viable. Reliable. Sustainable

Phase Change Material based **Thermal Battery technology** uses modular components similar to **rechargeable batteries** to store and release energy in a controlled manner

TESSOL boxes with PCM cartridges being loaded for last mile distribution

L&Z

Cam

L&Z used PCM based truck for delivery of yoghurt from Kano to other cities in radius of 500-600km

Cam Dairy is delivering small quantities of milk and yoghurt from Abuja to Lagos in 24-28 hours and also for local last mile delivery in Abuja

Short Distance & Last mile:

- **24 hours** of temperature-controlled delivery without consumption of fuel
- **45%** cost reduction

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Day 2: Market Trends and Enabling Environment

Agenda

9:30-10:00am	Keynote Address
10:00-11:00am	Emerging Sustainable Cooling Innovations
11:00-11:15am	Break
11:15-12:00pm	Cooling as a Service (CaaS) /Localization
12:00-1:00pm	Lunch
1:00-1:45pm	Private Sector Financing for Cooling Innovation
1:45-2:00pm	Break
2:00-2:45pm	Public Sector Financing for Sustainable Cooling
2:45-3:00pm	Break
3:00-3:45pm	Enabling Environment and Support Structures
3:45-4:00pm	Break
4:00-5:00pm	How Businesses Benefit from Gender Equality in the Cooling Sector & Building a Skilled Workforce
5:00-5:30pm	Takeaways from Day 2
6:30-8:30pm	Dinner

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Session 3.1

Emerging Sustainable Cooling Innovations

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Session 4.1

Cooling as a Service (CaaS) /Localization

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Electrochemical Water Treatment System

E.S.T - Elgressy Scale Treatment

Chemical-free solution to cooling tower treatment

ELGRESSY ENGINEERING SERVICES LTD.

- **15% reduction** ~8,836 m3 in **makeup water**
- **100% reduction** ~9,000 m3 less softening water
- **100% eliminating chemicals** use

- **6% energy saving ~ 156 tCO2**
- **$110,000 cost savings**

Tecnológico de Monterrey

GRACO

- **100% chemicals** ~ 8,000 liters **use eliminated**
- **100% salt** ~61 tons **use eliminated**

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Solar Power on the Go for Cooling

Pilot: Solar powered refrigeration for tricycle for last mile delivery of various temperature-controlled products

Eja-iCe

FOODCONCEPTS

FAN FanMilk

L&Z

Tricycle mounted with refrigerated container with solar panels, Li-ion battery & pay load of 400 kgs

- L&Z for delivery of yoghurt in Kano
- Fan Milk for delivery of ice cream to its retail vendors
- Food Concepts for delivery of frozen pie to its Pie-Express outlets

- Buy my product?

- CaaS ?

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Tabreed:
One of the world's largest public listed cooling utility

Footprint & Impact

89 plants
In 5 countries

1.35 million RT of delivered cooling capacity

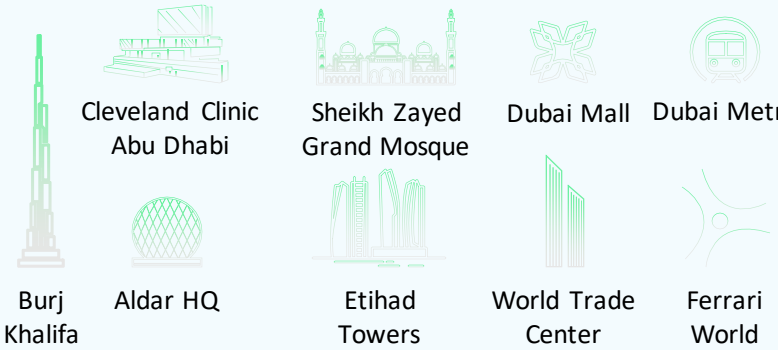
450 MN+
Sft of area served

1.0 GW
Power infrastructure avoided

2.3 billion kWh
energy consumption saved in 2022 compared to alternatives

1.4 mn tons
Elimination of CO2 emissions in 2022 vs alternative approaches

Cooling Services provider to several iconic buildings



Project design and delivery	• Technology and OEM agnostic • Strong R&D and Innovation Focus • Life-cycle cost view
Financing & Capital Structure	• **$4 BN** Consolidated Asset Base • Investment Grade (Fitch-BBB) • Green Bonds Financing Framework • Capital recovery through tariffs over 25-30 years
Operations track record	• SLA/KPI based service delivery • Automation, Unmanned, Central teams • 25 years, oldest plant in operation • 99.8% cumulative average reliability
Centralized Maintenance	• In-house with minimal OEM reliance • Reliability Centered Processes

Primary Shareholders

MUBADALA

Government of Abu Dhabi's investment fund

ENGIE

Largest independent power producer (c. 100 GW) and leader in low-carbon services.

Asia Presence through IFC Partnership

tabreed 75% — IFC 25%

Tabreed Asia Central Cooling Company, Singapore

tabreed India

Cooling Innovation Lab

TECH EMERGE — AN INNOVATION OF IFC International Finance Corporation WORLD BANK GROUP

- Market Enabler
- Adopter
- Innovator

Session 5.1

Private Sector Financing for Cooling Innovation

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Session 5.2

Public Sector Financing for Sustainable Cooling

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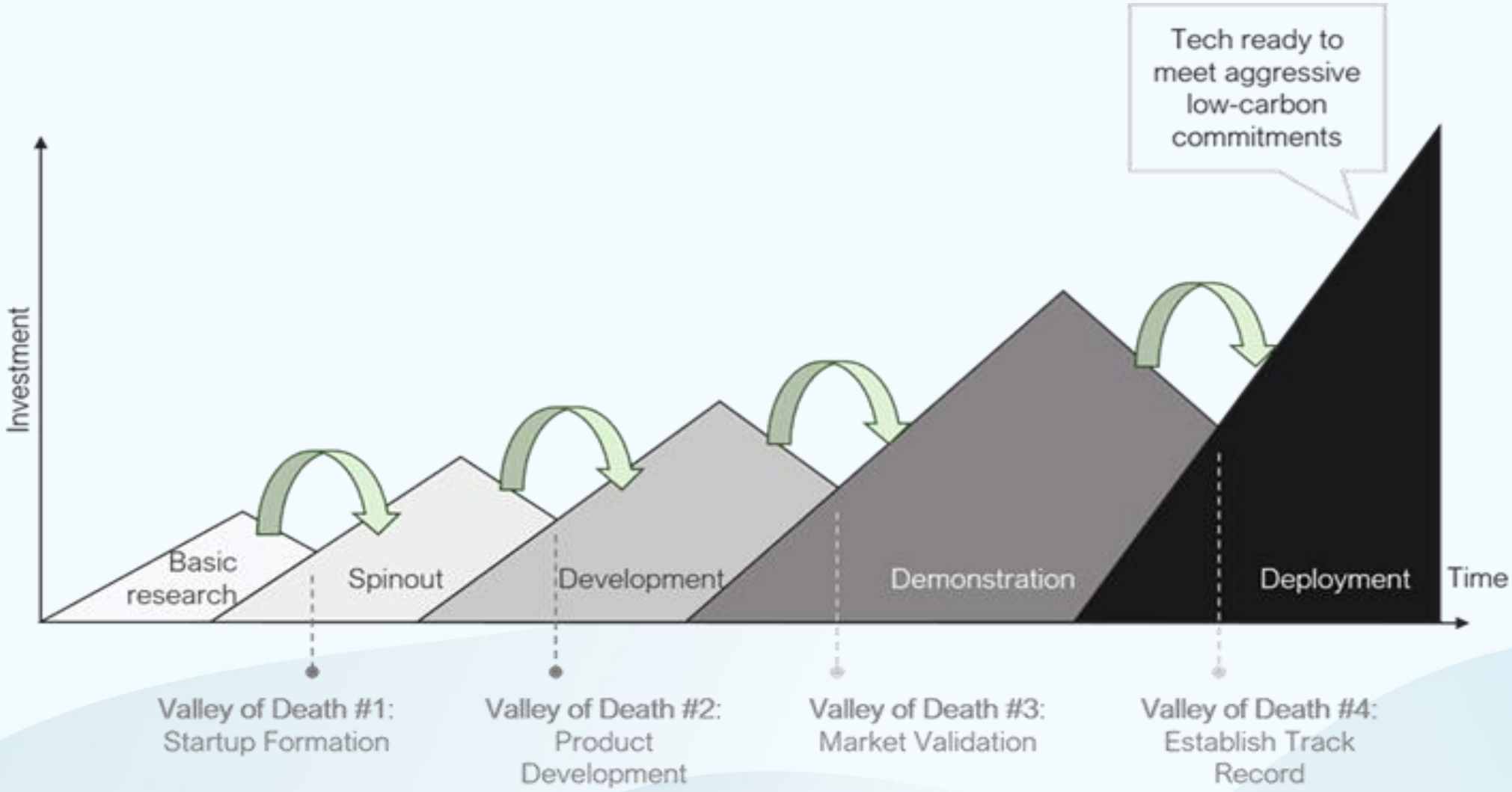

(Source: Third Derivative)

Session 6.1

Enabling Environment and Support Structures

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Holistic approach to cold chain development

PLANNING
Planning Ag-Energy-Cooling integration in development plans to create favourable environment

POLICY AND REGULATION
Government support for cold-chain, catalysing & championing incentives; standards, funds, etc

PUBLIC AWARENESS
Benefits of produce cooling, good practice & user guidelines for all stakeholders

DATA ANALYTICS
For productivity, demand & value chain assessments, investment prioritisation, stakeholder mapping

Holistic & integrated approaches needed to overcome fragmented activities & build Affordable, Effective & Sustainable Cold Chains

TECHNOLOGY & INNOVATION
Cutting edge technology proven fit for purpose, utilizing digitalization of finance / remote monitoring & produce/payment tracking

ACCESS TO APPLIANCES
Ensuring availability & affordability of quality appliances / equipment

PARTNERSHIPS
Stakeholder engagement within and beyond Agriculture - Cooling -Energy sector actors

ACCESS TO FINANCE
Financing for famers & MSME/ SME energy & cooling as a service providers

CAPACITY BUILDING
Technical up-skilling & operations support for energy & cooling as a service providers plus farmers

MARKET LINKAGES
Support farmers, Energy & Cooling providers in accessing markets and stakeholders

WAGENINGEN UNIVERSITY & RESEARCH

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GIZ Proklima - Making cooling a hot topic since 1995

- Implement technical projects for ozone protection under the Montreal Protocol and Kigali Amendment, promoting natural refrigerants and energy-efficient appliances in the RAC sector. Work on behalf of German Ministries BMZ, BMWK, BMUV and other donors, e.g., EU, AFD, NAMA, etc.
- **Proklima provide support in the areas of:**

Policy advice

technology transfer

capacity building

- **Activities in all areas are required** to establish an enabling environment for green cooling innovations, thereby accelerating the transition towards a sustainable cooling sector. Examples include;
  - National Regulation for license & quota systems for import, venting ban, public procurement regulation, obligation for operators to provide for recovery and recycling, MRV of frequency of system checks e.g., through a central operators' registry,
  - Pilot and incentivize technology transfer towards sustainable alternatives, for example through tax-reductions or grants, enforcing suitable containers (not single use) for transporting the substances
  - Standard or domestic certificate requirement to qualify technicians, include natural refrigerants in curriculum to facilitate transition, incentive scheme for technicians to return used and collected refrigerants to reclamation facilities /collection utilities

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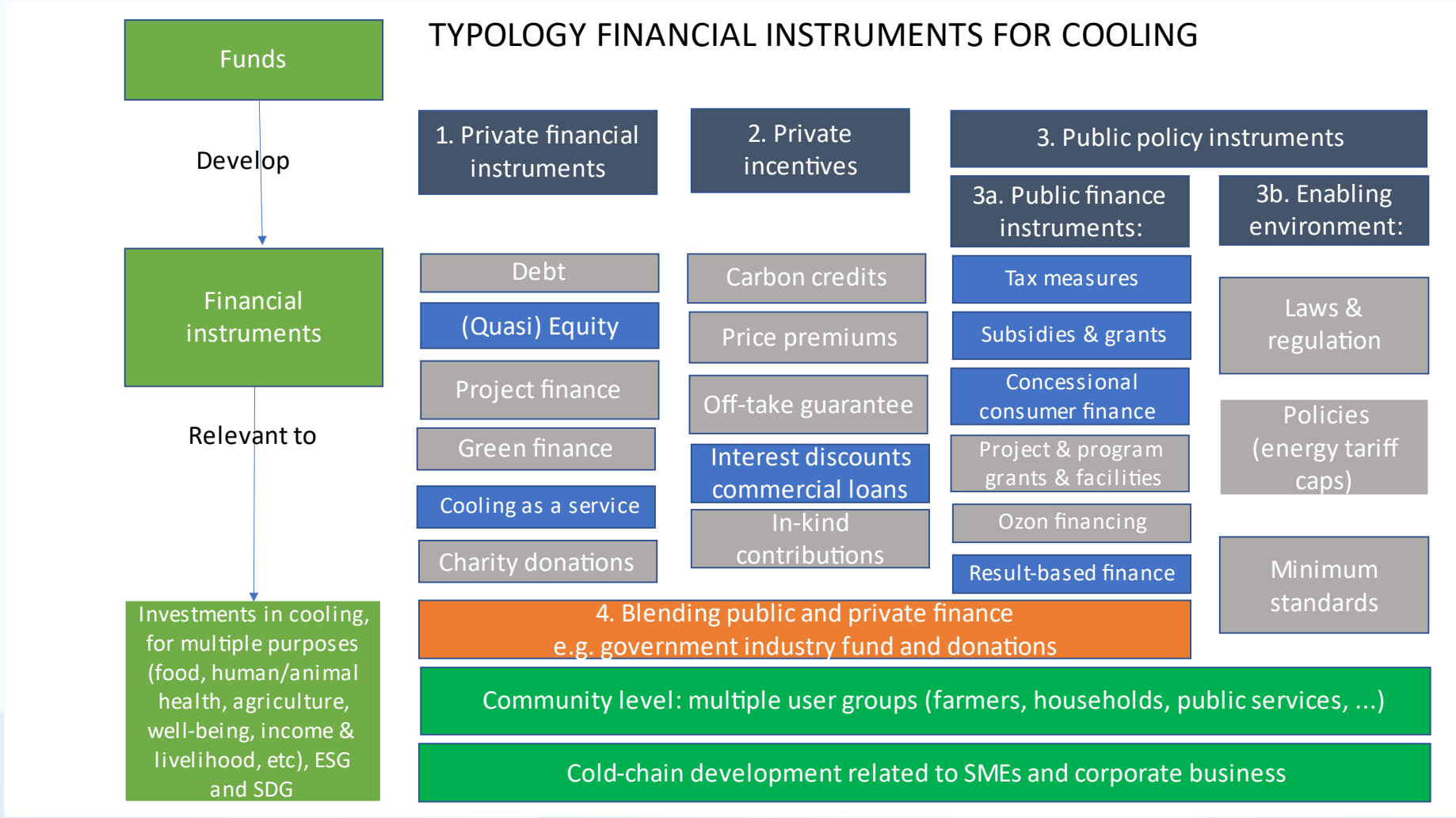
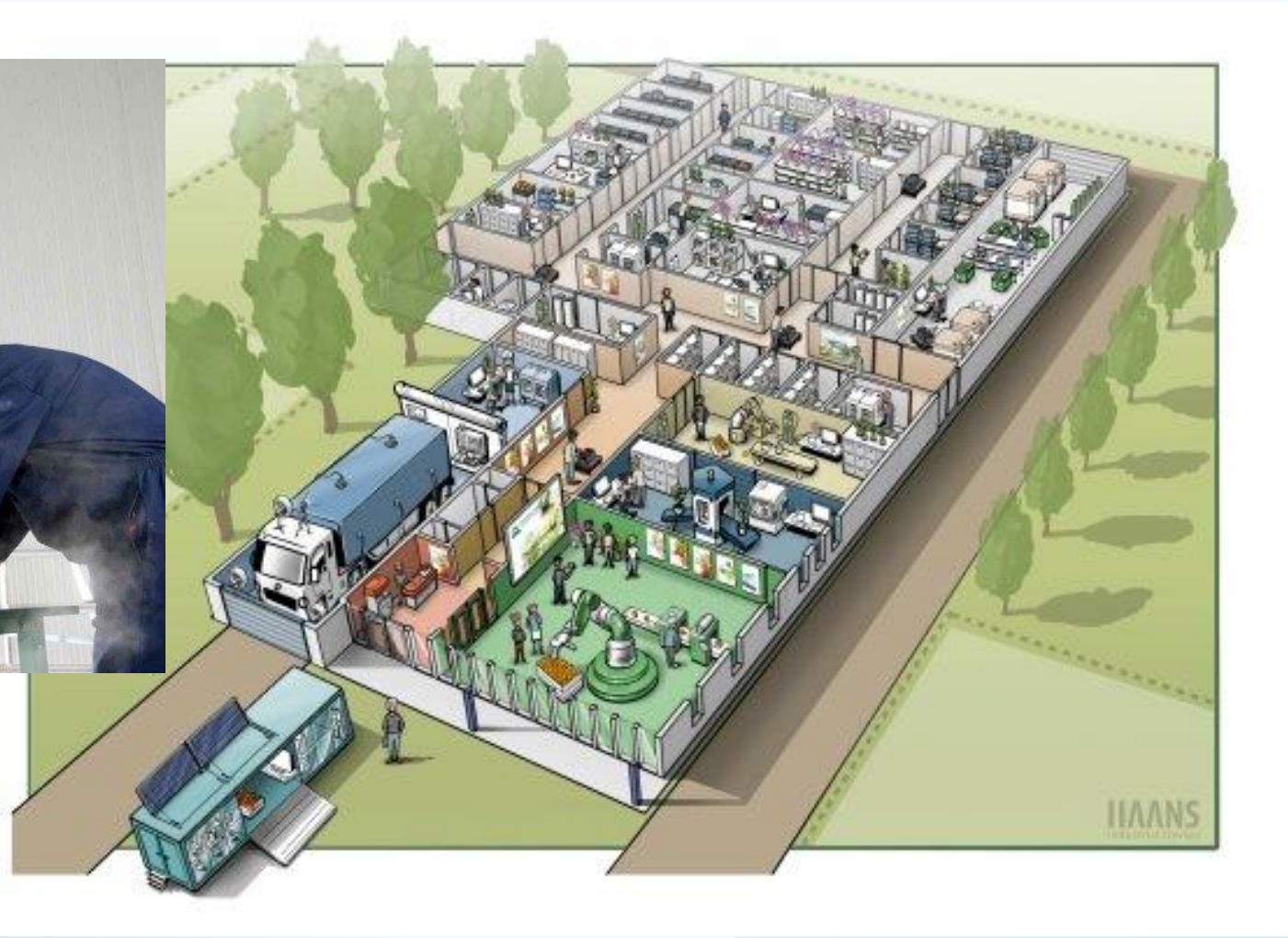
Financing Mechanism for Cold Chains



Cold Chain R&D Facilities



- 20 cold & CA rooms
- 2 environmental test chambers
- Robotics & IOT testing

Virtual tour: https://www.youtube.com/watch?v=e3B51uGDyrc

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Session 7.1

How Businesses Benefit from Gender Equality in the Cooling Sector & Building a Skilled Workforce

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Access to Cooling: big challenge and opportunity

- **3.2 billion** people are at risk due to no access or inefficient cooling in 54 high-impact countries (SEforALL's Chilling Prospects: Tracking Sustainable Cooling for All 2022)
  - over **1 billion** people are at high risk from a lack of access to cooling including **1.17** billion in poor rural and urban areas
  - **2.2 billion** are at risk due to inefficient cooling
  - **Critical 9** countries (Bangladesh, Brazil, China, India, Indonesia, Mozambique, Nigeria, Pakistan, Sudan): 772.2 million people at high risk due to a lack of access to cooling

- More women than men are impacted : in 2022 more than **719 million** poor rural and urban **women** and **448 million men** in the same category were at high risk due to lack of access to cooling and increasing heat waves.

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Câmpions of Real Dairy

- All our milk comes from pastoralist suppliers. When we talk about pastoralists, we mean anyone who cares for livestock. In Nigeria, **95%** of our **20.7 million cows** are owned by the Fulani ethnic group, who believe that **"the man owns the cow and the woman owns the milk."** Many of these households live in extreme poverty on less than $1.90 a day and **do not have access to electricity**.

- Business model unites: Pastoralists – Câm Rangers – Milk Aggregation Centers – Dairy production – Training – Customer Deliveries

- Reaches **195 women** (17 employed at Câm and 178 pastoralists)

- With TechEmerge tested TESSOL and INDAFRE solutions together with L&G

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Your Virtual Cold Chain Assistant

BASE
Driving investment in climate solutions

Empa
Materials Science and Technology

Ease smallholder farmers access to cold storage through:

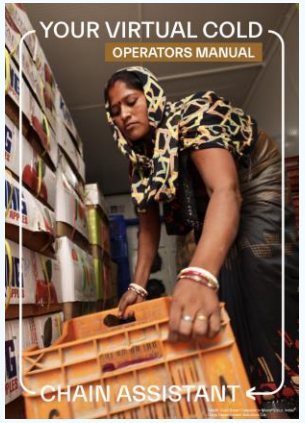
Cooling-as-a-Service

Digitalisation: Coldtivate app

Capacity building

Promote a more gender-inclusive approach:

- Your VCCA gender strategy
- Gender-sensitive design
  - Mobile app
  - Operators' manual
  - Comic strip
- Inclusive training sessions



yourvcca.org

Collaborating with local technology providers in India, Nigeria, the Philippines

Koel Fresh · OORJA · Cold Hubs · LEAP ENERGY · FreshDepot

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Diversity and Skills

- Strong evidence suggest that diversity and inclusion pays off:
  - Companies in the top-quartile for gender diversity on executive teams were **21%** more likely to **outperform on profitability** and 27% more likely to have superior value creation.
  - There is a penalty for opting out. The penalty for bottom-quartile performance on diversity (gender, ethnics and culture) - **29% less likely to achieve above-average profitability** than were all other companies.

- Over **15 million people** are employed worldwide in the HVAC/R industry, but **women** are highly under-represented: **only 6%**

- Why so few and what companies can do about it?

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Strengthening your well-being together

Unites **5,000** professional technicians and **150+** member companies since 1981

Key activities:

- R&D Innovation Center (CIDARE)
- Training facilities
- National and International projects and events
- Lead the Federation of Associations in Ibero-America

The Andean Community of Nations

Gender Gap study in Mexico and Colombia:

- **5-8%** of women (similar to global industry)
- **Existing gender gaps**: lack of awareness and discriminative practices (77%), lesser opportunities for women on promotion and existing payment gap (75%)

We need to make sure profile of the industry is attractive for female talent

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Our Diverse Tomorrow: Gender Equality in Action at CHALET HOTELS LIMITED

MILESTONES SO FAR…

- In the fiscal year 2022-23, women make up 33% of the senior management team at the Corporate Office.
- As of the fiscal year 2022-23, women constitute 17% of the overall workforce, including employees and workers.
- Chalet Hotels has been listed in the 2022 and 2023 list of 'India's Best Workplaces™ for Women 2022 – Mid-size' by Great Place to Work® India.

The Westin Hyderabad HITEC City stands as Chalet's pioneering hotel with an entirely female staff.

Fostering employee empowerment through the creation of policies centered around employees, offering learning and development platforms, and promoting diversity, equity, and inclusion.

EMPLOYEE WELFARE

- Learning & Development
- Employee Satisfaction (GPTW)
- Health & Safety
- Human Rights Due diligence

EQUAL OPPORTUNITIES

- Enabling Policies
- Equal opportunity
- Human Rights
- POSH

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Our Diverse Tomorrow: Gender Equality in Action at CHALET HOTELS LIMITED

CHALLENGES SO FAR...

- ✓ **Traditional Industry Norms**: The hospitality industry has historically been male-dominated, which can make it difficult to break traditional gender roles and expectations.
- ✓ **Recruitment and Retention**: Attracting and retaining female talent in the hotel industry can be challenging, especially in roles traditionally associated with men, such as chefs or maintenance staff.
- ✓ **Work-Life Balance**: The hotel industry often involves irregular working hours and demanding schedules, which can pose challenges for women, particularly those with caregiving responsibilities.
- ✓ **Gender Bias**: Gender bias and discrimination can persist in hiring, promotions, and daily interactions within hotels, creating a hostile or unwelcoming environment for female employees.
- ✓ **Lack of Female Role Models**: The absence of female role models in leadership positions can discourage women from aspiring to higher positions in the industry.
- ✓ **Equal Pay**: Ensuring that women are paid equally for the same roles and responsibilities can be a challenge, as pay gaps have been prevalent in the industry.
- ✓ **Training and Development**: Providing equal opportunities for training and career development can be difficult, especially when there is limited support or mentorship for female employees.
- ✓ **Workplace Safety**: Ensuring a safe and harassment-free workplace is crucial for gender diversity. Addressing issues of harassment and ensuring that employees feel safe reporting incidents is essential.
- ✓ **Cultural Sensitivity**: In some regions, cultural norms and values may impact the inclusion and advancement of women in the workforce. Sensitivity and adaptability to local cultural contexts are necessary.
- ✓ **Changing Organizational Culture**: Transforming the organizational culture to be more inclusive and supportive of gender diversity can be a long and challenging process.
- ✓ **Measuring Progress**: It can be difficult to track and measure progress in gender diversity initiatives, making it challenging to demonstrate the effectiveness of these efforts.

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Day 3: Agenda

9:00-9:30am	Key takeaways from the Summit
9:30-10:30am	Group Discussion
10:30-11:00am	Closing Remarks
11:00-12:00pm	Celebration
12:00-1:00pm	Lunch
1:00-5:00pm	Networking or Visiting Tyseley Energy Park

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