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Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



PRESENTATION OF THE NET ZERO COLD CHAINS FOR FOOD BRIEFING

David Aitken
Associate Director, Carbon Trust

















Net zero cold chains for foodA discussion document on the case for philanthropic action

Cool Coalition Webinar

28 October 2020

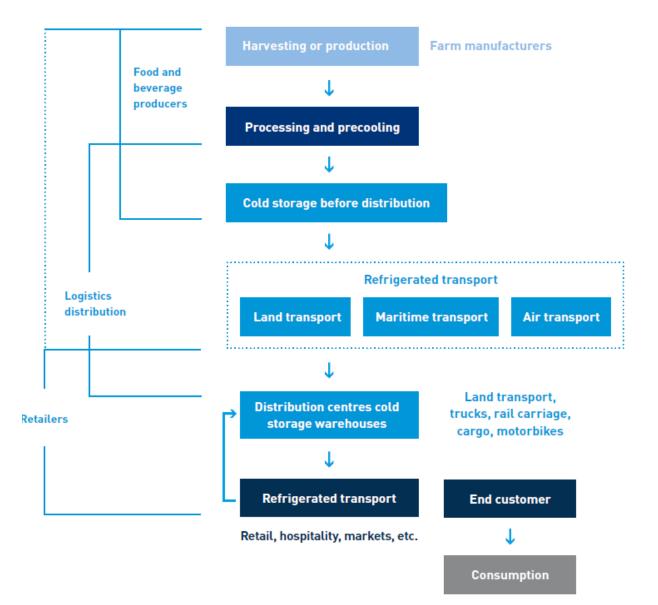


What is a cold chain?



'Cold chains are a temperature- and humidity controlled system that integrates a sequence of refrigerated preparatory, storage, and distribution activities'

'A net zero cold chain can be defined as a safe, monitored, and integrated refrigerated network designed with cooling technologies that uses environmentally-friendly refrigerants and maximises the efficient use of low carbon energy'





Cold chain deployment status globally varies driven by socio-economic factors and agri-food sector structure



Cold storage capacity (m3)

- Low Income
- High Income
- Lower Middle Income
- Upper Middle Income





Cold chains are c.1% of global GHG emissions and up to 4% of total GHG emissions in developed countries



- Data on energy consumption or emissions of different sections of food cold chains is inconsistent.
- The limited data available suggests that cold chains account for 1% of greenhouse gas emissions globally. In the UK only, food refrigeration is estimated to be responsible for 2% to 4% of the country's total GHG emissions.

Post-harvest cooling

Refrigeration can

account for 40-60 %

of electricity used

in a facility

Energy load

depends on

commodity and

cooling systems (i.e.

pre-cooling, blast

freezing, chilling

Transport

Mid- chain storage

Retail





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Refrigerated truck can use approximately 20 I/hr of travel A large class vehicle with a refrigerant charge of 6kg and an annual leakage rate of 20% is estimated to produce 5.3

gCO₂/pallet-km



There is large observed variance in energy consumption within cold stores. It can vary from 20 kWh/m3/year to 120 kWh/m3/year with higher values for frozen and mixed stores



Cooling sectors
currently account for
86% of the GWP
weighted share of
global HFC
consumption, the
cumulative direct
emissions from these
sectors could reach 90
GtCO₂e for which
commercial
refrigeration would
represent 23 GtCO₂e by
2050

E.g. of food cold chains energy consumption & emissions impact

etc.)



Literature and interviews suggest cold chains emissions are likely to grow significantly driven by four global trends

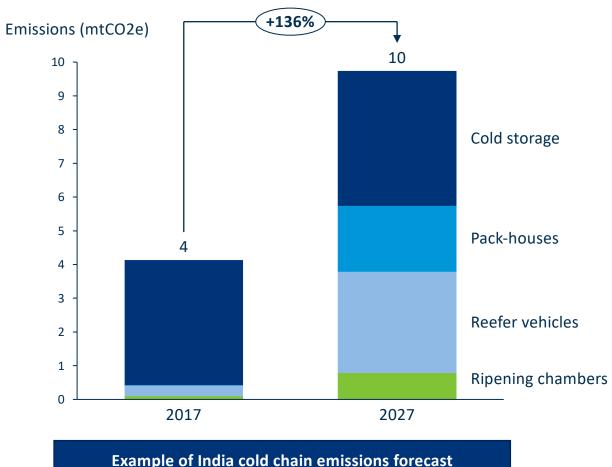


Population increase

Changing dietary preferences

Food loss reduction pressures

Climate change impacts on food security



Example of India cold chain emissions forecast



Net zero cold chains face acute barriers and are unlikely to develop at scale without support



Coordination and Planning

- Many stakeholders from different sectors with little coordination
- Silos and segmented intervention from different actors
- No catalyser for change

Logistics and infrastructure

- Grid unreliability
- Road network failures
- Scattered logistics operators
- Different needs for each food type
- Lack of market connectivity

Awareness and understanding

- Not seen as a chain bur rather siloed technologies
- Lack of awareness on benefits of cold chains for different actors
- Lack of data on cold needs, demand, and cold chain capacity

Finance

- Capital intensive
- Lack of business cases and evidence showcasing the value of cold chains
- Affordability

Barriers in **bold** are those more acute for net zero cold chains



Improving data, enhancing advocacy and demonstrating systems are three key areas for philanthropic action

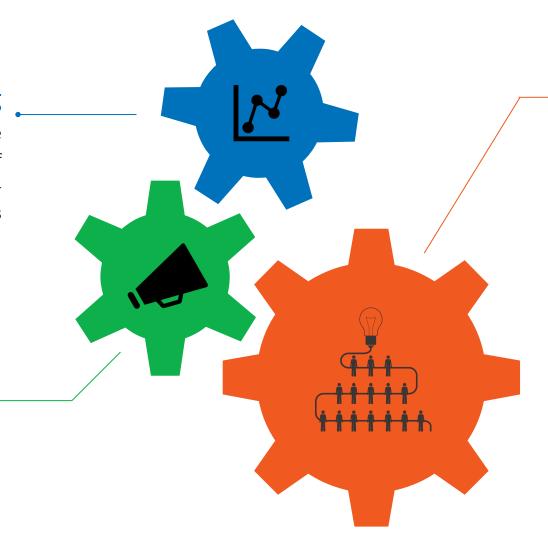


Data collection and modelling

Support development of database on the social, economic and environmental value of net zero compatible cold chains and an open-source model to help determine trade-offs

Advocacy

Raise the profile of the sector and increase the awareness of existing and innovative net zero compatible cold chain solutions and ensure this information is available widely



Integrated demonstration

As cold chains are a complex system that interact with many other systems, learning-by-doing approaches offer the most value in terms of evaluating benefits of interventions and consolidating learnings

Philanthropies to play a "systems integrator "role in the short term by bringing together disparate actors and helping to demonstrate the value of end-to-end net zero compatible cold chains

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Arijit Sengupta,
Director, Bureau of Energy Efficiency,
Ministry of Power, India



Nnaemeka Ikegwuonu, Founder and CEO, ColdHubs Limited



Juergen Goeller, Director Regulatory Affairs, Carrier Refrigeration Co-Chairman, Global Food Cold Chain Council (GFCCC)



Toby Peters, Professor University of Birmingham, Senior Research Fellow Heriot-Watt University



Makena Ireri, Manager, CLASP



Amanda Brondy,
Director of International Projects,
Global Cold Chain Alliance

MODERATOR



Thin Lei Win, Food Security and Climate Correspondent,
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Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Arijit Sengupta,
Director, Bureau of Energy Efficiency,
Ministry of Power, India

Mr. Arijit Sengupta is a Director of the Bureau of Energy Efficiency in India. He is presently working as Director in charge of International Cooperation and has previously worked with States to promote energy efficiency at the State level.

Mr Sengupta has worked in the Buildings Energy Efficiency programme and handled one energy intensive sector under the Perform, Achieve and Trade scheme.

A certified energy auditor and engineer by training, Mr. Arijit Sengupta has worked as a researcher at Central Pulp & Paper Research Institute before joining the Bureau in 2007.











SPEAKER

Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Brian Dean
Energy Efficiency and Cooling,
Sustainable Energy for All

Brian Dean is from the United States and works as Lead, Energy Efficiency and Cooling in the Vienna office. His role focuses on creating and executing the overall strategy for SEforALL's engagement in the space of energy efficiency and cooling.

Brian has spent more than 22 years supporting energy efficiency and cooling from a range of projects, including policy development, building design, energy analytics and software development. He joined SEforALL after spending five years with the International Energy Agency (IEA). As the Lead for Energy Efficiency in Buildings, he and policy tracking, the annual *Global Status Report on Buildings and Construction* as well as the *Future of Cooling* report.

For almost 14 years, Brian worked in Washington DC, San Francisco and New Delhi as the Head of Energy Efficiency Analytics and Policy at ICF International, a global consulting and technology services company. He started his career as a building designer and HVAC engineer.











SPEAKER

Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



David AitkenAssociate Director, **Carbon Trust**

David leads the Carbon Trust's incubation support to clean tech ventures. He has advised more than 50 clean tech ventures on how to grow. He also provides strategic advice to climate innovation centers internationally. David has over a decade of technology commercialization and infrastructure project experience for clients including the UK Government, GE, and World Bank.

Before joining the Carbon Trust, David worked in a start-up venture developing clean tech projects in developing countries. He has Law and Arts degrees from Canterbury University and an MSc in Environmental Change and Management from Oxford University.











Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Nnaemeka Ikegwuonu, Founder and CEO, ColdHubs Limited

Nnaemeka is a farmer, community radio agricultural presenter; Founder and CEO of ColdHubs Limited, and Executive Director of Smallholders Foundation Ltd. /Gte.

He founded <u>Smallholders Foundation</u> in 2003 at the age of 21; the organization uses its Smallholder Farmers Rural Radio (FARM F.M) Network to reach an estimated 250,000 farmers with daily agriculture, environmental management and market access, radio educational messages.

In 2015, he launched <u>ColdHubs</u> a social business that designs, installs and commissions 100% solar powered walk-in cold rooms in farms and marketplaces, to enable smallholder farmers, retailers and wholesalers to store and preserve fresh fruits, vegetables and other perishable food 24/7 extending the shelf life from 2 days to 21 days. ColdHubs aims to eliminate the impact of food spoilage and lack of small-scale post-harvest infrastructure facing 470 million smallholder farmers globally and increase the income of farmers and retailers because, previous losses have been eliminated.

Nnaemeka is Nigeria's most prominent young agriculturist. He is an Ashoka Fellow 2008, Laureate of the Rolex Awards for Enterprise 2010, Laureate WISE Awards 2010, Future Awards Nigeria's Young Person of the Year, 2011, Fast Company USA 100 Most Creative in Business 2012, Laureate of the Niigata International Food Prize, Japan 2012 and 2013 Laureate of the prestigious Yara Prize for Green Revolution in Africa (now Africa Food Prize) among other international and local recognitions.











Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Juergen Goeller, Director Regulatory Affairs, Carrier Refrigeration Co-Chairman, Global Food Cold Chain Council (GFCCC) Juergen Goeller is the Director Sustainability of Carrier Transicold & Refrigeration Systems. He serves as the current Co-Chairman of the Global Food Cold Chain Council (GFCCC) and as the current Chairman of the European Partnership for Energy and the Environment (EPEE).

Juergen has been with United Technologies Corporation (UTC) since 2008 holding different executive management positions in its Carrier Business Unit in Engineering, Marketing and Sustainability/Regulatory Affairs for Carrier Commercial Refrigeration, Carrier EMEA, UTC Climate, Controls & Security EMEA and Carrier Transicold & Refrigeration Systems.

Juergen holds a Master of Science from the Technical University of Darmstadt, Germany and a Post-Graduate Degree (PGD) and MBA from the Open University of Hagen, Germany.



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Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Toby Peters, Professor University of Birmingham, Senior Research Fellow Heriot-Watt University

Professor Toby Peters is an award-winning technology developer and industrial academic with more than 14 years of experience in energy storage /energy systems (incl. policy and regulatory environments); clean cooling/the "cold economy" and the environmental, societal and economic impacts of cooling; novel technologies for refrigeration and cooling and their development and system integration. He was the joint-academic lead for the Doing Cold Smarter Policy Commission (October 2015).

Building on work pioneering the development of the cold economy and clean cold technologies, he has now broadened this out to accelerate transformational innovation to market and improve innovation performance to help meet the world's big social and economic challenges within the limits of our natural resources and time deadlines.











Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Makena Ireri, Manager, CLASP

Makena is a Manager at CLASP, leading research on the Low Energy Inclusive Appliances program. She has over 7 years of diverse experience in the energy sector both in utility scale solutions and distributed renewables. Prior to joining CLASP, Makena managed energy access theme prizes and other research effort on pro-poor energy solutions in developing countries.

She has authored impact and baseline research on improved institution cookstoves and refrigeration for the rural poor, contributed to research efforts in solar home system market stimulation in Bangladesh, and helped scope energy for humanitarian needs. Before that, she spent four years as an engineer in the United Kingdom's Civil Nuclear Industry, in energy generation and utility scale distribution. Makena received her M.Eng in civil engineering from Manchester University.











Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Amanda Brondy,
Director of International Projects,
Global Cold Chain Alliance

Amanda N. Brondy is a project management expert with 15 years of international development in Africa and Asia. While serving as the Deputy Chief of Party for the Dezenvolve Agricultura Comunitária (DAC) Project in Timor Leste, she provided financial, contractual, personnel and operational guidance on the implementation and management of project activities.

Prior to assuming this role, Amanda worked in the Democratic Republic of the Congo on the Building Recovery and Reform through Democratic Governance (BRDG DRC) project in Kinshasa, and also served Crisis Mitigation and Response Project Coordinator at DAI headquarters, where she assisted managing grants to Congolese and international civil society groups, budget monitoring, research support, procurement, personnel, finance, and communication between the field offices and the home office.

She holds a master's degree in international relations and international economics from the Johns Hopkins School of Advanced International Studies, and a bachelor's degree from Texas A&M University in international studies and speech communication. Amanda is proficient in French.



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SPEAKER

Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Dan Hamza-Goodacre
Non-Executive Director, Kigali
Cooling Efficiency Programme,
COP26 Champions Team

Dan Hamza-Goodacre is the Non-Executive Director of the Kigali Cooling Efficiency Program, a global initiative focused on net-zero cooling. Dan is also the cooling sector lead for the COP26 Champions team. Dan has worked on sustainable development in the public and private sectors across the globe for over 20 years.

Previous positions include: Senior Director of Buildings and Industry at ClimateWorks; Deputy CEO of the Climate and Development Knowledge Network, U.K. Environment and Agriculture Ministry - Head of the Secretary of State's office; co-founder of the UK's Adapting to Climate Change Program; Adaptation Policy Lead for the UK Climate Change Act and Sustainable Agriculture Advisor, UK Foreign Office Climate Attaché.

Dan is a Chartered Environmentalist and Fellow of the Institute of Environmental Management and Assessment. He is a regular speaker and moderator at conferences and events and has written widely on climate and development. Dan has an MSc in International Development from Bristol University, where he also lectured and researched global environmental politics. In his early career Dan lived and worked in the rainforests of Latin America.





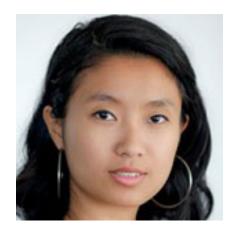






MODERATOR

Enhancing Food Security and Poverty Reduction through Net-Zero Food Cold Chains



Thin Lei Win, Food Security and Climate Correspondent,
Thomson Reuters Foundation

Born and raised in Myanmar, Thin currently covers food security issues globally for the Thomson Reuters Foundation (TRF), the non-profit arm of the Reuters news agency, for whom Thin has worked since 2008. In 2015, Thin returned to Myanmar after many years abroad to set up, launch and manage Myanmar Now, an award-winning bilingual news agency, producing in-depth reports on the country's historic elections and transition to a popularly-elected government, with the support of TRF.

Thin also co-founded <u>The Kite Tales</u>, a unique preservation project that chronicles the lives and histories of ordinary people across Myanmar. Until 2015, Thin worked as the Bangkok-based Southeast and East Asia Correspondent for TRF, producing award-winning humanitarian news coverage in the region.

Thin caught the journalism bug when she interned at a publishing house in Singapore in 2000 in her final year of studies in Business Management. She eschewed the business world for life as a reporter, to her parents' initial consternation.









