

Towards a Sustainable Food Cold Chain

Presented by Kevin Fay On behalf of GFCCC

Pontifical Academy of Sciences Rome, Italy November 11, 2019



This presentation is dedicated to our colleague and friend Eric Prieur, who pioneered much of the initiatives presented.

FCC can contribute to most of the SDG's



If Food Loss and Waste were a country, it would be the third largest emitter of GHG's globally.



Total GHGs emissions – Top 5 of countries (year 2011) vs Food wastage

Sources: http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/FWF_and_climate_change.pdf http://www.fao.org/docrep/018/ar429e/ar429e.pdf

Why now?

- There is now a wide awareness of the need to develop sustainable solutions for comfort A/C.
- But Food Cold Chain has attracted little attention so far. It is the purpose of this initiative.
- Urbanisation drives cold chain growth => Cold chain need to be sustainable
- All stakeholders must be involved in Food Cold Chain to ensure sustainability



How to ensure a sustainable food cold chain?



How to make things happen: A Government-Industry partnership

- Sept. 2014, UNSG Climate Summit, New York City: a coalition of major companies from around the world launch the Global Food Cold Chain Council (GFCCC), to:
 - Establish solid data as a reliable starting point.
 - Reduce greenhouse gas emissions in the processing, transportation, storage and retail distribution of food.
 - Stimulate global demand for energy-efficient low-GWP refrigerant technology.

 Successful implementation will generate economic, environmental and social value from:







Joint Project: Cold Chain Data Base Model



Partners' Objectives

Contribute to achieving Kigali amendment

Reduce emissions and GWP

Reduce food waste and provide safe and affordable cold chains for all

Advance state-of-art refrigeration technologies

Facilitate financing to deploy solutions

Different Initiatives and Groups addressing this Subject

- GFCCC (Global Food Cold Chain Council)
- UNEP
- FAO (Food and Agriculture Organization of the UN)
- "Champions 12.3 »
- IEA (International Energy Agency)
- ≻ IIR

Partnerships are initiated. Further cooperation desired.

Development of a solid database for Food Cold Chain Modelling

- GFCCC and UN Environment to develop **modelling tool** to understand the use of refrigeration in the food and beverage cold chain in some specific countries.
- Platform analysis for :
 - Refrigerant use and impact of HCFC phase-out and HFC phase-down
 - Energy use
 - Food wastage
- 2-stage data collection:
 - High level data collection via statistics
 - Detailed data via site surveys

- 7 sectors, 15 sub-sectors, 34 sub-sub-sectors:
 - Primary production
 - Processing
 - Bulk Storage
 - Transport
 - Retail
 - Food Service
 - Domestic

| Main Sectors | Sub-sectors | Sub-sub-sectors | Key Cooling Requirements | Example Modelling parameters |
|-----------------------|-------------------------|-----------------------------------|---|---|
| Primary production | Farming | On-farm milk cooling | Milk coolers; chilled tanks | Number of dairy farms; volume of milk collected |
| | | On-farm cold storage | Chilled storage | Number of stores; volume of stores; storage temperature |
| | Fishing | Land-based Ice production | Ice production plants and ice storage | Number of ice plants; mass of ice produced |
| | | On-boat fish cooling | Fish chillers and freezers; chilled / frozen storage | Number of fishing vessels; mass of fish caught |
| Processing | Dairy | Liquid milk | Pasteurisation; chilled tanks; chilled store | Number of liquid milk plants; volume of milk processed |
| | | Cheese | Pasteurisation; cheese maturing warehouse | Number of cheese plants; mass of cheese produced |
| | | Butter | Pasteurisation; butter cooling; chilled butter storage | Number of cheese plants; mass of cheese produced |
| | | Ice cream | Pasteurisation; product freezing, hardening and storage | Number of ice crream plants; mass of ice cream produced |
| | | Yoghurts / desserts | Pasteurisation, product chilling; chilled product storage | Number of plants; volume / mass of product |
| | Meat | Abbatoirs | Carcass chilling / freezing; chilled / frozen storage | Number of abbatoirs; type of meat; mass of product |
| | | Frozen / chilled raw products | Cutting room cooling; product chilling / freezing and storag | Number of cutting plants; mass of product |
| | | Cooked meat products | Cooked product chilling / freezing and storage | Number of meat prodct plants; mass of product |
| | Fruit and vegetables | Frozen / chilled raw products | Fruit / vegetable chilling / freezing and storage | Number of plants; mass of product |
| | | Cooked fruit / vegetable products | Cooked product chilling / freezing and storage | Number of plants; mass of product |
| | Confectionery | Chocolate products | Chocolate tempering: product cooling tunnels | Number of chocolate plants; mass of product |
| | Bakery | Chilled / frozen baked products | Baked product chilling / freezing and storage | Number of bakery plants; mass of product |
| | Edible oils and fats | Margarines and spreads | Product cooling / solidification; chilled storage | Number of margarine plants; mass of product |
| | Soft drinks | Carbonated | Water chilling | Number of carbonated drink plants; volume processed |
| | | Juice | Juice cooling; concentrate freezing; chilled /frozen storage | Number of juice plants; volume processed |
| | Alcoholic drinks | Beer and cider | Wort cooling; fermenter cooling; beer cooling; chilled maturation; pasteurisation; yeast cooling and storage | Number of breweries; volume of beer produced |
| | Pharmaceutical products | | Various cooling requirements e.g. fermeter cooling for antibiotic production. | Number of pharma plants; mass processed |
| Bulk Storage | Stand-alone warehouses | Chilled storage | Air cooling in 0 to 10 °C range | Number of chill stores; volume of stores |
| | | Frozen storage | Air cooling in -18 to -25 °C range | Number of frozen stores; volume of stores |
| | | Pharmaceutical storage | Special storage requirements e.g. at very low temperature | Number of pharma stores; volume of stores |

Project (Country's) Objectives and Outputs

- Provide policy-makers and other stakeholders with a comprehensive picture of industries involved with cold chain and supply.
- Project output will create impetus for action and basis for strategizing sustainability in local/ regional/ international cold chain.
- Strategizing HFCs reduction as per Kigali Amendment.

Sample Output

- Refrigerant consumption per sector & type of applications.
- > Population of equipment per sector per province.
- > Investment per sector per province per economic segment.
- > Energy consumption per sector per province.
- Food loss per sector per economic segment.
- ≻ Etc.

Scope of the Model







Primary production (fishing and farming)
Processing and Packaging (dairy, meat, vegetables, pharmaceuticals)

Bulk Storage

- > Transport
- Retail (shops and vending machines)
 - Food Service (eateries and catering)
 - Medical sector (hospitals and tertiary)
 - Domestic







The structure of the model was reviewed with IIR for consistency with IIR data.

Data Collection / 2-Stages / Role of Governments

- Background Research, using international data sources
 - -will be used to ensure Stage 1 Questionnaire is well targeted
- Stage 1: Country Questionnaire, high level; using national data sources
 - -host country to complete questionnaire
 - structured to collect available statistics on production, number of relevant food chain facilities, levels of food loss
- Stage 2: Country Research, detailed data e.g. via sample of site surveys
 - -based on Questionnaire, develop a customised investigation plan
 - -host country to collect detailed data based on this plan

Technical Support Offered by Partners

During the pilot stage of the project, to be implemented in limited number of countries, GFCCC and UNEP OzonAction will be working closely with member states to support:

- Design and provision of questionnaires and datasheets for collecting data.
- Orientation and training, if needed, about methodologies to collect and validate data.
- > Review, comment and assist in validating the collected data.
- Build final model for presenting the data and developing analytical sheets to support policy making.

Next steps

Phase 1

Phase 2

- UN Environment identifies 5-6 member state partners for trial pilot analysis
- Expansion of pilot to other countries
- Work with IEA and profile for energy efficient, low GWP refrigerant cold chain expansion

- Projection of food loss reductions
- Qualify assistance for cold chain expansion for energy efficient, low GWP refrigerant cold chain
- Development of finance mechanisms Champions 12.3, Green Climate Fund, MLF

Contacts

Kevin Fay, Executive Director <u>fay@foodcoldchain.org</u>

CHAMPIONS 12.3

Juergen Goeller, Co-Chair juergen.goeller@utc.com

Rajan Rajendran, Co-Chair rajan.rajendran@emerson.com

Paul de Larminat, Board Member paul.delarminat@jci.com Global Food Cold Chain Council 2111 Wilson Boulevard, 8th Floor Arlington, VA, USA 22201

GLOBAL

+1(703)841-0626

@FoodColdChain



www.foodcoldchain.org

