



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Low GWP Alternatives for Refrigeration in the Fishing Industry

UNIDO's Approach in Developing Countries

International Conference on
Energy and Environment in Ships

ASHRAE Hellenic Chapter

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Outline

- The mandate of UNIDO, its Environment Branch and the Montreal Protocol Unit
- Importance of the fishing industry and the related food value chain in developing countries
- Use of low GWP alternatives in the fishing industry in developing countries – current situation
- Barriers to the introduction of low GWP alternatives
- How can UNIDO facilitate/accelerate the introduction of low GWP alternatives?
- Demonstration projects in the fishing industry of Viet Nam and the Gambia



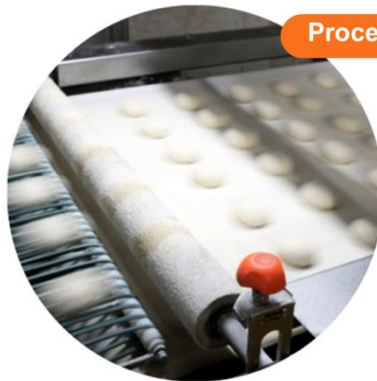
What is UNIDO?

The United Nations Industrial Development Organization is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability.

Inputs



Processing



Products



Storage



Farming



Packaging



Marketing





UNIDO provides services meeting the interlinked challenges of reducing poverty through productive activities, integrating developing countries in global trade through trade capacity-building, fostering environmental sustainability in industry, and improving access to clean energy.

Information

Skills

Knowledge

Education



Environment Branch

The Branch encourages resource-efficient industrial development that is protective of the natural environment and human health, and keeps workers, communities and consumers safe.

Efficient use of resources



Pollution



Waste management



Climate change



Water



Montreal Protocol Unit

- Ensure compliance with the Montreal Protocol through the planning, development and implementation of national phase-out plans and sector phase-out plans for developing countries and countries with economies in transition
- More than 250 ongoing projects in 78 countries in 9 sectors in the total value of USD 271 million





Montreal Protocol projects and ISID

Inclusive and Sustainable Industrial Development

Creating shared prosperity | Safeguarding the environment

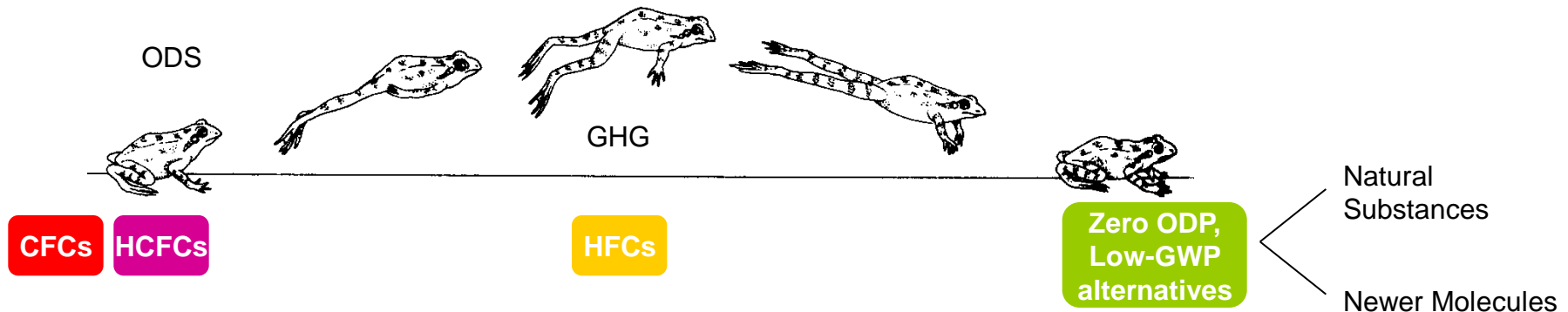


MP projects play a key role in promoting Inclusive and Sustainable Industrial Development by:

- Avoiding high GWP alternatives → *Green Industry*
- Upgrading appliances and promoting best refrigeration practices, which result in **fewer leaks** of substitute chemicals to the atmosphere as well as greater **energy efficiency** → *lower costs*
- MP projects promote and demonstrate new, state-of-the-art technologies from prominent technology providers → *technology transfer*
- Technological upgrades brought by MP projects are always coupled with training workshops for technicians, which guarantee that beneficiary companies remain productive and sustainable while using green technologies → *sustainability*

The Montreal Protocol and Climate Change

- It is estimated that since the late 1980s the Montreal Protocol has reduced GHG emissions by around 8 Gt CO₂eq annually.
- Growing concern: rapidly multiplying air-conditioning and refrigeration installations especially in developing countries → rapid growth in the volume of Hydrofluorocarbons (HFCs) being used (GWPs 2,000-4,000 times the GWP of CO₂)



Fishing Industry



- In developing countries the livelihood of over 500 million people depends on fisheries and aquaculture (FAO)
- The use of refrigeration technologies is one of the key elements of the overall fishing industry, associated to the entire related food value chain
 - Food quality & safety
 - Minimization of post harvest losses
 - Trade opportunities
- Refrigeration is the main source of energy consumption of the fishing industry
 - 50 % of the energy costs can be accounted for by refrigeration in the fish processing
 - 90 % in the cold storage sector (The Carbon Trust)



UNIDO Activities in the Fishing Industry

Women in Artisanal Fisheries In Senegal

<http://www.unido.org/en/resources/multimedia/videos/women-and-youth.html>



Low GWP Alternatives in the Fishing Industry I

Current Situation in Developing Countries

- Very high leakage rates, high HCFC-22 consumption
 - Old equipment
 - Constant vibration and rough conditions
- Frequent recharge / top-up in fishing vessels - cheaper than repair due to the down-time of the vessel
- With the phase-out of HCFC-22 tendency to move towards high GWP alternatives (HFCs)
- Concerns over low GWP alternatives
 - Toxicity
 - Flammability
 - Ambient and water temperature (efficiency)
 - Viability (dimensions of vessels)
 - Costs

Low GWP Alternatives in the Fishing Industry II

Current Situation in Developing Countries

- There is no universal solution, decisions should be made considering
 - Refrigerant
 - Characteristics of the unit
- Whilst over 90% of the industrial refrigeration and cold storage industry in developed countries rely on ammonia, and to a minor extent on CO₂ and hydrocarbon refrigerants, the market share in developing countries is much lower, currently at around 40% (shecco)
- Ammonia freezing systems are successfully used in the food processing and the fishery industries in some developing countries of South America and Asia





Barriers to the Introduction of Low GWP Alternatives I

- Awareness

- National governments and local public authorities - Regulations and standards
- Non-profit industry and environmental organizations - Accompany and drive market adoption
- Suppliers and manufacturers - Ensure supply of technology options
- Commercial and industrial end-users / private consumers - Demand side

- Training

- Education, training and certification
- Training facilities and hands-on equipment not available for practical training of engineering and servicing personnel



Barriers to the Introduction of Low GWP Alternatives II

- Safety, Trade and Technology Standards
 - Standards and regulations should be updated to reflect the changing landscape of refrigeration technologies
- Policy Framework
 - National authorities can drive the adoption of alternatives through numerous interventions (direct subsidies, subsidies, voluntary partnerships, taxes on obsolete technologies and obsolete technologies and practices)
- Market Availability
 - Lack of information, uncoordinated initiatives
 - Strong financial, legislative, industry-led signals are required



Barriers to the Introduction of Low GWP Alternatives III

- Selection Methodology
 - Calculate the total environmental impact / energy consumption of the system
- Costs
 - Strongest obstacles for developing countries
 - Additional costs associated with prior technology transfer, import tariffs, down-time, personnel training etc.



How can UNIDO Facilitate the Introduction of Low GWP Alternatives?



- Identify and mitigate barriers
- Develop financial mechanisms (e.g. through CCAC, GEF)
- Stimulate discussions among stakeholders



UNIDO Pilot Projects

Fishing Industry in Viet Nam and The Gambia

- Fishing industry identified as the most appropriate sector for the pilot projects
- UNIDO focused on finding a mechanism for promoting the conversion of existing installations with low GWP and energy efficient technologies
 - Main funding source: Global Environment Facility
 - Co-financing from partners (governments, beneficiaries, UNIDO, technology providers, local development banks)
- The projects consist of three main components:
 - Policy and regulatory support
 - Technology transfer/Technical assistance
 - Awareness raising

Viet Nam



- Goal: To introduce alternative refrigerant systems to the Vietnamese market and to demonstrate their effectiveness to policy-makers and to facility owners and operators
- Expected Outcome: Hydrocarbon technology (GWP~3) is demonstrated, replicated and deployed
- The mechanisms include:
 - Pilot facility conversions
 - Financial scheme for facility owners to convert to the new technology
 - Creation of a local knowledge based on alternative refrigerants, including training and capacity building

The Gambia



- Goal: To pilot a technology transfer mechanism through the establishment and operation of the technical support mechanism, while introducing innovative technologies
- Expected Outcome: Technical and financial support on replacement refrigerants and on the reduction of greenhouse gas emissions and operational costs, is ensured
- The technology focus is on energy efficiency improvements (reduction of ODS leakage and reduction of contaminated refrigerants) and the introduction of two types of demonstration systems – one using hydrocarbon and a second using CO₂ as refrigerant – to be piloted in training environment.



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Thank you for your attention!

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