Advancing Green Cooling in Supermarkets: Policies and Project Experiences

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- Programme established in 1995 in the context of implementing technical projects for **ozone protection** under the Montreal Protocol. In 2016, the Kigali Amendment broadened the focus from ozone to **climate protection**.
- Proklima is working on behalf of **German Ministries (BMZ, BMUV, BMWK)** and other donors, e.g. EU, AFD, NAMA.
- Goal: To advance the **concept of Green Cooling** = natural refrigerants and energy-efficient appliances in the RAC sector.

Policy advice

Technology transfer

Capacity building

The Green Cooling Approach

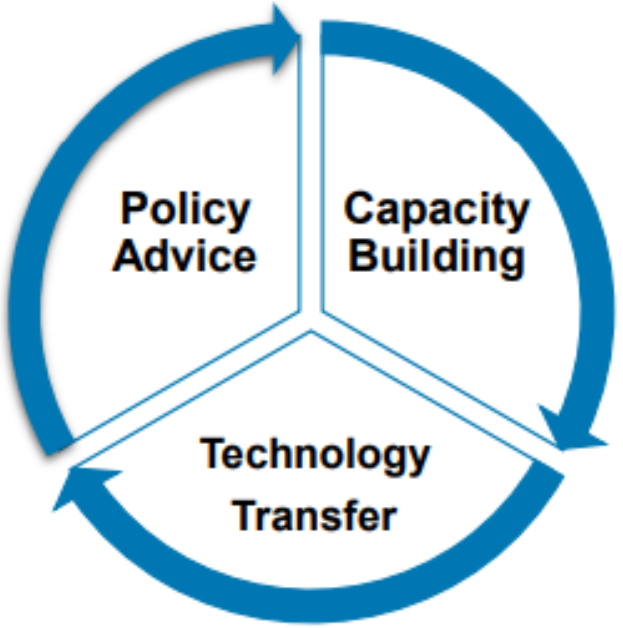
Natural refrigerants & high energy efficiency

"**Leapfrogging**": No use of climate-damaging refrigerants as a transition solution

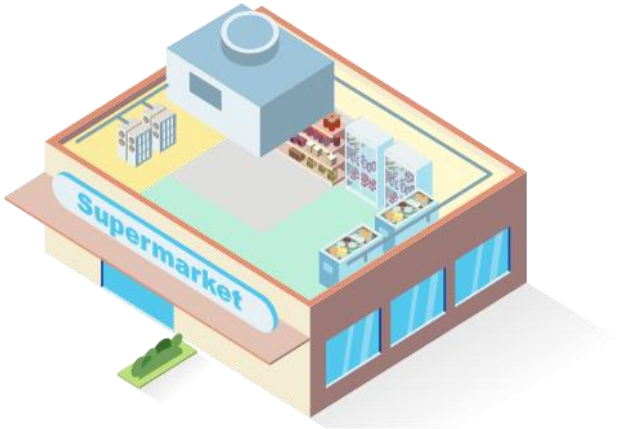
- ✓ **Stand alone equipment**: HCs, e.g. R290, R600a
- ✓ **Condensing units**: HCs for small units or R744
- ✓ **Centralised systems**: CO2 or ammonia

GIZ Proklima's work on commercial refrigeration

- Development of sub-sector **inventories**, technology **impact assessments** and subsector **roadmaps**
- **Technical advice** in revising and adopting national commercial refrigeration **efficiency and safety standards** based on international best-practice



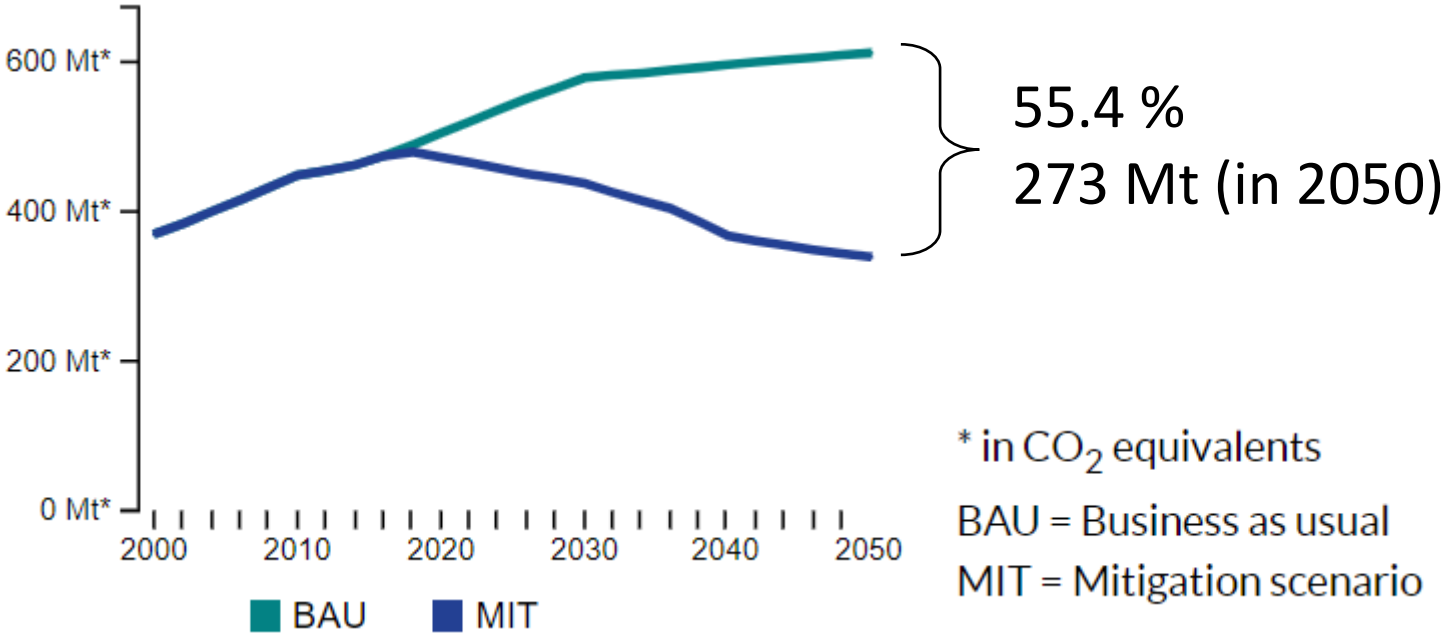
- **Training** of RAC trainers and technicians based on latest international standards (i.e. Cool Training, in-country training programmes)



- **Technology demonstration** (e.g. Pick n Pay Supermarkets in ZA)
- **Technical advice** to commercial refrigeration equipment manufacturers

Climate impact and mitigation potential

Total GHG Emissions of Commercial Refrigeration (World)



Source: Green Cooling Initiative

Policy Overview

International Agreements

- Montreal Protocol and Kigali Amendment (commercial sector in KIPs and HPMPs)
- Paris Agreement and Nationally Determined Contributions (EE and refrigerant emissions mitigation in NDCs)

Standards and Regulations

- EU F-Gas Regulation, e.g. HFC bans for commercial equipment
- Safety Standards: national implementation of the IEC 60335-2-89 (e.g. ref. charge limit increased)
- Energy Efficiency Standards, e.g. U4E Model Regulation Guidelines for Commercial Refrigeration
- Energy labelling, e.g. EU Eco-Design Directive, Germany: Eco-Label Blue Angel (UBA)

Roadmaps and Strategies

E.g. Colombia: National Strategy for the supermarket sector

Incentives and Innovative Funding

- Germany: BAFA Incentives program
- Cooling as a Service

Relevant HFC bans under EU Regulation No. 517/2014

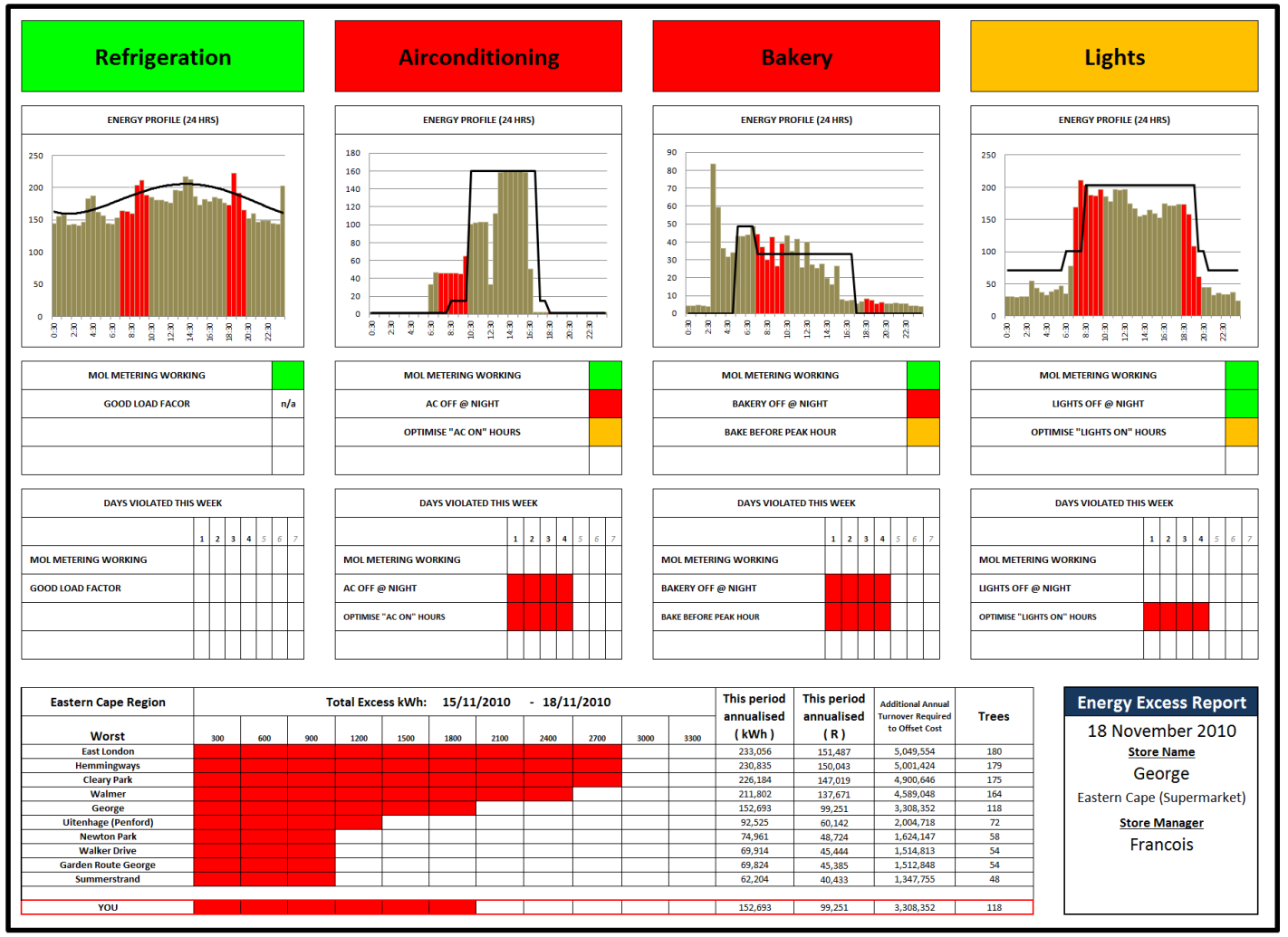
Date	Equipment
January 2022	Commercial refrigerators and freezers containing HFCs with GWP ≥ 150
January 2022	Commercial multipack centralised refrigeration systems with a capacity of 40 kW or more, containing HFCs with GWP ≥ 150, except in the primary refrigerant circuit of cascade systems where HFCs with GWP < 1500 may be used

South Africa: Switching Supermarkets to Natural Refrigerants & Energy Efficiency

- 2008 – 2013
- Results:
  - ✓ Two Pick n Pay supermarkets switched to combined CO2/NH3 cooling systems
  - ✓ 25 additional Pick n Pay supermarkets switched their cooling system of which five are operating exclusively on CO2/NH3
  - ✓ Reduction of direct emissions of ozone and climate damaging refrigerants of more than 500.000 kg of CO2 equivalent
  - ✓ Workshops and trainings carried out for Pick n Pay technicians and trainers
  - ✓ Technologies adopted by local service enterprises and available on the market
  - ✓ Monitoring system set up in 500 Pick n Pay supermarkets to measure emissions and energy consumption
- Read more: IKI Website

Key lesson learned:
Energy monitoring & management systems are key enablers for energy efficiency in supermarkets.

Energy Monitoring System



Source: Pick n Pay

Brazil: HCFC 22 Containment

- HPMP Stage 1 and Stage 2
- Results:
  - ✓ Three supermarkets improved refrigerant containment practices
  - ✓ Direct emissions of refrigerants reduced by more than 500.000 kg of CO2 equivalent
  - ✓ Indirect emissions reduced through energy efficiency improvements
  - ✓ Workshops and training courses carried out for 5,000 technicians, including 'Train the Trainers'
  - ✓ Project activities are documented in case studies for other supermarkets to replicate
  - ✓ Online Documentation System Pró-Ozônio: Interactive application for the administration, documentation and maintenance of refrigeration and air conditioning systems (www.ozoniohcfc.com.br/)
- Learn more: Youtube

Key lessons learned:

- Need for increased awareness among supermarket operators regarding refrigerant leakage control.
- Strengthened qualification of technicians is key for leakage identification and prevention.

Thailand: Production line conversion & Establishment of CIF

- Relevant RAC NAMA project results:
  - ✓ Supported Thai producers to switch to natural refrigerants with a focus on commercial plug-in equipment (bottle coolers, ice-cream freezers), among other activities
  - ✓ Product development with safe use of natural refrigerants (R290, R600a)
  - ✓ Safety and high energy efficiency design
- Establishment of the **Cooling Innovation Fund (CIF)**
  - ✓ Owned and managed by the Electricity Generating Authority of Thailand (EGAT)
  - ✓ Budget: approx. 5M EUR (188M THB)
  - ✓ Four strategic pillars: Demonstration and Pilots (incl. R290 water-loop cooling system in supermarkets) / Training and Education / Safety and Standard / Knowledge management and Communication

Key lesson learned:
Innovative funding mechanisms can play a key role for the transition to climate-friendly refrigeration and air-conditioning systems.

Conclusions

- Immense **mitigation potential** in the commercial refrigeration sector
- Comprehensive **policy instruments** accelerate a sustainable sector transformation towards natural refrigerant & energy efficiency.

- **Energy monitoring systems** are key enablers for energy efficiency.
- **Trainings and qualification** of RAC technicians are crucial for refrigerant containment, the safe use of natural refrigerants, and to ensure proper end-of-life management.

- **Innovative funding and financial support programmes** are vital, e.g. for technology demonstration and production line conversion.

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