Converting the Production of Refrigeration Equipment to Natural Refrigerants

Background

In Swaziland, and all over Africa, state-of-the-art refrigeration equipment is currently manufactured using fluorinated refrigerants. These refrigerant gases are currently used worldwide and are contributing considerably to global warming. Natural refrigerants (e.g. hydrocarbons, ammonia and CO_2), which are both climate- and ozone-friendly, have not been introduced in Southern Africa yet, despite their environmental and energy-efficiency benefits.
The refrigeration equipment manufacturer Palfridge of Swaziland had already considered the conversion of its manufacturing lines from the use of the unsustainable fluorinated refrigerant gases to natural refrigerants. Yet, the company was unsure and reluctant to engage on its own in the application of this new technology due to the safety concerns and requirements. Especially when utilising flammable refrigerants such as hydrocarbons, certain safety regulations and measures have to be considered and carefully implemented during production and servicing of the equipment. This requires special information and know-how for the production process, the design of products, and the training of the servicing sector accompanying the sale of the new refrigeration appliances. With the support of GIZ Proklima, including financial and technical assistance, Palfridge decided as the first refrigeration manufacturer in the sub-Saharan region to convert their production lines to the use of natural refrigerants.

Project Description

The project converts the entire production of domestic and commercial refrigeration appliances of the manufacturer Palfridge in Swaziland to hydrocarbon refrigerants (domestic fridges, commercial refrigerators for supermarkets and bottle coolers, solar refrigerators including a solar powered vaccine cooler). With the successful conversion of the production line, Palfridge impressively demonstrates that the environmental-friendly technology can be handled safely in a developing environment. The project is an important demonstration showcase for the whole region.
The important issues concerning the safe use of flammable refrigerants in a medium-size African enterprise are addressed through state-of-the-art safety devices, as well as intensive training and appropriate education of the entire Palfridge staff (engineers, technicians, workers). This also includes assistance with the safe design of the new models. Every new equipment produced will have to pass a quality control. The project also supports the development of information and training materials for marketing the equipment at the point-of-sale and for service technicians servicing the equipment and products. Qualification in the new technology is ensured among others by educating trainers of the “Vocational and Commercial Training Institute” (VOCTIM) in Matsapha and the “Swaziland College of Technology” (S.C.O.T.).

On behalf of

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

of the Federal Republic of Germany

Project Impact

Every sold and operating hydrocarbon based refrigeration equipment permanently replaces the use of fluorinated refrigerants in that application which is equivalent to the avoidance of 250 kg CO_2e in average of direct emissions during the lifetime of a unit. The conversion of the annual production of approx. 60,000 units to natural refrigerants cuts direct emissions of F-gases by up to 14,800 tonnes CO_2e per year or at least 148,000 tonnes CO_2e over the lifetime of the project, thereby achieving significant and sustainable climate benefits. The new units are more energy-efficient and save more than 20% energy consumption compared to conventional ones. The energy savings equal to 2.3 tonnes CO_2e per average unit over its lifetime and lead up to 1.3 million tonnes indirect CO_2e emissions over the lifetime of the production line. Furthermore, the higher energy efficiency of the units reduces electricity costs for households and commercial end-users such as retailers.

The conversion to modern production technologies also has a positive effect on Palfridge's market position, thereby strengthening a local African company for their domestic market also against the global competition and sometimes cheap imports, being often not climate or environmentally friendly. Qualifying the engineering and technical staff in new refrigeration technologies helps to secure and maintain around 500 jobs at Palfridge and a significant number of further jobs for service technicians and suppliers in Swaziland, one of the poorest land-locked countries in the world with a high unemployment rate. The project led to a positive self-conception and increased self-confidence of the local staff.

The project demonstrates the technical and economic feasibility of natural refrigerant-based technology and encourages other companies in the region to follow this unique good practice example. Other refrigerator manufacturers especially from South Africa already indicated their intent to follow the example of Palfridge and also to convert to the sustainable hydrocarbon technology.

Further information/Media interest: The German television Deutsche Welle (DW-TV) has produced a short film about this project, available on their website: www.dw-world.de or on the Proklima website.

Title Converting the production of refrigeration equipment to natural refrigerants
Country Swaziland
Sector Refrigeration
Objective Conversion of refrigeration equipment production from fluorinated to natural refrigerants
Target Group Refrigeration manufacturers and technicians
Project Executing Organization BMU (German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
Implementing Partner Organization Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH; National Ozone Unit (NOU) Swaziland; Palfridge (local manufacturer of refrigeration equipment)
Project Approval October 2008
Project Duration Until April 2011
Project Budget EUR 1,419,733
Funds The project is funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety within the framework of the International Climate Initiative based on a decision of the German Federal Parliament.
Impact on Climate Protection
With 60,000 HFC-free units produced annually, 148,000 t CO_2e are avoided over the lifetime of the units and thus 1.5 million t CO_2e (direct and indirect emissions) are abated over a 10 year production period.
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