COMPRESSORS AND REFRIGERANTS 2024
BRATISLAVA, 9-11 SEPTEMBER

CHALLENGES OF COP28
AND THE NATIONAL COOLING ACTION PLANS

Abstract:

General objectives, such as doubling energy efficiency, as well as more specific objectives for the refrigeration sector within the Global Cooling Pledge were set up at the Conference of the Parties held in Dubai in December 2023. These targets are challenging. They shall be included in National Cooling Action Plans by 2026. Governments and companies must develop strategies.

INTRODUCTION: REFRIGERATION IS A NEW INTERNATIONAL PRIORITY

According to the statements and dictionary of the International Institute of Refrigeration (IIR), refrigeration includes the cold chain, air conditioning, heat pumps and cryogenics, using similar technologies and thus having similar impacts on the environment, in particular on climate change.

The impact of refrigeration uses on climate change is huge and will increase as a result of population growth, especially urban populations in developing countries, which will have increasing needs not only for food and health products, but also for air conditioning, information technologies and other traditional or new technologies requiring refrigeration systems. Refrigeration is necessary for life.

Until 2023, the refrigerants issue was of course very well-known at United Nations level because of the effect on the stratospheric ozone layer and the Montreal Protocol. Issues relating to climate change, particularly energy consumption, were documented by the IIR, the IEA and UNEP partially, but without any objectives or commitments. We will describe the current situation, the commitments made at COP28 and their consequences.

I. THE ENVIRONMENTAL ISSUE

a. The refrigerants issue

Thanks to the Montreal Protocol, ratified by all countries, chlorofluorocarbons (CFCs) are already phased out and hydrochlorofluorocarbons (HCFCs) will soon be phased out (2030) in developing countries, as they already are in developed countries. The stratospheric ozone layer is recovering, potent greenhouse gases are eliminated, despite the issue of banks. However, hydrofluorocarbons (HFCs), which

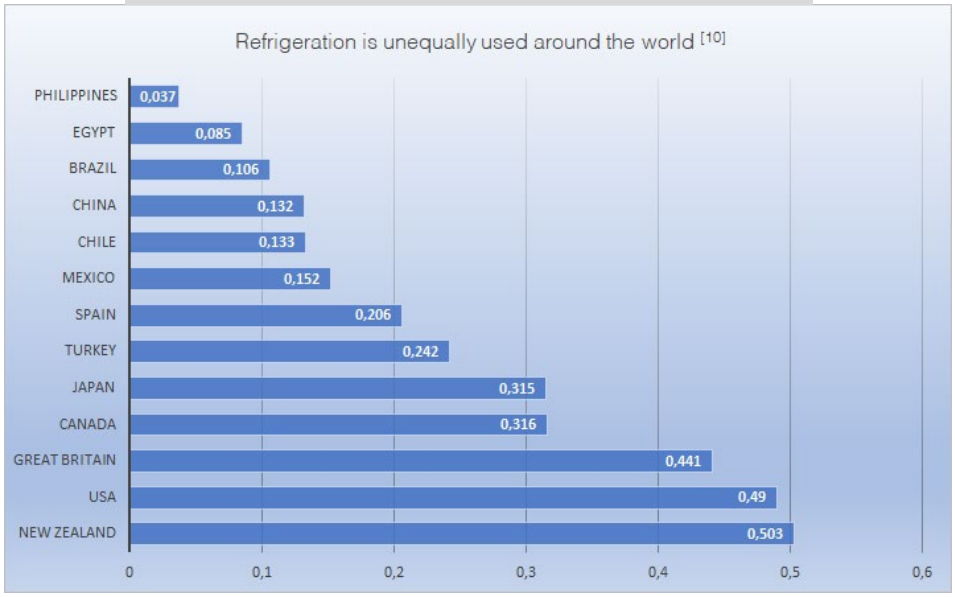
are mainly replacing CFCs and HCFCs, are often potent greenhouse gases, similar to HCFCs. Thanks to the Kigali amendment, HFCs are being phased down or will soon be. More than 150 countries have already ratified the Kigali amendment. General ratification is underway, but the need to ratify and apply the Kigali amendment all over the world has yet to be reiterated. The impact of fluorinated gases on climate change is estimated by the IIR(1) at currently 2.5% of total greenhouse gas emissions CO_2 eq or 30% of the total impact of refrigeration on climate change.

b. <u>The energy issue</u>

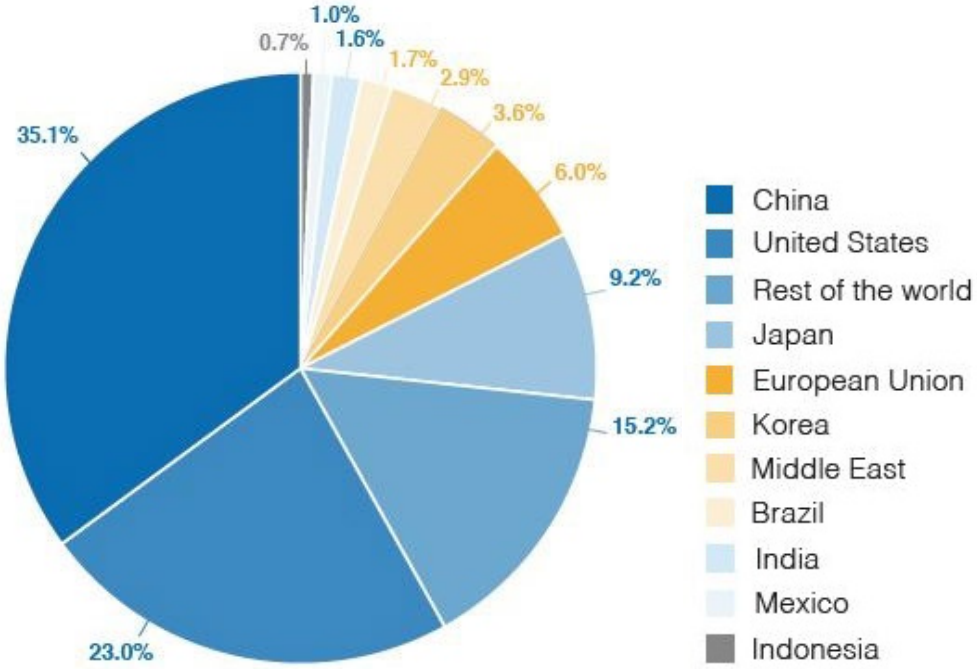
This is a more significant issue, because energy is the major challenge when it comes to climate change. According to the International Energy Agency (IEA)(2), emissions related to the refrigeration sector represent about 10% of global energy-related CO_2 emissions. 70% of the overall impact of refrigeration on climate change are due to indirect emissions from the production of electricity required to power the systems(1). This represents about 20% of the overall electricity used worldwide(1), even if excluding heat pumps. Air conditioning itself is responsible for around 12% of global consumption: it is the major problem, followed by the cold chain. Moreover, the global electricity demand for refrigeration could more than double(1) by 2050.

The following two figures(3) illustrate the problem:

Refrigerated warehouse capacity in m^3 per urban resident (2018)



Stock of air conditioners by country/region, end 2016



All countries would need an extensive cold chain for food and health products, like developed countries, as well as air conditioners for a better health, per capita. And the population of these “poor countries” will continue to increase by 2050.

II. THE COP IN DUBAI

a. The IIR's actions to face the challenge

Because of the importance of the global impact of the refrigeration sector on climate change, sooner or later the issue of the refrigeration sector would have been discussed at the Conferences of the Parties on Climate Change and commitments would have had to be imposed.

The IIR, as an intergovernmental organisation, is invited to all the meetings organised by the United Nations on climate change and especially to the annual Conferences of the Parties. The Director General is invited to deliver statements. The IIR has the possibility to hold a booth and organise side events. Its general objective is to explain the population’s need for refrigeration while recognising its role in increasing or mitigating climate change (for instance, the climate impact of reducing food losses is greater than the impact of the corresponding cold chain[(4)]), and to present technical solutions to reduce both the use of high global warming potential refrigerants and the energy consumption of equipment.

The latest annual Conference of the Parties on Climate Change was organised in Dubai (United Arab Emirates) from 30 November to 12 December 2023. The IIR shared a pavilion with the United Nations Environment Programme (UNEP) and co-organised several side events on the cold chain for food and health products and on air conditioning. In parallel, it worked with the Cool Coalition within UNEP to prepare the Global Cooling Pledge.

b. The Global Cooling Pledge

The Cool Coalition, whose secretariat belongs to UNEP, comprises various institutions, including the IIR. Its aim is to reduce the carbon footprint of the refrigeration sector. At the end of 2022, the Cool Coalition took the initiative of producing a book on the current situation and forecast emissions from the cold chain and air conditioning, the most important sectors. The IIR was in charge of several chapters and paragraphs. The IIR took part in the preparation of the Global Cooling Pledge, which sets out commitments by countries to reduce their carbon footprint through rapid ratification of the Kigali amendment and improved energy efficiency. However, it first recognises the importance of these sectors for the health of the population. The aim is sustainable development through national cooling action plans.
The pledge was presented at the COP. It was signed by 70 countries, both developed and developing. The IIR has also signed it.
Other sectors, such as heat pumps, are also becoming increasingly important, but will be addressed mostly at regional and national levels.

III. ACTIONS AT NATIONAL LEVELS

a. The IIR experience

The IIR has already been involved in the recent past in various projects that are similar to the National Cooling Action Plans (NCAPs), but only on the cold chain for food. Since 2010, the IIR has been involved as a partner in charge of disseminating the results of various projects, which were essentially European research and technical projects, in addition to several smaller projects funded by the United Nations, dedicated to specific technologies or domains at international or national levels. More recently, since 2021, the IIR has been involved in the ENOUGH project, which is a European project proposing a sustainable food chain by 2050 and which is already focused on a kind of regional action plan. Moreover, the IIR was selected in 2021 by the World Bank to be the coordinator of two national projects in Bangladesh and West Bengal (India) aiming to propose a new cold chain, with two objectives: an extensive cold chain to avoid food losses and a low-carbon footprint thanks to natural refrigerants, good energy efficiency and better logistics. These two projects are good examples of what NCAPs could be:

- The teams in charge of the projects included local universities (professors and students), who were in charge of determining the state of the art of food chains in the country. They also included international experts from the IIR network, responsible for proposing technologies and sharing their own experience.
- The farmers were particularly concerned, in order to build hubs with refrigerating equipment and new “routes” for transporting food: the whole logistics chain (storage and transport) is a key issue for avoiding food losses and reducing CO_2 emissions from motorised transport. These issues are clearly dependant on the local situation. For instance, part of the solution proposed in West Bengal was to use the rivers of the Ganges delta to transport food by boat.

b. The National Cooling Action Plans (NCAPs)

The global cooling pledge proposes to build, in each country, National Cooling Action Plans. In addition, national plans on heat pumps in Europe, for instance, can be built in parallel, provided they are coordinated: heat pumps can play a role in both heating and cooling.

The Cool Coalition and the IIR, partially together, will offer their help and support to build these national plans. National refrigeration associations must be the main actors with governments since they know the local situation, which differs from one country to another, and since these plans shall be coherent with other national policies.

This work is included in the IIR new strategy, adopted by the IIR's Executive Committee in June 2024 following surveys of the IIR's national delegates and its Science and Technology Council. This is a challenge for the near future: these national plans must be included in the new Nationally Determined Contributions (NDCs) that each country must present to the Conferences of the Parties on Climate Change, and which they must regularly update with new ambitions since 2015.

CONCLUSION: AN URGENT CHALLENGE FOR ALL REFRIGERATION STAKEHOLDERS

Fortunately, refrigeration is now recognised as a crucial need for human life and as a real challenge for mitigating and adapting to climate change at international level. We now must transform this recognition into practical and ambitious national plans. These plans must be coordinated to all other actions and plans for a sustainable future, since refrigeration equipment is everywhere. All refrigeration stakeholders must be involved, particularly through the national associations of refrigeration. The IIR strategy is now focused on this challenge, at the disposal of governments, companies and associations.

(1) The role of refrigeration in the global economy, IIR Informatory Note, 2024
(2) Refrigeration sector also has adverse environmental effects. According to IIR estimations, the refrigeration sector-related emissions represent about 10% of global energy-related CO2 emissions, which stood at 37.4 GtCO2eq in 2023.
(3) Nationally Determined Contributions: how refrigeration should be included; Didier Coulomb 2021
(4) "The carbon footprint of the cold chain", IIR Informatory Note, 2021