

Implementation of Energy-Saving Technologies with Low Global Warming Potential and No Ozone-Depletion Potential

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Abstract:

This article addresses the critical issue of ozone depletion and the urgent need to stop the use of ozone-depleting substances. Depletion of the ozone layer poses a serious threat to the environment and human health, leading to consequences such as increased ultraviolet radiation and its adverse effects on living organisms. The article is likely to discuss international efforts, policies and regulations to stop the use of substances known to harm the ozone layer. It can also examine the scientific basis of these measures and their impact on global environmental sustainability. As the international community continues to grapple with environmental issues, understanding the steps taken to end the use of ozone-depleting substances is critical to building a healthier, more sustainable future.

Keywords: environmental protection, sustainable development, biodiversity conservation, climate change, anthropogenic causes, disposal of ozone-depleting substances, waste disposal, recycling, legal entity, individuals, ozone-depleting substances, ozone layer, ozone, refrigerant or refrigerant (freons).

In the history of civilization, the introduction of effective technologies is of particular importance.

The twentieth century is marked by a rapid increase in humanity's needs for various forms of energy. This trend is inextricably linked with the widespread introduction in the 21st century of energy efficient technologies with reduced global warming potential and the absence of ozone

depletion potential. Maintaining the sustainability of the biosphere of our common home is currently one of the most important and pressing global environmental problems. Due to the non-standard use of natural resources, there is a negative impact of anthropogenic factors on nature, which have a strong impact on ecosystems. Man cannot live outside of nature. He gets all his products from nature. More than 7 billion people on Earth breathe oxygen, and the source of oxygen is the process of photosynthesis in plants.

The negative impact of emissions of hydrochlorofluorocarbons and hydrocarbons on the ecology and environment is clearly manifested in the depletion of the ozone layer and the impact on climate change. One of the important areas for reducing greenhouse gas emissions can be the widespread use of renewable energy sources. The total potential of solar energy in Uzbekistan is more than 51 billion tons of oil equivalent.

It should be noted that existing production facilities in our country in the oil, gas and chemical industries have capabilities and developments for the production of alternative refrigerants. In particular, the Republic of Uzbekistan has reserves of natural gas, including propane, butane and a number of other cyclic hydrocarbons that are refrigerants. In addition, there are enterprises for the production of natural refrigerant and carbonate anhydride, but additional funding is required to modernize production.

Thus, in this context, the problem of implementing international law into national legislation becomes particularly relevant. From the point of view of general philosophical theory, we can talk about the dialectical problem of universal, regional and national values, which can be rationally solved only through a legal approach. The world community is taking steps in this direction by concluding the Montreal, Kyoto and Paris agreements. Uzbekistan, as a member of the world community, has ratified all these agreements and assumed obligations for their implementation. Thus, the Government decided to eliminate HCFC and CFC refrigerants by 2030. "In accordance with international obligations, a phased elimination of HCFC 22 from circulation is envisaged, including 99.5% by 2020, and completely by 2030" [2].

International organizations such as UNDP also participate in the implementation of these decisions, which is implementing projects that provide for newly created centers for the recovery and recycling of HCFC and CFC refrigerants and careful storage of waste. Taking into account international experience and obligations of Uzbekistan, new methods of working with refrigerants are being introduced.

In this regard, an urgent task is to study a number of issues in this area. These include: systematization of acts of national legislation, analysis of laws and regulations providing for the disposal of refrigerators and air conditioners, analysis of international legislation on the write-off and disposal of refrigeration and climate control equipment by organizations in developed and developing countries from the point of view of the possibility of its application to individuals; development, based on the best world practices, of recommendations for further improvement of legislation, instructions for the disposal of refrigeration and climate control equipment, based on the opinions and recommendations received on the project.

International documents and national legislation. Since 1993, the Republic of Uzbekistan has been a party to the Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1987). Of the five recent amendments to the Montreal Protocol, Uzbekistan has acceded to four (London, 1990), (Copenhagen, 1992), (Montreal, 1997) (Beijing, 1999) and in accordance with these international agreements fully meets the requirements for the consumption of ozone-depleting substances.

In accordance with the Vienna Convention and the Montreal Protocol to combat Ozone Depleting Substances (OBM) concluded in 1987, the use of CFCs was permitted for developed countries until

1996, for developing countries until 2010, in turn, the use of HCFCs was permitted for developed countries until 2020, for developing countries - until 2030.

As part of the program with the assistance of the Global Environment Facility to phase out the use of ODS (hereinafter referred to as GEF), the United Nations Environment Program, the United Nations Development Program (UNDP), as well as at the expense of local organizations during 2000-2018. 6 projects were implemented in the republic for a total amount of \$9.9 million[2].

The Ministry of Ecology, Environmental Protection and Climate Change, UNDP and GEF have planned joint implementation in 2019 -2024. an \$8.6 million project to phase out the use of hydrochlorofluorocarbons (HCFCs) through the introduction of efficient technologies.

Recycling of refrigeration equipment and air conditioners. While refrigerators are found in almost every home, air conditioners are used mainly in hot climates. This question is becoming increasingly popular in our country.

Global production of household refrigerators and air conditioners is 100 million units per year[3].

In our opinion, the disposal of old refrigerators and air conditioners that have expired should be imperative. Regulations should specify that the disposal of old refrigerators and air conditioners with expired expiration dates should be carried out only by licensed organizations. In the manufacture of such refrigerators and air conditioners, substances that are harmful to the environment are used.

By law, old (out of circulation) refrigerators and air conditioners are recognized as household waste. Many refrigeration equipment contains freon, which is harmful to the ozone layer. But if someone throws a refrigerator in the trash, are they breaking the law? And if a refrigerator and air conditioner containing freon are thrown away without a landfill permit, there are no clear sanctions in this regard in the law. In addition, administrative punishment for violation of operating rules or failure to use installed structures, equipment, equipment for purifying emissions into the atmosphere, as well as means of controlling the quantity and composition of emitted pollutants can also be considered quite light. For example, Article 88 of the Code of the Republic of Uzbekistan on administrative responsibility establishes that failure to comply with requirements for the protection of atmospheric air entails a fine for citizens from one third to one, and for officials - from one to three basic calculated values.

It should be noted that when it comes to the disposal of old refrigerators and air conditioners with expired expiration dates, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated February 6, 2019 No. 95 “On approval of regulations in the field of waste management”, “Rules for the provision of services for collection and removal of solid and liquid household waste”, they are included in the category of bulky household waste (refrigerators).

Meanwhile, according to Article 3 of the Law of the Republic of Uzbekistan “On Waste” dated April 5, 2002 No. 362-II, waste management legislation does not apply to relations related to emissions and discharges of pollutants into the air and water bodies.

According to part 4 of this article, if an international treaty of the Republic of Uzbekistan establishes rules other than those provided for by national legislation on waste management, then the rules of the international treaty apply. In this regard, given that the protection of the ozone layer is now gaining primacy in the policy of our country, the requirements of the Montreal Protocol must apply. The standards specified therein to ensure compliance with the obligations of the Republic of Uzbekistan and regulate emissions of ozone-depleting substances must be implemented.

Relations regarding waste do not apply to relations related to emissions and discharges of pollutants into the atmospheric air and water bodies, since these issues are primarily regulated directly by the laws “On the Protection of Atmospheric Air” and “On the Protection of Nature.” Secondly, not all

types of waste can be included in the composition of pollutants. Thirdly, emissions of pollutants into the atmosphere do not relate to waste, since the Law “On Waste” regulates only relations in the field of solid waste management. Emissions and discharges of pollutants into the atmospheric air and into water bodies can be associated with waste legislation only from the point of view of eliminating the harmful effects on human health of unpleasant odors emitted by trash cans and waste storage facilities.

Over the past five years, refrigerator and air conditioner manufacturers have begun to implement production and disposal measures to standards similar to those adopted in the EU[4].

It is also worth emphasizing that in Uzbekistan the practice of recycling refrigerators and air conditioners on a paid basis has not yet been sufficiently developed.

In addition, it should be noted that taking into account the growth of all sectors of the economy, the annual increase in the use of cooling systems is 7%[5].

In turn, the Kyoto Protocol regulates only greenhouse gas emissions.

Disposal of OBM is a critical issue for developing countries that do not have the capacity needed to stockpile HCFCs and destroy their stockpiles. It is necessary to create industries for the collection and processing of HCFCs produced in these countries.

Decommissioning and disposal of refrigeration and climate control equipment in the countries of the European Union. The world community through amendments to the Montreal Protocol (London, 1990), (Copenhagen, 1992), (Vienna, 1995), (Montreal, 1997), (Beijing, 1999), (Kigali, 2016), Kyoto and Paris agreements works to prevent and reduce emissions. As a member of the international community, Uzbekistan has ratified all these agreements and assumed obligations to implement them. For example, by 2030 it is planned to reduce the consumption of HFCs.

In accordance with European legislation, liquefied gas produced under pressure to be destroyed is supplied as fuel to various industries. In Europe, the process of disposal and recycling of refrigeration appliances is regulated by the provisions of Regulation (EC) No. 2002/95/EC on the restriction of the use of hazardous substances in electrical and electronic equipment, which encourages companies and individuals to dispose of household appliances in a civilized manner. In addition to these regulations, there is also a European standard that defines the requirements for the handling, transportation, storage, sorting and recycling of household appliances containing volatile fluorinated gases, hydrocarbons or both[6]. In particular, the standard prescribes the requirements for the recycling process, indicating the components into which the equipment should be separated and describes the monitoring requirements.

Japan. The Basic Law “On a Sustainable Society” is in force, according to which companies are required to produce environmentally friendly products, select easily recyclable materials for production, and provide information on recycling methods.

It should be noted that the law “On enhancing the efficiency of the use of raw materials” was adopted, which covers 69 types of products produced in ten industries, that is, about 50% of all household and industrial waste. In accordance with this law, about two thousand enterprises have been built, specializing in the dismantling of old household appliances and others, as a rule, they include recycling shops, as well as many greenhouses heated by energy from waste combustion.

In Japan, businesses and municipalities are responsible for the disposal of industrial waste.

The objects of the Law “On the Recycling of Household Electronic Appliances” are refrigerators, freezers, air conditioners, televisions and washing machines. The law requires retailers and municipalities to collect and deliver old equipment to recycling facilities, with consumers paying for all collection and delivery services.

Japan has introduced the most stringent requirements for the write-off of refrigeration and air conditioning equipment, as well as the disposal of equipment. The consumer cannot even think about throwing the air conditioner into a landfill - the fines are very high. The population of Japan is forced to spend money on recycling large household appliances; transportation costs are also reimbursed by the owner of the equipment. So, to recycle one air conditioner, you will have to pay about \$200! In this country, air conditioners cannot be repaired at all.

Disposal of refrigeration equipment by legal entities. In recent years, the number of household appliances, especially refrigerators and air conditioners, has increased significantly. At the next stage, environmental requirements for the processing and disposal of these technologies are important.

When organizing their activities (according to their own charter), legal entities rely on a number of legislative acts of the Republic of Uzbekistan. Thus, they carry out their activities in accordance with the Land Code, the Labor Code, the laws of the Republic of Uzbekistan "On Nature Protection", "On Subsoil", "On Water and Water Use", "On Air Protection", "On Fire Safety", "On waste" and other by-laws.

As the experience of Injiniringklimatkontrol LLC (Bukhara) shows, if refrigerator disposal services should be simplified for the population, then special procedures should be established for legal entities.

In our opinion, an organization (company) must take the following measures before recycling refrigeration equipment:

- carrying out an examination of the condition of refrigeration equipment, confirming the need for disposal with a technical condition inspection report;
- carrying out an examination (write-off) of the condition of units of refrigeration units, with confirmation of the need for write-off based on an inspection report of the technical condition of the equipment at its disposal.

In this regard, noting the absence of a special regulatory act in the field of recycling, based on a study of practice, it is worth noting that the company involved in recycling directly dismantles the equipment, delivers it and disposes of it.

The organization's specialists quickly and professionally carry out examination, write-off, dismantling, removal and disposal of all types of household refrigerators, freezers, industrial refrigeration chambers, compressors and equipment.

Stages of disposal and recycling of refrigerators. Refrigeration units fail and break down due to normal wear and tear over time, non-compliance with operating rules, power surges or fires. Many owners of old equipment simply throw it in a landfill, not knowing or not thinking about what this will lead to. If you need to repair refrigerators, you should contact a specialized organization. The problem of disposing of old household appliances arises when a refrigerator breaks down, as well as when purchasing a new model. In this case, it is advisable to contact specialists from a specialized organization.

The disposal procedure is usually carried out in several stages:

1. At the preparation stage, an application is accepted from the owner of old or faulty equipment via a telephone call or by visiting the company's website[7]. Then the time for removal of faulty equipment is determined. A refrigerator to be disposed of is first prepared for this in a special way, for example, the power cord is cut off, and dismantling is carried out if it is built into a

kitchen unit. In addition, specialists remove glass shelves from the unit, as well as containers that are used to place various products in them.

2. At the loading stage, specialists arrive in prepared cargo transport at the address specified by the customer. In this case, you need to pay attention to ensure that the tubes of the refrigeration unit with freon do not break. To place refrigerators in cars, reliable fastenings are provided that prevent them from falling and being damaged.
3. At the transportation stage, refrigerators are delivered to a collection point, where they are disassembled into parts. Equipment that can no longer be used is then disposed of.
4. At the disposal stage, refrigerators are taken to specially designated places on prepared sites. Here, the equipment is directly dismantled and hazardous and harmful substances are destroyed. An important step in recycling refrigerators is pumping out freon, which is a harmful substance that destroys the ozone layer[8].

It will take some time to prepare one refrigerator for disposal. After this, non-ferrous metals, electronics if present, as well as plastic parts that can be recycled are removed from it.

At the end of this work, the iron boxes of the refrigerators are compressed in a special press with enormous force, as a result of which they become flat boxes of small sizes. Then the resulting metal from the refrigerator is sent for processing to metallurgical plants. Plastic parts are crushed in special crushers and then sent for further processing. The entire process of disassembling equipment takes place taking into account environmental safety standards, and therefore does not harm the environment.

Main conclusions, suggestions and recommendations.

1. To establish a closer acquaintance with the activities of legal entities specializing in the disposal (dismantling) of refrigeration and climate control equipment based on the best global practices, use of services, creation of a platform on the legal framework (website);
2. When developing a separate regulatory legal act, it is necessary to determine appropriate incentive measures for legal entities and individuals who have taken measures for the established (civilized) disposal of refrigeration and climate control equipment;
3. It is necessary to organize on a systematic basis the advanced training of personnel of specialized organizations engaged in this activity;
4. In accordance with Article 11 of the Law of the Republic of Uzbekistan “On Waste”, local government authorities also monitor compliance with legislation on waste management. However, the procedure for carrying out this control has not been developed.

It is advisable for local government authorities to exercise control in this area by organizing the registration of enterprises engaged in waste removal, hearing their reports and creating a commission to verify the legality of their activities.

5. In the field of environmental legislation, the issue of protecting the ozone layer has not found its conceptually justified expression. In addition, the law “On the Protection of Atmospheric Air” was adopted in the 90s of the 20th century, when the significance of the “ozone problem” was not at the level of the current 21st century[9]. Article 19 of the current law of the Republic of Uzbekistan “On the protection of atmospheric air” by law dated March 13, 2019 No. 529 was supplemented by rules establishing requirements for the prevention of harmful effects on the ozone layer. At the same time, in the Republic of Uzbekistan it is necessary to adopt a law “On the protection of the ozone layer”, similar to those already adopted in some member states of the Commonwealth of Independent States (CIS) (Belarus, Kyrgyzstan, Armenia, etc.). Moreover, it must include the legal, economic and organizational framework for the protection and

preservation of the ozone layer, the international obligations of the Republic of Uzbekistan to protect the ozone layer. In order to protect human life and health and the environment from the adverse consequences of depletion of the ozone layer, this law should be aimed at preventing depletion of the ozone layer, as well as its restoration.

6. Establishment, in accordance with the legislation of the Republic of Uzbekistan, of a preferential taxation and lending regime for legal entities and individuals making the transition to ozone-safe substances and technologies.

LIST OF MATERIALS USED AND RECOMMENDED

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