GREEN CHOICE PHILIPPINES

NELP-GCP 20250036
REFRIGERATORS AND FREEZERS

I. BACKGROUND

The refrigeration sector plays an important role in the preservation of food products, medicine and even industrial chemicals. Over the years, refrigerating appliances evolved as there are new technological innovations in the mechanism, design and configurations, and energy efficiency.

Based on PNS IEC 62552-1 to 3: 2016 Household refrigerating appliances – Characteristics and test methods there are two main types of refrigerators: 1) compression-type refrigerating appliance in which refrigeration is done by means of a motor driver compressor, and 2) absorption-type refrigerators in which refrigeration is affected by an absorption process using heat as an energy source.

Household refrigerators are becoming more of a necessity to prolong the food shelf life, which directly impacts the demand for this particular product. As the refrigeration demand surges, the concerning environmental impacts must also be taken into consideration.

Through the National Ecolabelling Programme - Green Choice Philippines (NELP-GCP), the development of an ambitious ecolabelling criteria aims to combat key environmental issues in the product life cycle of the refrigerators and freezers in terms of energy efficiency, health and safety, noise control, and waste management.

A. MARKET DESCRIPTION

Refrigerators were popularized in the late 1920s in private homes, followed by the popularization of home refrigeration in the 1930s. The introduction of refrigeration in the market has gained a significant surge in demand, hence the technological advancements.

In a global context, an approximate of 2 billion units of refrigerators and freezers is operating based on the 2018 Assessment Report of Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee and the domestic refrigerators and freezers consume almost 4% of global electricity.

In the Philippines, domestic refrigerators are commonly used cooling appliances in terms of equipment and emissions projecting to reach 30 million units by 2050 (C4 Inventory Philippines, 2019). This market growth is driven by the people’s increasing purchasing power due to rapid urbanization and improved living standards which enables the consumers to invest in different household appliances like refrigerators and freezers, which helps preserve food products. Rapid

urbanization and modern digitalization also increases the retail and e-commerce platform making the products more accessible to the consumers across the country (6Wresearch, 2023).

Figure 1 presents the exports and imports data of consumer electronics from 2018 to 2022.The graph shows a fluctuating trend due to the experienced pandemic in 2020. Consumer electronics along with semiconductor components, electronic data processing, office equipment, telecommunication, communication/radar, control and instrumentation, medical/industrial instrumentation, and automotive electronics are all classified under the electronic group, which is a commodity group with the highest export and import value according to the Philippine Statistics Authority in the February 2024 Preliminary Highlights of Philippine Export and Import Statistics.

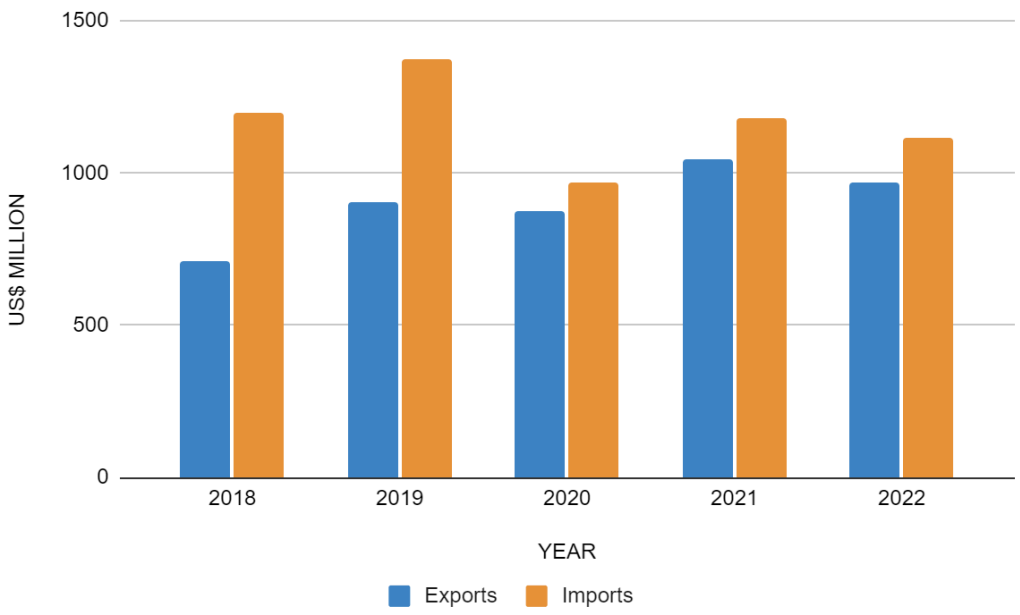

Figure 1 Exports and Imports Data for Consumer Electronics from 2018 to 2022 (in US$ Million)

Source: Semiconductor and Electronics Industries in the Philippines Foundation, Inc. (SEIPI)

In the report of OEC in 2022, Philippines exported 57.8 million US$ and imported 479 million US$ in refrigerators, making the country the 51st largest exporter and 32nd largest importer in the world, respectively.

This sub-sector falls under the more general category of the electronics industry. The electronics industry has always been the largest contributor to the manufacturing industry in the Philippines. In 2022, the sector accounted for an approximate of 62.3% of total exports and 23.9% of total imports. Not only it brings domestic and foreign investments, but also employs the highest number of workers, accounting to 16.1% of the total workforce in the manufacturing industry in 2021 (PSA, 2021).

In a local context, Table 1 shows the inventory of the Department of Energy (DOE) for the registered refrigerating appliances in the Philippine Energy Labeling Program (PELP) for the year 2021 and 2022. The refrigerants used in the Philippines for refrigerating appliances with volume capacity of 113L to less than 350L are R134a and R600a, which are also used for 350L above. Local manufacturers increased their output from 2021 to 2022 as the economy recovered and industry workforce resumed after the pandemic. The high number of imported products in the Philippine market has been visible since 2021 but it significantly decreased by 6.68% by 2022.

Volume	Refrigerant	2021 Inventory (Local)	2021 Inventory (Imported)	2022 Inventory (Local)	2022 Inventory (Imported)
113L to <350L	R134a	0	83,667	6,476	67,291
	R600a	209,033	903,029	244,214	815,647
equal or >350L	R600a	246	49,161	0	83,731
Total		209,279	1,035,857	250,690	966,669

Table 1. Inventory of Registered Refrigerating Appliances from 2021-2022
Source: Department of Energy - Philippine Energy Labeling Program

Table 2 shows the refrigerant amounts introduced in the market for the year 2021 and 2022. R134a has been introduced in the market in 2022 as it has no recorded data from 2021. Meanwhile, the R600a production in refrigerating appliances locally increased in 2022 causing the import industry to decrease its production. The R600a available for refrigerating appliances with 350L volume and above has been dissolved in local production by 2022.

Volume	Refrigerant	2021 Local x Refrigerant Amount (Kg)	2021 Imported x Refrigerant Amount (Kg)	2022 Local x Refrigerant Amount (Kg)	2022 Imported x Refrigerant Amount (Kg)
113L to <350L	R134a	0	9,633	1,619	4,562
	R600a	8,399	41,124	11,626	35,928
equal or >350L	R600a	17	4,287	0	5,603
Total		8,415	55,044	13,245	46,092

Table 2. Inventory of Registered Refrigerating Appliances multiplied by Refrigerant Amount from 2021-2022
Source: Department of Energy - Philippine Energy Labeling Program

In the Philippine market, the available domestic refrigerating appliances have a capacity ranging from 1.8 cu.ft (~51 L) to 25.7 cu.ft (~728 L), which was obtained from three local appliance vendors, namely Abenson, Anson's and SM Appliances.

Currently, there are a large number of AC manufacturers providing a wide range of refrigerating appliances unit types, specifications, and capacities depending on the needs of the market. The major players in the refrigeration industry such as LG, Samsung, Panasonic, Haier, Hitachi, Daikin, Midea and among others are competing in the international and local markets. Meanwhile, there is one local manufacturer available, namely, Concepcion Industrial Corporation, in the country.

However, concerns related to energy consumption, energy costs, and environmental impact arise as the refrigerators market progresses. This leads to the progression in the development of energy-efficient and environment-friendly refrigerators to minimize energy costs and lessen the environmental impact. Industry leaders are leaning toward low GWP refrigerants, such as R600a and R290 to capitalize the consumer's interest in environment-friendly products.

In fact, as of June 30, 2024, there are 1,420 refrigerating appliance units with issued energy labels from the Philippine Energy Labeling Program of the Department of Energy. This shows that the market is ready for the demand for energy-efficient products. And in terms of refrigerators product safety issued by the Bureau of Philippine Standards of the Department of Trade and Industry, as of March 31, 2024, there are 64 Philippine Standards licensees and 88 Import Commodity Clearance (ICC) Certificate holders.

B. ENVIRONMENTAL INITIATIVES

Most refrigerants used in refrigerators pose a threat to the environment due to their ozone depletion potential (ODP) and global warming potential (GWP). Chlorofluorocarbons (CFC) are now banned while hydrochlorofluorocarbons (HCFC) are prohibited in developed countries, while developing countries have until 2030 to phase it out. Hydrofluorocarbons (HFCs), another type of greenhouse gas, have no ODP. However, they do have the potential to contribute significantly to climate change. Its use is expected to increase in the coming decades mostly due to the increased demand for refrigeration and air-conditioning. They are listed under the Kyoto Protocol in the United Nations Framework Convention on Climate Change (UNFCCC) as substances whose emissions are to be limited or reduced.

The Department of Environment and Natural Resources (DENR) issued DAO 2013-25 Revised Regulations on the Chemical Control Order (CCO) for ozone-depleting substances (ODS) to regulate and restrict the importation, sale, distribution, and disposal of chemical substances that deplete the ozone layer. This is to support the implementation of the Philippine Hydrochlorofluorocarbon (HCFC) Phase-out Management Plan (HPMP).

Last 2016, the Montreal Protocol adopted the Kigali Amendment to phase down HFCs with high global warming potential by 80-85% by the late 2040s. This will make a major contribution to the fight against climate change goal of the Paris Agreement which aims to hold the average global

temperature increase below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. This set emissions targets, carbon neutrality, and policies for the 2020 - 2030 period of the Intended Nationally Determined Contributions (INDC) for both developed and developing countries.

The country's commitments to the ratification of the Kigali Amendment to the Montreal Protocol that is effective since February 2023, introduced measures to support the industry to shift towards more climate-friendly alternatives. This includes the reduction of greenhouse gas emissions and subscription to the net zero. In support, the Department of Environment and Natural Resources - Environmental Management Bureau (DENR-EMB) issued DAO-2021-31 CCO for HFCs that prohibits and regulates the use, import, and possession of the priority chemicals that are determined to be regulated, phase-down, or banned. The regulations drive the market shift towards climate-friendly Refrigeration and Air Conditioning (RAC) technologies and equipment and proper management of refrigerants during work up to its disposal stage.

The Philippine government has currently existing CCOs that will serve as the basis for the control of imports and use of Hydrochlorofluorocarbon (HCFC). The UNIDO proposed for the stage III of the HCFC phase-out management plan (HPMP) that aims to phase out the remaining consumptions of HCFCs by 2030 through strengthening the RAC sector and updating the legal framework in the country. The 1st Stage of HPMP met the 10% reduction from the baseline by 2015 resulting in the phase-out of 45.0 ODP tonnes of HCFCs. Meanwhile, the stage II phase out 24.59 ODP tonnes of HCFCs used in the RAC servicing and air conditioner (AC) manufacturing sectors to meet the 35% reduction from the baseline by 2020 and 50% by 2021.

Another country's initiative is the establishment of the Philippine Energy Labeling Program (PELP) of the Department of Energy (DOE) as part of the enactment of Republic Act 11285, otherwise known as the "Energy Efficiency and Conservation (EE&C) Act". The PELP is the national labeling system for energy-consuming products based on the energy performance of products and for the compliance of manufacturers, distributors, importers, and dealers. The law drives the manufacturers to take the initiative in increasing energy efficiency in cooling systems, judicious utilization of energy, and reducing overall cooling needs of the product to comply with the Minimum Energy Performance (MEP).

Moreover, the Technical Education and Skills Development Authority (TESDA) through a cooperation agreement with the *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)* introduced the safe use of the R290 hydrocarbon refrigerant for split-type air-conditioning systems as part of Cool Contribution fighting Climate Change (C4) Project. They conducted a "green" technical and vocational education and training (TVET) (Green TVET) forum to adopt more environmentally safe technology and encourage technical-vocational (tech-voc) scholars to support the government's advocacy to protect and preserve the environment in 2018.

Meanwhile, on the side of the private sector, the use of natural refrigerants and maximizing energy efficiency are part of "green cooling initiatives". In fact, several manufacturing companies are already incorporating these into their product (mostly on energy efficiency). For example,

Hitachi uses Dual Fan Cooling to speed up the cooling process, together with Frost Recycling Cooling with Hybrid Defrost and intelligent energy saving will effectively reduce energy consumption. Meanwhile, Cold Front was the very first company in the Philippines to use R290 natural refrigerant with a rating of 0 ODP and 3 GWP. The mainstream of the consumer in the innovation of inverter technology in the RAC sector to save electric consumption is considered as their best practice in terms of energy efficiency.

Appliances industry players are currently not implementing take back policy in the country. However, the government shows continuous effort to lead the initiatives in managing electronics waste. The DAO-2013-22 or the "Revised Procedures and Standards for the Management of Hazardous Waste" classified e-waste as a new class of miscellaneous waste with waste numbers M506 (Waste Electrical and Electronic Equipment or WEEE) and M507 (special wastes). The DAO mandates LGUs to ensure and enforce proper handling of e-waste to registered local Material Recovery Facility (MRF). Moreover, DENR-EMB has issued a draft document of the "Guidelines on the Environmentally Sound Management (ESM) of WEEE, to provide a framework for the proper management of WEEE, promote the reuse of EEE and its components, and encourage the participation of all relevant agencies and stakeholders in the life cycle of EEE. The Guidelines also aim to institutionalize extended producers responsibility (EPR) of producers and importers for a product to the post-consumer stage up to its entire life cycle Cuñado (2020). Lastly, in the 17th Congress, Senate Bill No. 568 (E-waste and Cellular Phones Recycling Act) aims to provide a "manufacturers responsibility" approach system of collection, transportation, and recycling of e-waste.

II. DEFINITION OF TERMS

Blowing (foaming) agent - A substance (gas, liquid, chemical) that is able to produce cells in the plastic structure of a foam. This process can vary according to the property of the substance: a liquid may develop cells when changing into gas, a gas may expand when pressure is released, a chemical may react under certain conditions to form a gas. *(Proklima International, Natural Foam Blowing Agent).*

Commercial Refrigerators - used for storage and display of products in food and drink retail (supermarkets, convenience stores, shops etc.) and in food service (restaurants, hotels etc.) (*UNEP Ozone Secretariat Workshop on HFC management: technical issues, 2015)*

Domestic Refrigerators - used for the storage of chilled and frozen food and drink products. The sector includes refrigerators, freezers and fridge-freezers. (*UNEP Ozone Secretariat Workshop on HFC management: technical issues, 2015)*

Freezer - A cabinet designed as a unit for the storage of food at temperature of -18 °C, or below, having the ability to freeze food, and having a source of refrigeration requiring electrical input only. *(PELP Implementing Guidelines for Refrigerating Appliances)*

Global Warming Potential (GWP) - A relative measurement used to estimate, compare, and collate the relative radiative effects of different greenhouse gasses *(UNFCCC, 2004)*.

Import Commodity Clearance (ICC)- is issued to an importer whose imported products have shown conformance to relevant PNS through inspection and product testing by the BPS Testing Laboratory or BPS-recognized testing laboratory. *(DTI Department Administrative Order No. 5 Series of 2008)*

Kigali Amendment - An amendment between parties to the Montreal Protocol to actively phase down and regulate Hydrofluorocarbons (HFCs). *(United Nations Environment Programme)*

Minimum Energy Performance (MEP)- refers to the minimum energy performance set by the DOE for specific energy consuming products. *(IG on PESLP for Energy Consuming Products).*

Montreal Protocol - A multilateral environmental agreement among different states and organizations that modulates the production and consumption of almost 100 man-made chemicals that are categorized as ozone depleting substances. *(United Nations Environment Programme)*

Ozone-Depleting Substances (ODS) - any substance which is controlled under the Montreal Protocol and its amendments. ODS includes CFCs, HCFCs, halons, carbon tetrachloride, methyl chloroform, hydrobromofluorocarbons, bromochloromethane, and methyl bromide. ODS has an ozone-depleting potential greater than zero (0) and can deplete the stratospheric ozone layer. *(DENR Administrative Order No. 2013 - 25)*

Ozone Depletion Potential (ODP) - A number that refers to the amount of ozone depletion caused by a substance. *(US EPA)*

Philippine Energy Labeling Program (PELP) - is one of the initiatives of the Department of Energy as part of the enactment of Republic Act 11285 Energy Efficiency and Conservation (EE&C) Act, which was approved on 12 April 2019. The PELP provides for a national labeling system for energy consuming products (ECPs) based on the energy performance of products. *(Department of Energy)*

Philippine Standard Quality and/or Safety Certification Mark - is granted to either local or foreign manufacturer whose factory and product have successfully complied with the requirements of the PNS ISO 9001 and the relevant product standard/s, respectively. *(DTI Department Administrative Order No. 04 Series of 2008)*

R290 - is a refrigerant grade propane, a natural, or "not in kind", refrigerant suitable for use in a range of refrigeration and air conditioning applications. The use of R290 is increasing due to its low environmental impact and excellent thermodynamic performance. It is non-toxic with zero ODP and very low GWP.

R600a - is a refrigerant gas that is being increasingly used due to its low environmental impact and excellent thermodynamic performance. It is now the refrigerant gas of choice in domestic and small commercial refrigerators. It is non-toxic with zero ODP and very low GWP.

Refrigerant - Fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure of the fluid and rejects it at a higher temperature and a higher pressure of the fluid usually involving changes of the phase of the fluid *(ISO 817:2014)*

Refrigerating Appliance - Insulated cabinet with one or more compartments that are controlled at specific temperatures and are of suitable size, cooled by natural convection or a forced convection system whereby the cooling is obtained by one or more energy-consuming means. *(PELP Implementing Guidelines for Refrigerating Appliances)*

Refrigerator (household or consumer-type) - Refrigerating appliance intended for the storage of foodstuff, with at least one fresh food compartment. *(PELP Implementing Guidelines for Refrigerating Appliances)*

Refrigerator-Freezer - Refrigerating appliance having at least one fresh food compartment and at least one freezer compartment. *(PELP Implementing Guidelines for Refrigerating Appliances)*

Restriction of Hazardous Substances (RoHS) - It is a directive in the European Union that regulates the use of hazardous substances in electrical and electronic equipment (EEE) to protect the environment and public health. *(European Commission)*

Take Back Program - a structured system implemented by a product manufacturer or retailer to collect used or end-of-life products for recycling, reuse, or disposal. These programs are driven by a combination of environmental responsibility, regulatory compliance, and consumer demand. *(Landbell H2 Compliance)*

Waste Electrical and Electronic Equipment (WEEE) - electrical or electronic equipment which is waste within the meaning of Article 1(a) of Directive 75/442/EEC, including all components, sub-assemblies and consumables, which are part of the product at the time of discarding. *(European Environment Agency).*

Warranty or Guarantee - means a contract, whether express or implied, between the buyer and the seller, manufacturer, producer or distributor of a consumer product or the owner or operator of a consumer service firm concerning the rights and obligations of both parties in a consumer sale or lease transaction. *(Implementing Rules and Regulations of RA 7394 or the Consumer Act of the Philippines)*

III. SCOPE

These criteria are applicable to household refrigerators and freezers with capacity of 113 L and above.

IV. GREEN CHOICE PHILIPPINES REQUIREMENTS

To carry the Green Choice Philippines Seal of Approval, a product must meet the following requirements.

CRITERIA	VALIDATION METHOD
A. Packaging	
1. The packaging materials shall not use materials that pose unreasonable risk to human health and environment, and do not release harmful substances.	Documentation and certification provided by applicant company
2. All packaging components shall be easily separated from individual materials without using special tools to facilitate recycling. These components shall include but not limited to carton box, polystyrene foam, plastic cover, plastic straps with metal clamps, and staple wire.	Documentation and certification provided by applicant company
3. Where used, corrugated fiberboard packaging shall consist of at least 80% recycled material.	Documentation and certification provided by applicant company
B. Marking and Labelling	
1. Plastic parts heavier than 50 grams shall have a permanent marking identifying the material, in conformity with the latest version or new reference standard of PNS ISO 11469 Plastics — Generic identification and marking of plastics products.	Documentation and certification provided by applicant company
2. The type of refrigerant (including GWP value), charge weight, and noise level shall be indicated on the appliance, on the nameplate, to facilitate possible future recovery.	Documentation and certification provided by applicant company
C. Instructions and Manual	
1. The appliance shall be sold with the user	Visual inspection, documentation and

manual, which provides instructions on the appropriate environmental use. The user's manual shall include the information on how to minimize environmental impacts. The following technical information shall be specified in the user's manual: - Instructions on the positioning of the machine - Information about how and where the used and decommissioned products/parts can be returned for recycling and/or disposal - Information on disposing the waste as a whole unit - Information on chemical used and hazardous components of the unit. - Servicing of the unit shall be conducted by an authorized technician. - Information on the optimal use of energy in the operation of the appliance	certification. The applicant shall submit a portfolio and statement in writing signed by the Chief Executive Officer or authorized representative of the company and shall be accompanied by the relevant documentations. Review of actual user's manual during inspection and review.
D. Energy Efficiency	
1. The product should conform to the rules and regulations in the Implementing Guidelines of the Philippine Energy Labeling Program for Refrigerating Appliances 2024, 1st Edition, and its future amendments.	The applicant shall present the issued energy label from the Department of Energy. If applicable, accredited third party certification or documentation shall be submitted.
2. The product shall meet a 5-star Energy Efficiency Performance Rating (EEPR) from the Department of Energy - Philippine Energy Labeling Program.	The applicant shall present the issued energy label from the Department of Energy.
E. Safety	
1. The product shall conform to the mandatory DTI-BPS standards based on the following: a. Department Administrative Order (DAO) No. 18-03, Mandatory Philippine National Standards (PNS) for Household and Similar Electrical Appliances adopts	The applicant shall present the Philippine Standards (PS) license or Import Commodity Clearance (ICC) Certificate from the DTI - Bureau of Philippine Standards.

the Philippine National Standard b. Department Administrative Order (DAO) No. 22-01, Series of 2022 The New Technical Regulation concerning the Mandatory Product Certification of Energy-Consuming Products; and c. Department Administrative Order (DAO) No. 22-02, Series of 2022 Updating of the Reference Standards Used in the BPS Mandatory Product Certification Schemes	
F. Environmental Criteria	
1. The manufacturing process shall comply with applicable regulations on the use of controlled substances and must meet all government regulations on safety, health and the environment.	Documentation and certification provided by the applicant company which includes a list of chemicals used in the product and its manufacturing process. The applicant shall have an environmental management system aligned with the requirements of the latest version or new reference standard of PNS ISO 14001.
2. The refrigerants in the refrigerating circuit and foaming agents used for the insulation of the appliance shall have an ozone depletion potential equal to zero.	Documentation and certification provided by the applicant company including a list of refrigerants and foaming agents that are used and a declaration from the supplier of the refrigerants and foaming agents that the criteria is fulfilled.
3. The refrigerants in the refrigerating circuit and foaming agents used for the insulation of the appliance, shall have a global warming potential (GWP) equal to, or lower than, 15 (rated as CO2 equivalents over a period of 100 years).	Documentation and certification provided by the applicant company including a list of refrigerants and foaming agents that are used with their GWPs, and a declaration from the producer/supplier of the refrigerants and foaming agents that the requirement is fulfilled.
4. All parts and components of the product shall be RoHS-compliant.	Documentation, certification provided by the applicant company, and inspection.
5. Lead content in paints shall comply with DAO 2013-24.	Documentation, certification provided by the applicant company, and inspection.

<table>
<tr><td>6. The materials must be simple to reuse, repurpose, and recycle.

The product must be designed so that when it reaches its end-of-life, at least 75% by weight of the appliance can be recycled.</td><td>Documentation, certification provided by the applicant company, and inspection.</td></tr>
<tr><td colspan="2">G. Take Back System</td></tr>
<tr><td>1. The applicant shall have an established take back program for the retrieval of its product from end-users.</td><td>The applicant shall submit its take back program mechanism ensuring the compliance to the technical requirements of the instructions and manual and all applicable rules and regulations.</td></tr>
<tr><td colspan="2">H. Noise Management</td></tr>
<tr><td>1. No evident noise should be produced when the refrigerator is running. Its sound power level should not be higher than 44dB (A).</td><td>Documentation, certification provided by the applicant company, and inspection.</td></tr>
<tr><td colspan="2">I. Warranty</td></tr>
<tr><td>1. The manufacturer shall offer a commercial guarantee that the appliance will function properly for at least ten (10) years. This guarantee shall be valid from the date of delivery to the customer.

The manufacturer shall guarantee the following:
<table>
<tr><td colspan="2">Warranty (Years)</td></tr>
<tr><td>Parts and Labor</td><td>1</td></tr>
<tr><td>Printed Circuit Board</td><td>3</td></tr>
<tr><td>Compatible replacement parts</td><td>10</td></tr>
<tr><td>Compressor</td><td>12</td></tr>
</table></td><td>Documentation, certification provided by the applicant company, and inspection.</td></tr>
</table>

Note: The criteria above are only applicable for refrigerator / refrigerator-freezer type products. It will be applicable for freezer products once the DOE issues the Philippine Energy Labeling Program (PELP) Implementing Guidelines for Freezers with Energy Efficiency Performance Rating / Star Rating.

V. PERIOD OF VALIDITY

The product criteria is valid for three (3) years from the date of its approval unless otherwise revised or withdrawn by the NELP-GCP Board, if proven necessary at any period of time.

VI. REFERENCES

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VII. TECHNICAL COMMITTEE MEMBERS

Institution	Member and Alternative
International Institute for Energy Conservation (IIEC)	Engr. Arturo Zabala
Department of Energy - Energy Utilization Management Bureau (DOE-EUMB)	Engr. Aaron Premacio Engr. Daniel Vincent De Guzman
Department of Energy - Energy Research and Testing Laboratory (DOE-ERTLS)	Engr. Isagani Soriano Engr. Kristian Carlo Victorio
DENR-Environmental Management Bureau (DENR-EMB)	Mr. Gilbert Maximo Mr. Onofre Escota
DENR-Climate Change Services (DENR-CCS)	Mr. Rolando Abad Jr
Department of Trade and Industry - Bureau of Philippine Standard (DTI-BPS)	Engr. Avelino Molina Jr.
OMNI SOLID SERVICES, INC.	Mr. Johnny Quinto
Philippine Appliance Industry Association (PAIA)	Mr. John Paulo Barbosa