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Products insights report

# Commercial products

TE TARI TIAKI PŪNGAO
ENERGY EFFICIENCY & CONSERVATION AUTHORITY

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# Report summary

This commercial products insights reports is designed to inform purchasers and product suppliers about trends in energy efficiency technology, as well as market trends for the commercial products that EECA (the Energy Efficiency and Conservation Authority) is responsible for regulating.

The report addresses the following regulated commercial products:

- air conditioners (multi-split, packaged and variable refrigerant flow (VRF)) to 65kW – Section 2
- refrigerated cabinets – Section 3
- three-phase electric motors – Section 4.

All of the products included in the report are subject to minimum energy performance standards (MEPS) or mandatory energy performance labelling (MEPL), or both. These regulatory initiatives have been in place for more than 20 years, with the purpose of regulating poorer performing products out of the market (via MEPS) and helping consumers to choose products that use less energy (via MEPLs), thereby saving them money and reducing the country's energy requirements.

There has been a general trend over time to increase the standards that apply to existing regulated products, or add new products to the MEPS regime and improve labelling information.

## About this analysis

The analysis to prepare this report was based largely on a database of product registration data held by EECA (the Energy Efficiency and Conservation Authority).

The following terms and definitions, relevant to this analysis, apply across all of the product categories assessed in the report.

- **Sales-weighted averages** – used to calculate average figures for a variety of features and metrics based on a weighted average number of models sold, thus taking into account the popularity of models. For example, the average capacity of an air conditioning system or the average efficiency of a three-phase electric motor.
- **Supplied products** – used to encompass all products advertised for supply, lease, hire or purchase.

## Summary of key insights

**Energy efficiency is steadily improving.** Across the three product categories analysed, the products sold are becoming more energy efficient.

The energy used by air conditioning systems and refrigerated cabinets is decreasing, while for three-phase electric motors, there are moves towards companies buying more efficient classes of motors. Initially there was a move from less efficient motors towards IE2 (high efficiency) motors, followed by a move from IE2 to IE3 (premium efficiency) motors. However, over the past 4 years there has been very little change in the average efficiency, with only 3% of motors that are sold being IE4 (super premium efficiency) motors.

**Increasing brands and choice**. Across all product categories there has been significant growth in the range of companies, brands and models operating in the New Zealand market, giving consumers a much wider range of choice than was available previously.

**Changes in country of manufacture**. With the exception of air conditioning systems, where there is insufficient data to be able to analyse this factor, there is a noticeable trend towards Chinese manufactured products.

China has been the dominant supplier of three-phase electric motors supplied in New Zealand, being the source of 20% to 45% of motors over that time. For refrigerated cabinets, over the past 15 years, products from China have steadily increased and are now the dominant source at 74% of sales. Sales of New Zealand manufactured products generally comprised 30% to 50% of sales from 2005 to 2019, but have now declined to a small percentage of the market.

**Shift in refrigerants.** There is a strong move towards lower global warming potential (GWP) and low ozone depleting potential (ODP) refrigerants being used in air conditioners. The majority of commercial air conditioning systems now use R32 as a refrigerant, having moved away from the higher GWP R410A refrigerant, which was the dominant refrigerant unit around 2021/22.

**Sales trends are not related to economic conditions.** Sales of three-phase electric motors were relatively flat from 2010 to 2024. By contrast, sales of air conditioning systems increased sevenfold between 2016 and 2024, and refrigerated cabinet sales doubled from 2016 to 2024. This indicates there is no real correlation between growth in the economy and purchasing patterns for these products.

# 1. Overview and purpose of these reports

This report is part of a series of product insights reports from EECA (the Energy Efficiency and Conservation Authority), which have the purpose of informing consumers and product suppliers on trends in energy efficiency technology and market trends for regulated products.

This report focuses on a number of commercial product categories that are regulated in New Zealand and required to comply with the minimum energy performance standards (MEPS) or the mandatory energy performance labelling (MEPL) regime, or both.

## 1.1 Data sources and analysis methodology

The insights in this report are based on an analysis of product registration and sales data held by EECA, captured as part of the Energy Efficiency (Energy Using Products) Regulations 2002, and supplemented by research into each of the product categories.

The data used for all products is for sales for the year ending 31 March. This means that data that is identified as, for example, 2024, represents data for the period 1 April 2023 to 31 March 2024.

The analysis involved the following steps:

- raw data was extracted from a database of product registrations held by EECA
- the data was checked and assessed for invalid values
- analysis and calculations of key parameters was conducted for each product, including sales-weighted averages, size distributions and efficiency measures
- results were output as pivot tables and charts for inclusion in these reports.

## 1.2 Report structure

There is a separate section in the report for each of the product categories analysed. Each section covers:

- description of product class
- relevant regulations
- market and sales trends
- product trends
- product efficiency trends
- additional commentary
- summary of key insights.

# 2. Commercial air conditioners and heat pumps

## 2.1 Description of product class

Reverse-cycle air conditioners (aka. heat pumps) are a highly efficient form of heating and cooling. Their heating energy efficiency is measured using the coefficient of performance (COP), which is the ratio of heat energy output to electric energy input. Their cooling energy efficiency is measured using the energy efficiency ratio (EER). COPs typically range from 3 to 5.5 and EERs from 3 to 5.

Heat pumps within the scope of EECA's regulatory programme are electrically powered and use a vapour compression refrigerant cycle to provide cooling, or heating when operating in reverse-cycle.

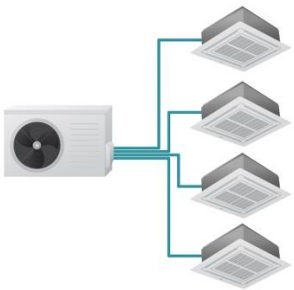
The main types of air conditioning systems used in New Zealand in the commercial sector include:

- multi-split systems
- packaged systems
- variable refrigerant flow (VRF) systems.

Smaller air conditioning (heat pump) systems of 20kW or less, and of the single-split or ducted type typically used in residential settings, are also installed in some commercial situations, but it is not possible to quantify the exact extent of this commercial use.

A summary of commercial air conditioning systems, including descriptions and key statistics is shown in Table 1.

**Table 1: Summary of commercial air conditioning systems**

| Type | Multi-split | VRF | Packaged |
|---|---|---|---|
| |  |  |  |
| Description | Connect multiple indoor units (e.g. wall-mounted, ducted, cassette) to a single outdoor condenser unit. They are typically used in medium- and large-sized residential or light commercial buildings where different rooms or zones require individual temperature control. They offer independent control of each indoor unit and offer a limited number of indoor units (usually 2 to 5). | A type of advanced multi-split system that uses a variable-speed compressor to regulate the flow of refrigerant to multiple indoor units, allowing for individual zoning and simultaneous heating and cooling. They are commonly used for large commercial buildings, apartment complexes and multi-storey offices where zoning flexibility is | Integrate all components (compressor, evaporator and condenser) into a single outdoor unit. They are commonly used in commercial buildings, schools or retail premises where ductwork is distributed from a central location. They offer easier installation and maintenance than split systems for larger buildings. |

| Type | Multi-split | VRF | Packaged |
|---|---|---|---|
| | | important. They offer precise temperature control in each zone and can support many indoor units per system. | |
| Market share of sales in 2024 | 57% | 37% | 6% |
| Average heating capacity | 8.5kW | 18.0kW | 31.3kW |
| Average cooling capacity | 7.4kW | 16.7kW | 19.7kW |
| Average COP at full load | 4.7 | 4.4 | 3.4 |
| Average EER at full load | 4.1 | 3.75 | 3.4 |
| HSPF* – cold commercial zone | 4.3 | 3.8 | 2.8 |
| CSPF* – cold commercial zone | 6.5 | 5.9 | 5.0 |
| Dominant type of refrigerant | R32 | R410A | R410A |

Note: * HSPF = heating seasonal performance factor; CSPF = cooling seasonal performance factor

## 2.2 Relevant regulations

**Air conditioners <= 65kW**

Commercial air conditioners with a capacity of 65kW and under must comply with MEPS requirements. They are regulated in both Australia and New Zealand, with most common types also required to have a zoned energy rating label (ZERL).[1]

The majority of air conditioning systems in this category that are between 20kW and 65kW would be used for commercial applications.

In New Zealand, the requirements are set out in the Regulations, which in turn reference AS/NZS 3823.42:2014 - Performance of electrical appliances: Air conditioners and heat pumps.

[1] Note that the requirement to display the ZERL only applies in physical stores and is not required online.

Since 1 July 2021, updated regulatory requirements have applied to commercial air conditioners in New Zealand, including:

- the performance of products is to be assessed using the seasonal energy efficiency ratio (SEER) standard for energy efficiency rating purposes
- some products are required to carry a ZERL, which replaces the previous energy rating label and uses SEER data as an input. (Note: certain product types, such as ducted units, are required to test and register this information, but do not need to display the ZERL).

The introduction of the ZERL means labels now show energy ratings for three climate zones across Australia and New Zealand. For devices capable of both heating and cooling, the ZERL shows heating and cooling ratings for each of the three climate zones. The heating seasonal performance factor (HSPF) is calculated in accordance with clause 6.1 of AS/NZS 3823.4.2:2014 and derived from the use of rated values. The rating corresponds directly to the HSPF according to a table of values within certain ranges.

**Air conditioners > 65kW**

Air conditioners above 65kW, which are typically used in very large commercial and industrial settings, are not currently regulated in New Zealand. However, proposals are in place to introduce MEPS for this category of air conditioners, to align with Australia's regulations.

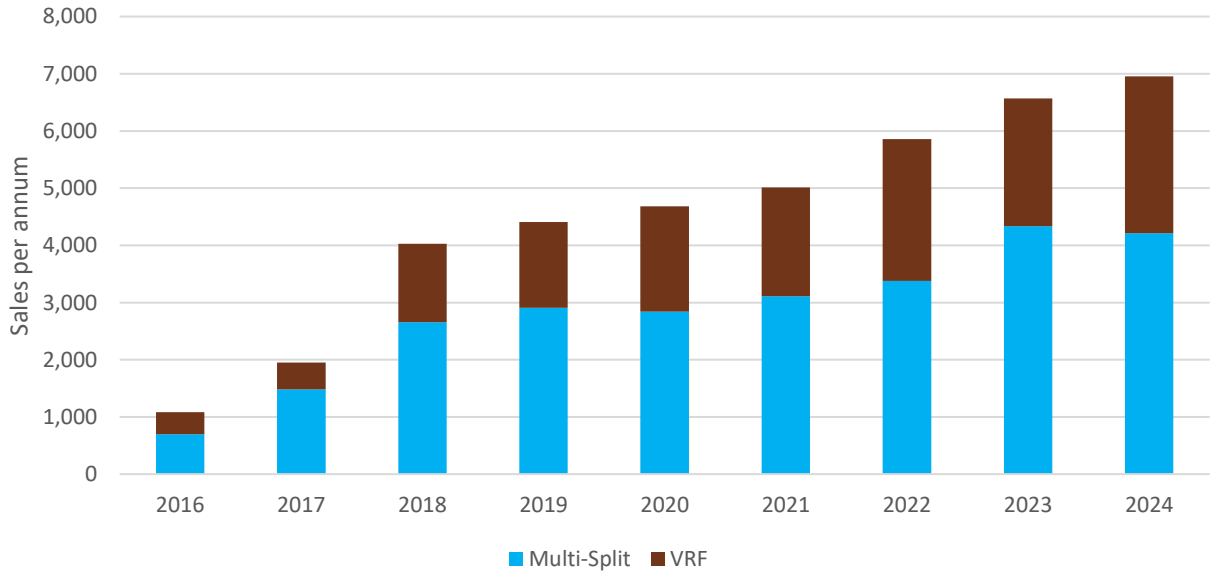
More information on energy efficiency requirements for air conditioners is available at Air conditioners | EECA

## 2.3 Market and sales trends

Multi-split packaged and VRF systems are more commonly used in commercial settings, although occasionally they are used in residential settings. Figure 1 shows trends in total sales of these system types, based on systems up to and including 65kW.

Figure 1 shows the rapid growth in sales volumes of multi-split systems, increasing from 700 sales in 2016 to 4,211 sales in 2024. VRF systems have also undergone a relatively rapid increase in popularity from 386 sales in 2016 to 2,743 sales in 2024. By contrast, sales of packaged systems have largely been flat over the past 15 years, at around several hundred units per annum.

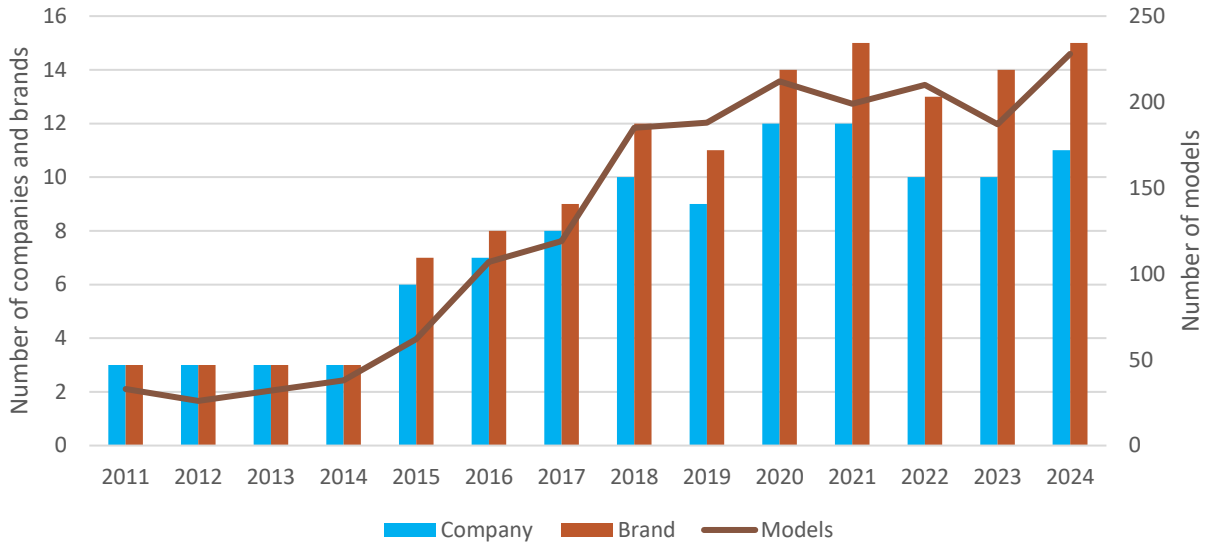
**Figure 1: Sales by system type – commercial air conditioning systems up to 65kW**



The number of commercial air conditioning models available has increased sevenfold from the 33 models available in 2011 to the 228 models being sold in 2024. The number of companies and brands available has also increased significantly over that time, with 15 brands being available from 11 different companies in 2024.

These trends can be seen in Figure 2.

**Figure 2: Changes in number of companies, brands and models – commercial air conditioning systems up to 65kW**




## 2.4 Product trends

**Heating capacity**

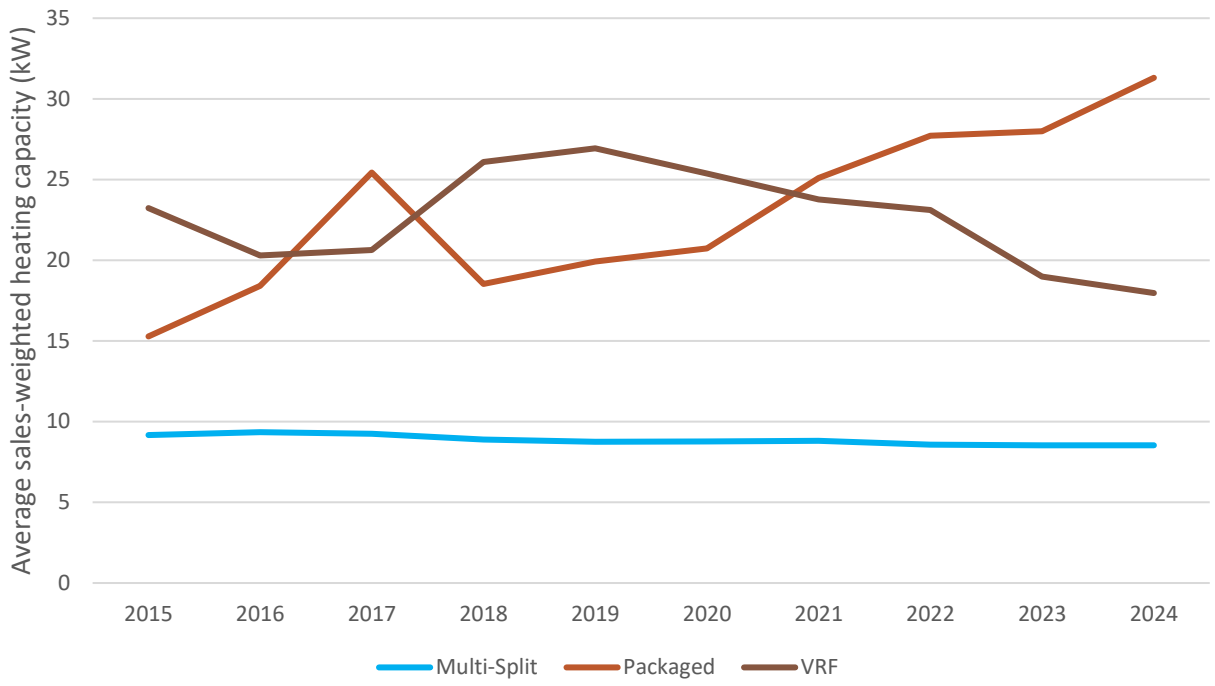
Figure 3 shows the trends in sales-weighted average heating capacity for each of the three system types.

This shows that the average heating capacity of multi-split systems has essentially remained constant at around 9kW since 2015.

The average heating capacity of VRF systems has moved up and down over the years, and is currently 18kW.

The average heating capacity of packaged systems (which have a low sales volume) increased slowly from 15kW in 2015 to 28kW in 2022, and since then has undergone a steady increase to 31kW in 2024. This may possibly be due to an increase in commercial construction activity for building types that use large, packaged air conditioning systems.

Figure 3: Sales-weighted average heating capacity – commercial air conditioning systems up to 65kW

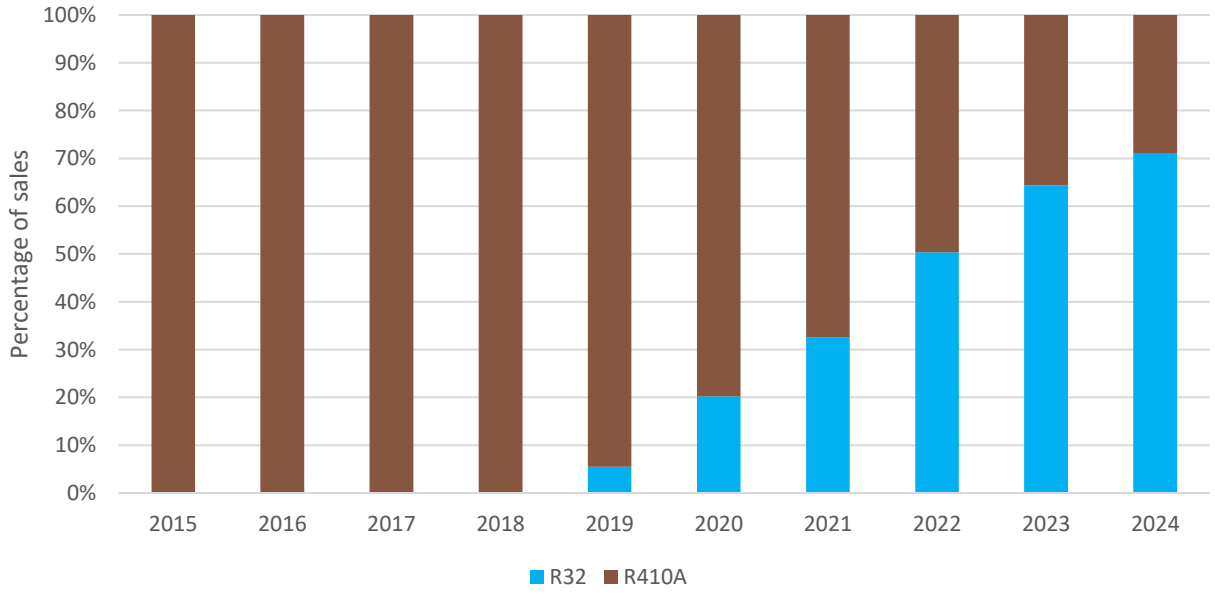



**Refrigerant type**

Figure 4 shows the major change in the refrigerant used in commercial air conditioning systems. In 2015, 100% of all systems sold used R410A as a refrigerant. R22, which has a high GWP as well as high ODP, had previously been used, but was completely phased out by 2011. From 2019, another change became apparent with the phasing out of R410A and a move to the lower GWP R32 refrigerant. R32 has a GWP of 675, whereas R410A has a GWP of 2,088.

By 2024, 71% of commercial systems sold used R32.

Figure 4: Refrigerant types – commercial air conditioning systems up to 65kW



There are some differences in the use of refrigerants by system type and size.

Multi-split systems moved to R32 earlier than other types and by 2024 almost all multi-split systems were using R32 refrigerant. VRF systems were slower in the move to R32. Packaged systems were slower again. In 2024, approximately 60% of VRF and packaged systems were still using R410A.

Systems up to 20kW began moving to R32 in 2019, and by 2024, 80% of these smaller systems were using R32 refrigerant. Larger systems were slower in the move to R32, starting the transition around 2022 or 2023. By 2024 approximately 80% of systems larger than 20kW were still using R410A.

## 2.5 Product efficiency trends

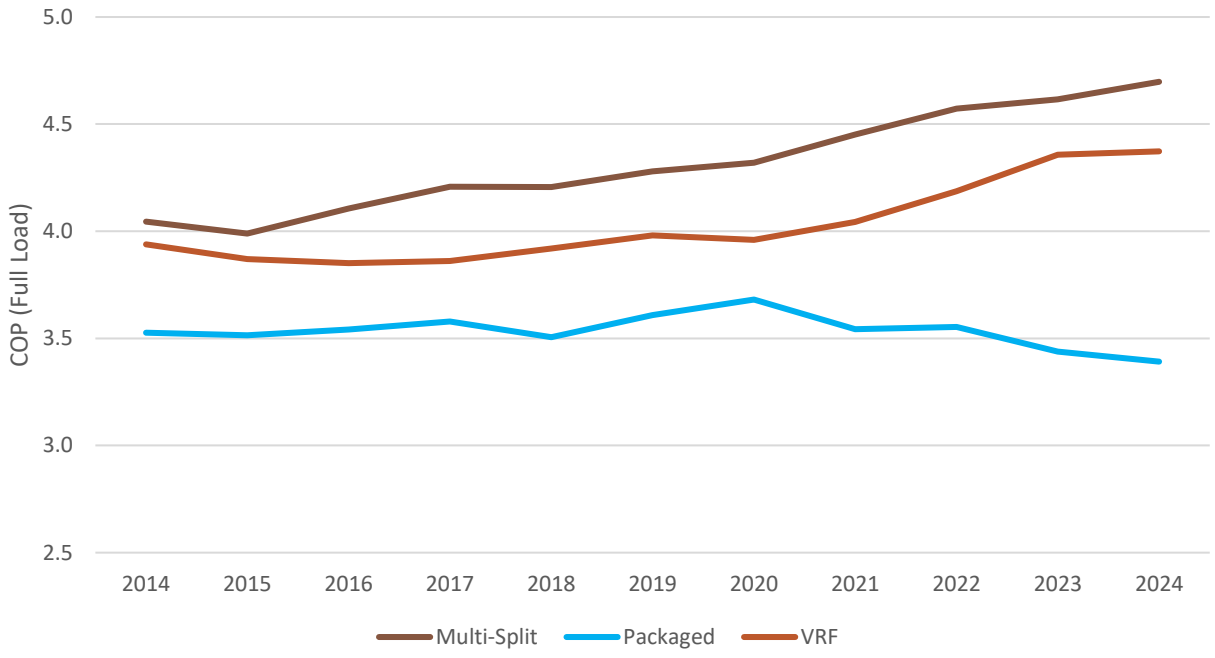
### Full-load heating performance trends

COP is a measure of how efficiently a heat pump heats a space, calculated as the ratio of the useful amount of heat energy provided (kW) by the system, divided by the amount of electrical energy input (kW) required to operate it.

As can be seen in Figure 5, the sales-weighted average COP for multi-split and VRF systems has increased relatively steadily over the past 10 years. In that time, the COP for multi-split systems has increased by 16% to 4.7 and for VRF systems by 11% to 4.37. The COP for packaged systems has declined slightly over that period and was 3.39 in 2024.

The graph also shows that multi-split systems have the highest COP, followed by VRF systems, and then packaged systems with the lowest average COP.

**Figure 5: Full-load coefficient of performance trends – commercial air conditioning systems up to 65kW**



### Full-load cooling performance trends

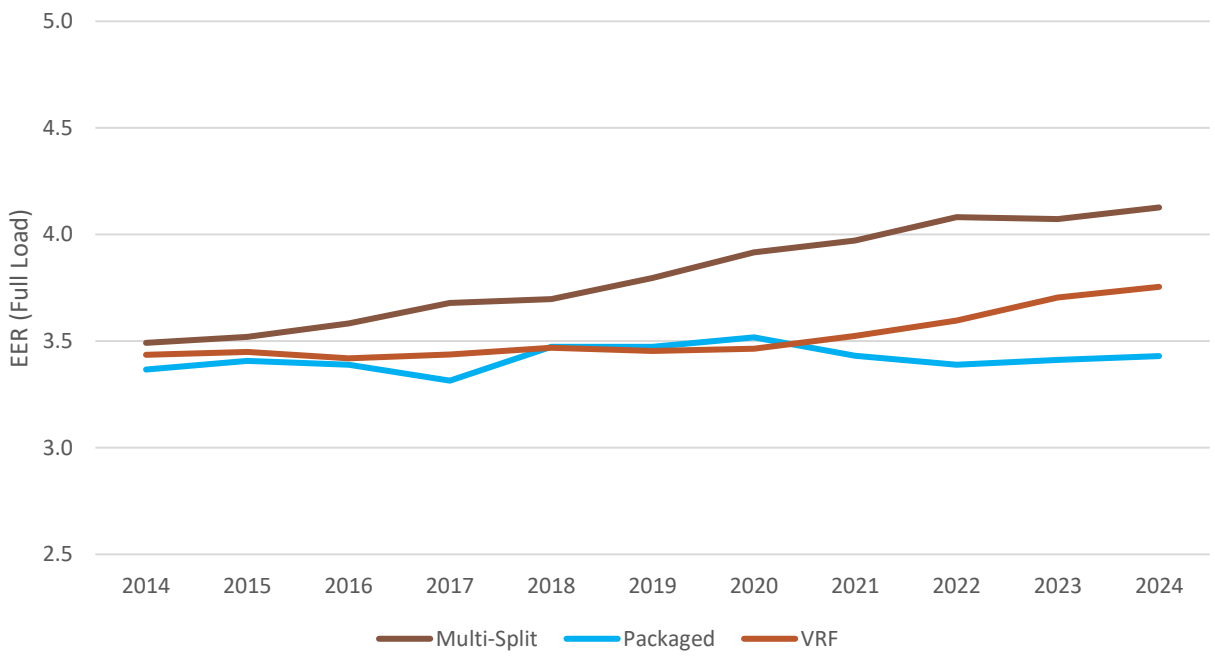
EER is a measure of how efficiently an air conditioner cools a space, calculated as the ratio of cooling provided (kW) by the system, divided by the amount of electrical energy input (kW) required to operate it.

As can be seen in Figure 6, the sales-weighted average EER for multi-split and VRF systems has followed a similar path to that of their COP trends.

Over the past 10 years, the EER for multi-split systems has increased by 18% to 4.13 and for VRF systems by 9% to 3.75. The EER for packaged systems is virtually unchanged over that period and was 3.43 in 2024.

The graph also shows the same order of efficiency that is the case for COP, i.e. multi-split systems have the highest EER, followed by VRF systems, and packaged systems have the lowest average EER.

**Figure 6: Full-load energy efficiency ratio trends – commercial air conditioning systems up to 65kW**




### Heating seasonal performance factor – cold commercial zone[2]

HSPF is the ratio of the total annual amount of heat load, including make-up heat, required to condition the space when operated for heating in active mode to the total annual amount of energy consumed by the equipment in heating mode.

The HSPF in the cold commercial zone for multi-split systems has essentially been flat at around 4.3 since the introduction of the ZERL, as can be seen in Figure 7.

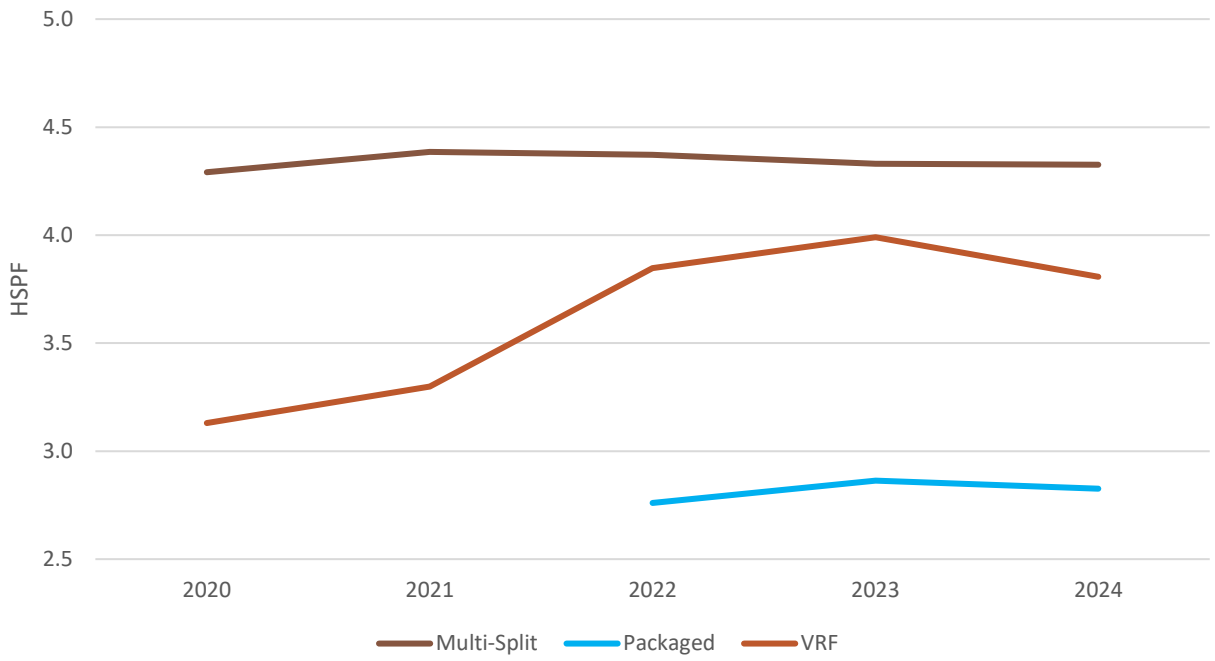
For VRF systems, the trend is different, with an increase in the HSPF from 2021 to 2023, and then a slight decline in 2024.

[2] Commercial SEER rating, commercial heating outdoor temperature distribution bins, as defined in *Greenhouse and Energy Minimum Standards (Air Conditioners up to 65kW) Determination 2019*.

The HSPF for packaged systems has also been flat. However, these systems only sell in small numbers and less than 50% of models sold have a HSPF recorded. This is different to multi-split and VRF systems, where the majority of models sold from 2022 have an HSPF recorded.

As is the trend for COPs, multi-split systems have the highest HSPF, followed by VRF systems and then packaged systems.

**Figure 7: Heating seasonal performance factor trends – commercial air conditioning systems <=65kW**




### Cooling seasonal performance factor – cold commercial zone[3]

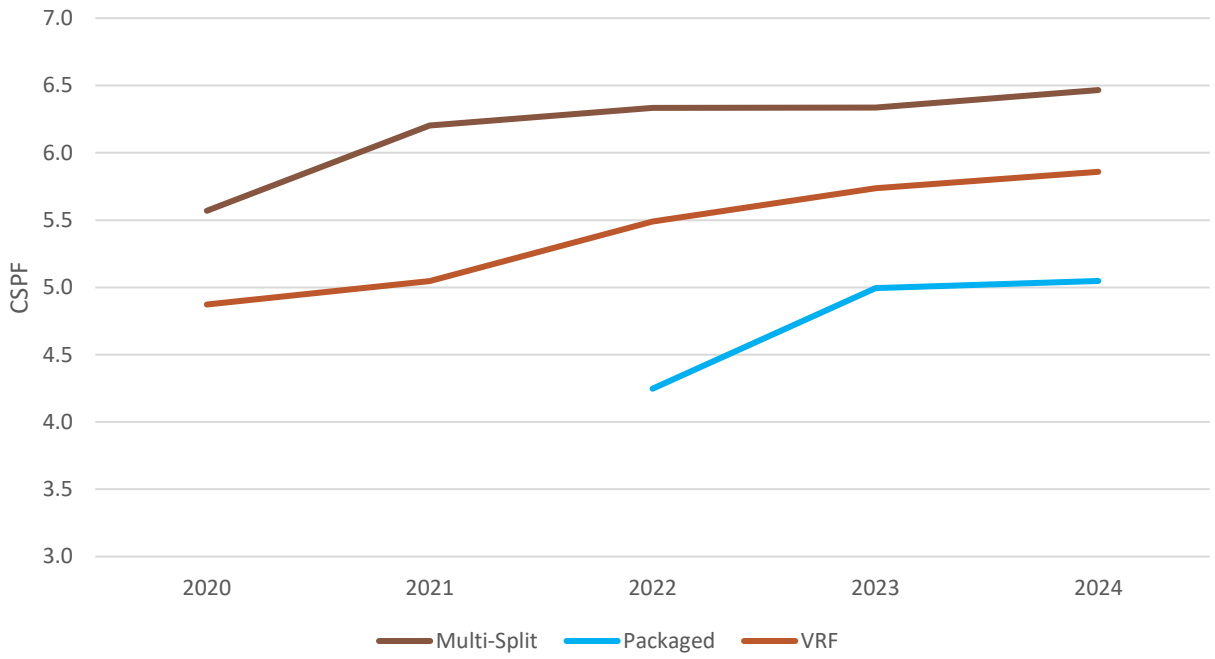
CSPF is a measure of how efficiently an air conditioner operates throughout the entire cooling season. It's calculated by comparing the total amount of heat required to be removed from a space during the cooling season (cooling load) to the total amount of electricity consumed by the air conditioner over the same period.

The CSPF in the cold commercial zone for all system types has increased recently, since the introduction of ZERL, as can be seen in Figure 8. The rate of increase is relatively similar for all system types.

As is the trend for EERs, multi-split systems have the highest CSPF, followed by VRF systems and then packaged systems.

[3] Commercial SEER rating, commercial cooling outdoor temperature distribution bins, as defined in *Greenhouse and Energy Minimum Standards (Air Conditioners up to 65kW) Determination 2019*.

Figure 8: Cooling seasonal performance factor trends – commercial air conditioning systems up to 65kW




**Standby power**

Air conditioners use a small amount of power when switched on and in standby mode. Trends in the average amount of power used in standby mode for the three types of systems are shown in

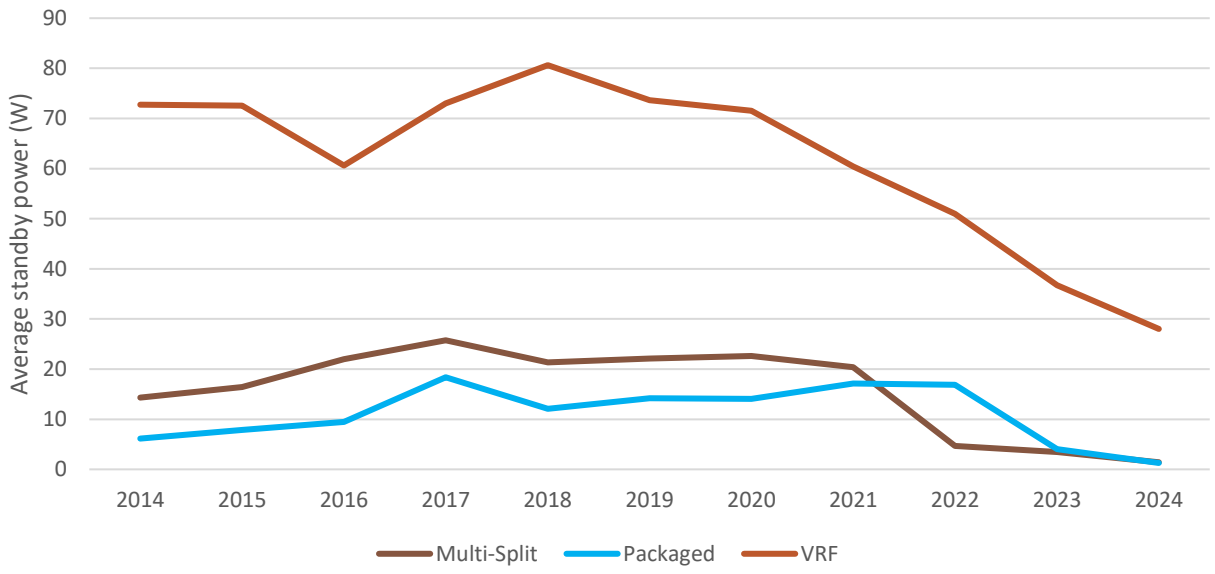
Figure 9.

Standby energy consumption for all systems has generally followed a downward trend over the past 10 years.

The amount of standby power used by multi-split and packaged systems dropped at a rapid rate from 2021 and 2022, respectively. For VRF systems, the rapid rate of decline in standby power began from 2020.

The standby power used by multi-split and packaged systems is now around 1.3 to 1.4W and is 90% less than in 2014. For VRF systems the reduction is 54% and is now an average of 28W.

Figure 9: Standby power – commercial air conditioning systems up to 65kW




## 2.6 Summary of key insights

**Rapid growth in multi-split systems.** Sales of multi-split systems have grown sixfold since 2016 and now represent over half (57%) of all commercial air conditioner sales. Sales of VRF systems have grown at a similar rate, but off a smaller base and now represent 37% of the market. Sales of packaged systems have been flat for the past 15 years, with sales of several hundred units per annum.

**Varying trends in heating capacity of different system types over the past 10 years.** The average heating capacity of multi-split systems has essentially remained constant at around 9kW since 2015. The average heating capacity of VRF systems has moved up and down over the years, with no consistent trend, and is currently 18kW. There has been recent growth in the average capacity of packaged systems, up from around 20kW in 2018 to 2020, to 31kW in 2024. This may be due to packaged systems being a lower-sales-volume segment of the market, where a higher-than-normal level of commercial construction using packaged systems may significantly affect the overall average capacity.

**Shift in refrigerants.** There has been a strong move towards lower GWP and ODP refrigerants being used in air conditioners. In 2024, 71% of commercial systems sold used R32, with sales of systems using the higher GWP R410A having declined to 29% of sales. This shift has been driven by multi-split systems and smaller commercial systems up to 20kW, which represent the largest sales volume categories of commercial air conditioners. In 2024, 94% of multi-split systems used R32, compared with around 40% of VRF and packaged systems. In 2024, 78% of systems up to 20kW used R32, compared with 18% of systems from 20kW to 65kW using R32.

**High, and improving, energy efficiency.** The average COP for multi-split and VRF systems has increased relatively steadily over the past 10 years. In that time, the COP for multi-split systems has increased by 16% to 4.7 and for VRF systems has increased 11% to 4.37.

**Multi-split systems are the most efficient.** For heating purposes, multi-split systems have the highest COP, followed by VRF systems, and packaged systems with the lowest average COP. The same order of efficiency between the system types applies to cooling operations, as measured by the EER.

**More choice in the market**. There has been rapid growth in the number of brands and models of air conditioners in the market. The number of commercial air conditioning models available has increased sevenfold from the 33 models available in 2011 to 228 models offered in 2024.

# 3. Refrigerated cabinets

## 3.1 Description of product class

Refrigerated cabinets comprise 15 different product classes as defined in Schedule 2B, part 1, clause 2 of the Regulations.

For the purposes of this report, these product classes are split into refrigerated display cabinets (RDCs), for which MEPS requirements were introduced in 2004, and subsequently revised in 2021; and refrigerated storage cabinets, for which MEPS requirements were introduced in 2021.

This approach has been taken to strike a balance between providing useful product information without disclosing confidential sales information that could lead to the identification of individual supplier's sales volumes.

Integral units have the refrigeration unit built into the display case, whereas remote systems have the compressors and condensers located separately from the display unit. A remote setup allows for quieter operation, as noise-generating components are placed outside or in a designated machine room.

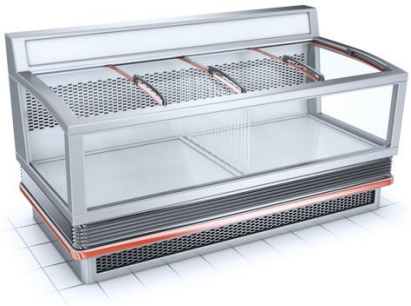
The product classes and their descriptions are shown Table 2.

**Table 2: Refrigerated cabinet product classes and categories used for this report**

| Use | Type | Sub-class code | Type of Use | Description (type: orientation/type) |
|---|---|---|---|---|
| Refrigerator | Integral | IRH | Display | RDC: integral, horizontal chiller |
| Refrigerator | Integral | IRV | Display | RDC: integral, vertical chiller (other than refrigerated drinks cabinets) |
| Refrigerator | Integral | IRV-4 | Display | RDC: chiller (refrigerated drinks cabinet) |
| Refrigerator | Integral | SRH | Storage | RSC: integral, horizontal chiller |
| Refrigerator | Integral | SRV | Storage | RSC: integral, vertical chiller |
| Refrigerator | Remote | RRH | Display | RDC: remote, horizontal chiller |
| Refrigerator | Remote | RRV or RRV-2 | Display | RDC: remote, vertical chiller |
| Freezer | Integral | GSC or ISC | Storage – other | Integral horizontal scooping cabinets |
| Freezer | Integral | IFH | Display | RDC: integral, horizontal freezer |
| Freezer | Integral | IFH-5 | Storage – other | Ice cream freezer cabinets |
| Freezer | Integral | IFV | Display | RDC: integral, vertical freezer |
| Freezer | Integral | SFH | Storage | RSC: integral, horizontal freezer |
| Freezer | Integral | SFV | Storage | RSC: integral, vertical freezer |
| Freezer | Remote | RFH | Display | RDC: remote, horizontal freezer |
| Freezer | Remote | RFV | Display | RDC: remote, vertical freezer |

A summary of refrigerated cabinets, including descriptions and key statistics, is given in Table 3.

**Table 3: Summary of refrigerated display cabinets**

| Type | Refrigerator – integral | Refrigerator – remote | Freezer – integral | Freezer – remote |
|---|---|---|---|---|
| |  | |  | |
| Market share of sales in 2024[4] | 69% | 3% | 22% | 1% |
| Total display area (TDA) | 0.8 $m^2$ | 5.1 $m^2$ | 0.6 $m^2$ | 4.8 $m^2$ |
| Efficiency | 5.2kWh/day/$m^2$ of TDA | 7.65kWh/day/ $m^2$ of TDA | 8.4kWh/day/$m^2$ of TDA | 11.6kWh/day/$m^2$ of TDA |

A summary of the average storage volumes of refrigerated cabinets is given in Table 4.

**Table 4: Average storage volumes of refrigerated storage cabinets**

| Sub-class code | Description | Average storage volume |
|---|---|---|
| SRH | RSC: integral, horizontal chiller | 250 litres |
| SRV | RSC: integral, vertical chiller | 633 litres |
| SFH | RSC: integral, horizontal freezer | 184 litres |
| SFV | RSC: integral, vertical freezer | 568 litres |

## 3.2 Relevant regulations

MEPS were first introduced for refrigerated display cabinets in New Zealand and Australia in 2004. Refrigerated cabinets now supplied in New Zealand in the following product categories must, by law, comply with these MEPS requirements:

- refrigerated cabinets designed for storage and display of, and access by consumers to, chilled or frozen items contained in a cabinet in a retail environment
- refrigerated drinks cabinets (non-perishable beverages)
- refrigerated storage cabinets (light, normal and heavy duty)
- small ice cream freezers < 500 litres designed for prepackaged ice cream
- ice cream scooping cabinets – including ice cream and containerised gelato.

More information on the specific MEPS requirements can be found at Refrigerated cabinets | EECA.

[4] 5% of sales cannot be categorised owing to lack of data.

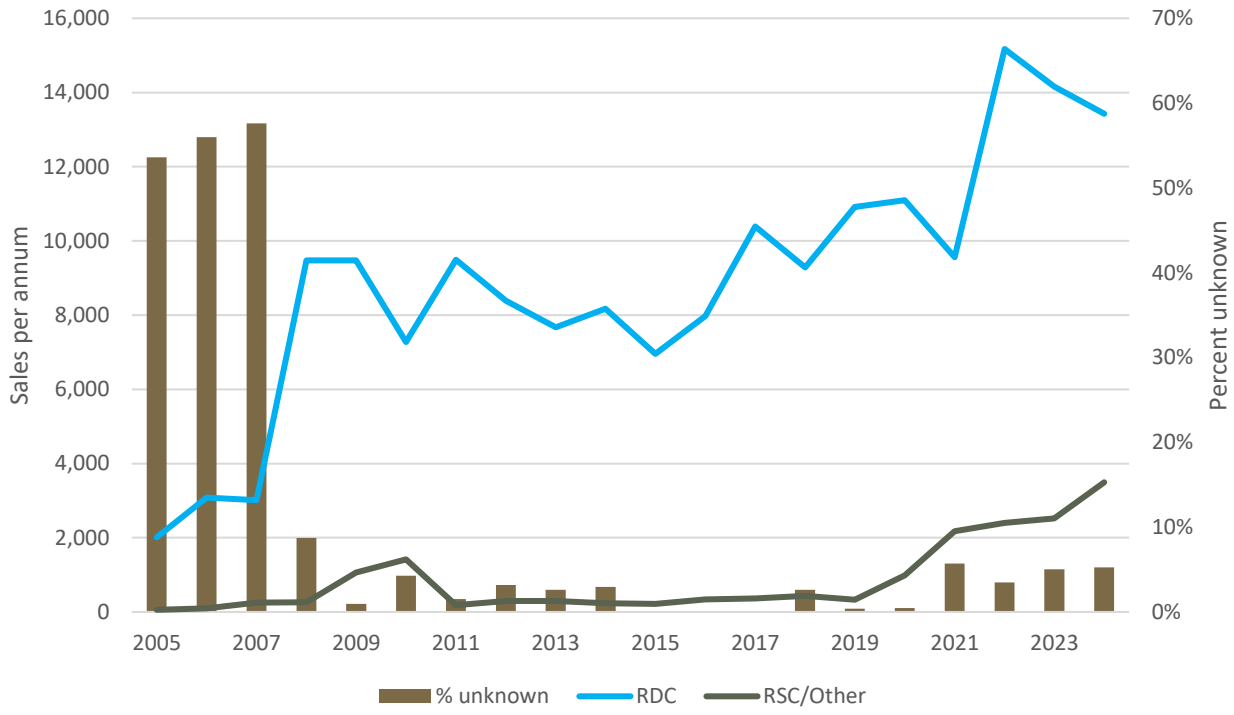
## 3.3 Market and sales trends

The sales trends for RDCs and RSCs are shown in Figure 10.

Annual sales for RDCs have shown an increasing trend over the past 10 to 15 years. In 2024, RDCs outsold RSCs by nearly four to one.

It is difficult to analyse data prior to 2008, as more than 50% of the sales data was incomplete. Sales data is also incomplete in other years to a much lesser degree, with 5% of 2024 sales data incomplete. Incomplete data is represented by the vertical bars in Figure 10. Storage cabinets were included in the scope of the MEPS from 2021, except for IFH-5[5], which were regulated as display cabinets in the 2004 regulations, and categorised as storage cabinets in the 2021 regulations.

**Figure 10: Refrigerated cabinets sales trends**



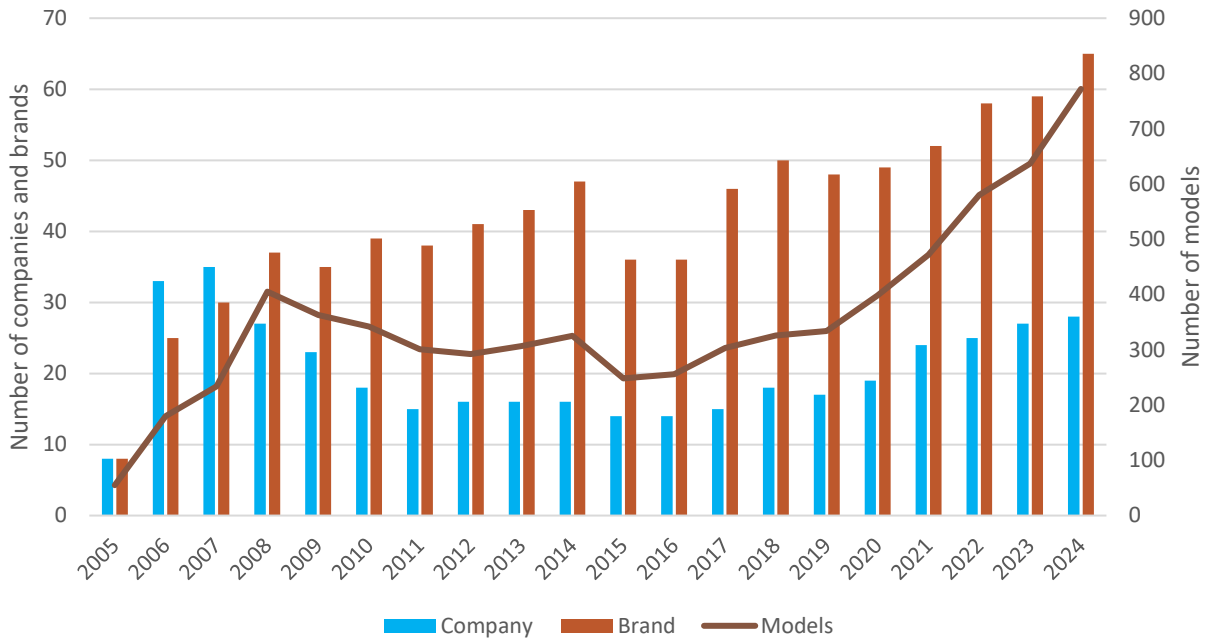

The supplier make-up for refrigerated cabinets has changed over time, with 772 models, 65 brands and 28 suppliers available in the market in 2024. The number of models available increased significantly from 2005 to 2008, then declined gradually until 2015, and then rose rapidly from 2019 following the expansion of the scope of products covered by the regulations.

The numbers of brands and suppliers have also grown, but at a lesser rate, with the number of companies doubling from 2016 to 2024, and the number of brands up 81%, while the number of models in the market tripled in that time. These trends can be seen in Figure 11.

The vast majority of suppliers provide multiple types of refrigerated cabinets, with two-thirds of suppliers providing multiple types of refrigerated cabinets over the past 3 years.

[5] Small ice cream freezers.

Figure 11: Changes in number of companies, brands and models – refrigerated cabinets




## 3.4 Product trends

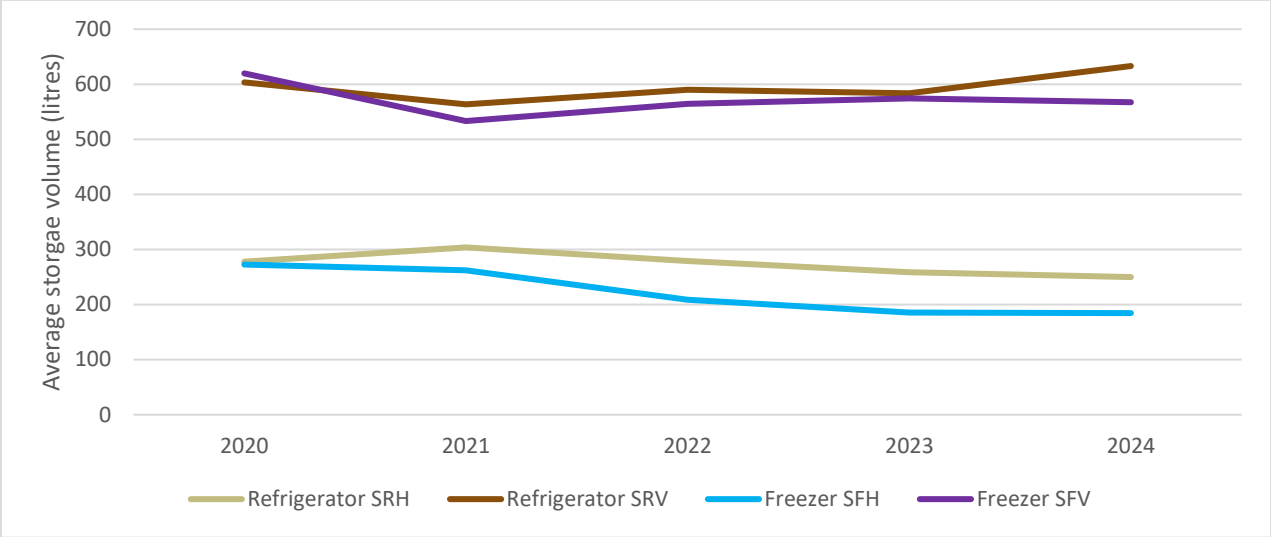
**Refrigerated storage cabinets and other cabinets**

The trends for the sales-weighted average storage volume of refrigerated storage cabinets and other cabinets, based on their volume, are shown in Figure 12. With the exception of the 'Freezer SFH' (horizontal refrigerated storage cabinets) class, the capacity of refrigerated cabinets has changed very little over the past 4 years since the data has been available.

The capacity of freezer SFH class cabinets (refrigerated storage cabinets – horizontal) has decreased 32% over that period.

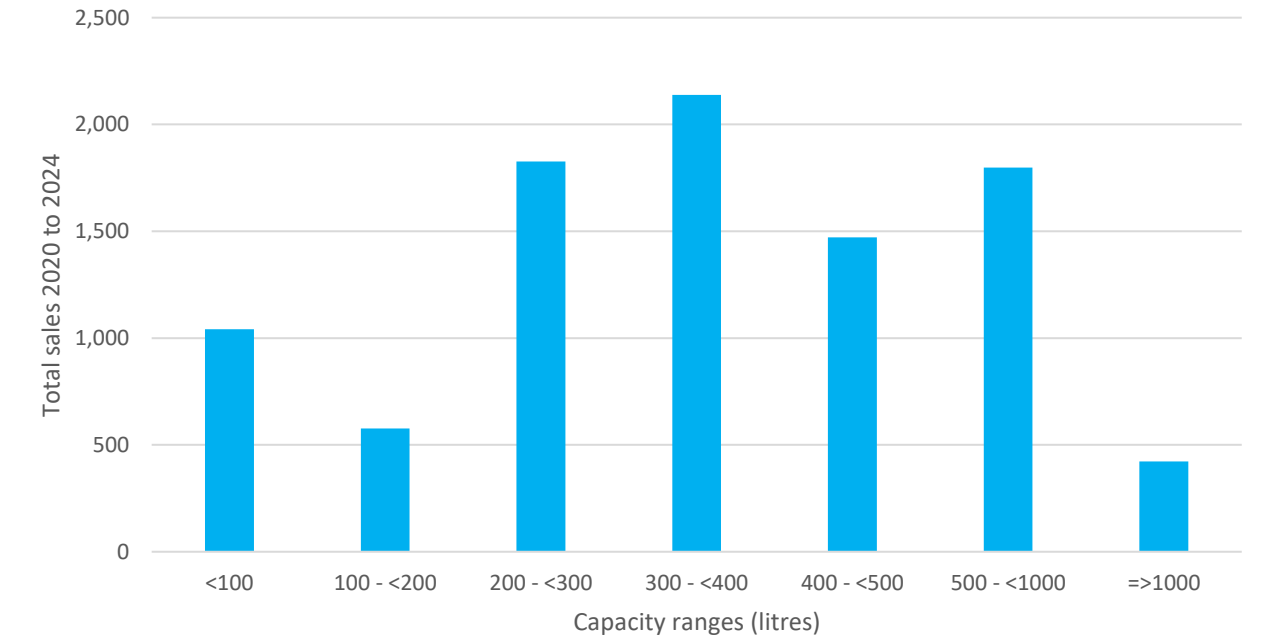
The average capacities of horizontal storage refrigerators and freezers are much smaller than their vertical counterparts, with average capacities in 2024 of 267 litres and 204 litres for horizontal refrigerators and freezers, respectively. For vertical refrigerators and freezers, the average capacities in 2024 are 599 litres and 565 litres, respectively.

Figure 12: Storage volume – refrigerated storage cabinets




A distribution of the average storage capacity across all refrigerated storage cabinets, based on total sales, from 2020 to 2024 is shown in Figure 13. This graph shows that the most common capacity is in the 300 to 400 litre range.

Figure 13: Distribution of average storage capacity – refrigerated storage cabinets




**Refrigerated display cabinets**

The trends for the size of refrigerated display cabinets, based on their total display area, are shown in Figure 14.

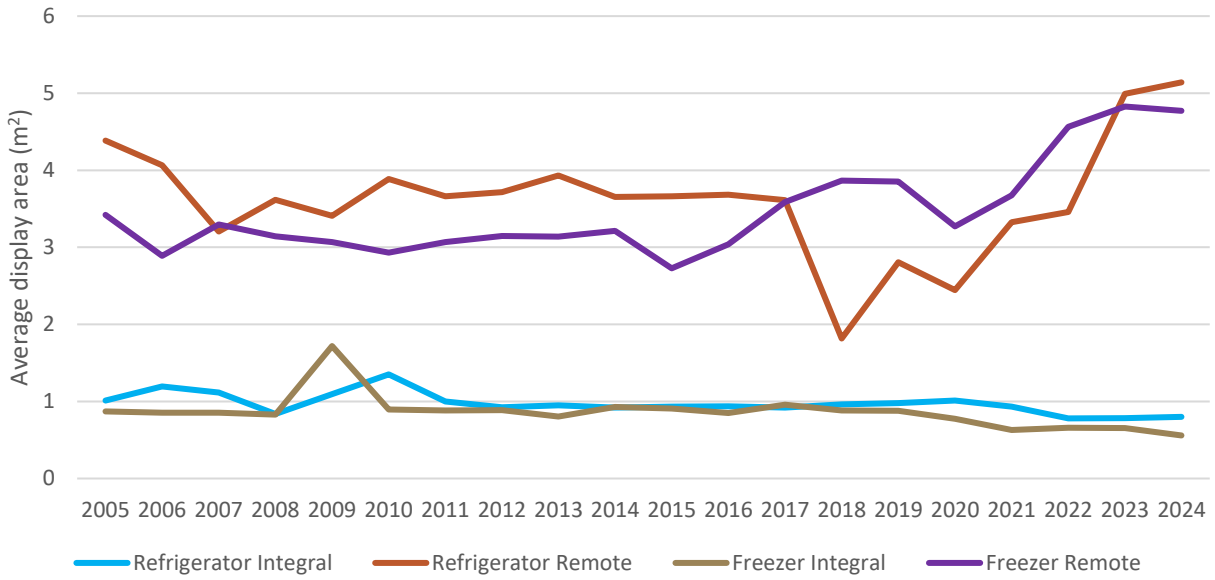
The size of remote refrigerators and remote freezers has increased considerably over the last few years.

Remote refrigerators have grown 42% in average size from 2017 to 5.1m$^2$ in 2024.

Remote freezers have grown 33% in average size from 2017 to 4.8m$^2$ in 2024.

The average size of integral units is much less than for remote units, with integral refrigerators and freezers having average sizes of 0.8m$^2$ and 0.6m$^2$ respectively in 2024. The size of integral units was relatively stable from 2011 until about 2020, and has declined slightly from then. The average size of integral refrigerators has decreased in the past 4 years due to the several-fold increase in sales of IRV class cabinets, which are smaller in size compared to previous years.

**Figure 14: Refrigerated display cabinets size trends**




## 3.5 Product efficiency trends

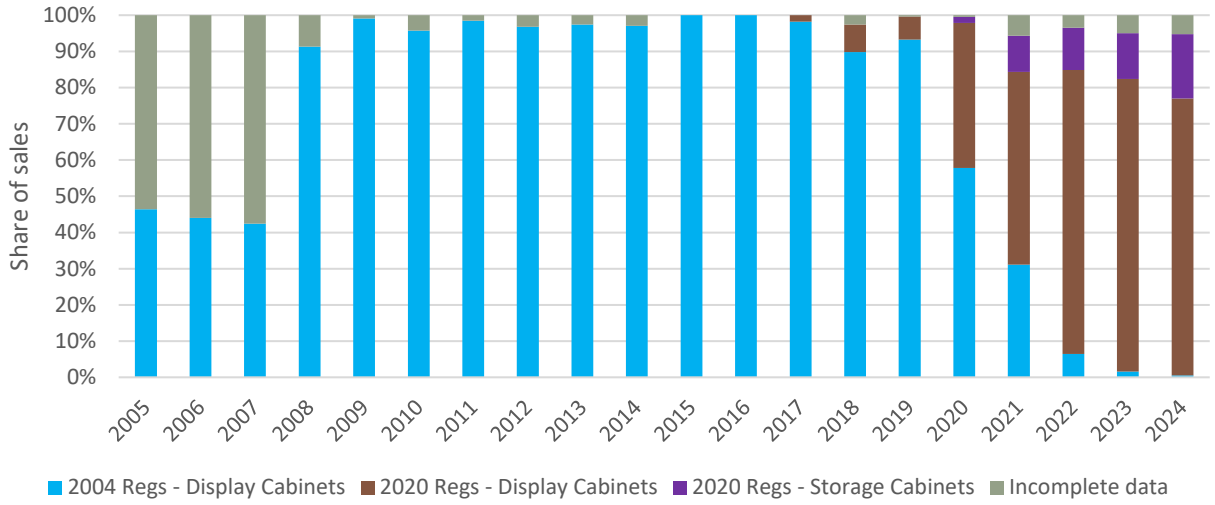
**Registrations vs. Regulations**

Figure 15 shows the distribution of sales of all refrigerated cabinets, based on their registration under three different sets of regulations, namely:

- 2004 Regulations – display cabinets only,
- 2021 Regulations – display cabinets (revised MEPS),
- 2021 Regulations – storage cabinets added.

This graph shows a rapid increase in registrations to the 2004 Regulations in 2008, where sales of products that registered with those Regulations staying relatively steady, in the range of 90% to 100%, from 2008 until 2019. From 2021, the percentage of products registered under the 2021 Regulations began to increase, and in 2024 was 94% of sales, although 5% of sales data was incomplete.

Figure 15: Distribution of sales of refrigerated cabinets based on their registration




## 3.6 Refrigerated display cabinets

**Energy consumption per day per square metre of total display area**

Figure 16 shows the trends in energy efficiency of refrigerators and freezers based on kWh of energy used per day per square metre of total display area. This statistic shows trends in energy consumption after adjusting for changes in total display area over time.

The graph shows downward trends in energy consumption for both refrigerators and freezers, with energy consumption declining by 64% for refrigerators and 44% for freezers from 2005 to 2024.

The graph also shows that freezers require more energy to operate, as would be expected, as freezers operate at a lower temperature than refrigerators and require more energy to cool to those lower temperatures. In 2024, the energy consumption of refrigerators was 5.3kWh/day/$m^2$ and for freezers it was 8.7kWh/day/$m^2$.

Figure 16: Energy efficiency of refrigerators and freezers

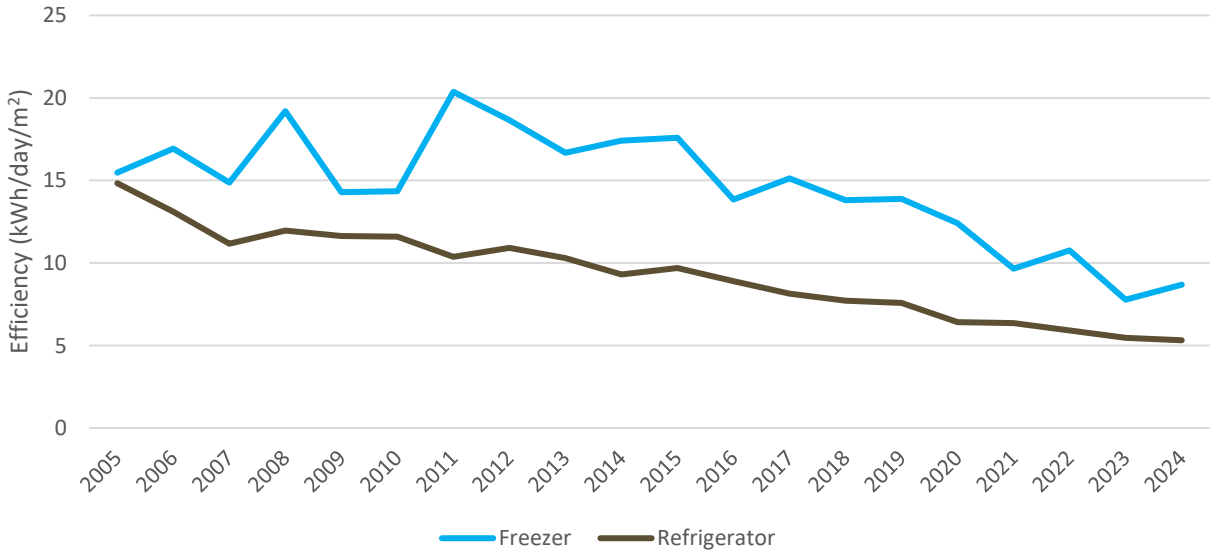
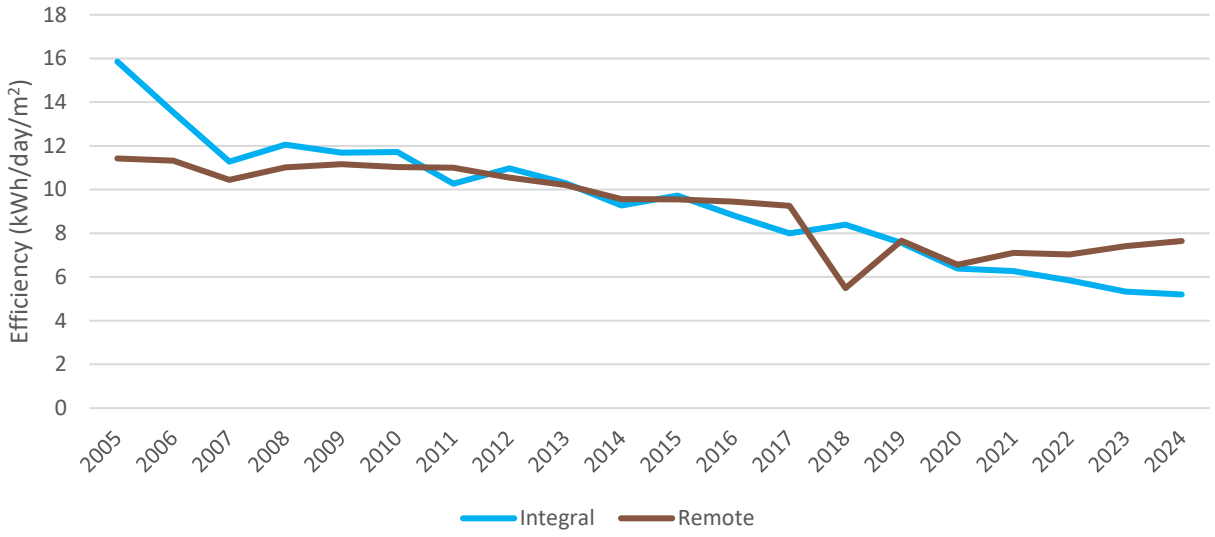


Figure 17 and Figure 18 segment the above information by integral and remote refrigerators and freezers, respectively.

For refrigerators, there is generally a steady downward trend in energy consumption. From 2007 to 2020, the energy consumption of integral and remote refrigerators was very similar. However, from 2020 the consumption of remote refrigerators has started to increase, while that of integral refrigerators has decreased.

In 2024, integral and remote refrigerators used 5.2kWh/day/$m^2$ and 7.65kWh/day/$m^2$, respectively.

**Figure 17: Energy efficiency of refrigerators**




The pattern for integral freezers is inconsistent initially, followed by a general downward trend in energy consumption from 2011. For remote freezers, the trend is more of a steady decline in energy consumption. In 2024, integral and remote freezers used 8.4kWh/day/$m^2$ and 11.6kWh/day/$m^2$ respectively.

**Figure 18: Energy efficiency of freezers**

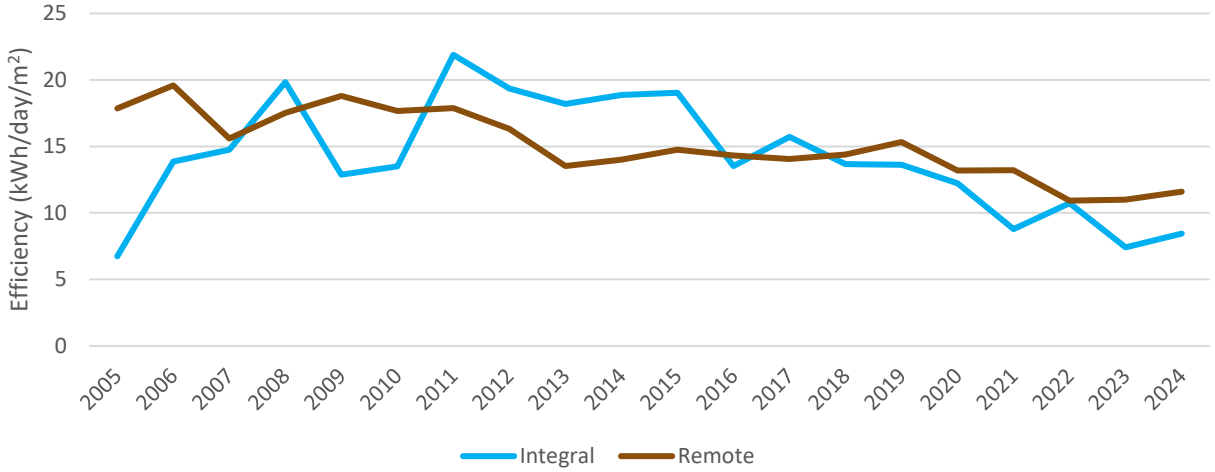
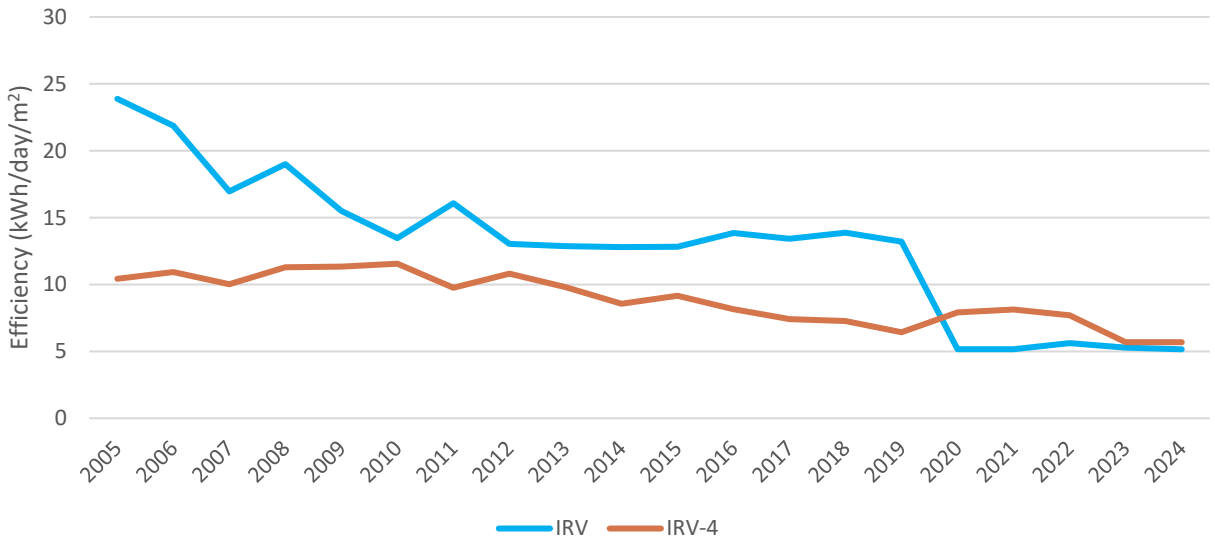


Figure 19 shows the energy consumption trends for two specific types of integrated vertical refrigeration cabinets: IRV and IRV-4. Both lines on the graph show the continuing downward trend evident in the overall refrigeration category shown in Figure 20.

Figure 16It is interesting to note the sudden reduction in energy consumption for IRV models from 2019 to 2020, decreasing 61% from 13.2kWh/day/$m^2$ to 5.2kWh/day/$m^2$. This will be as a result of the announcement in 2019 that new MEPS requirements would be introduced from 2021.

**Figure 19: Energy efficiency trends – IRV and IRV-4**




**Energy efficiency index**

The energy efficiency index (EEI) is calculated from the ratio of the annual energy consumption (AEC) to a reference annual energy consumption (RAEC). AEC is a measure of the refrigerated cabinet's tested yearly energy consumption in kWh. RAEC is a measure of the reference level of a refrigerated cabinet's tested yearly energy consumption in kWh per year. The RAEC is a function of the refrigerated cabinet type and configuration, and is computed by the method prescribed in the Energy Efficiency (Energy Using Products) Amendment Regulations 2021.

Figure 20 shows the trends in the EEI for five different product classes that have been included in the refrigerated display cabinets category since 2021. Data is provided for product categories since the 2020 Regulations, and where the majority of sales have an EEI recorded.

The trends in these lines are mixed. The lines for IRV, RFV and RFH are relatively flat, whereas those for IFH and IFV show a decline in EEI.

Figure 21 shows the trends in the EEI for five different product classes that have been included in refrigerated storage cabinets and other cabinets category since 2021. Data is provided for product categories since the 2021 Regulations, and where the majority of sales have an EEI recorded.

The trends in these lines are mixed. The lines for GSC and SRH are relatively flat, whereas those for SFH, SFV and SRV show a decline in EEI. The line for IFH-5 is initially flat and then shows an increase from 2023 to 2024.

A decline in the EEI means that the product category is, on average, improving in energy efficiency.

Figure 20: Energy efficiency index by product category – refrigerated display cabinets

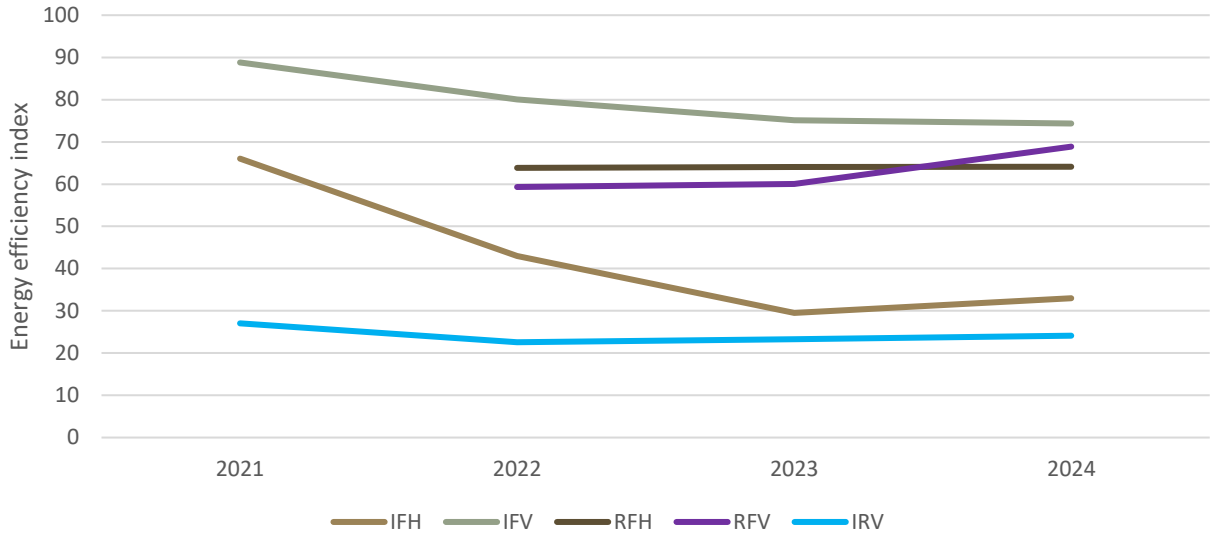
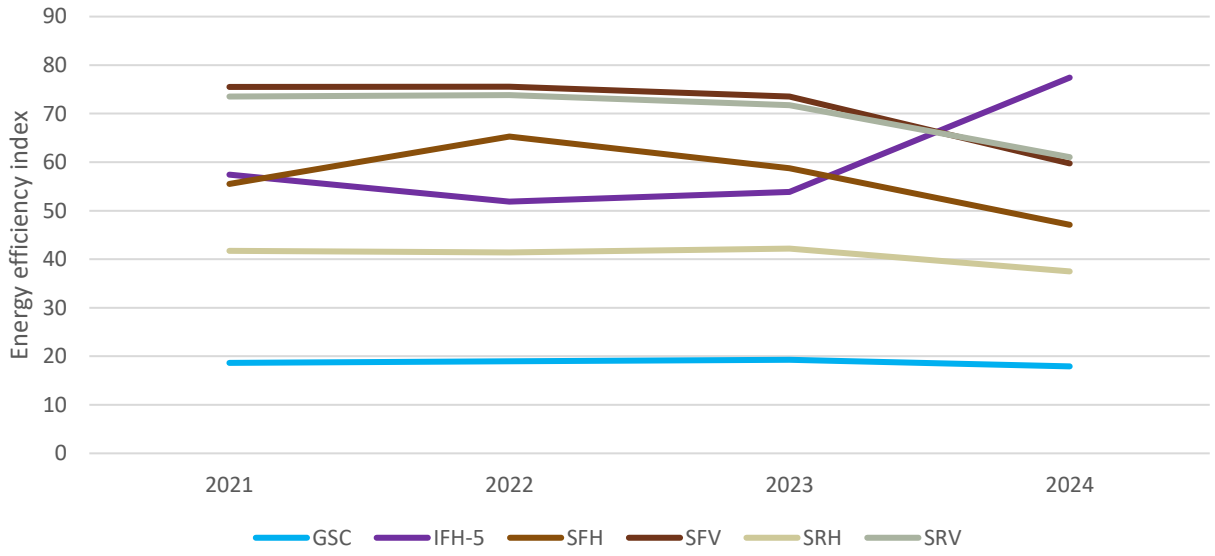



Figure 21: Energy efficiency index by product category – refrigerated storage cabinets and other




## 3.7 Additional commentary

**Country of manufacture**

Refrigerated cabinets sold in New Zealand are manufactured in a range of countries.

Over the past 15 years, sales of refrigerated cabinets from China have steadily increased and are now the dominant source at 74% of sales. Sales of New Zealand manufactured products generally comprised 30% to 50% of sales from 2005 to 2019, but have now declined to a small percentage of the market.

## 3.8 Summary of key insights

**Overall sales of refrigerated cabinets and freezer cabinets with integral compressors is growing strongly.** Sales of integral refrigerators and integral freezers have grown 93% and 250%, respectively, in the past six years.

**Refrigerated and freezer cabinets with remote compressors are less popular and sales are flat or declining.** Refrigerated and freezer cabinets with integrated compressors outsell their remote compressor counterparts by approximately 20 to 1.

**Steadily improving energy efficiency.** Energy consumption, as measured by kWh/day/$m^2$ of total display area, has been steadily declining recently for both refrigerators and freezers. Energy consumption on that basis has halved for both refrigerators and freezers over the past 12 years.

**Large increase in models sold being registered to the 2021 Regulations.** Models sold that are registered to the 2021 Regulations have increased from 42% in 2020 to 94% in 2024, although 5% of sales data in 2024 could not be identified.

**Storage volume relatively static.** Except for the 'Freezer SFH' class (horizontal refrigerated storage cabinets), the capacity of refrigerated cabinets has changed very little over the past four years since the data has been available. The capacity of freezer 'SFH' class models has decreased 32% over that period. The average volume of vertical products is two to three times that of horizontal products.

**Total display area increasing.** The total display area of remote compressor refrigerators and freezers has increased steadily over the past few years. Their total display area is now in the order of five times that of the comparable integral compressor models, which are declining in total display area.

**Shift towards Chinese manufacturers.** Sales of Chinese sourced products have grown from 12% to 74% of sales over the past 15 years. New Zealand sourced product had earlier been dominant at around 40% to 50% of the market, but sales of New Zealand manufactured refrigerated cabinets have declined to 10% of the market currently.

**More choice in the market**. There has been rapid growth in the number of brands and models of refrigerated cabinets in the market, with increases of 80% and 200%, respectively, over the past eight years.

# 4. Three-phase electric motors

## 4.1 Description of product class

Three-phase electric motors are widely used in commercial and industrial applications. Pumps, compressors, fans and conveyers used in workshops and manufacturing machinery are common examples of where this type of electric motor can be found.

Three-phase electric motors typically range in power rating from 0.73kW to 375kW.

Motors can be supplied into the market as individual motors (known as bare motors) or integrated into other equipment (known as embedded motors).

Three-phase electric motors are classified using the International Electrotechnical Commission (IEC) efficiency classes shown in Table 5. These classifications are used as the basis for establishing MEPS requirements for these motors.

**Table 5: IEC motor efficiency classes**

| Class number | Class type |
|---|---|
| IE1 | Standard efficiency |
| IE2 | High efficiency |
| IE3 | Premium efficiency |
| IE4 | Super premium efficiency |
| IE5 | Ultra-premium efficiency |

A summary of the key statistics for three-phase electric motors is given in Table 6.

**Table 6: Summary of three-phase electric motors**

| | |
|---|---|
| |  |
| Sales distribution in 2024 | 0.73kW to 15kW: 83%<br>15kW to 75kW: 11%<br>75kW to 185kW: 1%<br>Unknown: 5% |
| Average power | 6.2kW |
| Distribution by IEC class in 2024 | IE2: 37% of sales<br>IE3: 60% of sales<br>IE4: 3% of sales |

| | |
|---|---|
| Average efficiency by number of poles | 2-pole: 88.2%<br>4-pole: 87.3%<br>6-pole: 85.0%<br>8-pole: 85.2% |

## 4.2 Relevant regulations

New Zealand MEPS cover the supply of new three-phase cage induction electric motors and three-phase cage induction electric motors incorporated into machines with:

- rated output ≥ 0.73kW & < 185kW
- 2, 4, 6 and 8-pole configurations
- voltages rated up to 1,100V (AC).

All three-phase electric motors sold in the above categories must meet the current MEPS requirements. The New Zealand Government has proposed updating these requirements to harmonise with IE2 levels.

Some motor categories are excluded from MEPS, such as submersible motors or those to be used for short-time duty-cycle applications.

There are policy proposals to increase the MEPS coverage for three-phase electric motors, including the breadth of products covered and the required standards, and a stakeholder consultation process on this has recently been undertaken: Three-phase cage induction motors | EECA

Information on the requirements for three-phase electric motors, including details of excluded products can be found at: Three-phase electric motors | EECA

## 4.3 Market and sales trends

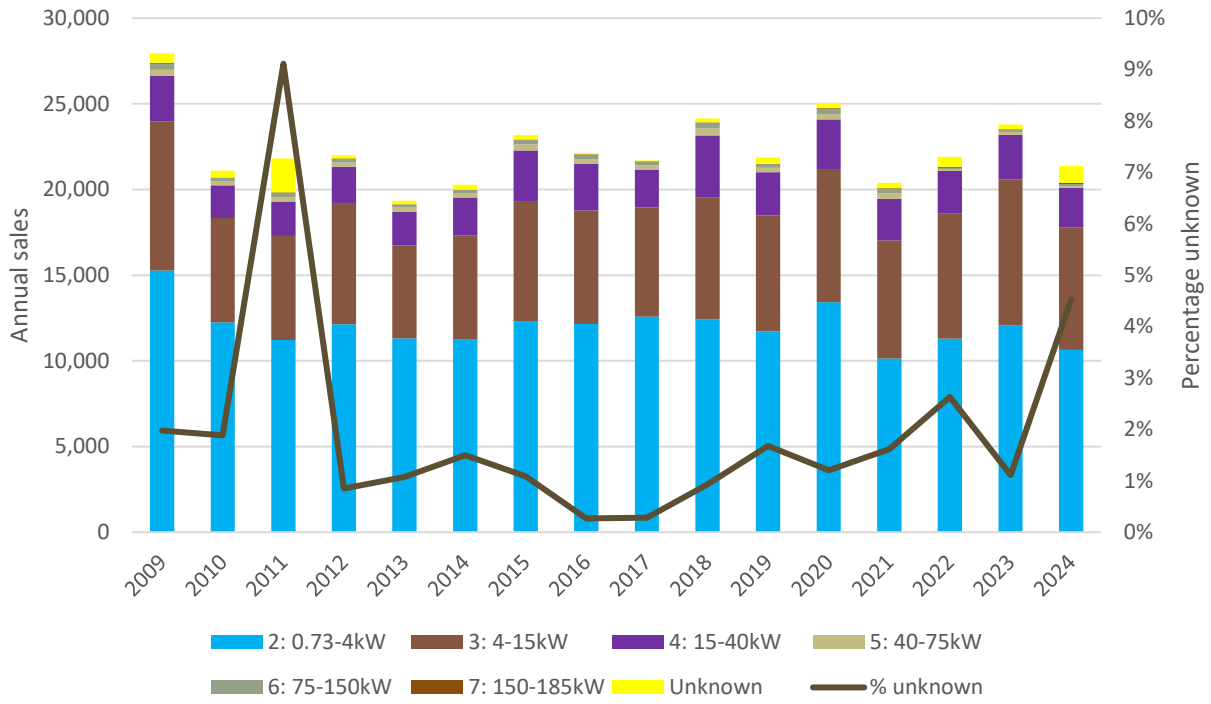
**Sales trends and distribution by size**

Figure 22 shows total sales of three-phase electric motors by year from 2009, as well as a distribution by size category. Data prior to 2009 had a very high percentage (50% to 70%) of records with no associated motor size. This would make analysis of sales data prior to 2009 potentially misleading.

From 2010 to 2024, annual sales of motors have moved around from year to year, but remained in the range of 20,000 to 25,000 units per year. The size distribution shows that the most common motor size ranges are 0.73kW to 4kW (50% to 60% of sales), followed by 4kW to 15kW motors (30% to 35% of sales).

The line on the graph shows the percentage of motors for which size data is unknown. This is generally between 0% and 2% of total sales, with the exception of 2011 and 2024, where 9% and 5% of sales respectively had unknown size data.

Figure 22: Sales trends and distribution by size – three-phase electric motors

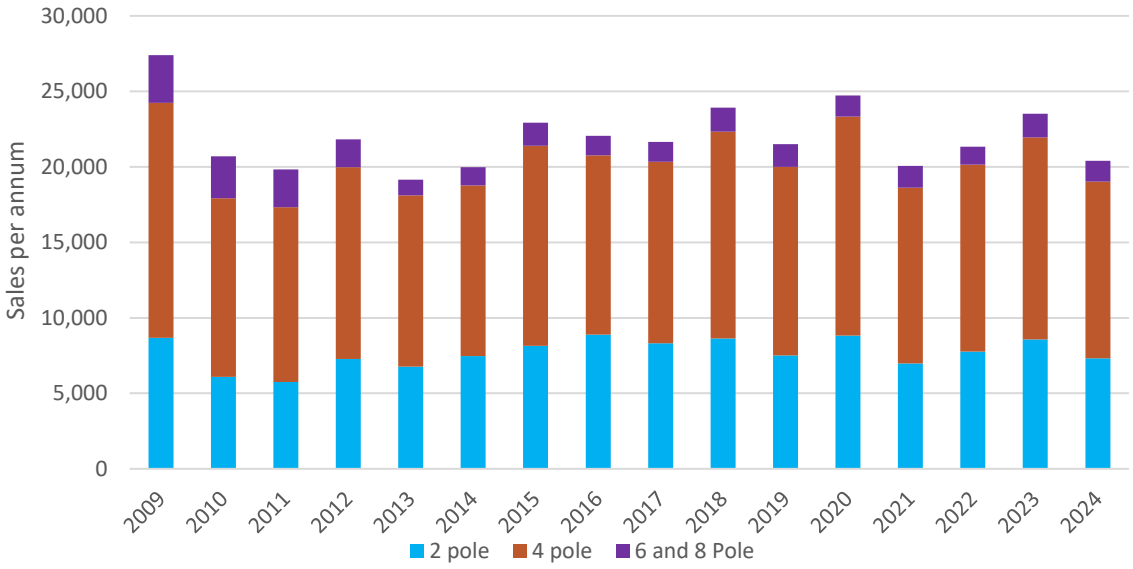



**Sales trends and distribution by number of poles**

Figure 22 shows total sales of three-phase electric motors by year from 2009, segmented by the number of poles.

4-pole motors are the dominant type of three-phase motor sold, representing 55% to 60% of sales over the past 15 years. 2-pole motors are next most popular at around 35% of the market. For the purposes of the graph below, 6-pole and 8-pole motors have been combined, as their sales volumes are quite low, and currently only represent about 7% of the market.

Figure 23: Distribution of sales by number of poles – three-phase electric motors

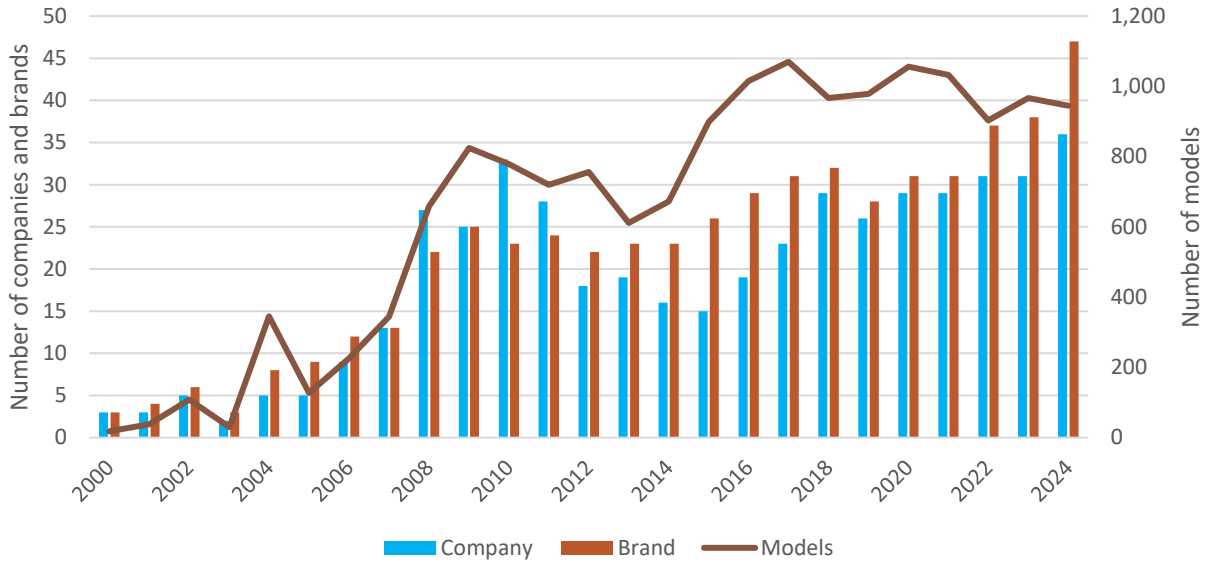


**Changes in numbers of companies, brands and models**

The number of three-phase electric motors available has increased by a factor of 52, from the 18 models available in 2000 to 945 models available in 2024. The number of companies and brands available has also increased considerably over that time, and there are 47 brands from 36 companies available in 2024. Currently, there is an average of 20 models available per brand and 26 models available per company.

These trends can be seen in Figure 24.

**Figure 24: Changes in numbers of companies, brands and models – three-phase electric motors**




## 4.4 Product trends

**Motor size**

Figure 25 shows the trend in sales-weighted average size of motors sold by year, on the basis of all regulated three-phase electric motors sold. This graph shows an up-and-down pattern over the years, generally varying between 6kW and 7kW.

Figure 26, Figure 27 and Figure 28 break down the sales data by motor-size categories to show any trends within particular size bands. These lines are all relatively flat from 2009 to 2024, indicating no real movements to larger or smaller motors within each size grouping.

Figure 25: Average motor size trends – three-phase electric motors

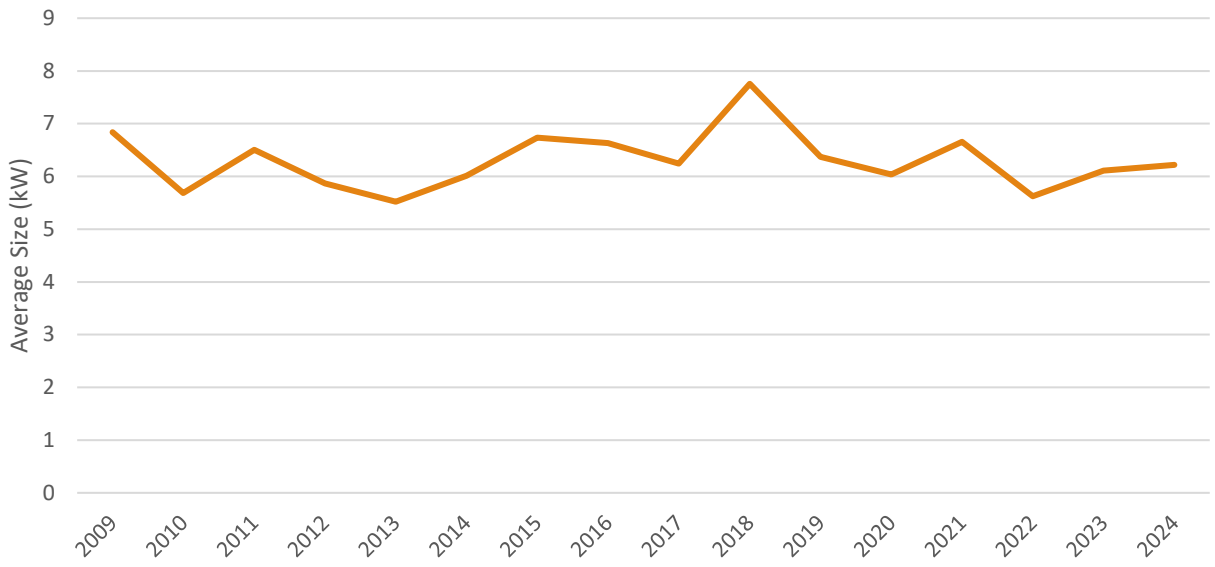



Figure 26: Motor size trends – 0.73 to 15kW

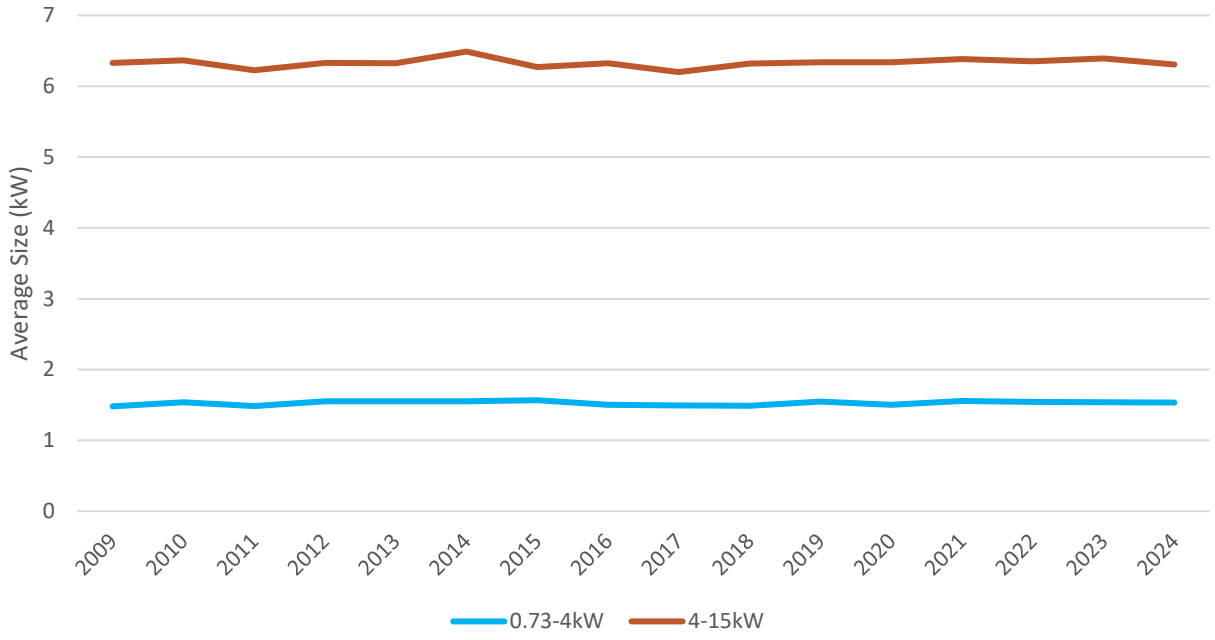


**Figure 27: Motor size trends – 15 to 75kW**

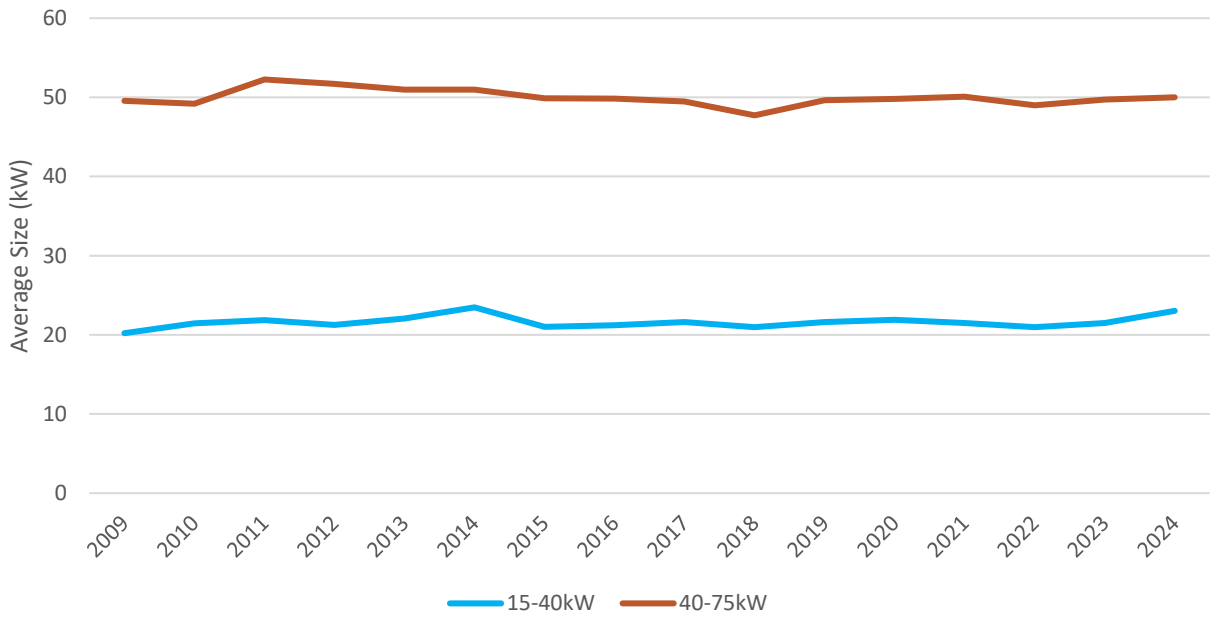
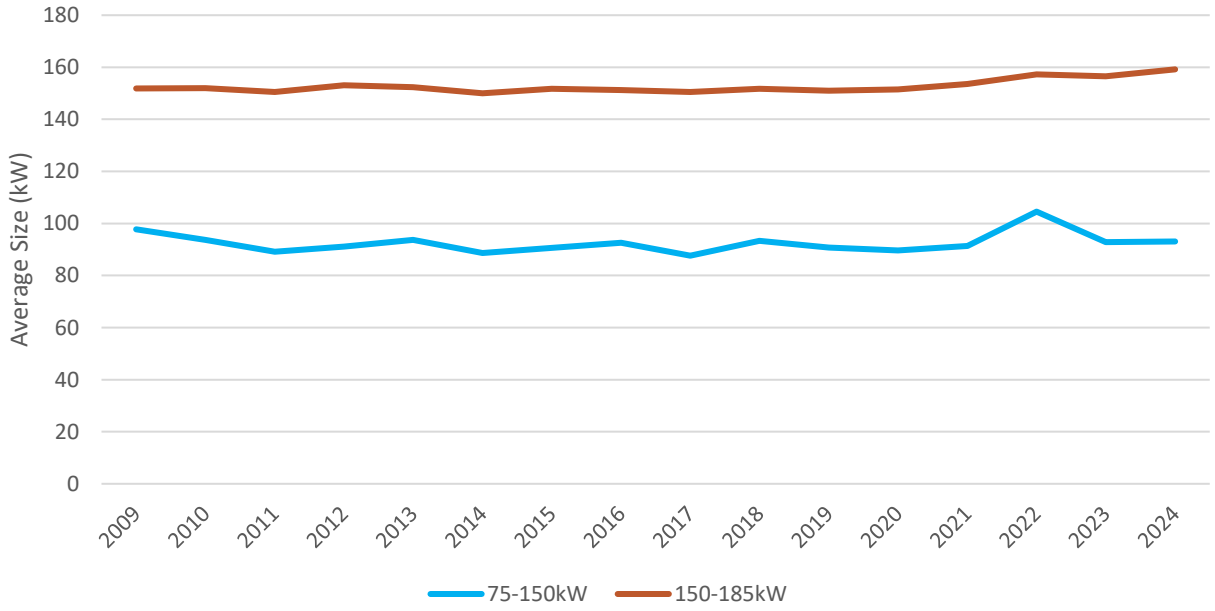



**Figure 28: Motor size trends – 75 to 185kW**



## 4.5 Product efficiency trends

The energy efficiency of electric motors is expressed as a percentage of the mechanical output power divided by the electrical input power.

Figure 28 to Figure 32 show trends in the efficiency of three-phase electric motors, segmented by the number of poles and the motor size groupings, over the past 15 years.

The following observations can be made from these graphs.

- There is a general trend of gradually improving efficiency over time within each combination of size grouping and number of poles. 2-pole and 4-pole motors increased in efficiency by just over 2 percentage points in that time. 6-pole motors increased efficiency by 4.3 percentage points. There was less data available for 8-pole motors, but efficiency by size groupings increased from 2 to 5 percentage points.
- Efficiency gains have been greater for smaller motors. For example, with 4-pole motors, 0.73kW to 4kW motors improved by 2.2 percentage points from 2009 to 2024, compared with a gain of 1 percentage point for 40kW to 75kW motors.
- The efficiency of motors increases with increasing size. For example, in 2024 the average efficiency of a 4-pole 0.73kW to 4kW motor is 84.7%, compared with a 4-pole 150kW to 185kW motor at 96.3%.
- There is a slight correlation between the efficiency of motors and the numbers of poles. The average efficiency of motors is 88.2%, 87.3%, 85.0% and 85.2% for 2, 4, 6 and 8-pole motors, respectively.

**Figure 29: Efficiency trends – 2-pole motors**

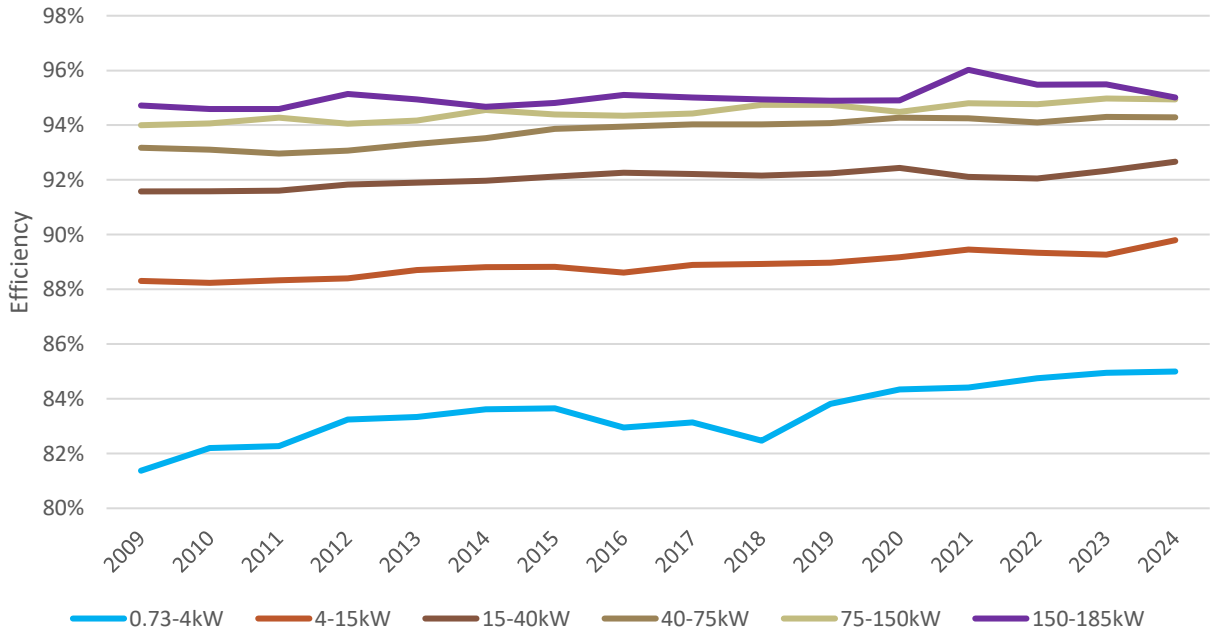


**Figure 30: Efficiency trends – 4-pole motors**

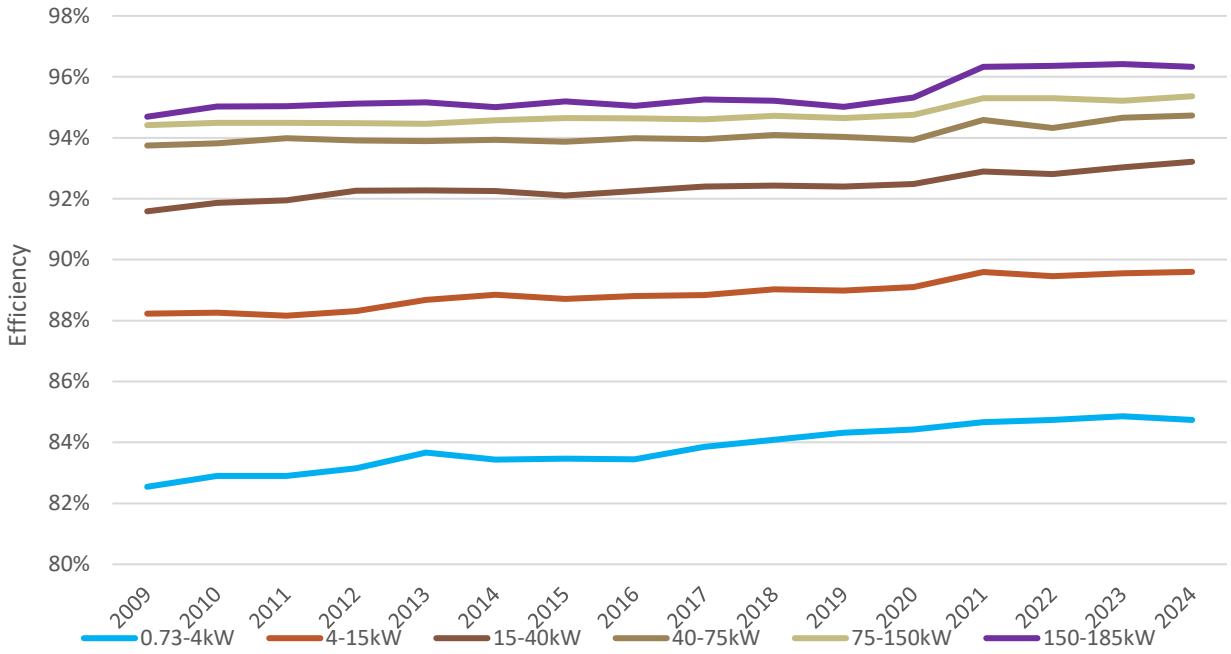



**Figure 31: Efficiency trends – 6-pole motors**

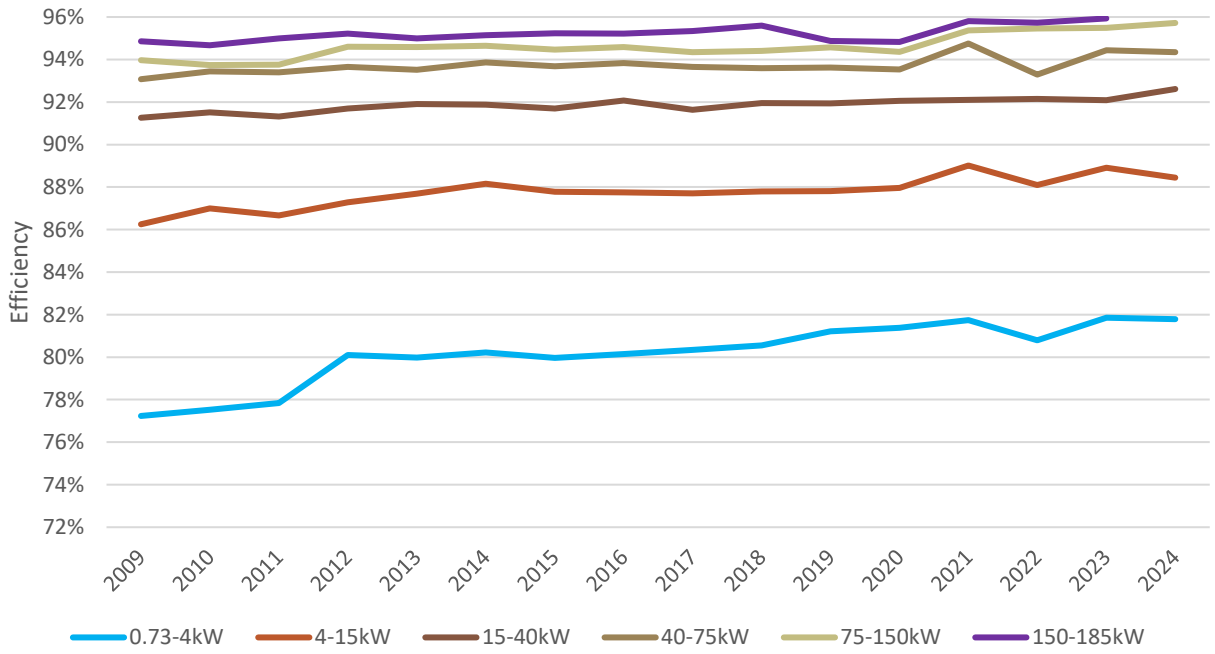
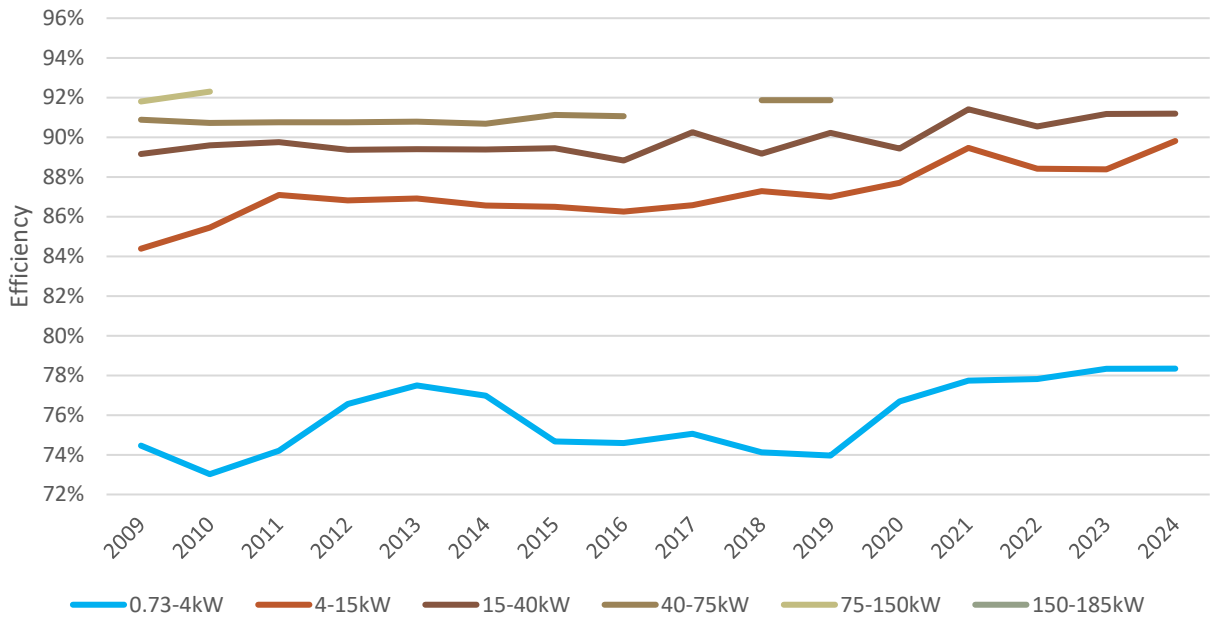


Figure 32: Efficiency trends – 8-pole motors




**Trends by IEC rating**

Figure 33 shows the distribution of sales of three-phase electric motors by IEC classification.

This graph shows the following trends.

- The percentage of sub-IE2 motors sold declined from 23% of sales in 2008 to 0% by 2015.
- The percentage of IE2 motors sold initially increased from 61% of sales in 2008 to 82% of sales in 2010 and 2011, before declining to 36% of sales in 2024.
- The percentage of IE3 motors sold steadily increased from 16% of sales in 2008 to 60% of sales in 2024.
- IE4 motors started to appear from 2016 and increased to 3% of sales in 2024.

Figure 33: Share of sales by IEC motor efficiency classes – all three-phase motors

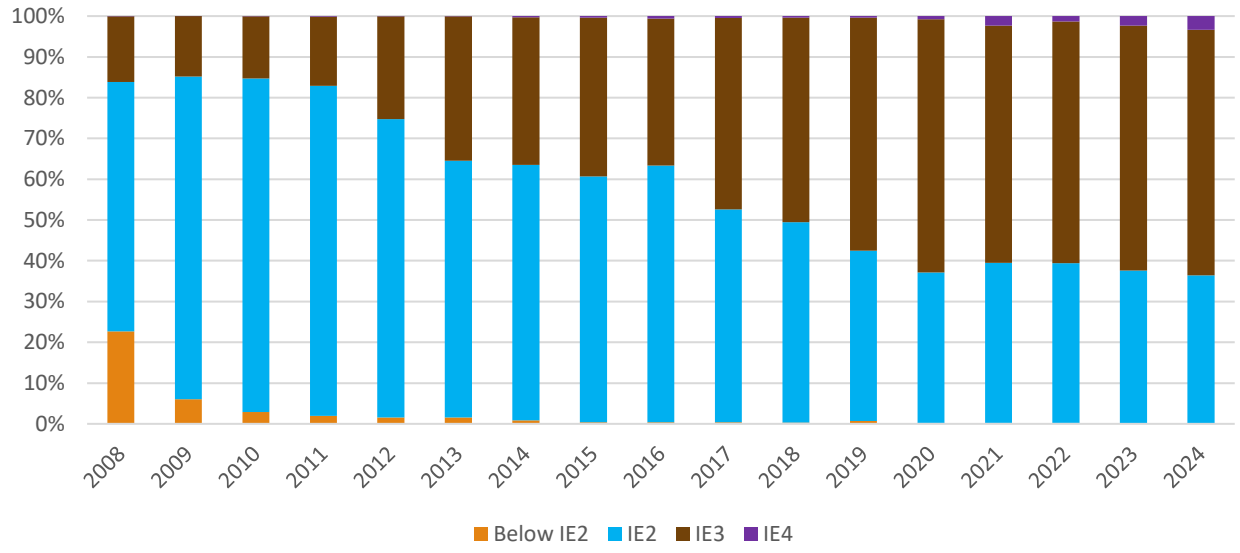
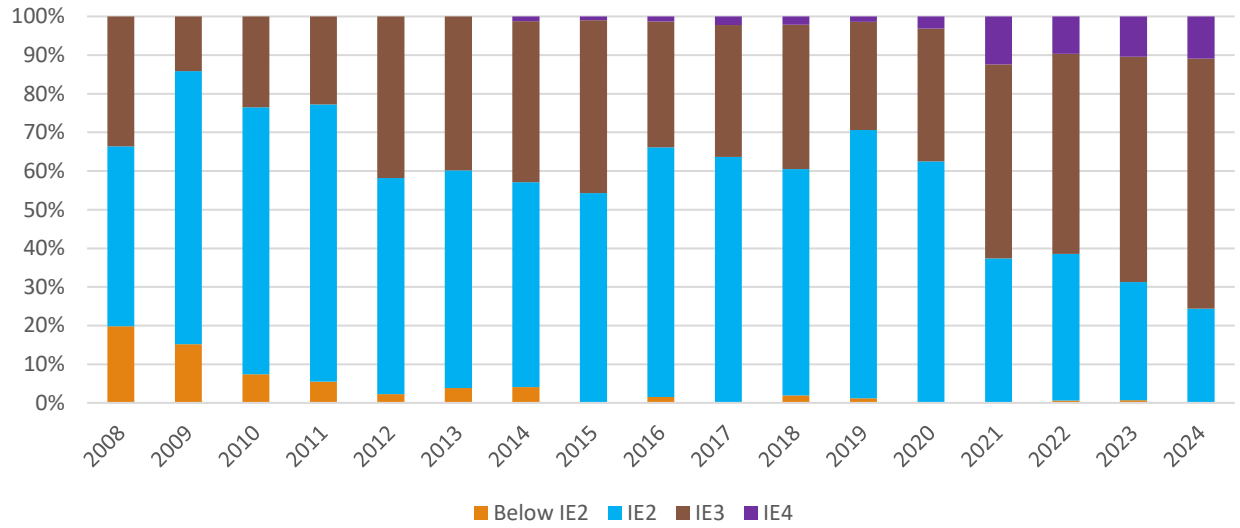


Figure 34 shows the same analysis as the above, but based solely on 75kW to 185kW motors.

Comparing the two graphs shows that, in the larger size range, fewer IE2 motors are sold and more IE3 and IE4 motors are sold; demonstrating a preference by purchasers for more efficient motors in the larger size category.

**Figure 34: Share of sales by IEC motor efficiency classes – three-phase motors from 75kW to 185kW**




## 4.6 Additional commentary

**Country of manufacture**

Three-phase electric motors sold in New Zealand are manufactured in a range of countries.

Over the past 15 years, China has been the dominant supplier of three-phase electric motors to New Zealand, being the source of 20% to 45% of motors over that time. Brazil is the next most common source of motors, supplying 15% to 20% of motors over that time. Motors from the USA started to appear from 2020 and now comprise the third most common source of motors. Other countries supplying three-phase electric motors to New Zealand include India and Italy.

## 4.7 Summary of key insights

**Overall sales of three-phase electric motors stable.** Sales of three-phase electric motors have been relatively stable in the range of 20,000 to 25,000 units per year over the past 15 years.

**No real change in motor sizes.** The average size of three-phase electric motors sold in New Zealand has moved up and down by a small amount over the past 15 years, generally between 6kW and 7kW, with no underlying trend to larger or smaller motors.

**Move towards more energy efficient motors.** Over the past 15 years, there has been a clear trend towards more efficient motors. Initially there was a move towards IE2 (high efficiency) motors from less efficient motors, followed by a move from IE2 to IE3 (premium efficiency) motors. From 2016, IE4 (super premium efficiency) motors have appeared in the sales statistics and now represent 3% of sales.

**Steadily improving energy efficiency.** The energy efficiency of three-phase electric motors has increased by between 2 and 5 percentage points, depending on the size of motor and number of poles, over the past 15 years. This will have been driven by buyers moving towards more efficient motor classes. On

average, smaller motors have made more efficiency gains than larger motors. However, larger motors are more energy efficient. For example, in 2024, the average efficiency of a 4-pole 0.73 to 4kW motor was 84.7%, compared with a 4-pole 150 to 185kW motor at 96.3%

**China continues to be the dominant country of manufacture.** China has been the main source of three-phase electric motors over the past 15 years. Since 2012, market share from China has varied within the range of 35% to 45% of sales.

**Much more choice in the market**. There has been rapid growth in the number of models of three-phase electric motors in the market, up by a factor of 52 since 2000.

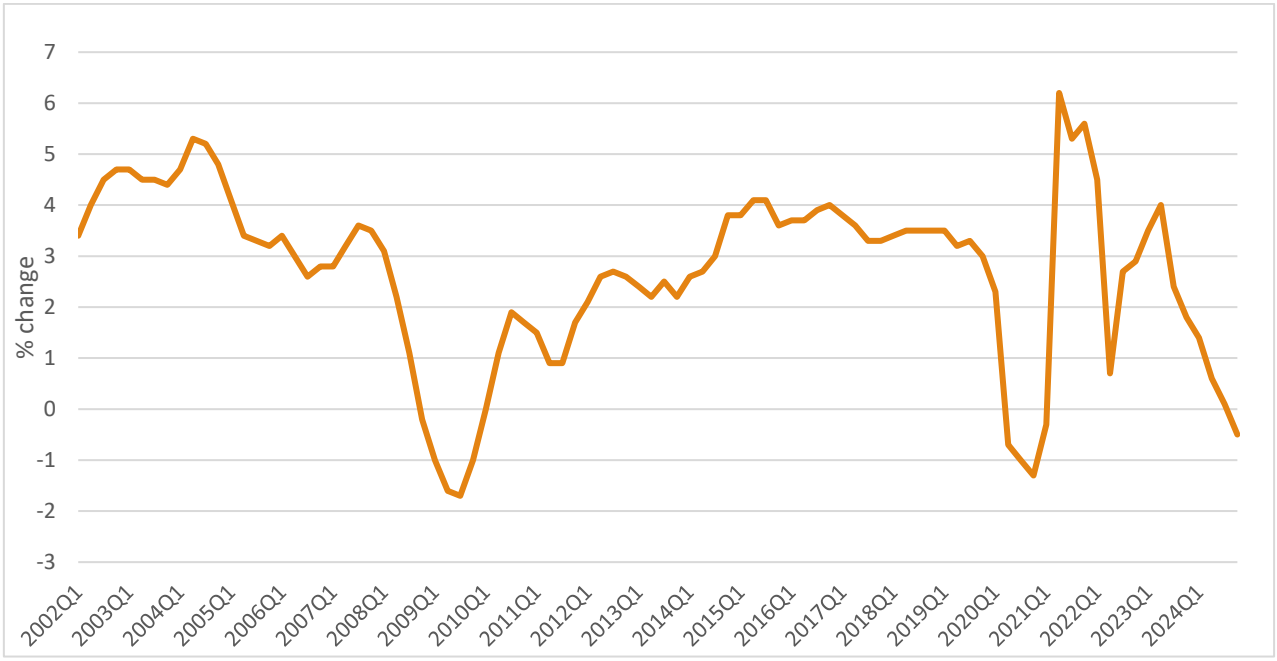
**Wide range of models per brand and company.** Currently there is an average of 20 models available per brand and 26 models available per company. This reflects a wide range of motor sizes in combination with other variations such as the number of poles.

# 5. New Zealand economic growth

Figure 35 shows the quarterly changes in New Zealand's gross domestic product (GDP) as a measure of the total value of goods and services produced. The figure shows:

- **moderate GDP growth** – between 2013 and 2019, New Zealand experienced consistent GDP growth (averaging around 2.5–3% annually), supporting increased consumer spending on durable goods like appliances
- **post-COVID rebound** – after a sharp contraction in 2020 due to the pandemic (GDP fell ~2.1%), growth rebounded in 2021, partly fuelled by pent-up demand and government stimulus
- **recent stagnation and mild recession** – in 2023 and 2024, GDP growth slowed significantly due to inflation, higher interest rates and global economic uncertainty, dampening discretionary consumer spending.

**Figure 35: New Zealand quarterly change in GDP**




www.stats.govt.nz

# 6. References

*Consultation Regulatory Impact Statement: Three-phase Cage Induction Motors.*

*Decision Regulatory Impact Statement on the energy efficiency of chillers: Liquid-chilling packages using the vapour compression cycle.*

# 7. Glossary

| | |
|---|---|
| **COP** | Coefficient of performance. The ratio of heating output to energy input for reverse-cycle air conditioners (heat pumps). |
| **CSPF** | Cooling seasonal performance factor. A measure of how efficiently an air conditioner operates throughout the entire cooling season. The factor is calculated by comparing the total amount of heat required to be removed from a space during the cooling season (cooling load) to the total amount of electricity consumed by the equipment over the same period. |
| **E3** | The Equipment Energy Efficiency (E3) Programme is an initiative of the Australian Government, states and territories, and the New Zealand Government to improve the energy efficiency of appliances and equipment. |
| **ERL** | Energy rating label, as specified in the standards for the products MEPL requirements. |
| **GEMS** | Greenhouse and energy minimum standards, which apply in Australia. |
| **Load or heating load** | A general term referring to the demand or need for heating. It is also used to specifically refer to a standard amount of heating, as a function of outdoor temperature, which is used to evaluate and compare heaters. |
| **MEPL** | Mandatory energy performance labelling, which includes the star rating and CEC for the product, along with other useful information for consumers when making a comparative purchasing decision. |
| **MEPS** | Minimum energy performance standard |
| **Power input** | A general term for the energy (electricity, gas or solid-fuel) consumed by a product. |
| **Rated** | A rated value or amount is one that is claimed by the manufacturer and that is based on a tested value or amount. |
| **SEER** | Seasonal energy efficiency rating is a key metric for assessing the energy efficiency of air conditioners over a range of seasonal ambient temperature variations. |
| **SRI** | Star rating index. A calculated measure of energy efficiency (compared to a 1-star product), to allow consumers to make comparisons between different models of a similar size. |
| **Star rating** | The star rating uses the SRI rounded down to the nearest half star (up to six stars) and to the nearest full star above six stars. This star rating is what appears on the energy rating label. More stars on a label means less energy consumption and lower operating costs. |
| **ZERL** | Zoned energy rating label. A specific type of energy rating label for air conditioners only, to reflect the fact that their performance will vary depending on ambient climatic conditions, unlike other whiteware and home appliances. The label provides a seasonal efficiency rating for three distinct climate zones — hot, average and cold, and displays performance information to help consumers select a product that is suitable for their climate zone. Ratings are up to a maximum of 10 stars for both heating and cooling. |