AICPA & CIMA
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# Strategic Case Study Examination

## November 2022 – February 2023

## Pre-seen material

## Contents



# Introduction

Hottayr is a quoted company that manufactures domestic heating products, mainly gas boilers and air source heat pumps.

You are a senior manager in Hottayr's finance function. You report directly to the Board and advise on special projects and strategic matters.

Hottayr is based in Norland, a developed country that has an active and well-regulated stock exchange. Norland's currency is the N$. Norland requires companies to prepare their financial statements in accordance with International Financial Reporting Standards (IFRS).

# Domestic central heating systems

Heating systems are necessary to keep rooms at comfortable temperatures and to prevent dampness caused by condensation.

Most dwellings in countries that have cold weather for a significant part of the year have central heating systems. These use a central heat source, such as a boiler or heat pump, to heat water that is then pumped round the dwelling in order to heat each room.

Traditional combustion-based boilers

Gas boilers are popular in countries that have mains gas, usually natural gas, piped to individual dwellings. Gas is an efficient fuel that is used to power central heating boilers, for cooking and to heat water for bathing and cleaning.

A gas-powered boiler is connected to the dwelling's gas and cold-water supplies. The boiler heats water by burning gas. The hot water is then either pumped round the dwelling to heat radiators or it can be used as hot water for baths, showers and washing.

Most countries impose strict regulations to ensure the safety of gas boilers. The boilers themselves must meet safety standards, and they must be installed and maintained by qualified plumbers to ensure that there can be no gas leaks.

Domestic gas boilers are generally designed to have relatively little need for controls that require users to make any adjustments once they have been installed and switched on. Consumers must buy separate controllers that combine thermostats and clocks to manage heat output and the availability of hot water. Thermostats can vary in sophistication from basic mechanical devices to electronic devices that can be operated by smartphones.

Gas boilers can be powered using liquid petroleum gas (LPG) that is stored outdoors in a tank and piped into the dwelling as required. The tank is replenished by a tanker vehicle.

Some dwellings use oil-fired boilers. Those require a similar arrangement to LPG systems, with a tank containing heating oil located in the garden and an oil burning boiler used to heat water in the home.

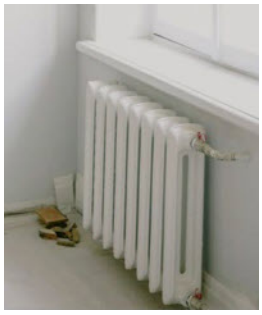
Woodburning stoves can be used as a heat source for central heating systems. Householders burn logs that provide radiant heat within the room. Pipes at the back of the stove heat water that is then used to heat other rooms in the same manner as for gas and oil burning boilers.

The wood that is burned in woodburning stoves is a renewable energy source, making them more environmentally friendly than gas or oil powered boilers. Nevertheless, all heat sources that rely on combustion release carbon into the atmosphere.

Distributing heat around the home

A network of pipes, made from either copper or plastic, carries hot water from the boiler to each room in the dwelling that is to be heated.

The most popular method of heating a room is to install one or more radiators. Radiators are metal pipes that are designed to transfer heat from the hot water that flows through them into the surrounding air. That release of heat energy warms the room, cooling the hot water in the process. The water carries on through the pipes to the next radiator, where further heat is released.



Central heating systems are designed to ensure that every room is heated to a satisfactory extent. Boilers come in different capacities, with more powerful boilers producing more hot water, which enables them to provide heat across larger houses. Larger radiators release more heat energy and so can heat a larger volume of air. Larger rooms require larger radiators, or perhaps multiple radiators.

Radiators are usually fitted with thermostats. Those can be used to regulate the amount of heat that is released into any given room and so prevents uncomfortably high temperatures.

Underfloor heating is an alternative to radiators. Hot water from the boiler is piped from room to room. Plastic pipes are set into the concrete floor in a zigzag design that enables heat to be released, creating an even heat across the whole room and avoiding the need to install radiators on the walls of the room.

The pipes are embedded in the floor and so they cannot be seen, and they can be walked across without causing any damage. The floor can be covered with any conventional floor covering, although carpets tend to act as insulators and so reduce the effect of the heat flow.

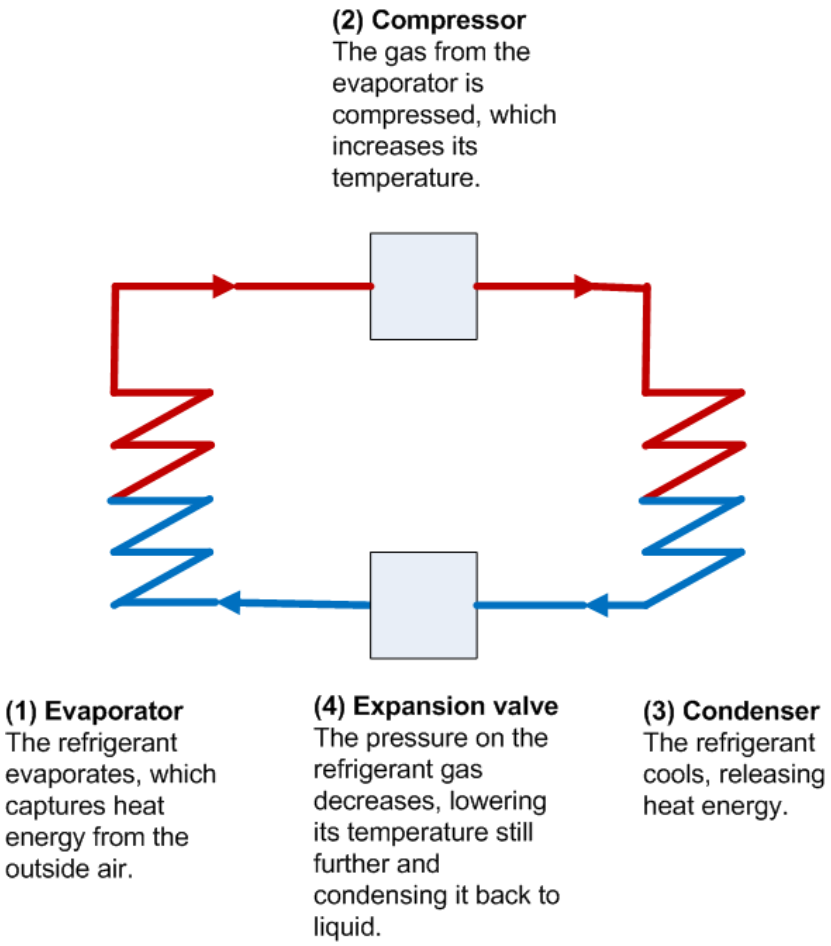
Heat pumps

Heat pumps capture heat energy from a source and release it elsewhere. The source may be cooler than the destination. There are several different applications of this technology:

- Refrigerators and freezers use heat pumps to capture heat energy from the interior of the appliance and move it to the exterior. Doing so reduces the temperature inside the appliance and so helps to keep food fresh or to chill drinks. If the heat pump was switched off, then the higher temperature in the room would lead to heat energy flowing back into the cooler interior of the refrigerator or freezer until it reached room temperature.
- Air conditioners use the same principle to take heat energy from a room that is uncomfortably warm and then release that energy outside. The room becomes cooler and more comfortable while the device is in operation.
- Heat pumps can be used to capture heat energy that can be used in central heating systems. Heat energy is captured from outside a building and is released inside to make the interior warmer.

Heat pumps do not create heat energy, they simply move it from one place to another.

The technology required to create an effective heat pump relies on a number of physical laws. These are illustrated in the following diagram.




Heat pumps rely on a volatile liquid called a “refrigerant”, which is trapped inside a pipe. The refrigerant is pumped round the pipe in a continuous cycle:

(1) The evaporator is a section of pipe that has been twisted into a coil or a zigzag shape to increase its area. It is used to capture heat energy.

Heat pumps generally use Hydrofluorocarbons (HFCs) as refrigerants. These boil at very low temperatures, sometimes as low as minus 20 degrees Celsius. When liquids boil, they evaporate into gas, which captures heat. The refrigerant is warmer when it leaves the evaporator than it was when it entered.

(2) The compressor increases the pressure of the gas, which further increases its temperature. The refrigerant is now hot enough to be useful as a heat source.

(3) The condenser is a further coil or zigzag of piping that allows the refrigerant gas to cool and so release its heat energy. In central heating systems, the condenser is used to heat water that can then be pumped to a hot water tank for washing or to radiators or underfloor heating pipes.

(4) The expansion valve reduces the pressure on the refrigerant gas. Decreasing pressure cools the gas, which releases still more heat. The refrigerant can then be returned to the evaporator.

There is a constant flow of refrigerant through the heat pump, so there is a constant cycle of heat being captured and released. The flow is driven by electrical pumps.

Heat pumps also contain a variety of sensors that can be used to optimise the operation of the device. Valves and other components within the heat pumps can be controlled by

electronics connected to those sensors to improve heat output or reduce electricity consumption.

Heat pumps in central heating systems

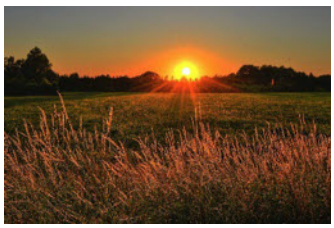
Heat pumps are alternatives to boilers as heat sources for central heating systems. A heat pump's evaporator can be located outside of a building, where it will capture heat energy even during cold weather.

The condenser and expansion valve are located inside the home, with pipes installed through the wall to carry the refrigerant around the system.

Some heat pumps can reverse the flow of heat, which means that they can be used to heat a building during winter and cool it down in summer. That is potentially attractive to consumers in countries that have wide temperature variations between seasons.

Heat pumps do not need electricity to create heat energy, but they depend on a number of electrical components in their operation. These include the compressor, the circulator pump used to maintain the flow of refrigerant and fans or pumps that help with the circulation of air or water round the evaporator and condenser. In cold climates, it may also be necessary to use electricity to heat mechanisms located outdoors to prevent them from icing up.

Heat pumps cost less to run than traditional boilers, despite their need to consume electrical power. Typically, a heat pump can deliver 3 kilowatts of heat energy for every kilowatt of electricity consumed. Unfortunately, heat pumps cost more to buy and install. An air source heat pump will cost roughly five times more than an equivalent gas boiler and a ground source heat pump can be even more expensive.



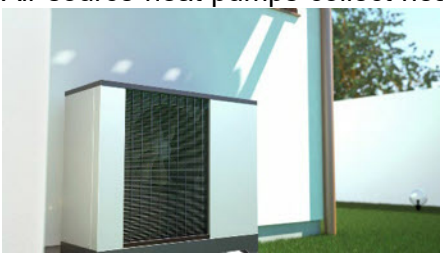
Heat pumps capture heat energy from the environment that is supplied by the sun. There is no combustion and so no carbon emission.

Care must be taken in the installation, maintenance and replacement of heat pumps to ensure that the refrigerant is not accidentally released. Refrigerants harm the environment by causing global warming if they are allowed to escape into the

atmosphere. It is, however, possible to drain the refrigerant from old heat pumps into sealed tanks for reuse or safe disposal.

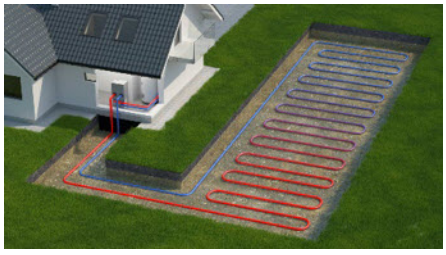
Heat pumps can capture energy from outside in almost any weather, although they become less efficient at lower temperatures. In practice, a heat pump can supply a central heating system with sufficient heat energy when outside temperatures are as low as minus 15 degrees Celsius. That is rarely a problem in many countries, including Norland, because it is seldom that cold.

Air source heat pumps collect heat energy from air as it passes over the evaporator. This is



the simplest type of heat pump for use in heating systems, and it is the most popular. The evaporator is enclosed in a housing, along with a fan that draws air into the apparatus. The condenser and the other components are enclosed in another housing that is inside the house and is connected to the central heating and hot water systems. Refrigerant flows between the interior and exterior housings using pipes that run through the wall. Air source heat pumps have the drawback of being exposed to variable air temperatures, which change with the weather and so affects their efficiency. They are, however, relatively easy to install. The interior workings of a heat pump that is being installed in place of a gas boiler can be fitted in place of the boiler that is to be removed. The exterior housing also remains accessible for any repairs in the event of a breakdown or leak.

Ground source heat pumps are an alternative to air source. Those use the same principle as



air source pumps, except that the evaporator is placed underground or is submerged in a body of water. The evaporator then captures heat energy from the surrounding earth or liquid in the same way as an air source device. The temperature around the evaporator is less severely affected by changing weather conditions, and so it is more efficient than the air source equivalent. The need to bury the evaporator can complicate the installation of a ground source heat pump compared to an air source pump. The evaporator must be several feet below ground in order to capture heat energy efficiently and also to be protected from damage. Not all homes will have a suitable outdoor space in which to install the evaporator. Ground source heat pumps require the same equipment to be installed inside the house as air source pumps, so there is no difference to the installation inside the house.

One disadvantage of all heat pumps, both air source and ground source, is that they produce hot water that is cooler than the water from a boiler. The difference is roughly 10 degrees for air source heat pumps and a little less for ground source. In either case, that can mean that a central heating system based on a heat pump will struggle to raise the room temperature to a comfortable level. That problem can be solved by using larger radiators than for a traditional boiler-based system or by installing underfloor heating when installing a heat pump. Either option will provide a larger surface area for the transfer of heat, although the cost of doing so could discourage many homeowners from replacing their gas boilers with heat pumps. It is easier to install heating systems based on heat pumps in new homes because they can be built with larger radiators or underfloor heating pipes in place.

## Alternative heating systems

There are alternatives to boilers and heat pumps when powering central heating systems.

**Solar thermal panels** can be used to capture heat from sunlight to heat water. The panels contain pipes filled with water. The glass helps to focus the sunlight on the pipes and the water heats up before being piped to a hot water tank.

Solar panels are simpler than heat pumps, but they rely on sunlight to heat water. No energy can be collected during hours of darkness and the panels will be less effective when skies are cloudy.

Photovoltaic solar panels use a different technology to convert sunlight into electricity.

Both types of solar panel require homeowners to have a suitable location for an array of panels. They are usually mounted on a rooftop. In the northern hemisphere, it would be ideal if that rooftop was facing south in order to maximise exposure to sunlight throughout the day.

**District heat** is a communal heating system that is usually provided by city governments that have access to biomass fuel than can be burned to create heat. Biomass takes a variety of forms, including waste forestry wood, agricultural residue such as wheat stalks and even household waste. A large biomass boiler heats water that is pumped to individual homes in surrounding buildings.

District heat systems involve combustion, so they cause carbon emissions. They are, however, generally more efficient than having separate heat sources in individual dwellings. This technology tends to be popular in locations that can offer cheap fuel from nearby sources. For example, a city with a large commercial forestry on its outskirts will have a ready supply of combustible material that would otherwise be dumped.

**Electric heaters** can be freestanding or wall-mounted. In either case, they are connected to the household electricity supply. The flow of electricity through wiring that has a high resistance creates heat.

Electric heaters were popular before central heating became popular. They are easy to install in any room. They are also flexible because heaters can be switched on and off in different rooms, in line with occupants' needs.

These heaters offer convenience but are relatively expensive to operate.

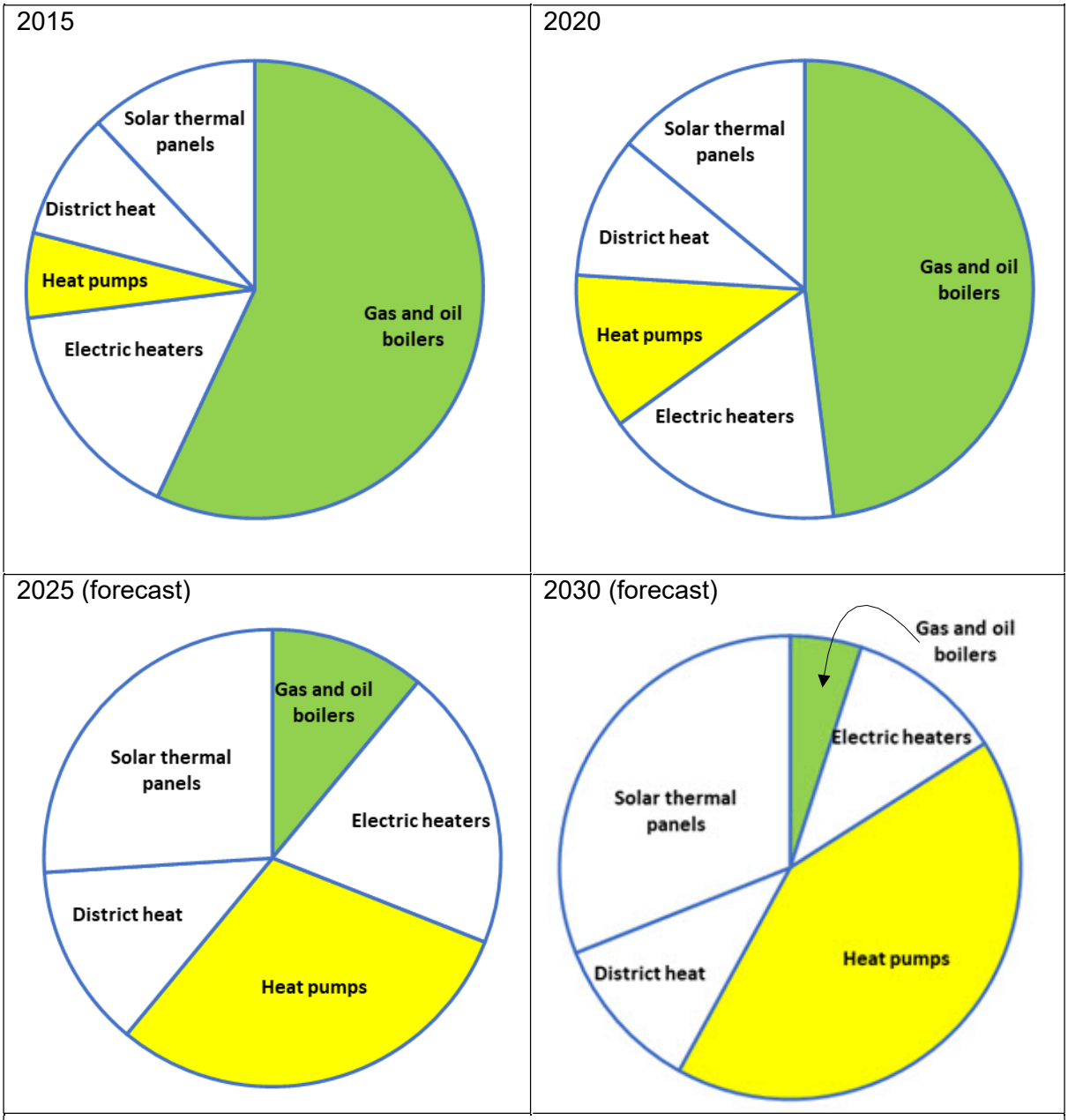
<u>Global sales of domestic heating technologies</u>

Boilers are slowly declining in popularity because of environmental concerns about carbon emissions. Consumers are, however, often reluctant to switch to heat pumps because of the cost of doing so. Heat pumps cost more than boilers, and they usually require a significant investment in new radiators or underfloor heating. Consumers often replace old boilers with newer models that are more efficient and more reliable than their existing models.

Demand for boilers is expected to decline more rapidly within the next few years because many governments have committed themselves to achieving a target of zero net carbon emissions. Governments will make increasing use of a combination of incentives to install heat pumps and legislation to discourage the manufacture and sale of boilers. It is anticipated that this will leave a small residual demand for boilers from consumers whose properties are unsuitable for heat pumps.

Electric heaters and solar thermal panels will continue to be used alongside other heating technologies. Mains electricity can be generated from renewable energy sources, which means that electric heaters need not cause emissions in operation.

GLOBAL SALES OF DOMESTIC HEATING TECHNOLOGIES 2015 -2030

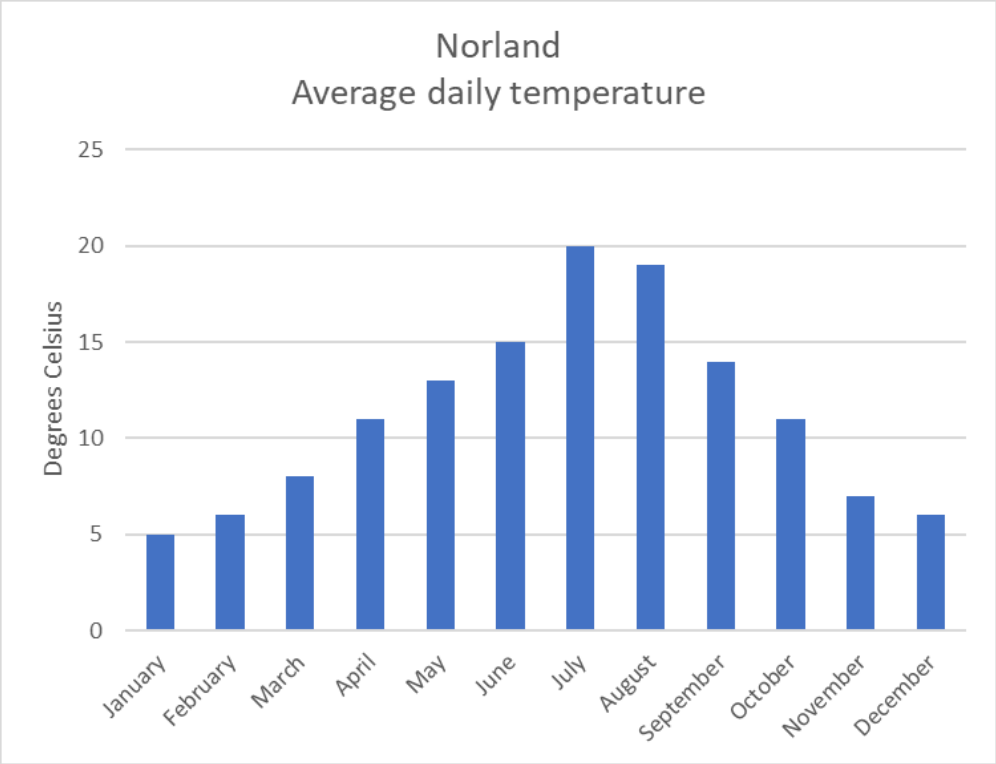



Residential properties: proportions of global revenues by type of heating technology

The promotion of renewable energy sources is expected to boost the unit sales of heat pumps more than other sustainable heat sources. Solar thermal panels are not suitable for every location and are not always capable of meeting a household's entire need for heating and hot water. District heat requires a major investment in infrastructure and so tends to rely on government support, generally in areas that are being redeveloped.

## Norland's residential central heating market

Norland has a temperate climate, with a significant variation in temperature from season to season throughout the year.




Temperatures vary significantly during the day, with cooler temperatures during the hours of darkness and higher temperatures during the daylight hours. Winter night-time temperatures are often below 0 degrees Celsius.

There is also significant seasonal variations around the average daily temperatures. It is not unusual for cold periods in winter when the temperature remains below 0 degrees Celsius for a week or more. Similarly, there can be hot spells during the summer when the temperature reaches 30 degrees Celsius.

Most householders heat their homes from mid-autumn until early spring. Heating costs can be a significant part of a typical Norlandian family's budget.

Norland's government is committed to reducing carbon emissions to zero. Heat pumps are promoted as offering a contribution towards meeting that target. It has been estimated that 20% of Norland's carbon emissions are attributable to domestic heating.

Norlandian homeowners collectively spend an average of N$1.6 billion each year on the purchase of central heating systems. That includes the installation of central heating in new homes and also the replacement of existing systems that are deemed unsafe, unreliable or inefficient.

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|---|---|
| Replacements for existing systems | Gas boilers can become unreliable over time, leaving homes without heating when a component fails. Older designs are also less efficient than current models, meaning that they use more gas in order to maintain a comfortable temperature.<br><br>At present, most homeowners replace defective gas boilers with newer models but keep their existing radiators.<br><br>Demand for heat pumps is growing slowly in this market because the pumps themselves are more expensive than gas boilers, and there is likely to be a further cost due to the need for upgraded radiators or underfloor heating. |
| Newbuild homes | Housebuilders often install heat pumps in newbuild houses because they are an attractive selling feature for potential buyers. The |

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|---|---|
| | additional cost is not a significant factor in relation to the total cost of a new house. Radiators or underfloor heating pipes can be installed during the house's construction for about the same cost as for traditional radiators for gas boilers. |

## Hottayr

Hottayr was established in 1952. It was quoted on Norland's stock exchange in 1967.

Hottayr was one of the first companies to specialise in boilers for domestic heating systems. Very few homes had central heating systems when Hottayr was first established, and so the company was one of the first to enter the market for domestic gas boilers.

Demand for central heating grew over time, although it was not common for central heating to be installed in new houses until the 1970s. By that time, Hottayr was one of the largest manufacturers of gas boilers in the country and had expanded into several export markets. Hottayr continues to manufacture domestic gas central heating boilers.

Hottayr has always been heavily involved in product development:

- **Safety** – Hottayr was the first domestic boiler manufacturer to receive a safety award from Norland Gas. There are very strict standards governing the safety of gas boilers and Hottayr's policy has always been to exceed those standards.
- **Reliability** – Hottayr was the first domestic boiler manufacturer to offer a 10-year guarantee for its boilers. The company's boilers rarely break down provided they are properly maintained and serviced. All boilers have limited useful lives because of deterioration caused by heat, moisture and blockages caused by soot, but Hottayr's boilers last for an average of 15 years. Most competitors' boilers require replacement after an average of 12 years.
- **Efficiency** – Hottayr's boiler designs have constantly evolved to use less gas, making them cheaper to run and more environmentally friendly. Hottayr patented several features that enable its boilers to create more heat energy from burning a given volume of gas and also waste less heat in bringing water up to the desired temperature.

Hottayr's gas boiler factory is located on the outskirts of Norland's Central City. The factory employs 3,800 staff. Many production processes are automated. A large proportion of the factory staff are engaged in quality control activities arising from the need to prevent gas leaks in consumers' homes.

Hottayr commenced production of heat pumps for domestic heating systems in 1997. This was regarded as a risky venture at the time because demand was very limited. However, growing concerns about emissions and the need to protect the environment created interest. Some "early adopter" consumers have replaced their gas boilers with heat pumps, despite the significant cost of doing so. Hottayr's main market for heat pumps has been housebuilders who often install heat pumps in new homes under construction. Consumers regard this as an attractive feature when buying new build houses because they offer lower running costs.

All of Hottayr's heat pumps are air source. There is insufficient demand for ground source heat pumps to justify the investment that would be required for their development and manufacture.

Hottayr's heat pumps are subject to the same attention to development and improvement as its gas boilers:

- **Consumer feedback** – Hottayr pays close attention to feedback from consumers, particularly with regards to whether their heat pumps are providing sufficient hot water and

maintaining their homes at a comfortable temperature. This feedback is an important element of ongoing product development.

- **Product features** – Hottayr was one of the first domestic heat pump manufacturers to offer the option of reversing the heat flow so that homes could be cooled during the summer months and heated in winter.

  Hottayr's heat pumps can connect to consumers' home Wi-Fi, enabling them to use an app on their smart phones to track the heat energy captured by their heat pumps. That data is also automatically uploaded to Hottayr, who uses it to monitor the use of and performance of its heat pumps. Hottayr also uses this Wi-Fi connection to upgrade and update the operating software in heat pumps in order to improve their efficiency. Consumers must decide whether or not to activate this connection after their heat pumps have been installed, but most choose to do so. Activation is a simple process using a smartphone to enter a valid Wi-Fi username and password. All upgrades are then loaded automatically.

Hottayr's heat pump factory is located in Norland's Maxtown. It employs 2,400 staff.

Hottayr also maintains a head office that employs 2,600 administrative and management staff who are responsible for a range of functions that include accounting, purchasing, sales, human resources, information technology and research and development. The head office is located in the business district of Central City.

The Information Technology (IT) Department is nominally under the control of Hottayr's Chief Finance Officer. There is a data centre within the head office, supported by a remote backup site at a separate location. IT staff provide programming and data management support for the whole of Hottayr.

Hottayr has three main categories of customers:

- Energy providers, such as Norland Gas, which supply and install central heating systems for homeowners.
- Large housebuilding companies which build housing estates that may have hundreds of homes, each of which requires a central heating system.
- Builders' merchants who provide a wholesale service for smaller businesses, such as plumbers, heating engineers and small housebuilders who do not order in bulk.

Homeowners rarely express any interest in the brand of boiler or heat pump in their central heating system. New homes come equipped with heating systems. Owners who are replacing existing heating systems will usually rely on their installers to recommend the most suitable heat source. Installers often recommend Hottayr's boilers because they have an excellent reputation for quality and efficiency.

Hottayr's heat pumps are also regarded as offering excellent quality and efficiency. They are quieter in operation than most competing brands. That is an important consideration because the electric pump used to drive the flow of refrigerant must be running whenever the heating is switched on.

Hottayr exports its boilers to several countries, all of which are in the same geographical region as Norland. Export sales are limited by the fact that many countries have warmer climates, and so there is little or no demand for central heating systems in many parts of the world.

Hottayr has two main rivals, both in Norland and in its export markets:

- Thermwyk is also based in Norland. It sells boilers and heat pumps that are slightly cheaper and slightly less efficient than Hottayr's.
- Flownyse is based in Eastland, a temperate country with a climate that is colder than Norland's. Eastland's currency is the E$. Flownyse is the largest manufacturer of boilers

and heat pumps in its home country, although Hottayr also makes some sales in that market. Flownyse also exports its boilers to the countries in which Hottayr makes sales, including Norland. Flownyse's products are comparable in terms of quality to Hottayr's.

Thermwyk and Flownyse are both more heavily focussed on boilers than Hottayr, although each sells its own range of air source heat pumps.

## Extracts from Hottayr's annual report

**Hottayr's mission and values**

Our mission

Hottayr's mission is to establish itself as a trustworthy supplier of excellent heating products.

Our vision

Hottayr's vision is to lead the move towards a zero-carbon world.

Our core values

- Hottayr keeps its promises.
- Hottayr ensures that it understands the needs of its customers and that it is responsive to those needs.
- Hottayr is constantly striving to enhance its products, making them safe, efficient and economical to operate.
- Hottayr people trust and respect one another.
- Hottayr is a safe and healthy place to work.

## Hottayr's Board of directors

*Martin Gregory, Non-Executive Chair*

Martin was a leading commercial lawyer. He spent most of his career with a major law firm, rising to the rank of partner. He was partner in charge of the firm for 5 years before he retired. In addition to his role with Hottayr, Martin chairs the Board of Norland Opera.

Martin joined Hottayr's Board in 2019.

*Dr Eva De Volder, Chief Executive Officer (CEO)*

Eva is an engineer by profession. She has a doctorate in mechanical engineering from Norland's Capital City University.

Eva joined Hottayr as a design engineer in 1998. She played a significant role in the design of Hottayr's heat pumps. She spent several years as Hottayr's Head of Research before being promoted to Chief Operating Officer in 2012. She was further promoted to Chief Executive Officer in 2020.

*Bogdan Amuzescu, Chief Operating Officer (COO)*

Bogdan joined Hottayr as a management trainee straight after graduating from university. He has held a number of management roles in Hottayr's factories. He had risen to General Manager of the boiler factory before he joined Hottayr's Board as Chief Operating Officer in 2020

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*Elaine Barros, Chief Finance Officer (CFO)*

Elaine is a qualified accountant. She passed her professional examinations while working as a trainee accountant with Norland Steel. She has since held several senior roles in a variety of manufacturing companies. Elaine joined Hottayr's Board as Chief Finance Officer in 2019.

*Emmanuel Maravanyika, Marketing Director*

Emmanuel studied marketing at Norland's Central City University. Since then, he has worked for a number of major manufacturing companies. He took a career break in 2011 to complete an MBA degree at Capital City University, passing with a distinction. Emmanuel worked as a Senior Marketing Manager with Hottayr from 2014 to 2020, at which time he was promoted to the Board as Marketing Director.

*Professor Amina Rajab, Research Director*

Amina studied mechanical engineering at Central City University. She graduated with honours and was offered a place on the University's PhD programme. Her doctoral thesis was on the optimisation of heat output from heat pumps in cold climates. She remained at the University, being promoted to Professor of Engineering in 2012. She was appointed to Hottayr's Board in 2018. She remains a visiting professor at Central City University.

*Akira Akiyama, Senior Independent Director*

Akira spent his career in corporate finance, working in senior roles with major investment banks. He developed an interest in funding wind farms and other enterprises that aimed to reduce energy emissions. He retired in 2019 and was appointed as Hottayr's Senior Independent Director at that time. He is also a non-executive director at the Central City Children's Hospital.

*Patricia Angopa, Independent Non-Executive Director*

Patricia had a career in politics. She was the member of parliament for Hightown, an industrial town in Norland, for 17 years. During that time, she served as a junior minister for business. She retired from politics in 2020 and was appointed as a Non-Executive Director by Hottayr. She is also a Non-Executive Director for a television documentary maker.

*Ye Haitao, Independent Non-Executive Director*

Ye has held a number of posts with Norland's government. He has served in a variety of senior roles, assisting in drafting legislation on a diverse range of areas including transport and pensions. Ye was appointed to Hottayr's Board when he retired from full-time employment in 2021.

| Dr Eva De Volder<br>Chief Executive Officer | | | |
|---|---|---|---|
| Bogdan Amuzescu, Chief Operating Officer | Elaine Barros, Chief Finance Officer | Emmanuel Maravanyika, Marketing Director | Professor Amina Rajab, Research Director |
| • Manufacturing<br>• Human resources | • Financial reporting<br>• Management accounting<br>• Treasury<br>• Information technology | • Promotion and advertising<br>• Customer relations | • Product development<br>• Certification of new products |

| | Board committees | | | |
|---|---|---|---|---|
| | Audit | Risk | Remuneration | Nomination |
| Martin Gregory<br>Non-Executive Chair | ♦ | ♦ | | ♦ |
| Akira Akiyama<br>Senior Independent Director | ♦ | | ♦ | ♦ |
| Patricia Angopa<br>Independent Non-Executive Director | ♦ | ♦ | ♦ | |
| Ye Haitao<br>Independent Non-Executive Director | | ♦ | ♦ | ♦ |

Hottayr's Chief Internal Auditor reports to the convener of the Audit Committee.

## Hottayr's Principal Risks

| Risk impact | Risk mitigation |
|---|---|
| Central heating systems are expensive, and so Hottayr's product sales are affected by economic cycles and by consumer confidence. | Hottayr's Board aims to diversify by selling to as many different countries as possible. |
| The company is vulnerable to credit risk, arising from the fact that customers are themselves exposed to fluctuations in the economy and in consumer confidence. | Hottayr aims to mitigate this risk through diversification across different markets, as well as setting credit limits for existing customers and conducting credit checks on new customers. |
| Cash flows can be volatile because of fluctuations in revenues and also because of the company's exposure to currency movements. | Hottayr's Treasury monitors and manages cash flows and currency exposures, taking appropriate measures to prevent cash deficits and significant currency losses. |
| The company's employees make a vital contribution to its success. The manufacture and quality control of boilers and heat pumps requires care and precision. | Hottayr's Human Resources Department conducts monthly meetings with employees' representatives.<br>Hottayr provides excellent training and funding for part-time study to enable employees to develop skills in order to seek promotion. |
| The company's products require a steady supply of materials, particularly steel, copper and aluminium. We also make heavy use of semiconductors and other electronic components. These create vulnerabilities, both in terms of availability and in pricing. | Hottayr pays close attention to the markets for these commodities. The company has developed strong relationships with key suppliers. |
| The company is vulnerable to changes in legislation relating to emissions and the safety of gas appliances. | Hottayr more than fulfils all applicable legal requirements for emissions and safety in the countries to which it makes sales.<br>Hottayr pays close attention to any proposed changes in the law, working with government agencies around the world to ensure that any proposals are realistic and proportionate.<br>Where necessary, Hottayr alters the design of its products to ensure that their performance exceeds forthcoming changes in the law. |
| Consumer demand for central heating systems is affected by environmental concerns. | Hottayr's products are designed to be at the forefront of efficiency, aiming to minimise the emissions of carbon and of harmful refrigerants in their operation.<br>Hottayr aims to educate consumers about the environmental benefits of replacing outdated gas boilers with newer models and with heat pumps. |

**Hottayr Group**
**Consolidated statement of profit or loss**
**for the year ended 31 December**

| | 2021 | 2020 |
|---|---|---|
| | N$ million | N$ million |
| Revenue | 756 | 699 |
| Operating costs | (628) | (578) |
| Operating profit | 128 | 121 |
| Finance costs | (15) | (15) |
| | 113 | 106 |
| Tax expense | (16) | (15) |
| Profit for the year | 97 | 91 |

**Hottayr Group**
**Consolidated statement of changes in equity**
**for the year ended 31 December 2021**

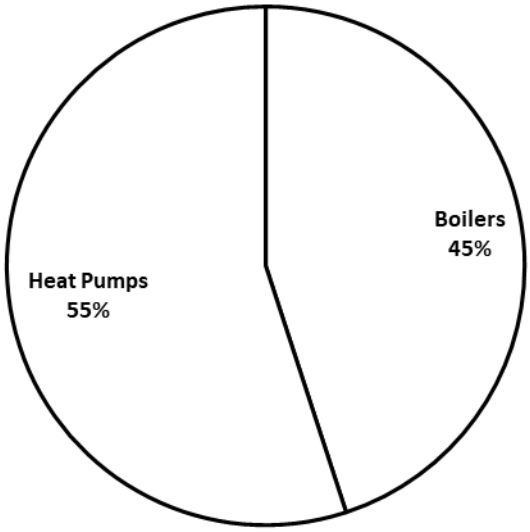
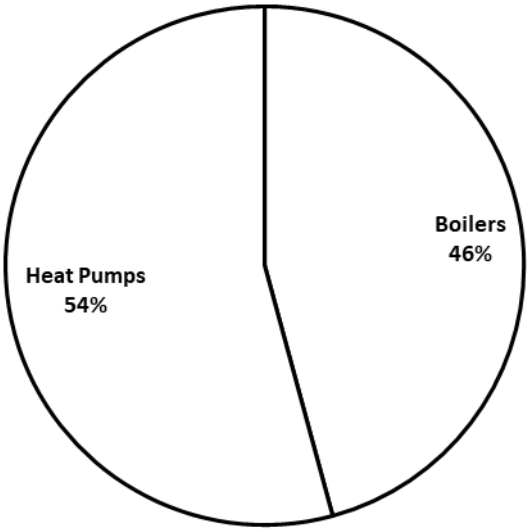
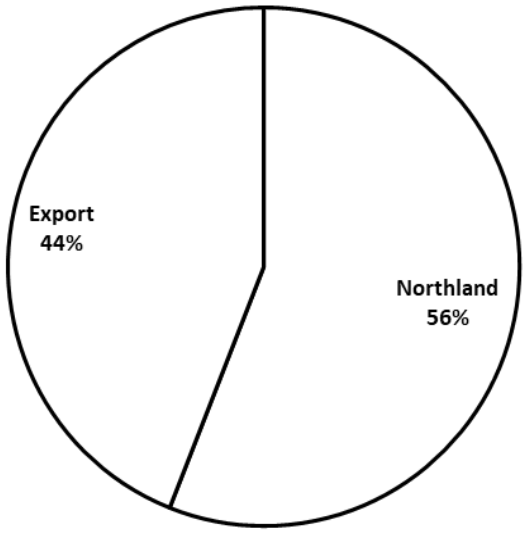
| | Share capital | Retained earnings | Total |
|---|---|---|---|
| | N$ million | N$ million | N$ million |
| Opening balance | 250 | 103 | 353 |
| Profit for year | | 97 | 97 |
| Dividend | | (42) | (42) |
| Closing balance | 250 | 158 | 408 |

**Hottayr Group**
**Consolidated statement of financial position**
**as at 31 December**

| | 2021<br>N$ million | 2020<br>N$ million |
|---|---|---|
| **Assets** | | |
| **Non-current assets** | | |
| Property, plant and equipment | 358 | 330 |
| Goodwill | 123 | 123 |
| Development costs | 85 | 69 |
| | 566 | 522 |
| **Current assets** | | |
| Trade receivables | 70 | 63 |
| Bank | 38 | 32 |
| | 108 | 95 |
| **Total assets** | 674 | 617 |
| **Equity** | | |
| Share capital | 250 | 250 |
| Retained earnings | 158 | 103 |
| | 408 | 353 |
| **Liabilities** | | |
| **Non-current liabilities** | | |
| Borrowings | 200 | 200 |
| **Current liabilities** | | |
| Trade payables | 52 | 48 |
| Tax liability | 14 | 16 |
| | 66 | 64 |
| **Total equity and liabilities** | 674 | 617 |

**Hottayr Group**

**Analysis of revenues**

| 2021 | 2020 |
| --- | --- |
|  |  |
|  |  |

## Extract from competitor's financial statements

**Thermwyk Group**
**Consolidated statement of profit or loss**
**for the year ended 31 December**

| | 2021 | 2020 |
|---|---|---|
| | N$ million | N$ million |
| Revenue | 801 | 790 |
| Operating costs | (641) | (653) |
| Operating profit | 160 | 137 |
| Finance costs | (9) | (10) |
| | 151 | 127 |
| Tax expense | (21) | (18) |
| Profit for the year | 130 | 109 |

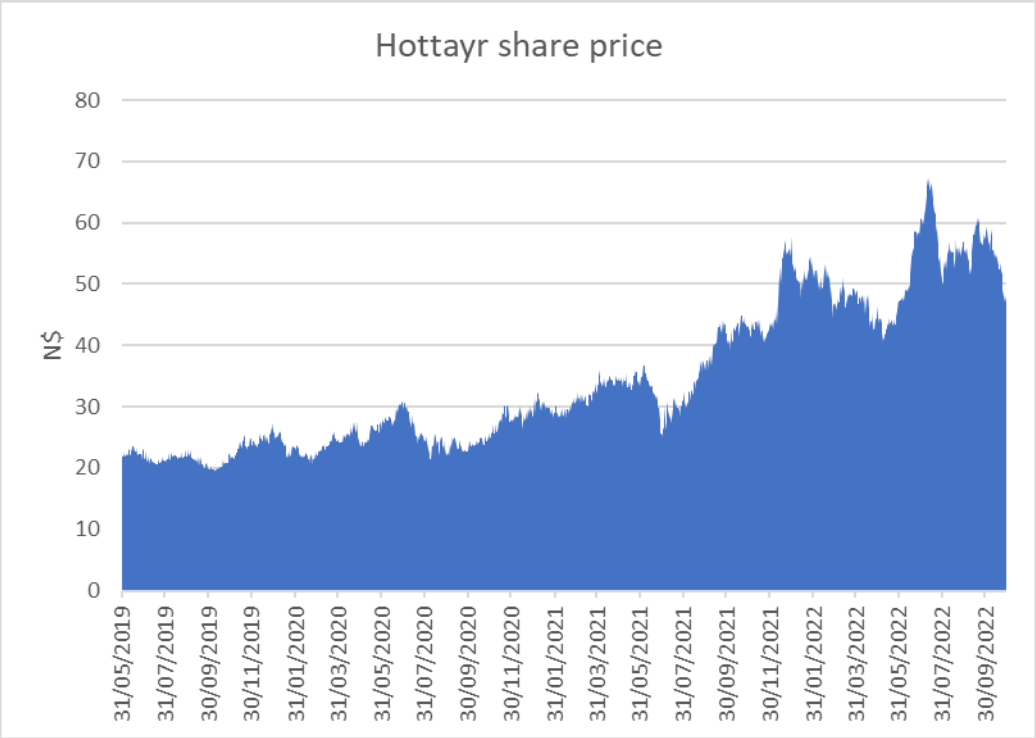
**Thermwyk Group**
**Consolidated statement of changes in equity**
**for the year ended 31 December 2021**

| | Share capital | Retained earnings | Total |
|---|---|---|---|
| | N$ million | N$ million | N$ million |
| Opening balance | 260 | 98 | 358 |
| Profit for year | | 130 | 130 |
| Dividend | | (82) | (82) |
| Closing balance | 260 | 146 | 406 |

**Thermwyk Group**
**Consolidated statement of financial position**
**as at 31 December**

| | 2021<br>N$ million | 2020<br>N$ million |
|---|---|---|
| **Assets** | | |
| **Non-current assets** | | |
| Property, plant and equipment | 326 | 290 |
| Goodwill | 82 | 82 |
| Development costs | 68 | 56 |
| | 476 | 428 |
| **Current assets** | | |
| Trade receivables | 96 | 111 |
| Bank | 32 | 28 |
| | 128 | 139 |
| **Total assets** | 604 | 567 |
| **Equity** | | |
| Share capital | 260 | 260 |
| Retained earnings | 146 | 98 |
| | 406 | 358 |
| **Liabilities** | | |
| **Non-current liabilities** | | |
| Borrowings | 90 | 90 |
| **Current liabilities** | | |
| Trade payables | 88 | 103 |
| Tax liability | 20 | 16 |
| | 108 | 119 |
| **Total equity and liabilities** | 604 | 567 |

## Share price history




Hottayr's beta is 1.12.

# Happy Comic

## Readers' questions

**Question:** I am worried about the environment and have been asking my parents to replace our gas boiler with solar panels. They say that solar panels would not heat our house properly. Is that true?

Amos, age 12

**Answer:** It is good that you are taking climate change seriously, but it is true that solar panels cannot completely replace gas boilers in Norland. Solar panels rely on having plenty of direct sunlight to heat the water that runs through them. There is no sunlight at night and sometimes very little during the day, for example, when it is cloudy. In countries like Norland, solar panels only work as a supplement to other heat sources, such as boilers. They can provide all the hot water needed for baths, showers and cleaning during summer, but you would still need an additional heat source in winter, especially if you planned to have central heating.

There are also practical issues, such as whether your house has a large enough roof to attach solar panels to.

You could consider asking your parents to install a heat pump. That would cost more than solar panels, but a heat pump can gather heat from outdoors on the coldest and darkest of days and would completely replace your gas boiler.

# Happy Comic

## Readers' questions

**Question:** My parents had a heat pump installed in our house. So far, it has worked really well. The house is almost as warm inside as it was when we used a gas boiler, and there is always plenty of hot water for showers and washing up.

The weather has been very cold recently, and I am worried that there won't be any heat outside for the heat pump to capture and keep our house warm.

Alexandra, age 13

**Answer:** You should be ok, even on the coldest of days. Heat energy makes particles of gas, liquid and solid material vibrate. The hotter they are the more they vibrate. The vibration slows as things get colder, but it only stops completely when they reach absolute zero, equal to minus 273 degrees Celsius.

In theory, there is heat energy that can be captured all the way down to absolute zero. In practice, heat pumps run into mechanical difficulties if the temperature falls below minus 15 degrees Celsius, but it is never quite that cold in Norland.

Your new heat pump will reduce your family's carbon footprint and is capable of keeping you warm right through the winter.

# Happy Comic

## Readers' questions

**Question:** My parents bought a new freezer recently, and the shop asked if they wanted to pay extra to have the refrigerant from their old one removed and recycled. They agreed, even though the recycling was expensive, because the people in the shop that sold the freezer said that letting the refrigerant escape is extremely harmful to the environment in terms of global warming.

My question is, why don't we use something else that would be less damaging to the environment?

Netta, age 12

**Answer:** It is true that the Hydrofluorocarbons (HFCs) that are released when old fridges and freezers are scrapped carelessly are amongst the most damaging of greenhouse gases. They do a great deal of harm when they are released into the atmosphere, and so the advice that your parents received was correct.

There are alternatives to HFCs that are less harmful to the environment. Unfortunately, they usually have other drawbacks. For example, propane is an effective refrigerant, but it is highly flammable if it escapes. Ammonia is another alternative that works well, but it can be poisonous in high concentrations.

# Norland Telegraph

## Norlandian government commits to “net-zero” by 2040

Norland’s Government has announced an ambitious plan to reduce the country’s greenhouse gas emissions to “net-zero” by 2040. Greenhouse gases, such as carbon dioxide and the hydrofluorocarbons (HFCs) that are used as refrigerants, have been blamed for the phenomenon of global warming. The release of those gases into the atmosphere affects the Earth’s temperature by absorbing more heat energy from sunlight.

The Government’s net-zero commitment requires a massive reduction in emission levels. The remaining emissions will then be offset by initiatives such as planting trees, which capture carbon from the atmosphere while they are growing.

This legislation will have a huge impact on many aspects of daily life. For example, the Government will ban the sale of new petrol- and diesel-powered cars by 2035 as one step towards meeting the net-zero target.