Kāinga Ora
Homes and Communities

National Office Wellington
80 Boulcott Street
Wellington Central
PO Box 2628, Wellington 6140

0800 801 601
www.kaingaora.govt.nz

[redacted]

Thank you for your email of 21 November 2019 requesting the following information under the Official Information Act (the Act):

> *All available information about the "Smart Homes Project Pilot" (160 Kainga Ora homes across Palmerston North and the Hutt Valley)*

Kāinga Ora's Smart Homes Pilot began in July 2018. There were 160 homes in Palmerston North and Lower Hutt included in the pilot which ended in October 2019.

A final report on the pilot has not yet been completed but I am able to provide you with several reports that have been prepared during the pilot. Some of this information has previously been released under the Official Information Act and is available on the Kāinga Ora website:

http://kaingaora.govt.nz/assets/Publications/OIAs-Official-Information-Requests/June-2019/OIA-17-June-2019-Smart-Homes-sensors.pdf

I am also providing three additional documents:

1. The relevant portion of the Weekly Report to Ministers that discussed the Smart Homes Pilot
2. A Smart Homes Pilot update
3. A pilot success case study regarding CO2

Yours sincerely

Rachel Kelly
Manager – Government Relations

Excerpt from Minister's Weekly Report

For period ending 8 November 2019

Smart Homes – next steps

Kāinga Ora-Homes and Communities is getting smarter about its homes and how they perform so that it can make sure we provide warm and dry homes for our tenants and their families. To do this we undertook a pilot that involved installing "Smart Homes" sensor equipment in selected properties/homes in Palmerston North and Hutt Valley Retrofit Properties (HVRP). Since July 2018 around 160 homes have participated in the Smart Homes pilot.

The sensors record a combination of temperature, carbon dioxide (air quality), humidity, air pressure and light. HVRP also has some power loggers installed on the circuit boards to capture data related to the power usage and to test for energy consumption against the thermal envelope of the property. This information is securely transmitted to a Kāinga Ora database.

Aims of the Smart Homes pilot:
Making our homes warmer and drier is a key part of our renewal programme, which is providing better homes for our customers. To ensure we are doing the best we can to improve our homes, we need to know more about how they perform. The purpose of the pilot has been to understand more about how the sensor data can help to:

- inform and measure investment decisions
- support organisational learning regarding the performance of our properties
- enable interventions and engagement about what actions customers can take to help have a warm, dry and healthy home.

Findings so far:
Information from the Smart Homes pilot suggests that physical interventions alone cannot be expected to achieve desired outcomes for our customers. The evidence suggests that customer behaviour and economics play a large part in the goal of *helping create warm, dry healthy homes for low-income families*, but we need to understand more about this relationship.

At a frontline level, the data is providing a tool to engage with our customers about how to have a warm, dry, and healthy home. The sensor data then allows us to measure the impact of these interventions. One of the key interventions has been around high CO^2 levels.

$C0^2$ Intervention Case Study
Sensor data showed unusually high CO^2 levels in some properties. The tenancy manager visited the properties, shared the data, and talked through with the customers the dangers of high CO^2 and the need for adequate ventilation particularly in bedrooms overnight. Following this we saw an immediate decrease in CO^2 levels. A copy of the CO^2 Case Study is attached with this Weekly Report – see attached pdf

Next Steps

Following the initial pilot, we are expanding the pilot to install sensors in up to 2,000 of our homes across New Zealand. This will help us gain further information about how our homes perform, and how we can use the data.

A Request for Proposal (RFP) will be published shortly to engage a provider for sensors for up to 2,000 homes. Insights from our experience with the pilot and what we received from a Request for Information (RFI) run earlier this year, has helped us develop the RFP and will help with the evaluation of proposals. The RFP has the potential to generate some further external interest in the project.

Privacy for customers is of the greatest importance. Customers will have a detailed consent form, with information about how the data will be used, kept safe, and who it will be shared with. If customers do not consent to be part of the Smart Homes project, this will have no impact on any ongoing or future relationship customers have with Kāinga Ora.

While we are evaluating the RFP responses, we will start looking at locations for the project. We expect to start installing sensors in April 2020.

We will keep your office and key stakeholders updated about plans for the wider roll out.

Sharon Girvan
Acting DCE Governance

SMART HOMES PILOT

UPDATE | JUNE 2019

Tena koutou.

Over the past 10 months, the Smart Homes Pilot team have been installing sensors and using the information collected to understand how our homes are performing for whānau who live in them.

In this newsletter, we want to share with you what we have learnt so far, and provide some tips on how to keep your home warm and dry.

Heating your home and electricity use

Last winter, we learnt many of the pilot properties can be heated to a healthy temperature. But what we don't know is how much it's costing whānau to achieve that, or why some homes were colder than others.

To help with that, you should shortly receive a letter, if not received already, asking for access to your electricity use. By comparing this information with the temperatures in your home we can better understand how much it costs to heat your home to a healthy standard.

MSD Winter Energy Payment reminder

Please remember that from 1 May to 1 October the Winter Energy Payment will be paid to seniors and people on a benefit. This is an extra payment to help with the cost of heating your home over the winter months. The Winter Energy Payment won't affect your other payments from Work and Income, or your income-related rent.

Keep your home well ventilated

We also found that some of our tenants were not adequately ventilating their homes. As a result the air quality was not always healthy for their whānau. Simply opening doors and windows more often made a huge difference in those homes. This is important to remember for everyone. It also helps keep humidity levels down.

Thank you!

We would like to thank you all for participating in the Smart Homes pilot. Your involvement has given us an opportunity to learn about our homes in a way we have never had before so your trust and patience has been so appreciated.

We hope you enjoy reading this newsletter and if you have any questions or feedback, please get in touch on 0800 801 601 or email enquiries1@hnzc.co.nz

Nga manaakitanga,

The Smart Homes Team

INSIDE:

How warm is your home?

Here are the average indoor temperatures for the winter and summer periods across all of our Smart Homes.

We started installing sensors in Palmerston North homes in July while Hutt Valley installs started in October.

Average **summer** temperature — December 2018 - February 2019

PALMERSTON NORTH

23.2°C

Average daytime: 23.4°C Average night-time: 22.8°C

HUTT VALLEY

22.9°C

Average daytime: 22.9°C Average night-time: 22.8°C

Average **winter** temperature — July 2018 - September 2018

PALMERSTON NORTH

17.1°C

Average daytime: 17.3°C Average night-time: 16.9°C

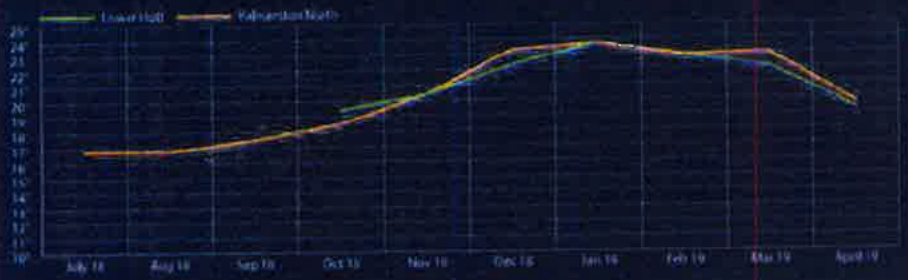
HUTT VALLEY

—

Winter: is taken as the months July, August and September. **Summer:** is taken as the months December, January and February.

Daytime: is between the hours 8am and 7pm. **Night-time:** is between the hours of 10pm and 6am.

Month by month average temperature by city



Carbon dioxide (CO_2)

Over winter we can sometimes see an increase in carbon dioxide levels. This can happen when homes aren't ventilated well; whānau are sleeping together in one room with the windows and doors closed; or are using portable gas heaters. We saw this occur in some of our homes last winter.

High levels of CO_2 can cause drowsiness, headaches, and poor concentration. It can also affect the quality of your sleep and wellbeing. As the cooler weather sets in, it's important to continue to let fresh air into your home.

Some ways you can reduce the CO_2 levels in your home are:

- **Air your home** - open windows and doors a few times a day to air the house, even in winter. Don't forget to open wardrobe and cupboard doors.
- **Ventilate your bedroom** - sleeping with your bedroom door or window open lets out the CO_2 that naturally builds up over the night. This is especially important if multiple whānau members sleep together in one room.
- **Avoid unflued gas heaters** - these can release toxic fumes and make your house damp.

Where we found high levels of CO_2 the case manager spoke with the tenants about the risks and they did some of these things. Immediately we saw a big improvement in the air quality in their homes. Do speak with your tenancy manager if there are reasons why you don't like opening your doors or windows regularly.

CO_2 LEVELS

BEFORE INTERVENTION

40 DAYS

Number of days CO_2 levels were very high 4 weeks prior to intervention.

AFTER INTERVENTION

08 DAYS

Number of days CO_2 levels were very high 4 weeks after intervention.

Humidity

Humidity levels increase when there is more moisture in the air. High levels of humidity can cause mould.

Some ways you can reduce the humidity levels in your home are:

- **Dry clothes outside or in a clothes dryer that is vented to outside** - try not to use indoor airing racks or clothes dryers that vent into your house. The moisture in the clothes will end up in your home.
- **Air your bedding** - especially in winter. Duvets, pillows, and other heavy bedding absorb moisture over time, so air them outdoors when it's sunny.
- **Cooking, showering and washing** - all introduce moisture to your home. The best way to get rid of this moisture is with externally vented extraction fans. If you don't have these, open windows during or after cooking, showering and washing up.

Tips for Keeping Your Home Warm and Dry

WIPE
any moisture or drips off your windows and walls.

OPEN
windows in the mornings and while you shower or take a bath.

HANG
washing outside to dry, if you can. Or in a room with a door closed and windows open.

OPEN
curtains during the day to let warmth in and close them in the evening to keep the warmth in.

STOP
cold air getting into your home by stopping draughts around doors and windows. Contact your tenancy manager if you need help with this.

HEAT
your home using thermostats and timers so your heaters only come on when you need them and automatically turn off when the right temperature is reached.

Create as much space as possible between the heads of sleeping children.

Try 'topping and tailing' if your children share a bed.

Try not to have lots of people sleeping together in one room.

Housing New Zealand
Housing New Zealand Corporation

SMART HOMES PILOT

Reducing CO_2 levels: A success story

SMART HOMES

Housing New Zealand
Housing New Zealand Corporation

Understand: Monitor the state of properties with sensors

Between July and September 2018, the pilot team identified seven properties with CO_2 levels exceeding 5,000ppm. Further investigation showed that the higher readings were isolated to particular rooms or times of the day. In some instances readings exceeding 7,000ppm were recorded regularly in bedrooms.

Why is this important?

High levels of CO_2 can cause drowsiness, headaches, and poor concentration. It can also affect the quality of a person's sleep and wellbeing. Research on air quality has traditionally suggested that a very high concentration of CO_2 (at least 5000ppm) is needed before there are risks to human health. However, a growing body of research suggests levels as low as 1000ppm could cause health problems.

Determine: Research the influence of various pressures on that state

We use sensor data combined with Housing New Zealand administrative data and the knowledge of the local offices to determine what is happening and potential causes of any concerns.

To determine the cause of these high CO_2 levels, the Case Manager visited the whānau in these homes to discuss the findings with them.

Three common contributing factors were identified from those discussions:

- Windows and doors were kept closed due to privacy and security concerns and/ or because of the cold
- Whānau were sleeping together in one room despite having enough bedrooms for the household (functional overcrowding)
- Unflued gas heaters were used to heat bedrooms in two properties

Improve: Plan intelligent interventions

After learning of the impact high CO_2 levels can have on their health, these tenants committed to ventilating their homes more often. As a result, CO_2 levels in all seven properties dropped back to those of the other properties in the pilot due to better ventilation.

While valuable, this was a short term solution to mitigate the impact of the actual causes of the high CO_2 levels. Longer term challenges suggest the CO_2 levels will rise again in some of these properties without more permanent solutions.

What does this mean for HNZ?

This winter we are again identifying properties with high levels of CO_2 during colder days and nights; although not as high as last year (perhaps because it has not been as cold).

Ventilation is critical for healthy homes and there are core messages that tenancy and case managers can share with all their tenants. In some instances this will be all that is required. Many people don't know about the possible negative health effects poor ventilation can have and how important it is to let the air flow through their home. Raising awareness can be all that is required.

However, the high CO_2 levels reported here were about more than poor ventilation. Functional overcrowding and poor heating choices, are common causes of high CO_2 levels. Where this occurs regular ventilation to mitigate the impact becomes even more important particularly if the core issue cannot be readily solved.

Potentially more problematic is where tenants do not want to open their doors or windows for security or privacy reasons. This may require discussions with asset managers to find a solution.

Messages for tenancy and case managers to use with tenants

High levels of CO_2 can cause drowsiness, headaches, and poor concentration. It can also affect the quality of your sleep and wellbeing. As cooler weather sets in, it's important to continue to let fresh air into your home.

Some ways you can reduce the CO_2 levels in your home are:

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