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District Health Board
Te Poari Hauora ō Waitaha

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2 April 2019

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RE Official Information Act request CDHB 10049

I refer to your email dated 28 February 2019 requesting the following information under the Official Information Act from Canterbury DHB. Specifically:

- **Copies of all reports, memos, discussion papers, advice, plans, or policies created by your DHB (including by contractors) since 1 January 2017 concerning climate change.**

For the avoidance of doubt, this request is not intended to capture all email correspondence or letters referring to climate change, but it does include documents in which climate change is not the sole topic.

Please refer to the Appendices below for information concerning climate change for Canterbury DHB since 1 January 2017.

Appendix 1 - This paper responds to the Canterbury DHB's Executive Management Team's environmental sustainability sponsor's request for a briefing on Canterbury DHB's responsibilities in this area, its current activity, a review of activity in other parts of New Zealand and the world, and recommendations for next steps. (May 2018)
Appendix 2 – Ministry of Health Survey on Environmental Sustainability in New Zealand's District Health Boards. (June 2018)
Appendix 3 – Canterbury DHB 2018/19 Annual Plan – Climate Change Stocktake.
Appendix 4 – Terms of Reference - Transalpine Environmental Sustainability Governance Group – February 2019.
Appendix 5 – Environmental Sustainability – increasing environmental sustainability facilities. Programme Plan 2018/19.
Appendix 6 – Canterbury Mayoral Forum February 2019 – presentation – Dr Anna Stevenson, Public Health Physician, Canterbury DHB.
Appendix 7 – Transalpine Environmental Sustainability Governance Group Action notes / Minutes February 2019.
Appendix 8 – David Meates notes for speech – Net Zero Emissions Workshop 5/12/2018
Appendix 9 - Summary of CEMARS (Certified Emissions Measurement and Reduction Scheme) certification.

We have redacted information under section 9(2)(a) of the Official Information Act i.e. *"…to protect the privacy of natural persons, including those deceased".*

If you disagree with our decision to withhold information you may, under section 28(3) of the Official Information Act, seek an investigation and review of our decision from the Ombudsman. Information about how to make a complaint is available at www.ombudsman.parliament.nz; or Freephone 0800 802 602.

I trust that this satisfies your interest in this matter.

Please note that this response, or an edited version of this response, may be published on the Canterbury DHB website after your receipt of this response.

Yours sincerely

Carolyn Gullery
Executive Director
Planning, Funding & Decision Support

Canterbury
District Health Board
Te Poari Hauora o Waitaha

Canterbury Health System: A health promoting health board

How the CDHB is using sustainable development approaches to improve, promote, and protect the health of people and communities in Canterbury

May 2018

Contents

Executive Summary....3
1. Purpose....5
2. Developing a Health Promoting Health System....5
3. A Sustainable Development Approach....7
4. Climate Change – a Global Environmental Determinant of Health....9
5. Sustainable Development in the Health Sector....11
6. Legislative and Regulatory Context....15
7. Non-statutory Agreements....23
8. Sustainable Development Approaches in the New Zealand Health System....26
9. Conclusions and Recommendations....37
Updated recommendations....39
References....42
Appendices....45

Executive Summary

This paper responds to the Executive Management Team's environmental sustainability sponsor's request for a briefing on CDHB's responsibilities in this area, its current activity, a review of activity in other parts of New Zealand and the world, and recommendations for next steps.

The paper contains:

- A brief summary of why health systems around the world are increasingly focused on a sustainable development approach
- A brief review of relevant legislative and non-statutory agreements that CDHB is party to
- A selected stocktake of work CDHB and other district health boards (DHBs) are already undertaking in the area of environmental responsibility
- Recommendations for potential next steps for CDHB in taking a sustainable development approach with respect to environmental sustainability as part of CDHB's commitment to being a health promoting health system.

Currently the most rapid ecosystem change is global climate change. Other ecological processes, such as reducing biodiversity, changes in disease vectors and extreme weather events, are all linked to climate change and are interweaving with societal dynamics in ways that can amplify risks to health. CDHB must meet a number of legislative requirements and contribute to international agreements that New Zealand is party to where those agreements link health, wellbeing and environmental outcomes.

CDHB is well placed to respond to these environmental challenges and to take a leading role in formally embracing a sustainable development approach that supports an explicit vision of being a health promoting health system. This approach can benefit the country as a whole in terms of achieving positive health **and** environmental outcomes.

Already CDHB has made significant steps towards optimising the mix between health promotion, disease prevention, cure and rehabilitative care. Its approach to achieve this mix involves policy work streams, stakeholder partnerships and operational measures.

It remains a challenge to make significant gains at a time when the Canterbury health system is under severe budgetary constraints and is subject to external societal and environmental pressures.

This report makes recommendations for further discussion with the Executive Management Team under five main categories:

1. Governance and Leadership
2. Facilities Management
3. Emissions Measurement and Management
4. Operational Management
5. Workplace Management.

The recommendations made in this report are informed by a review of environmental sustainability activity in major North Island DHBs (Appendix 1). The review focused on factors leading to success and barriers to successful environmental sustainability outcomes.

Early drafts of this paper have been reviewed by the CDHB Sustainability Advisory Group, the CDHB Energy Manager, CDHB Senior Operations Manager, the South Island Alliance sustainability working group the Ministry of Health's Environmental Advisor, the Executive of the Canterbury Hospital Medical Specialist Association and other individuals. These groups and individuals have helped write the final paper and the recommendations.

May 2018: This paper has been amended in May 2018 from the version presented to EMT late 2017 to update carbon pricing, incorporate new achievements such as CEMARs certification and provide the final version of the recommendations accepted by EMT.

Mō tātou, ā, mō kā uri ā muri ake nei – for us and our children after us.

1. Purpose

Having a commitment to environmental responsibility is an important component of the mandate of a district health board (DHB) to be a health promoting health system. Over many years, the Canterbury District Health Board (CDHB) has shown concern about its environmental footprint both at governance levels and in its day-to-day activities.

At the recommendation of the CDHB Clinical Board, CDHB appointed a Sustainability Advisor in mid-2014. The resignation of the Advisor in mid-2016 provided an opportunity to reassess how well CDHB is performing in its environmental responsibilities and what it needs to do to perform even better.

The Executive Management Team's sponsor for environmental sustainability asked for a briefing to be prepared on CDHB's responsibilities in this area, its current activity, a review of activity in other parts of New Zealand and the world, and recommendations for next steps.

This paper responds to this request.

2. Developing a Health Promoting Health System

A health promoting health system actively works to optimise the mix of health promotion, disease prevention, treatment and rehabilitative care. It recognises its own potential for causing harm and seeks to minimise and mitigate this harm.

All DHBs are subject to the requirements of the New Zealand Public Health and Disability Act 2000. Under section 22 (Objectives of DHBs), a DHB needs to:

- 22(a) improve, promote, and protect the health of people and communities
- 22(h) foster community participation in health improvement, and in planning for the provision of services and for significant changes to the provision of services
- 22(j) exhibit a sense of environmental responsibility by having regard to the environmental implications of its operations.

In addition, under section 23 (Functions of DHBs), a DHB needs to:

- 23(1)(g) regularly investigate, assess, and monitor the health status of its resident population, any factors that the DHB believes may adversely affect the health status of that population, and the needs of that population for services
- 23(1)(h) promote the reduction of adverse social and environmental effects on the health of people and communities.

CDHB is required under this Act to link health, wellbeing and environmental outcomes in a way that *'promotes the reduction of adverse effects'* on health so that it *'improves, promotes and protects health'*. In summary, like other DHBs, CDHB should be a 'health promoting health system'. Figure 1 gives an overview of the outcomes and activities involved in becoming a health promoting health system.

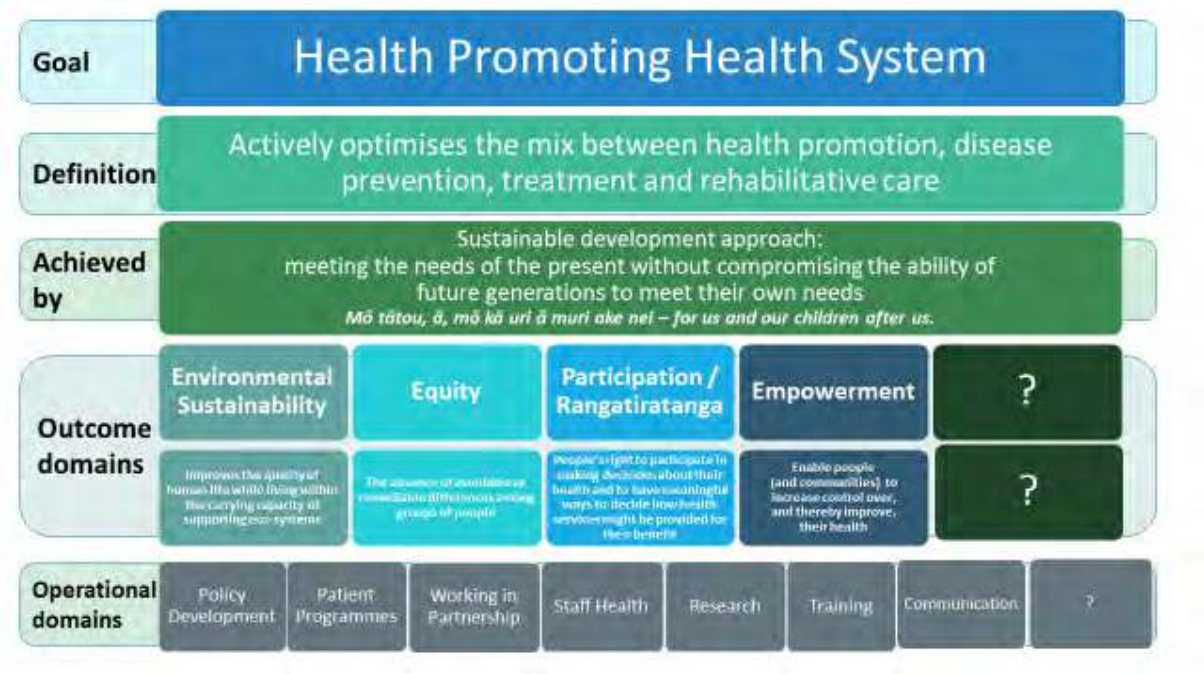

Figure 1. Overview of a health promoting health system model. The question marks denote the need for further development of this model to incorporate the many other outcome and operational domains that are needed for a health system to be health-promoting.

Health promoting health systems have a challenging task. They must deliver high-quality services in the clinical setting, mitigate and/or reduce their environmental footprints and act on the social determinants of health to promote good health and wellbeing in patients, whānau, staff and the community. All clinical care services cause harm, ranging from iatrogenic injury to unnecessary carbon emissions and excessive waste. The task of getting the 'right' mix of health promotion, disease prevention, treatment and rehabilitative care will never be complete as the social and ecological environment is constantly changing. Figure 2 illustrates how CDHB already contains many attributes of a health promoting health system, with a clear representation of many of the social, environmental, cultural and economic determinants of health of the communities we serve.[1] Although it is not yet explicitly named as such, CDHB is in many important ways beginning to embody the culture of a health promoting health system.

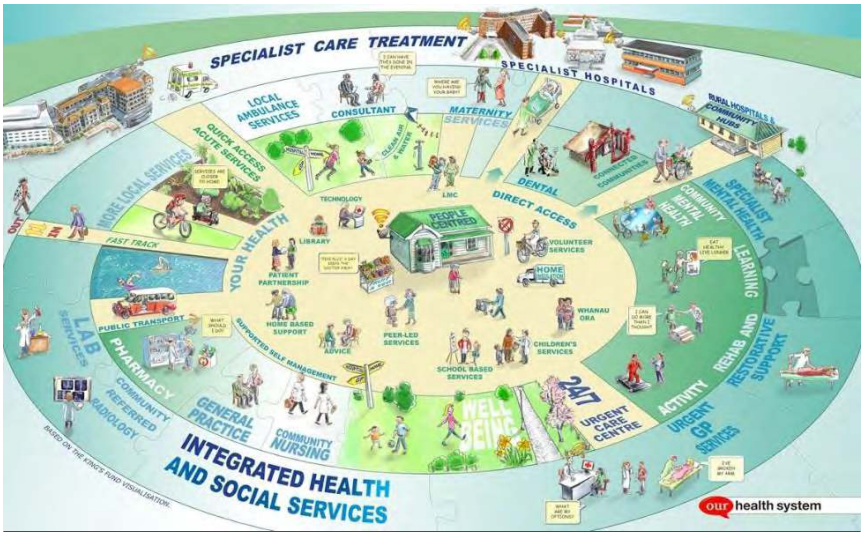

Figure 2. CDHB's health system, which deals with many determinants of health, including clean air and water, public and active transport, home insulation, smoke-free spaces, provision of adequate nutritious food, and cultural competency.[1]

3. A Sustainable Development Approach

'Sustainable development', as it was defined and described in the 1987 Brundtland Report,[2] is about *'meeting the needs of the present without compromising the ability of future generations to meet their own needs'*. A clear social mandate is included alongside environmental responsibilities.

Statistics New Zealand have portrayed our country's progress towards a sustainable development approach by attaching indicators to the generally agreed target dimensions – social cohesion, environmental responsibility and economic efficiency (Figure 3)[3].

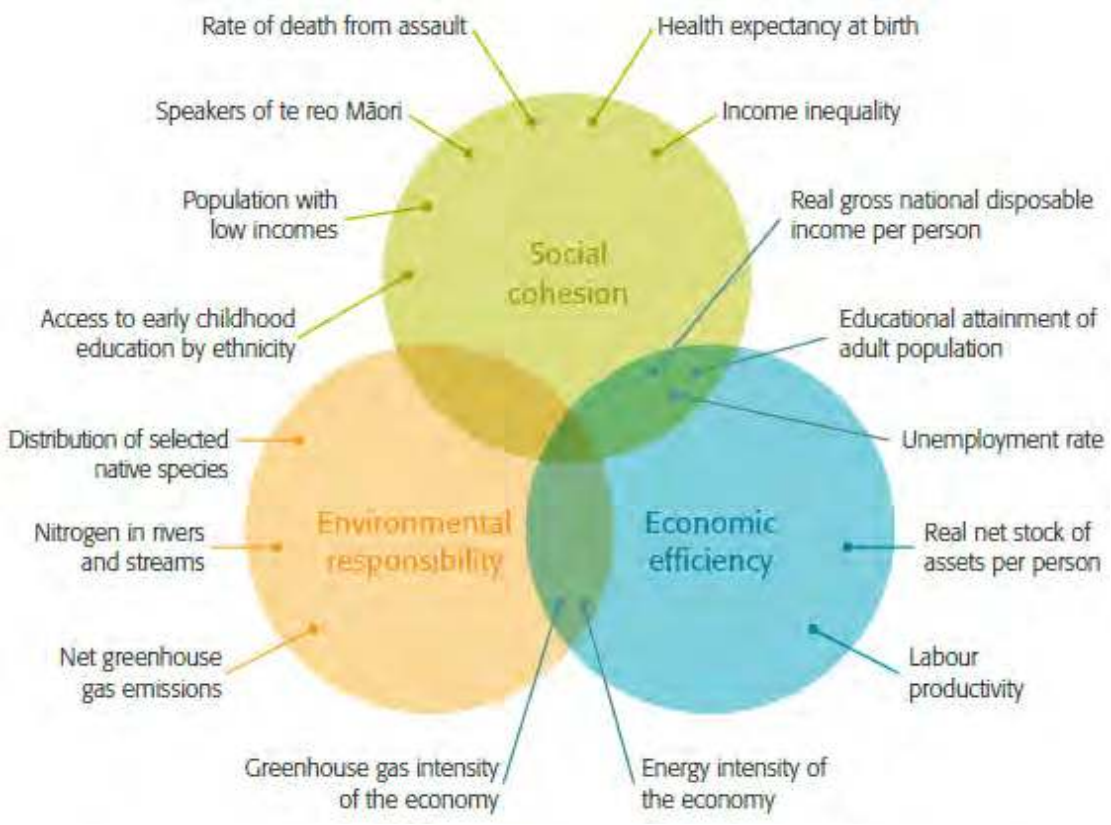

Figure 3. Relationship between target dimensions and key indicators[3,a]

[a] Statistics New Zealand now reports on the following indicators: adult educational attainment, disposable income, unemployment rate, assets and infrastructure, labour productivity, energy intensity, greenhouse gas intensity, access to early childhood education, health expectancy, income inequality, physical safety, population with low incomes, speakers of te reo Māori, greenhouse gas emissions, river condition, distribution of selected native species (http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-progress-indicators/Home.aspx).

Figure 4. The determinants of health and wellbeing [4]

Alongside the social and economic dimensions a sustainable development approach explicitly acknowledges that the environment in which we live, underpinned by the global ecosystem (stable climate and biodiversity), is a major determinant of health and wellbeing.

The health map (Figure 4) shows how actions in the environment are strongly linked to human health and wellbeing. Communities in New Zealand, including Canterbury, are living in a time when public health and environmental issues are more frequently intersecting. Examples include:

1. The contamination of Darfield's drinking water supplies in 2012
2. The '1 in 50 years' floods in Christchurch in 2014[5]
3. The contamination of Havelock North's drinking water supplies in late 2016
4. The winter storms of 2017 affecting Dunedin, Oamaru, Timaru, Christchurch and to a lesser extent the rest of the country.

Economic efficiency is a component of a sustainable development approach– it recognises that the local economy is another key determinant of health and wellbeing. Conversely, the local economy is itself affected by poor health. The Darfield campylobacter outbreak in 2012, for example, was estimated to have cost the local economy around $1 million.[6] The economic cost of the *E.coli* water contamination in Havelock North is estimated to be at least $21 million.[7] Indirect costs are not yet known but, with an estimated 40 per cent of residents and 55 per cent of households affected, they are certain to be significant. These environmental health events have clearly demonstrated to the New Zealand population that a healthy environment and a thriving economy are linked.

A sustainable development approach is a core part of a health promoting health system. This paper addresses, in particular, its environmental aspects.

No standardised global definition of what sustainable development looks like in a health context has been established. However, when a health promoting health system addresses environmental challenges, it should certainly incorporate the following aims:

- ***It will recognise the connection between human health and the environment, and demonstrate that understanding through its governance, strategy and operations.***
- ***It will promote public health by continuously reducing its environmental impact and ultimately eliminating its contribution to the burden of disease.***
- ***It will connect local needs with environmental action and will practise primary prevention by actively engaging in efforts to foster community environmental health, and health equity.***

The health sector acting alone cannot provide all the solutions to issues our local and global communities face. The health map (Figure 4) identifies that good public health and wellbeing depend heavily on collaboration. That collaboration occurs across professions as diverse as planners, service providers, ecologists and urban designers, as well as across portfolios as diverse as transport, energy management, air quality, community development and economic development. A sustainable development approach will be required in collaborative approaches.[a]

4. Climate Change – a Global Environmental Determinant of Health

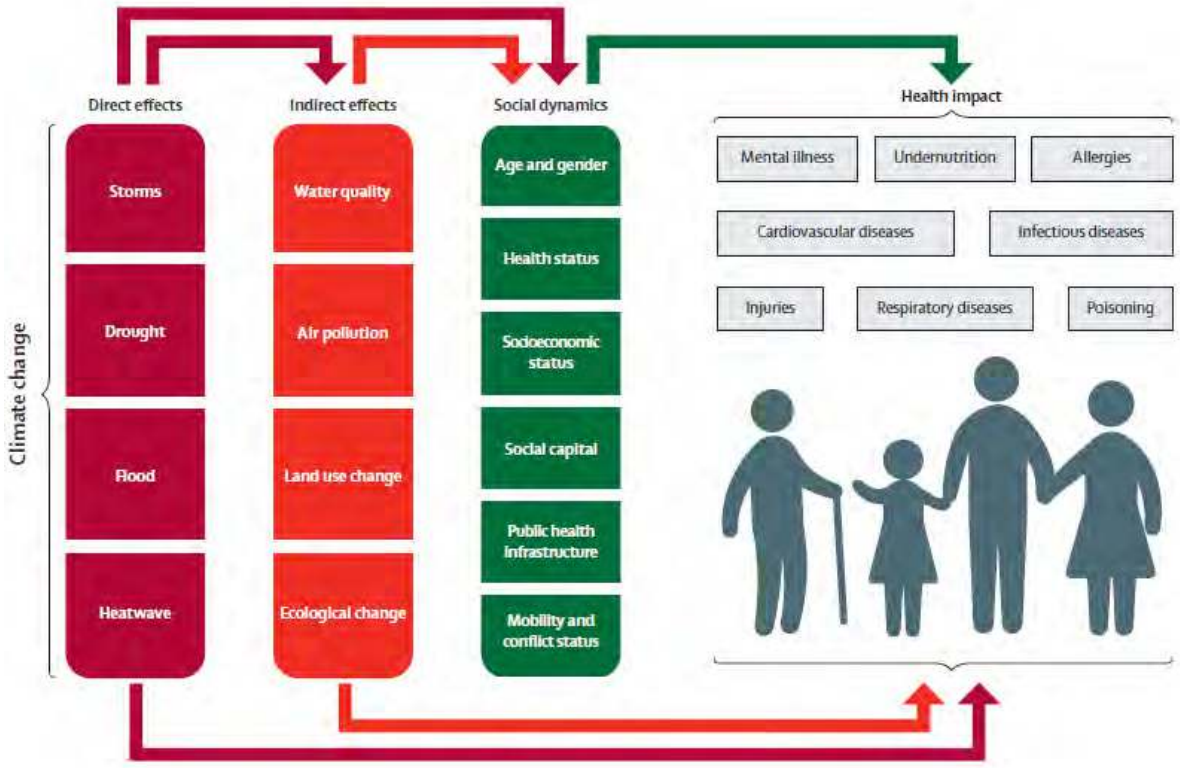

Figure 5. The effects of climate change on health and wellbeing[8]

[a] The 'Health in All Policies' toolbox has been a significant contribution from the global health sector that supports sustainable development approaches in collaborative projects.

Changes in the global climate system are causing an increasing proportion of environmental impacts that in turn affect individual humans and communities.[9] We experience these effects both directly and indirectly (see Figure 5).

In 2009 the *Lancet* published a paper acknowledging climate change as the biggest global health **threat** of the 21st century.[10] In contrast, in 2015 the *Lancet* Commission on Health and Climate Change[11] noted that tackling climate change could be the greatest global health **opportunity** of the 21st century. The opportunity arises because actions to reduce carbon emissions and to mitigate the effects of 'locked in'[a] climate change almost always have co-benefits that promote human health.[12] Carefully considered action to reduce the harms of climate change can also enable and support all people to enjoy their right to the highest attainable standard of health.[11,13]

The New Zealand College of Public Health Medicine is only one of many such organisations to recognise climate change as a serious, potentially catastrophic emerging risk to public health and health equity. In 2013 it prepared a policy statement outlining possible actions to prevent and manage these risks to human health.[14]

Action is required to prevent and mitigate the impact of climate change on human health (Figure 6).

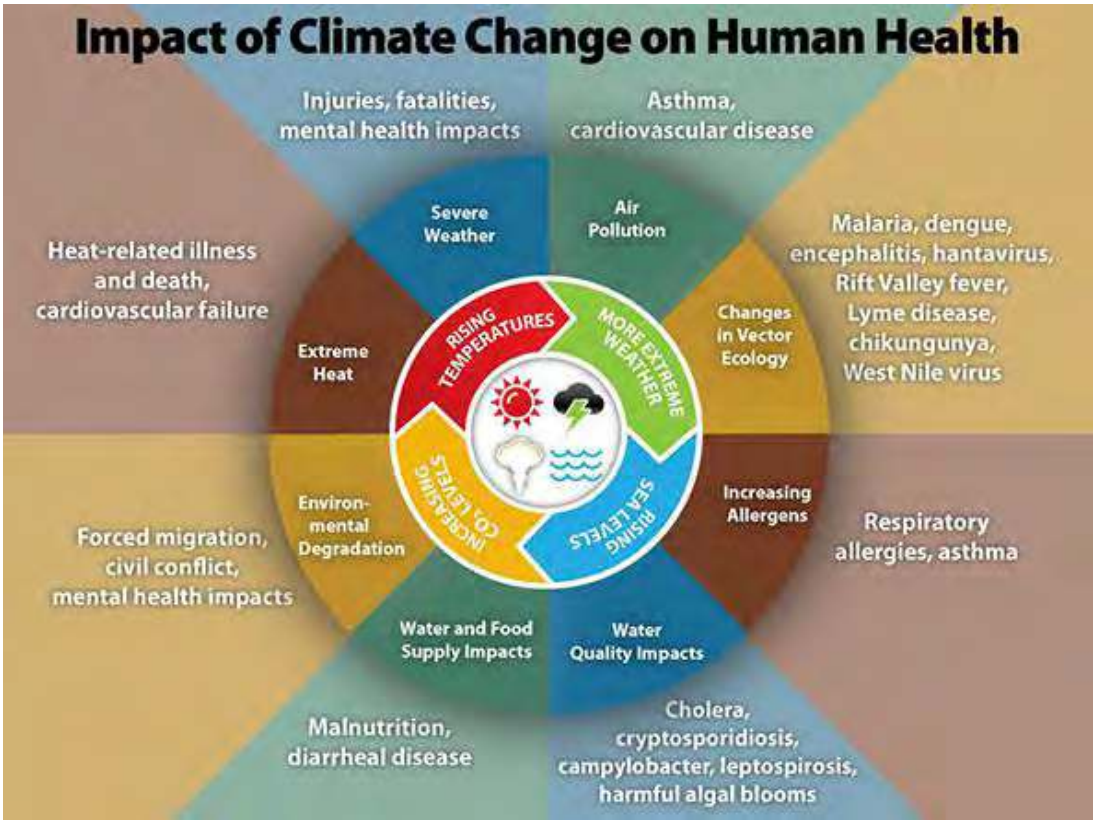

Figure 6. Some impacts of climate change on health[15]

[a] 'CO_2 concentrations at Cape Grim passed through 400 parts per million for the first time in May 2016, and global concentrations are now at their highest levels in the past 2 million years. It takes time for the climate system to warm in response to increases in greenhouse gases, and the historical emissions over the past century have locked in some warming over the next two decades, regardless of any changes we might make to global emissions in that period. Current and future global emissions will, however, make a difference to the rate and degree of climate change in the second half of the 21st century'.[12]

5. Sustainable Development in the Health Sector

The health sector, through the products and technologies it deploys, the resources it consumes, the waste it generates and the buildings it constructs and operates, is a significant source of environmental harm, including through greenhouse gas emissions. Perversely, therefore, the health sector is unintentionally contributing to issues that undermine public health.

A paradigm shift is underway. Around the world a number of health systems have recognised the wider social, health and economic costs of their environmental footprint and have begun to work towards a sustainable development approach. Health systems in many countries have found that resource efficiency and improvements in areas such as energy, waste, water and use of raw materials have already delivered financial savings along with positive environmental impacts and direct benefits to health.[16]

Table 1. Current versus new ways of thinking in the (public) health system (adapted from SDU, 2013)[17]

CONVENTIONAL THINKING	NEW THINKING
Episodic and reactive	Integrated, prevention focused and proactive
Focus on treating sickness	Focus on keeping people well and out of health facilities
Health and social care as institution led services based on needs	Community focused health and social care based on needs and assets
Predominantly medicalised approach	A more holistic approach that empowers individuals and communities
Decision-making based on annually set finances	Decision-making that also accounts for current and future impacts on society and the environment
Focus on the professional	Focus on the Individual
Sustainability regarded as an 'add-on'	Integration of sustainability into organisational culture, practice and training
Single indicators and historical measurements	Multiple and balanced scorecard / index with information available in real time
Waste and overuse of resources	A balanced use of resources where waste itself becomes a resource.

Examples include Global Green and Healthy Hospitals, Green Hospitals, the United Kingdom's National Health Service's Sustainable Development Unit (SDU), and Health Care Without Harm. All recognise and advocate for environmental initiatives that have co-benefits for human health and wellbeing. Ultimately these are cost saving initiatives. Never-the-less, taking a sustainable development approach can be a financial challenge within a budget constrained health system. This can be particularly difficult when the

budget for up-front costs is diverted or prioritised to meet day-to-day or operational costs, and when long-term operating costs are treated separately to initial capital costs.

Creating a health promoting health system will require new ways of thinking and a steady transformation of practice.[a,18] Table 1 (above) contrasts conventional and new ways of thinking, from the perspective of the United Kingdom's National Health Service's Sustainable Development Unit.

5.1 The New Zealand Health Strategy

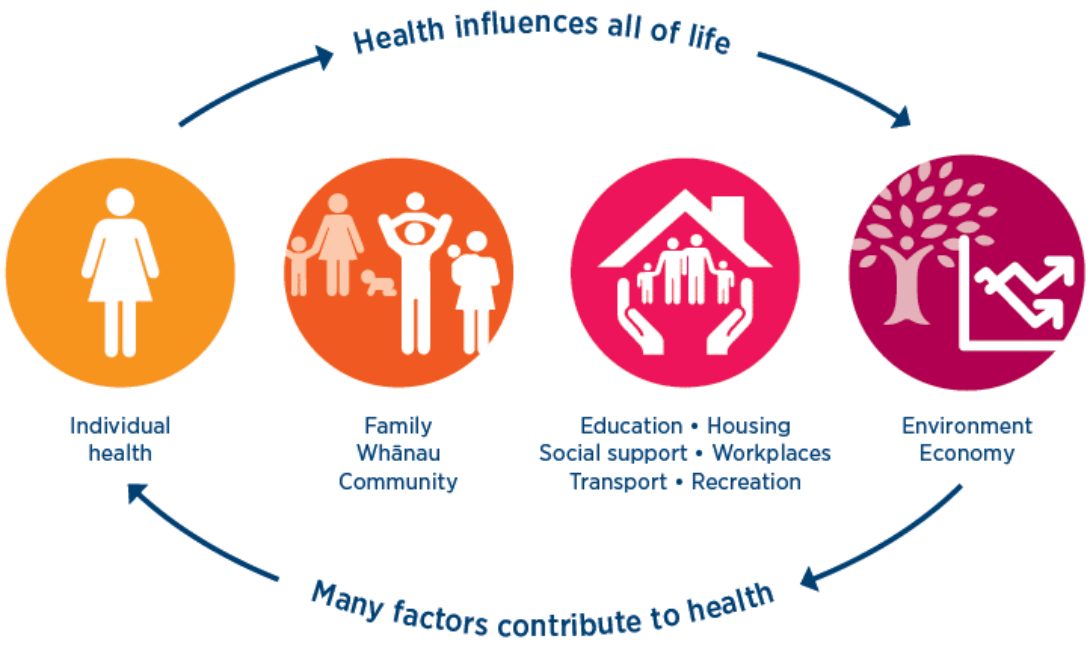

Figure 7. Health links with the wider environment[19]

Picking up on the new way of thinking described in Table 1, the New Zealand Health Strategy[19] graphic above (Figure 7) acknowledges the importance of the social determinants of health and working with partners in other sectors to achieve positive health and wellbeing outcomes. The Strategy identifies as its central theme 'All New Zealanders live well, stay well, get well'.[20]

As the New Zealand Health Strategy 2016 describes it, global challenges relevant to New Zealand are that:

- Health and social services must be provided to increasing numbers of older people, who are living longer
- The health burden of long-term conditions, such as heart disease, diabetes, depression, dementia and musculo-skeletal conditions, is growing
- Benefits need to be assessed in light of affordability as new technologies and drugs emerge and expectations about health services rise
- The global workforce is highly mobile

[a] For examples see Sustainability Development Unit, 2013[17] and Roberts, 2016[18]

- New infections and antibiotic resistance are emerging
- Climate change has health and social consequences.

Within CDHB, the 'new thinking' or sustainable development approaches identified in Table 1 are an established part of business as usual. For example, the Community Rehabilitation Enablement & Support Team (CREST) programme has reduced projected admission rates, introduced falls prevention programmes and made advances in managing patients with chronic respiratory illnesses. Other examples include the Acute Demand Management Service, Health Pathways and HealthOne. Although they fit the definition of sustainable development approaches, these initiatives are not always identified explicitly as such.

CDHB's vision is to be an integrated health system that keeps people healthy and well in their own homes by providing the right care and support, to the right person, at the right time and in the right place. This vision is fully compatible and aligns strategically with a sustainable development approach.

The rebuild of Greater Christchurch and the surrounding regions (including Kaikōura) provides another opportunity for CDHB to demonstrate leadership by promoting best practice and continuing to deliver exemplary service, underpinned by a sustainable development approach, within the context of a health promoting health system's kaupapa.

5.2 Wai Ora and Kaitiakitanga

Wai ora, healthy environments, is a key outcome of the current Canterbury Māori Health Framework (Figure 8).[21] The concept of wai ora represents the importance of the environment – from housing to the wider effects of climate change – and its impact on the health and wellbeing of individuals, whānau and communities. Achieving wai ora will mean that the environment in which Māori, and all New Zealanders, live, work and play is safe.

Wai ora is an essential element of pae ora, healthy futures. As described in He Korowai Oranga,[22] pae ora encompasses three interconnected and mutually reinforcing elements:

- Mauri ora – healthy individuals
- Whānau ora – healthy families
- Wai ora – healthy environments.

Pae ora urges everyone in the health and disability sector to foster new ways of delivering services, thinking beyond confined definitions of health and accepted delineations. As outlined in the Canterbury Māori Health Action Plan 2016–17.[23] CDHB continues to explore ways to strengthen its role in supporting the aspiration of pae ora for Māori.

Kaitiakitanga reflects the concept of environmental guardianship. A key value for Ngāi Tahu, kaitiakitanga encompasses protecting the people, environment, knowledge, culture, language and resources for future generations.

Similar values are reflected in the CDHB Vision Tā Matou Matakite *'to improve, promote, and protect the health and wellbeing of the Canterbury community. Ki te whakapakari, whakamanawa me te tiaki i te hauora mō te oranga pai o ngā tāngata o te rohe o Waitaha*.'

Figure 8. Canterbury Māori Health Framework 2016–17[21]

The value is also acknowledged in legislation: section 2 of the Resource Management Act 1991 states that people managing resources under the Act must take kaitiakitanga into account.

One aspect of kaitiakitanga is mahinga kai, which is a management concept, a way of thinking about simultaneously protecting and using resources. Meaning 'to mahi ngā kai' (work the food), mahinga kai provides an opportunity to adopt a holistic organisational framework to guide outcomes that are woven together through its values.

Ngāi Tahu interprets mahinga kai in its broadest sense to include food for body, mind and spirit. The concept of mahinga kai exemplifies the complex, interconnected cultural beliefs and practices of Ngāi Tahu in relation to the environment.

Toitū te marae a Tāne-Mahuta, Toitū te marae a Tangaroa, Toitū te tangata.
If the land is well and the sea is well the people will thrive

6. Legislative and Regulatory Context

This section outlines some of the statutory agreements that have specific relevance to a sustainable development approach that CDHB is party to explicitly, or implicitly as part of the New Zealand effort as a whole.

Table 2 at the end of this section summarises this information.

6.1 International Policy

New Zealand is a member of the United Nations, which means it has obligations towards a number of international protocols and treaties as a signatory. Of particular relevance are:

- The Rio Declaration on Environment and Development, which defines principles of development, including sustainability (which emerged from the Rio Earth Summit in 1992)
- Agenda 21, the related programme of action for sustainable development for the 21st century
- The Framework Convention on Climate Change, which addresses political and technical responses to climate change, based on the scientific findings of the Intergovernmental Panel on Climate Change
- The 17 Sustainable Development Goals of the **2030 Agenda for Sustainable Development**
- The 2015 Paris Conference of Parties on climate change.

The last two are described in more detail below.

6.1.1 2030 United Nations Agenda for Sustainable Development

Building on the success of the Millennium Development Goals and as part of Agenda 2030, in 2015 United Nations member countries agreed to 17 Sustainable Development Goals with an overarching aim to ***'end poverty, protect the planet, and ensure prosperity for all'.***[a] The third Sustainable Development Goal, Good Health and Wellbeing, is specifically health-focused and is supported by eight more goals fundamental to the social determinants of health kaupapa.

The World Health Organization's (WHO's) Ninth Global Conference on Health Promotion held in Shanghai (November 2016) noted in its declaration that '*health and wellbeing are essential to achieving Agenda 2030 and its sustainable development goals'*.[24] A supporting WHO-organised conference in March 2017 was titled 'Health in All Policies: A key approach in progressing the Sustainable Development Goals'.

6.1.2 Paris Agreement

In 2015 a Conference of Parties (COP21) was held in Paris as one of the cycle of conferences run by the United Nations to address climate change. The Paris Agreement will require organisations, including the health sector, to acknowledge the true environmental cost of 'doing business'. That is, it will be necessary to address the issue of environmental 'externalities' and, primarily, to acknowledge the true cost of managing greenhouse gas emissions. New Zealand ratified the agreement on October 5 2016. The Hon Paula Bennet stated "New Zealand's big challenge now is to develop an effective plan for meeting our target of reducing our emissions by 30 per cent below 2005 levels by 2030".[25]

[a] The Agenda officially came into force on 1 January 2016. Its 17 goals and 169 targets set out a universal agenda to achieve sustainable development globally by 2030.

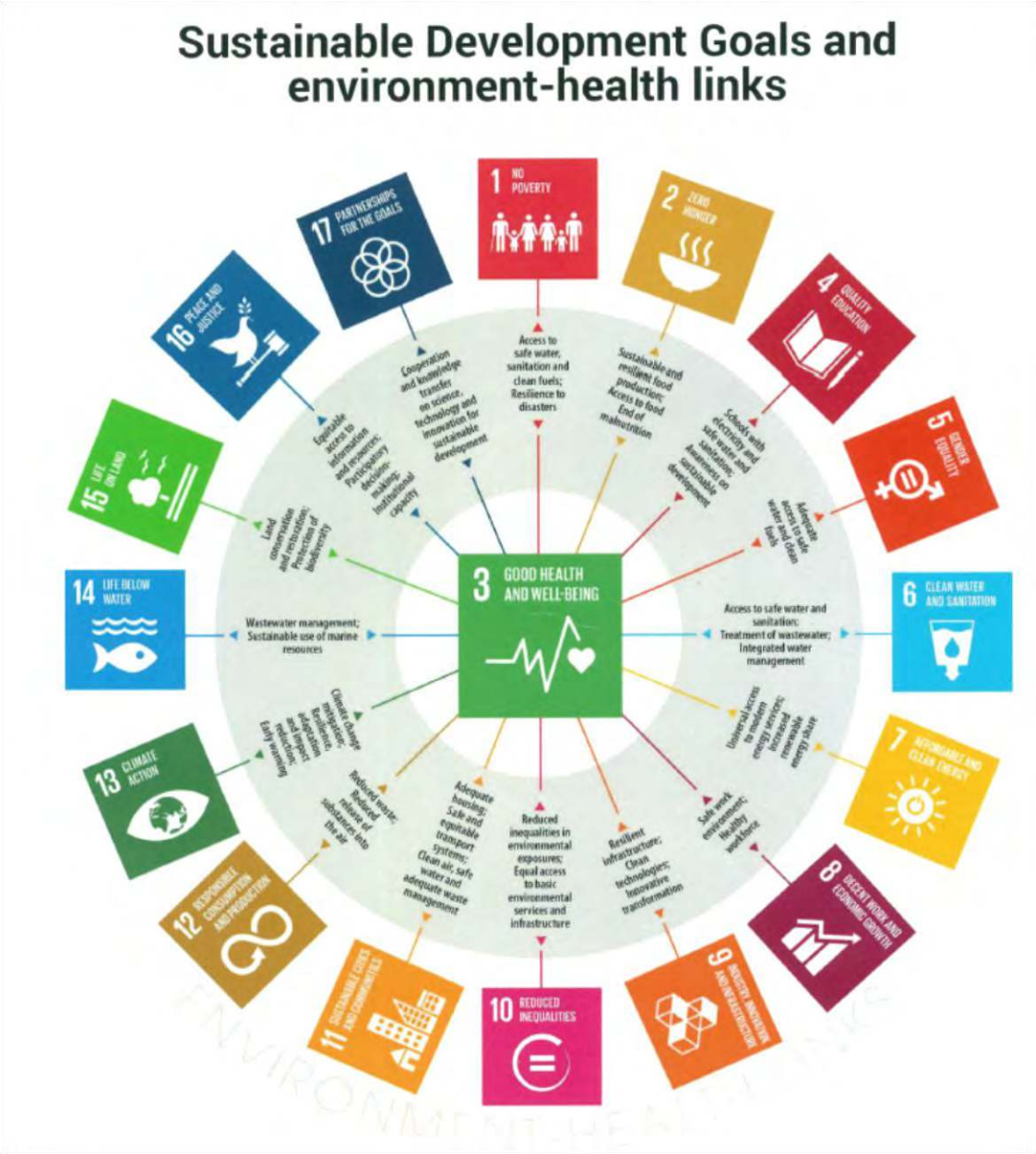

Figure 9. The 17 global goals for sustainable development[26]

"Health and well-being are seen as an outcome, a determinant and an enabler of the SDGs. It is recognized that investment in health contributes to sustainable economic growth, social development, environmental protection and poverty and inequality reduction. Improved health will depend on the successful implementation of many of the targets in all SDGs. This requires strong whole-of-government and whole-of- society action for health and wellbeing."[27]

The New Zealand health sector, as a key part of the country's economy, will need to play its part in reducing emissions as part of the Emissions Trading Scheme. The price of carbon – namely the carbon 'risk' – is currently stable (Figure 10) but the costs to CDHB will inevitably rise when the Emissions Trading Scheme becomes fully operational and the current one-for-two unit subsidy scheme is fully phased out in 2018. Furthermore, when the new Acute Services Building is in full operation, emissions at the Christchurch Hospital campus could *increase* by as much as 50 per cent. The CDHB Energy Manager estimates financial liability could be as much as $550,000 per annum for coal in the near future. See Section 8.4.3 for further analysis of this issue.

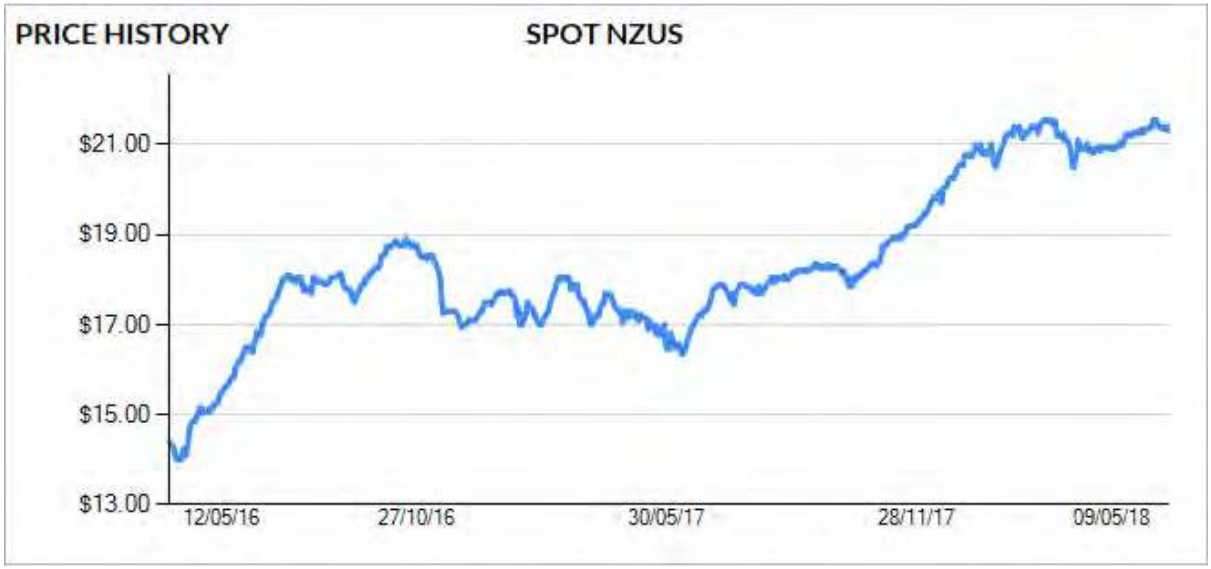

Figure 10. International price of carbon (US$/tonne carbon dioxide equivalent[28]

6.2 New Zealand Policy

This section identifies the legislative and regulatory instruments at a national level that are most relevant to DHBs or have the greatest impact on DHB decision-making.

6.2.1 New Zealand Public Health and Disability Act 2000

As described in Section 1, DHBs are subject to the requirements of the New Zealand Public Health and Disability Act 2000 to link health, wellbeing and environmental outcomes. Of particular relevance to a sustainable development approach are sections 22 (Objectives of DHBs) and 23 (Functions of DHBs) of that Act.

6.2.2 Resource Management Act 1991

The environment and public health are firmly linked. Regional councils must adopt a 'sustainable management' approach under the Resource Management Act 1991 (RMA).[a] Under section 5 (Purpose) of that Act, **sustainable management** means managing natural and physical resources in a way, or at a rate, 'which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety' while:

[a] The RMA requires regional councils to take a 'sustainable management' approach to natural resources.

- 5(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations
- 5(b) safeguarding the life-supporting capacity of air, water, soil and ecosystems
- 5(c) avoiding, remedying or mitigating any adverse effects of activities on the environment.

Importantly, CDHB has a highly successful joint work plan with Environment Canterbury that focuses on promoting health and wellbeing and mitigating issues of concern to CDHB before they occur. Further, CDHB makes submissions under the RMA on publicly notified resource consents. It would do so, for example, where a developer is required to demonstrate that a proposed activity involving potentially toxic emissions will have 'less than harmful' effects on the human population.[a]

6.2.3 Civil Defence and Emergency Management Act 2002

Under section 38 of the Civil Defence Emergency Management (CDEM) Act (Matters relevant to development of civil defence emergency management plans), all people exercising functions in relation to the development of civil defence emergency management plans under this Act must have regard to:

- 38(a) the responsibility of people and communities to provide for their own wellbeing and the wellbeing of future generations.

In late November 2016, three new CDEM-related Bills[29] were drafted so that the government can enable affected communities to respond quickly and efficiently to natural disasters.

6.2.4 Ministry for the Environment National Policy Statements

National Policy Statements (NPS) are instruments issued under section 52(2) of the RMA that state objectives and policies for matters of national significance. As defined under section 5 of the Act, **sustainable management** refers explicitly to managing natural and physical resources to enable people to provide for their wellbeing and health.[b]

Of particular relevance is the NPS on Urban Development Capacity (2016). Because Christchurch, Waimakariri and Selwyn districts all have high-growth urban areas within their jurisdiction, they are expected to meet all of the requirements of this NPS. The 2016 update of the Greater Christchurch Urban Development Strategy explicitly acknowledges the importance of good-quality urban development to individual and community health and wellbeing. CDHB, as part of its responsibilities within the Urban Development Strategy Partnership, needs to ensure the NPS objectives and policies relating to future planning and outcomes support the wellbeing of communities and future generations.[c]

6.2.5 New Zealand Emissions Trading Scheme

The New Zealand Emissions Trading Scheme (NZ ETS) is the government's principal policy response to climate change. It supports global efforts to reduce greenhouse gas emissions[d] while maintaining economic productivity. The Environmental Protection Authority is responsible under the Climate Change Response Act 2002 for ensuring sectors comply with the NZ ETS.

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[a] It also makes submissions on resource consents made under a District Plan.

[b] National Environmental Standards are standards (issued under section 43 of RMA) for maintaining public health, including air quality and potable water.

[c] Standard parameters for wellbeing in objectives and policies are social, economic, cultural and environmental.

[d] From this point, 'emissions' means 'greenhouse gas emissions'.

The NZ ETS puts a price on carbon dioxide equivalent emissions, providing incentives to reduce and offset emissions. Certain sectors (including health) are required to acquire and surrender emission units to account for their direct greenhouse gas emissions or the emissions associated with their products.

The NZ ETS sector of most relevance to CDHB is energy. When the NZ ETS one-for-two unit measure phases out in 2018, CDHB's annual financial liability will steadily increase.

6.3 Canterbury Policy

This section describes policies and instruments that are relevant at a regional level and to CDHB in particular.

6.3.1 Canterbury Regional Policy Statement

Regional councils are obliged under the RMA to prepare a regional policy statement. CDHB collaborated closely with Environment Canterbury to prepare the 2013 Canterbury Regional Policy Statement.[30] It contains a number of policies relevant to health and wellbeing, for example, on the quality of air and water resources, which are key determinants of health. CDHB continues to work closely with Environment Canterbury to improve air and water quality through its joint work plan.

6.3.2 Local Government Act 2002

The Local Government Act 2002 implicitly links to health and wellbeing. Accordingly, CDHB has joint work programmes with Canterbury's local authorities and provides input to relevant reviews and plan development.

One example of how the Act links health and wellbeing is its provisions for trade-waste bylaws, for which proposed changes must be advised to the Ministry of Health. Another is infrastructure planning, for which section 101B 3(d) of the Act requires councils to 'maintain or improve public health and environmental outcomes or mitigate adverse effects on them'.

As part of its health-promoting activities, CDHB also actively participates in the development of council policies and bylaws relating to determinants of health (and disease) that can cause harm to the community. Some examples of these determinants are alcohol, gambling and psychoactive substances.

6.3.3 Greater Christchurch Regeneration Act 2016

Part of the task of regenerating Greater Christchurch following the 2010–2011 earthquakes is to reshape the city to support the community's social, economic, cultural and environmental wellbeing and resilience. Under section 3 (Purpose) of the Greater Christchurch Regeneration Act 2016, it is expected that CDHB will be a key player in aiding the recovery of the residential red zone, such as through psychosocial recovery programmes.

Following the disestablishment of the Canterbury Earthquake Recovery Authority in 2016, three entities have been established in its place to undertake specific rebuild and regeneration responsibilities. One of these entities, Regenerate Christchurch,[a] has indicated its intent to establish and maintain strong working relationships with its regeneration partners. This will include CDHB's input into developing and implementing Regeneration Plans and achieving regeneration outcomes in the priority areas, such as the Square and the Red Zone.

[a] The other two entities are Ōtākaro Ltd and Development Christchurch Ltd.

6.3.4 An Accessible City

During the *Share an Idea* campaign in 2011, Christchurch people asked for a pedestrian-friendly city centre with green spaces and people-friendly areas for living, working and recreation. To this end *An Accessible City*[31] was developed – now an addendum to the Christchurch Central Recovery Plan[32], replacing the previous transport chapter. *An Accessible City* is designed to deliver a central city that significantly increases the mode share of active and public transport. It is noteworthy that a large part of the (unpublished) business case for *An Accessible City* consisted of projected health sector savings from the health benefits of increased walking and cycling activity- an example of the health co-benefits that can be achieved from action in the environmental sphere.

While CDHB has no explicit role in delivering projects contained in *An Accessible City* (project responsibility falls to Ōtākaro Ltd and Christchurch City Council), it will need to provide input to some aspects of infrastructure development. Examples of matters in which it will be involved are siting high-quality bus stops and shelters ('super stops') at key areas and improving the accessibility of Christchurch Hospital and nearby facilities.

6.3.5 Christchurch Central Parking Plan

The provision of appropriate parking space is an important component of the plan of *An Accessible City*. After many inner-city parking buildings were damaged in the earthquake sequence and subsequently demolished, redevelopment plans are considering parking space. Giving greater certainty about parking that is and will be available is important for providing confidence in the rebuild of the central city.

The Christchurch Central Parking Plan is a non-statutory document that forms part of *An Accessible City*'s work programme. To manage the effects on the transport network and to increase their use, public parking buildings will likely need to be smaller and more strategically placed than they were before the earthquakes (see Figure 11).

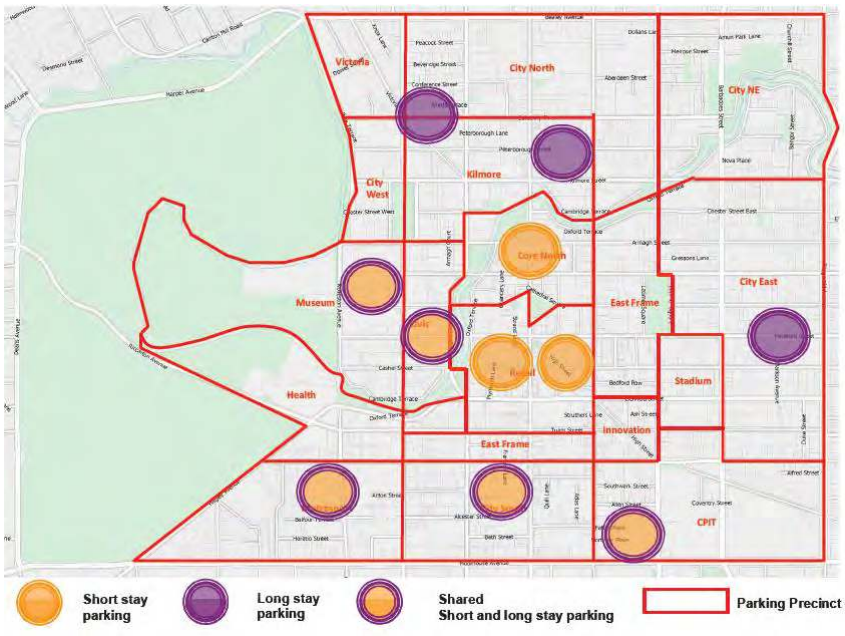


Figure 11. Indicative locations of proposed off-street parking buildings[33]

Table 2. Summary of the legislative and regulatory context

International policy	Relevance to a sustainable development approach
The Rio Declaration on Environment and Development 1992 – Rio Earth Summit	Defines principles of development, including sustainability.
Agenda 21 1992 – Rio Earth Summit	Sets a programme of action from the Rio Declaration, for sustainable development for the 21st century.
Framework Convention on Climate Change 1992 – United Nations	Addresses political and technical responses to climate change, based on the scientific findings of the Intergovernmental Panel on Climate Change.
2030 Agenda for Sustainable Development 2015 – United Nations	Includes 17 Sustainable Development Goals with an overarching aim to 'end poverty, protect the planet, and ensure prosperity for all'.
Paris Agreement 2015 - Conference of Parties (COP21), Paris	Will require organisations, including the health sector, to acknowledge the true environmental cost of 'doing business'.
National policy	**Relevance to a sustainable development approach**
New Zealand Public Health and Disability Act 2000	Sets out requirements for DHBs linked to health, wellbeing and environmental outcomes.
Resource Management Act 1991	Requires regional councils to adopt a 'sustainable management' approach, defined as the management of physical resources in a way '*which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety'.*
Civil Defence and Emergency Management Act 2002	Requires all people exercising functions in relation to the development of civil defence emergency management plans under this Act to consider: • 38(a) the responsibility of people and communities to provide for their own wellbeing and the wellbeing of future generations.
Ministry for the Environment [National Policy Statements]	Instruments issued under section 52(2) of the RMA that state objectives and policies for matters of national significance. Of particular relevance is the NPS on Urban Development Capacity (2016), as CDHB needs to ensure its objectives and policies relating to future planning and outcomes support the wellbeing of communities and future generations.

New Zealand Emissions Trading Scheme (NZ ETS)	The Government's principal policy response to climate change. It supports global efforts to reduce greenhouse gas emissions while maintaining economic productivity. The Environmental Protection Authority is responsible under the Climate Change Response Act 2002 for ensuring sectors comply with the NZ ETS.
Canterbury policy	**Relevance to a sustainable development approach**
Canterbury Regional Policy Statement 2013	Contains policies relevant to health and wellbeing, for example, on the quality of air and water resources, which are key determinants of health.
Local Government Act 2002	Implicitly links to health and wellbeing. Accordingly, CDHB has joint work programmes with Canterbury's local authorities and provides input to relevant reviews and plan development.
Greater Christchurch Regeneration Act 2016	Regeneration encompasses reshaping the city to support the community's social, economic, cultural and environmental wellbeing and resilience. Under section 3 (Purpose) of this Act, it is expected that CDHB will be a key player in helping the recovery of the residential red zone, such as through psychosocial recovery programmes.
An Accessible City **2013**	During the *Share an Idea* campaign in 2011, Christchurch people asked for a pedestrian-friendly city centre with green spaces and people-friendly areas for living, working and recreation. To this end *An Accessible City* was developed – now an addendum to the Christchurch Central Recovery Plan, replacing the previous transport chapter.
Christchurch Central Parking Plan 2015	A non-statutory document that forms part of *An Accessible City*'s work programme. Providing appropriate parking space is an important component of *An Accessible City*.

7. Non-statutory Agreements

CDHB has been a leader in using 'Health in All Policies'[a] approaches to work with sectors that have direct influence on determinants of health and wellbeing in the community. Described below are examples of CDHB's agreements and partnerships with external organisations, in which it applies appropriate governance and management approaches to identify relevant determinants of health and wellbeing (including environmental sustainability and equity) and enhance them using a health-promoting lens.

7.1 Urban Development Strategy Partnership

Of key importance is the Greater Christchurch Urban Development Strategy (UDS) Partnership with local and central government agencies. The overarching goal of the UDS is to ensure Greater Christchurch is a liveable, safe, sustainable and healthy place (Figure 12).[34]

Figure 12. 2016 UDS principles[34,a]

CDHB is active in the UDS Partnership. The UDS partners have agreed to work collaboratively to achieve the Strategy's vision and shared goals with and on behalf of the wider community. They have a statutory responsibility for, or significant interest in, the future development of Greater Christchurch. Table 3 identifies the priority actions for CDHB as set out in the 2016 update of the UDS.

[a]WHO have identified Health in All Policies approaches as a way of achieving positive changes across all the Sustainable Development Goals. The definition of Health in All Policies used in Canterbury is: *Health in All Policies is a structured approach to working across sectors and with communities on public policies. It promotes trusting relationships and engages stakeholders to systematically take into account the implications of decisions. Health in All Policies seeks synergies to improve societal goals, population health and health equity*. CDHB's joint work plans with Environment Canterbury and Christchurch City Council are an important part of our Health in All Policies work.

Table 3. Priority actions in the UDS update, August 2016

Action	Description and CDHB commitment
Healthy Communities (Action F)	Improve the health of communities through supporting the continuation and enhancement of the Healthy Christchurch partnership. Specific examples are work to promote: • A **Health in all Policies** approach and Integrated Assessments for significant strategies and plans, including consideration of regeneration plans • Psychosocial wellbeing in Greater Christchurch • Housing quality improvement options so that all people have warm and dry homes. **CDHB commitment:** Working with all partners as **lead agency of *Healthy Greater Christchurch.***
Transport (Action K)	Improve transport system performance and travel choices in Greater Christchurch, including by: participating in the Greater Christchurch Public Transport Joint Committee; and funding and coordinating the implementation of the updated Greater Christchurch Transport Demand Management Strategy. **CDHB commitment:** Working with key partners including New Zealand Transport Agency, Environment Canterbury and Christchurch City Council.

CDHB and the Ministry of Health are leading the psychosocial recovery (Community in Mind[35]) in Canterbury. They are also overseeing provision of psychosocial services, with the main goals of responding to the needs of the most vulnerable, and benefitting the wellbeing of people and communities most affected by the earthquakes.

CDHB, with the Ministry of Health, monitors recovery progress through the Canterbury Wellbeing Survey and Index and communicates its findings. It uses indicators to identify emerging social trends and issues to enable agencies to respond in a timely way. Other important programmes contributing to UDS implementation include the Greater Christchurch Psychosocial Committee and governance group, Greater Healthy Christchurch (previously named 'Healthy Christchurch') and the Canterbury Health in All Policies (HiAP) Partnership.

7.2 Resilience Plan

The UDS Partnership has responsibilities in the implementation of the Resilient Greater Christchurch Plan. Health and wellbeing are important within the context of resilience. Table 4 outlines CDHB's involvement as both a lead and support agency in the Plan.

Table 4. Resilient Greater Christchurch Plan – programmes and actions in which a CDHB has lead or partnership role

Programme	Action and CDHB commitment
1. Connect People	1B: Create formal connections between the psychosocial work lead by CDHB and the Greater Christchurch Resilience Plan **CDHB commitment: CDHB lead** (within two years)
	1B: Psychosocial review **CDHB commitment: CDHB / Healthy Christchurch lead** (develop over 1–2 years)
2. Create Adaptable Places	2A/2B: UDS review **CDHB commitment:** CDHB partner organisation
	3A: Voluntary targeted rate for home insulation **CDHB commitment:** CDHB partner organisation (develop over 1–2 years)
3. Improve the Quality, Choice and Affordability of Housing	3B: Regular review of Greater Christchurch Housing Market Assessment **CDHB commitment:** CDHB partner organisation (develop over 1–3 years)
	3B: Develop a Greater Christchurch Housing Policy **CDHB commitment:** CDHB partner organisation (develop over 1–3 years)
5. Support Community Organisations and Leaders	5B: Map community groups and resources **CDHB commitment:** CDHB partner organisation (in progress and develop over 1–3 years)
10. Manage the Risks We Face	10B: Health Impact Assessments **CDHB commitment:** CDHB lead (committed and in progress)

8. Sustainable Development Approaches in the New Zealand Health System

8.1 Crown and Other Initiatives

In 2007 the then Labour-led government promulgated a package of initiatives, building on the 2003 *Sustainable Development Programme of Action* that encouraged a move to more sustainable practices in New Zealand households, communities, businesses, local authorities and central government.[36] Since then, although the National-led government has reduced the explicit focus on sustainability or 'sustainable development', a number of programmes are operating that have considerable merit related to environmental sustainability, either explicitly or implicitly.

Table 5 describes some of the existing funding sources and other initiatives most relevant to DHBs.

The New Zealand Ministry of Health has no specific funding for environmental sustainability. However, the Ministry is developing an Environmental Health Action Plan (EHAP). The EHAP is intended to address many of the actions and reporting obligations contained in the WHO's recent *Western Pacific Regional Framework for Action on Health and Environment on a Changing Planet*. Among its measures are to prioritise the Sustainable Development Goals related to environmental health, particularly for health and climate change, and to reflect 'greening of health-care facilities' in national, local and facility-based policies. This framework document notes that more than a quarter of the disease burden in the Western Pacific region, representing 3.5 million individuals and a quarter of healthy life years lost, is attributable to environmental determinants of health.

8.2 Private Health Service Providers in Canterbury

It is worth noting that some clinician groupings, when choosing to build their own private health care centres in Christchurch post-earthquakes, have invested in facilities with sustainable and energy-efficient design as a primary consideration. One such example is the building exemplar of private provider Forté Health, which in 2014 was awarded a Four Star Custom Design rating by the NZ Green Building Council for building design.

More recent examples include the buildings constructed at St George's Hospital and Christchurch Eye Surgery's purpose-built ophthalmic surgery facility.

Table 5. A selection of the sustainability funding sources and initiatives available to DHBs

Agency/organisation	Initiative	Description
Ministry for the Environment	Waste Minimisation Fund (WMF)	WMF is for projects that promote or achieve waste minimisation, including waste reduction, reuse, recycling and recovery of diverted material. Scope of fund includes educational projects. Applicants are required to part-fund their projects.
Energy Efficiency and Conservation Authority	Various funding streams	One example is the **Low Emissions Vehicles (LEV) Contestable fund** for LEV-specific initiatives. The most common mode of funding is collaboration agreements that part-fund small and medium initiatives. **Crown loans** are available for larger capital works.
Housing New Zealand	Healthy Housing	This joint project between Housing New Zealand and DHBs started in 2001.
Regional and district councils	Funds and grants	These vary from region to region; in general, they cover areas of transport, energy, water and waste.
Baxter Healthcare	Stewardship scheme	Baxter is a large provider of intravenous fluid solutions. DHBs can sign on free to their product recycling scheme.
Ricoh, Fuji-Xerox and Sharp	Toner cartridge recycling schemes	These companies take back used toner cartridges for recycling.
Other (various)	Collection point schemes	Schemes collect photocopiers, printers and electronics (Sharp); mobile phones; carpet tiles (Interface); equipment and consumables (Fuji Xerox).

8.3 Major North Island Metropolitan DHBs

Many DHBs across New Zealand are pursuing environmental sustainability initiatives. Table 6 is a summary of Appendix 1 which compares formal activity in the domain of environmental sustainability across five DHBs including Canterbury (in red).

Table 6: Overview of sustainability initiatives – Canterbury and major North Island metropolitan DHBs

Initiative	DHB				
	Canterbury	Counties Manukau	Auckland	Capital & Coast	Waitemata
Sustainability Officer	No current appointment	1 FTE	0.5–1 FTE	1 FTE	1 FTE
Formal emissions or energy management system	CEMARS; Energy-Mark Silver certified	CEMARS; CarboNZero	CEMARS	EECA support for specific projects	Enviro-Mark Gold certified
Participation in a recognised external sustainability network		SBN	GGHH	SBN and GGHH	SBN
Extent of engagement / support from senior management	SSG established in 2014 to support Sustainability Advisor- currently inactive.	Governance framework supported by Sustainability Committee comprising senior executives*	ELT member co-chairs sustainability steering group since 2011	CEO and senior management team support	Success measured by formally adopted practices, supported by senior management
Key documents	Terms of Reference for SSG	Approved Emissions Management and Reduction Plan		Environmental Sustainability strategy (2012) Environmental Sustainability annual report	Sustainability policy 2013 Core design principles for Waitemata 2025

Key: CEMARS = Certified Emissions Measurement and Reduction Scheme; CEO = Chief Executive Officer; EECA = Energy Efficiency and Conservation Authority; ELT = Executive Leadership Team; FTE = full-time equivalent; GGHH = Global Green & Healthy Hospitals; SAG = Sustainability Advisory Group; SBN = Sustainable Business Network.

Note: * Also includes representation from the University of Auckland.

All four major North Island metropolitan (MNIM) DHBs have environmental improvement programmes, usually with metrics to monitor progress, typically covering energy efficiency, staff transport and waste management, green buildings, procurement and medical gas management. Some programmes are site-specific; others gain leverage from regional joint activity (Health Alliance procurement guidelines, council programmes) or national clinical network activity (theatre waste). Some MNIM DHBs identify both clinical and environmental sustainability benefits from teleconsultations as well as from electronic ordering and result delivery for clinical tests and treatment.

Financially robust business cases are important for all four MNIM DHBs. Two of the four report to the Governance Board. Three acknowledge being motivated by an organisational culture of quality, continuous research and learning, staff engagement and empowerment and staff morale.

The majority took advantage of opportunities provided by partners, alliances, funding opportunities and timing. MNIM DHBs varied in their emphasis on reporting on technical solutions, process changes and individual behavioural changes. Additionally they varied in their capability to measure the impact of interventions for environmental sustainability, both across hazard areas and between organisations. Most MNIM DHBs have ongoing processes for clinical and other staff engagement, with ways to seek project champions and maintain engagement for embedded culture change. Some clearly engage in environmental sustainability as a core part of their vision. They identify as organisations that contribute to the health of their communities (that is, as health promoting health systems).

Appendix 1 provides a full review of the findings on the MNIM DHBs. [a]

8.4 CDHB Activities and Opportunities Relating to Environmental Sustainability

This section outlines some of CDHB's current work that aligns with a sustainable development approach. A full stocktake is not yet possible.

8.4.1 Leadership Activities

In 2014 the Sustainability Steering Group was formed to address CDHB's impacts on the environment, and to coordinate work within the CDHB that mitigates and minimises environmental harm while supporting a health promoting health system. It supported the work programme of the Sustainability Officer with an expectation that the work programme would 'advance human development, sustainability and equity as well as improving health outcomes'.[37]

The group aimed to see the CDHB decision-making process consider environmental, economic and social impacts as part of an approach to health and social care delivery that is environmentally sustainable, with outcomes benefitting the region's current and future residents. This approach is consistent with the Health Quality & Safety Commission's Triple Aim Framework (Figure 13).

The members of the group were chosen to ensure cross-divisional support and representation from across CDHB.

[a] While accurate at the time the activity level described in this Appendix is now (May 2018) considerably higher and includes many more DHBs.

Figure 13. Triple Aim Framework of the Health Quality & Safety Commission

During the Sustainability Officer's two-year appointment, the Sustainability Steering Group coordinated a programme of (mainly) environmentally focused sustainable development initiatives. The aim of these initiatives was to support CDHB in reducing its carbon footprint, energy use and waste production, at the same time as improving health outcomes and reducing health inequities.

After the Sustainability Officer left the position in mid 2016, the CDHB Clinical Board reiterated in its November 2016 meeting its strong commitment to pursuing a sustainable development approach. It noted the importance of reflecting on what had already been achieved and of incorporating lessons learnt over the last few years into any future programme of activity.

The *Sustainable Health 4 Canterbury* (SH4C) staff advocacy group is a volunteer group that meets when it is able. Members of SH4C attend the national monthly teleconferences of the *Sustainable Health Sector Network*, which has members from every DHB in the country.

The *South Island Public Health Partnership* (a workstream of the South Island Alliance) has a sustainability workgroup that meets six-weekly by teleconference. The workgroup is in the process of undertaking a stocktake summary of workplace sustainability initiatives in South Island DHBs. The stocktake categories are based closely on the 10 priority goals set out in the Global Green Healthy Hospitals document (Health Care Without Harm).[38]

8.4.2 Facilities Development

CDHB is mid-way through one of the largest-ever hospital redevelopment projects in New Zealand. The design principles set by the Clinical Board are aligned with a sustainable development approach. Of particular note are:

- Principle 3. Health promoting

  Our culture will promote the best health outcomes through effective communications, learning from the experiences of patients, family/whānau and staff. Our physical environment will actively support healthy choices and lifestyles for patients and families/whānau, staff, and our Canterbury community

- Principle 7. Environmentally sound

Systems and processes will be designed, built and operated to support environmental sustainability. This would for example include minimising the energy requirements of buildings, choosing non-toxic building materials, maximising operational energy efficiency, reducing wastage and supporting sustainable transport[39].

8.4.3 Measurement of Greenhouse Gas Emissions

The Certified Emissions Measurement and Reduction Scheme (CEMARS) allows CDHB to monitor and manage greenhouse gas emissions through: understanding the major sources of CDHB emissions and potential financial risks; reducing capital and operational costs; and tracking progress of key variables including greenhouse gas emissions and fuel costs.

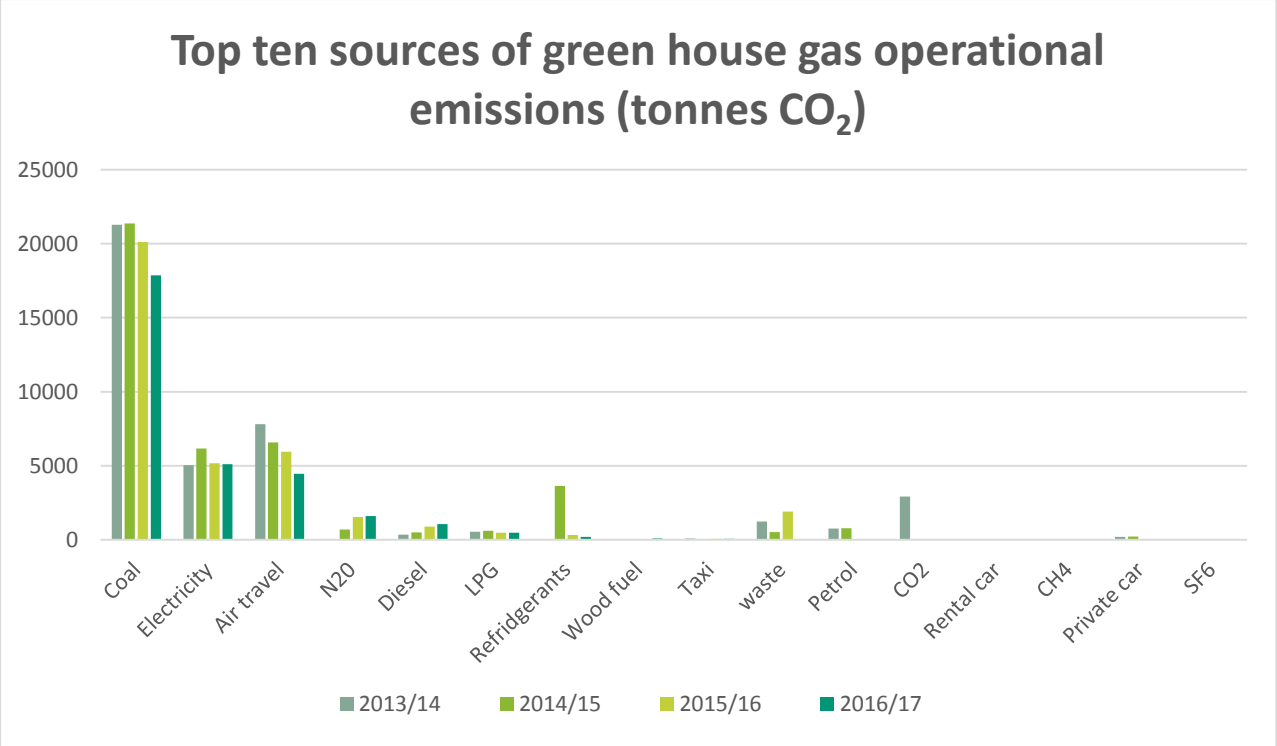


Figure 14. Results of CEMARS audits for CDHB, 2014 to 2017

The CDHB Sustainability Advisor began the CEMARS process. The CDHB Energy Manager has since taken over its measurement and reporting component. Figure 14 presents the most recent data available, showing an encouraging trend of reduced greenhouse gas emissions from coal burning. CDHB gained full CEMARs certification in March 2018 with a 20% reduction in greenhouse gas emissions from baseline measurements three years earlier.

Retaining coal-fired heating sources has negative health, environmental and reputational impacts. CDHB has made a significant investment to reduce emissions from its heating sources (and associated costs of carbon dioxide emissions) at Burwood (where coal boilers were decommissioned) and Hillmorton (which runs on woodchips and LPG). The largest single source of CDHB greenhouse emissions currently is the coal-fired boilers at Christchurch Hospital- this will change when woody biomass becomes the energy source for the Christchurch Hospital campus Energy Centre / Boiler House as agreed at the May 2017 CDHB Board meeting.

Coal emissions in total (including the smaller coal-fired boilers in Ashburton and Greymouth) have historically been three times greater than the emissions from the next largest source – electricity. Air travel and gases (nitrous oxide) also contribute significantly.[a]

Although CDHB's costs related to the New Zealand Emissions Trading Scheme have been variable, in the last two to three years they have steadily increased (see Figure 15). CDHB's annual financial liability from burning coal will continue to increase because the new Acute Services Building will have increased energy requirements and the NZ ETS is phasing out its one-for-two unit measure in 2018. Figure 16 shows CDHB's monthly ETS charges over four years.

In December 2016, it was estimated that approximately 8,000 tonnes of carbon dioxide were emitted in the 2015/16 financial year at the Christchurch campus and a further 1,000 tonnes in Ashburton. In July 2017 a tonne of coal cost CDHB $28.31. Once we enter the next phase of the NZ ETS, if the price per New Zealand unit of carbon remains the same, the cost per tonne of coal will increase to $42.62. When the new Acute Services Building is in full operation, emissions at the Christchurch Hospital campus could increase by as much as 50 per cent. The CDHB Energy Manager estimates financial liability could be as much as $550,000 per annum for coal.

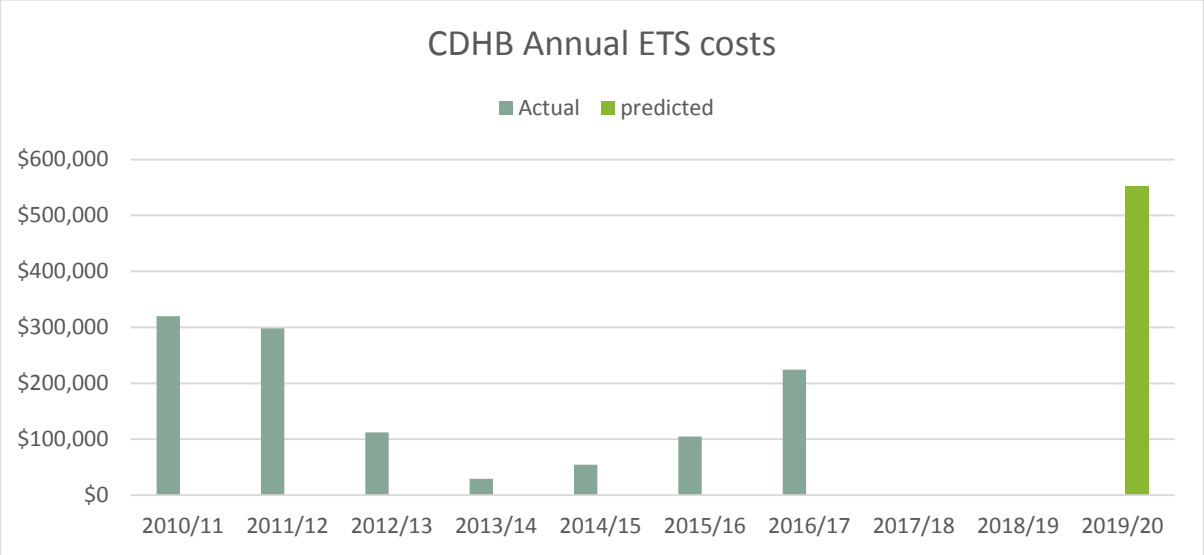


Figure 15. NZ ETS costs for CDHB, 2010/11 to 2016/17 and projected 2019/20

[a] Options to replace Ashburton coal boilers with more environmentally friendly fuels are being investigated. Despite having wood fuel available in the area, the Grey Base Hospital redevelopment is going ahead with a coal boiler that, although new, involves very old technology. This is likely to be one of the last new coal boilers at a public facility and represents a missed opportunity to significantly reduce the carbon footprint of the health system in Greymouth.

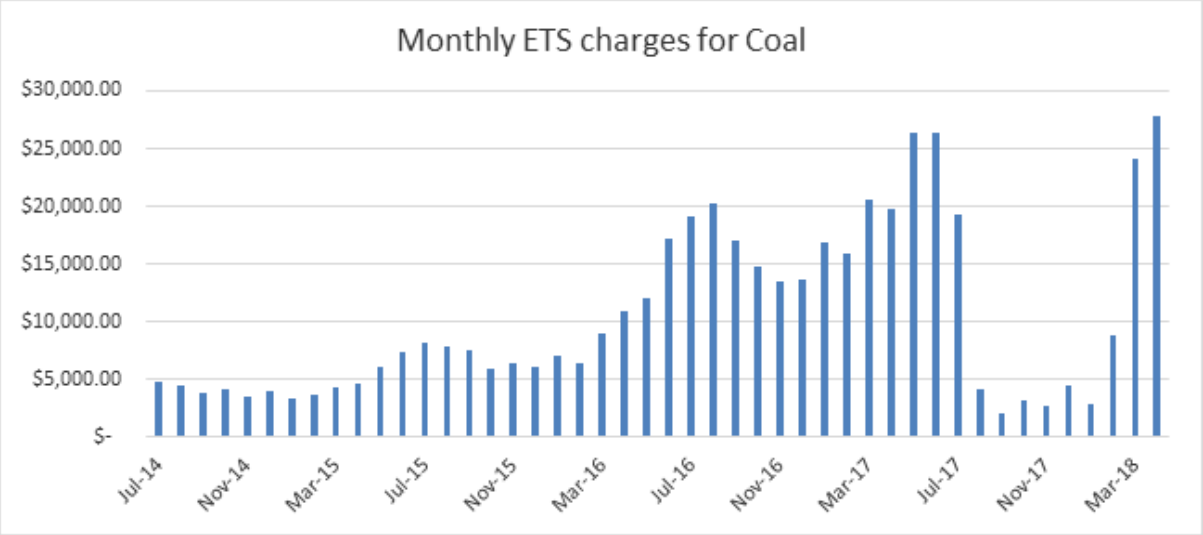


Figure 16. Monthly NZ ETS charges for CDHB, July 2014 to April 2018

(NB the drop off in coal use from July 2017 was during the restoration of the service tunnel when diesel was being used instead off coal.)

8.4.4 Facilities Energy Management

CDHB's energy management policy includes the goal of 'Minimise(ing) pollution and carbon footprint by ensuring plant and building envelope efficiency.'[40]

Greenhouse gas emissions – that is, 'what goes out' from CDHB – are monitored using the CEMARS tool described above. Energy use – or 'what goes in' – is monitored and managed using the 'Energy-Mark' tool.

David Meates, CEO Canterbury DHB; Ann Smith, CEO of Enviro-Mark Solutions; Steve Wakefield, former Deputy Chair, Canterbury DHB.

The setting for the award presentation was the new boiler house at Burwood Hospital, our flagship state of-the-art energy facility that runs on environmentally friendly wood waste. (October 2016)

In October 2016 Enviro-Mark Solutions, New Zealand's leading environmental certification authority, awarded CDHB an Energy-Mark Bronze Award for its commitment to energy management. CDHB was the second organisation in New Zealand to receive this award[a]. In November 2017 CDHB was awarded an Energy-Mark Silver Award which was described by Dr Belinda Mathers, General Manager Technical from Enviro-Mark Solutions, as a significant achievement: "At Silver level, certified organisations have a functioning energy management system with plans in place for monitoring and targets for improving energy efficiency. This puts your organisation in the group of most aware and proactive companies in New Zealand."[b]

In July 2017 Christchurch City Council became the first organisation in New Zealand to achieve Energy-Mark Gold certification.[41] It is an important milestone, demonstrating significant commitment to achieving performance improvements. Significant advances the Council has made include implementing an energy management system, objectives and targets, and considering energy performance in long-term planning.

Dr Belinda Mathers presents Tim Enson and David Meates with Canterbury DHB's EnergyMark Silver certification (November 2017)

8.4.5 Commuting and Mobility

Approximately 6,000 staff work at Christchurch Hospital, of whom 60 per cent travel to work alone in a private vehicle[c,42]. Emissions from staff travel, particularly air travel, are a significant component of CDHB's carbon footprint. Reducing staff reliance on single-occupancy vehicle travel to and from work will provide staff (and patients) with an array of health and environmental co-benefits.

[a] The first was Antarctica NZ.

[b] CDHB CEO update http://www.cdhb.health.nz/About-CDHB/staff-resources/Documents/Canterbury%20DHB%20CEO%20Update%20Monday%204%20December%202017%20%282MB%2C%20PDF%29.pdf

[c] Sustainability Officer's report on staff travel patterns Zero Heroes Christchurch Hospital Survey - Interim report (July 2016). This survey had 2297 respondents, thought to be approximately a 40% response rate.

Staff Travel – the 'Clever Commuters' Programme

At Hillmorton Hospital in 2015 a pilot of a travel demand management programme ('Clever Commuters') had very positive results. At the close of the project at least 20 per cent and possibly up to 40 percent of participating staff were active commuters. (No funding was available for ongoing monitoring and project implementation.)

A travel survey of staff carried out in April 2016 at the Christchurch Hospital campus[43] showed that parking (72%) and congestion (55%) were important transport considerations for staff. Among the respondents, 25 per cent indicated that, with appropriate support, they would try changing modes from single-occupancy vehicles to carpooling, bus travel or cycling. The issues with car parking and commuting are expected to intensify as the availability of car parking in the surrounding area reduces (e.g. with the closure of the Metro Sports parking site) and commuting times lengthen as large organisations return to the central city. In the short term, extensive inner-city road repair and cycleway construction programmes will also have negative impacts on car commuting times.

CDHB has the opportunity to participate in the Travel Demand Management programme that the Greater Christchurch Urban Development Strategy partnership is implementing with organisations that are already working in or moving into the central city.

The Travel Demand Management programme aims to greatly increase the number of people commuting to the city by bicycle, bus, carpooling and walking to meet the targets of *An Accessible City*. Currently 17 large private and government organisations are participating, representing a total workforce of 4,300 staff as well as 9,000 ARA students. In its first six months the programme has had significant success: it has seen a 31 per cent reduction in the use of single-occupancy vehicles, a 20 per cent increase in public transport use and a 25 per cent increase in cycling from baseline.[44]

By aligning with the UDS Travel Demand Management programme, CDHB has the opportunity to potentially obtain funding from the New Zealand Transport Agency, which would match CDHB's investment dollar for dollar.

Green the Fleet

Opportunities to reduce fossil fuel use through moving to low-emission vehicles exist. A recent positive development is the shared fleet initiative, a partnership between Council, Ara Institute, Aurecon, Beca, CDHB, Chapman Tripp, Environment Canterbury, Meridian Energy, Tonkin and Taylor, Warren and Mahoney, Jacobs and Christchurch International Airport. 52 electric vehicles (fully battery powered) will allow staff from each agency to utilise the shared fleet with zero exhaust emissions.

8.4.6 Workplace and Office

Given that CDHB is a sizeable community of more than 9,000 people, initiatives such as office energy efficiency and waste recycling can bring significant economic returns as well as improved environmental performance. One example is the campaign of clinical records staff to reduce paper duplication of electronic records, which could save individual departments several thousand dollars a month, reduce costs associated with waste and provide benefits for the whole health system.[45] Another is the recent pilot on using the lowest-possible anaesthetic gas flow into the patient's breathing circuit, which could lead to more efficient use of expensive and environmentally harmful anaesthetic gases in hospitals around the world.[46]

The latter is a good example of how measuring the impact of an activity can enable appropriate mitigation measures that generate good outcomes in several areas – in this case, the initiative had

economic benefits, reduced waste and improved clinical care. When CDHB takes positive approaches to sustainability in the workplace, it also sends a powerful signal to the wider community, both via media and directly through staff involvement. Staff who participate in such activities frequently experience a 'gateway effect'; that is, they are subsequently more open to taking up activities that may (initially) seem challenging. In many ways this effect is the most important benefit of such a programme as on its own it achieves only minimal carbon savings compared with the carbon 'spend' of the coal-fired boiler.

At the moment, gains from measures that are in place are vulnerable due to the loss of 'champions' and lack of continuity.

Zero Hero Programme: Workplace Sustainability

The Zero Hero Programme has been designed to encourage more sustainable behaviour among staff by promoting behaviours that improve community health, protect the environment and reduce expenditure in the health system. It is a voluntary scheme open to all CDHB employees. The programme has **four stages, plus two optional projects**.

The first stage is an assessment of what is happening in your area of work right now.

The second and third stages are checklists of sustainable actions you can choose to take in the workplace, including:

- A checklist of possible changes in our homes so we are warmer, healthier and wealthier
- A sustainability project for environmental sustainability champions.

The final stage is concerned with monitoring and auditing.

Figure 17. An example of Zero Hero branding

The programme is available on the CDHB internal website and can be picked up by interested staff. Figure 17 gives an example of Zero Hero branding.

9. Conclusions and Recommendations

CDHB understands its mandate to improve, protect and promote the health of the community it serves. It also recognises the strong links between environmental health and human health: many activities and projects throughout the CDHB aim to improve environmental outcomes with concurrent benefits to human health.

Although the issues are not new, recent events have increased expectations that the health sector – globally, nationally and locally – will actively contribute to the achievement of the United Nations Sustainable Development Goals.

Health systems around the world and around New Zealand are making choices to explicitly pursue sustainable development approaches. Their aims are to both improve efficient delivery of patient services and reduce environmental footprints.

The appointment of a Sustainability Advisor in 2014 enabled significant work to be done on projects that span various CDHB divisions. For example, it led to the development of travel planning resources and workplace efficiency resources, and CDHB's involvement in the Certified Emissions Measurement and Reduction Scheme.

CDHB has an opportunity to pursue a sustainable development approach to support the goal of becoming a health promoting health system. Such a system takes its mandate to prevent harm and promote health just as seriously as the mandate to treat injury and disease.

The following recommendations have been made after extensive consideration of the content of this paper and the initiatives in other DHBs described in Appendix 1. The paper has been reviewed by the Canterbury Hospital Medical Specialist Association Executive, the members of the CDHB Sustainability Steering Group, including the Energy Manager and Senior Operations Manager, the members of the South Island Alliance sustainability working group, and the Ministry of Health's Environmental Advisor. Their advice has shaped the content of the recommendations outlined below, which build on and extend the established foundation of good practice at CDHB.

9.1 Governance and Leadership

Strong and visible support from the Board and Executive Management Team for a sustainable development approach that enables a health promoting health system is critical to the success of the initiative.

It is recommended that:

1. CDHB develops a position statement affirming its intention to be a health promoting health system. This statement will outline the rationale and definition of a health promoting health system
2. A sustainable development strategy for CDHB is developed to provide direction for the operationalisation of a health promoting health system in Canterbury
3. A communications plan is developed as part of CDHB's sustainable development strategy
4. A working group guides the implementation of the sustainable development strategy. The working group will have representatives from the Executive Management Team, the general managers, Finance, Planning and Funding, clinical staff, Facilities Development and Community

and Public Health. It can also co-opt members for specific projects as required from all divisions of CDHB

5. Funding for the development and implementation of these pieces of work is agreed with Planning and Funding
6. The working group reports through its chair to the Executive Management Team and the Board on a six-monthly schedule.

9.2 Facilities Management

As a large organisation CDHB needs to be a role model of sustainability, efficiency and health-supporting practices.

It is recommended that:

7. An environmental sustainability policy is developed to provide guidance on the implementation of a sustainable development approach for logistics, operations, clinical and strategic staff in their daily work.
8. Funding for the development and implementation of these pieces of work is agreed with Planning and Funding.

9.3 Emissions Measurement and Management

To have a useful carbon emissions reduction action plan, it is necessary to understand where CDHB generates carbon emissions and to accurately measure those emissions. To meet its various legal obligations nationally (including the NZ ETS) and as part of New Zealand's international commitments, CDHB must 'measure to manage'.

It is recommended that:

9. CDHB continues to participate in the Enviro-Mark programme, the 'Certified Emissions Measurement and Reduction Scheme' (CEMARs)
10. The information generated through CEMARs is used to help prioritise programmes of activity in the sustainable development strategy.
11. The CDHB continues to participate in the Enviro-Mark programme, 'Energy Mark'.
12. Funding for the development and implementation of these pieces of work is agreed with Planning and Funding.

9.4 Operational Management

Although in the long term the changes delivered under An Accessible City and related programmes will have health benefits, staff at Christchurch Hospital campus are already feeling the impacts of reduced street car parking and increased construction work in the surrounding area; and those using single-occupancy car travel will find their commute increasingly stressful, costly and time consuming.

It is recommended that:

13. CDHB implements a formal travel demand management programme at its sites. This programme should cover, at a minimum, staff commutes, work-related flying, and transport related to CDHB activities such as waste removal, laundry, catering, and boiler function
14. Funding for the development and implementation of these pieces of work is agreed with Planning and Funding.

9.5 Workplace Management

Many staff have expressed a desire to work in a way that is more consistent with a 'sustainable development' approach with respect to environmental sustainability -they need support to do so. Although the benefits from initiatives such as office energy efficiency and waste recycling are, relative to reduced coal burning, much smaller in scale, they still offer opportunities to make considerable financial and operational improvements.

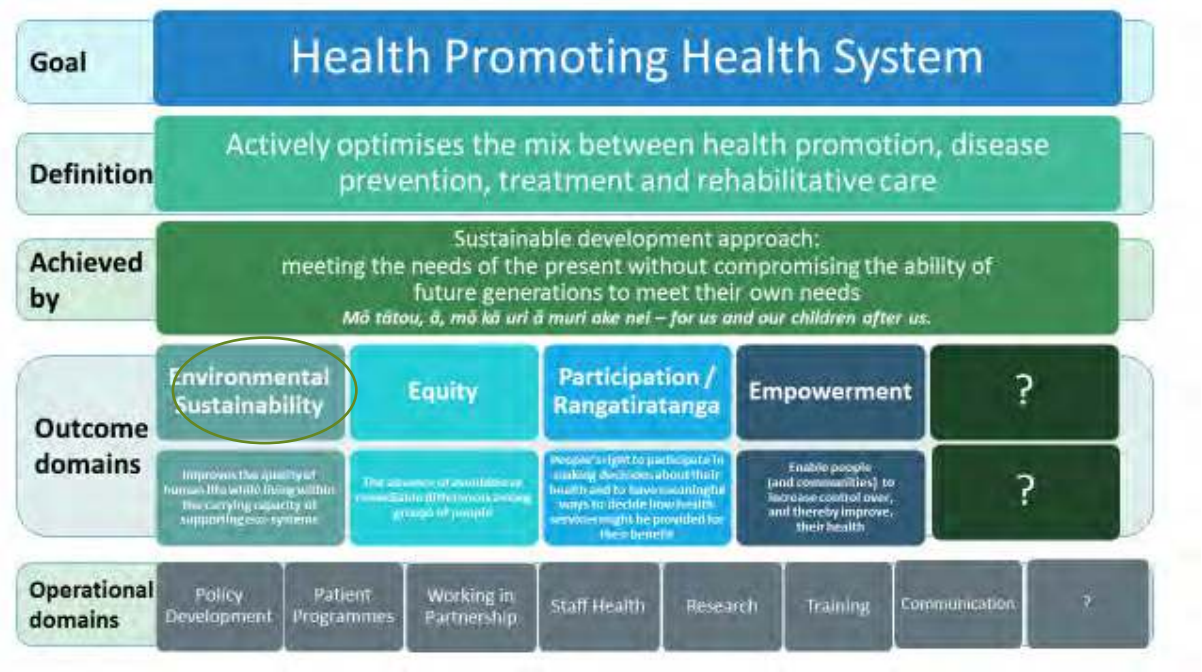
It is recommended that:

15. Senior management mandates the existing programme for staff to implement sustainable development programmes at work, e.g. Zero Hero Programme, with the resources and support available for them to implement their ideas and participate
16. Funding for the development and implementation of these pieces of work is agreed with Planning and Funding.

Updated recommendations

On December 6 2017 Canterbury DHB Executive Management Team discussed the health promoting health system paper presented by Dr Anna Stevenson. While endorsing the overarching intent of the plan (as depicted in the graphic below) there was also recognition of the current pressures on our health system which inevitably impacts its ability to undertake a wide range of additional projects at one time.

The decision was to endorse in total the content and intent of the health promoting health system paper while specifically focusing for 18/19 on the area of environmental sustainability.



This focus area incorporates the following headings:

- Governance and Leadership
- Facilities management
- Emissions measurement and management
- Operational management
- Workplace management

A request was made for the specific recommendations associated with the environmental sustainability portion of this plan to be further refined and re-presented to EMT for approval. This paper provides specific recommendations as requested.

Environmental Sustainability Recommendations

Strong and visible support from the Board and Executive Management Team for actions that reduce Canterbury DHBs environmental footprint is critical to the success of the initiative.

It is recommended that EMT:

1. Endorse the set-up of a Sustainability Governance Group to provide direction and guidance on the:
   - Definition of "Environmental Sustainability"
   - Development of a CDHB Environmental Sustainability Position Statement
   - Development of a CDHB Environmental Sustainability operational Policy. The Policy will provide guidance on the implementation of a sustainable development approach for logistics, operations, clinical and strategic staff in their daily work.
   - Development of a 5 year Implementation strategy, to enable the Sustainability Policy to be actioned in every aspect of our
     i. Operations,
     ii. Teaching and learning
     iii. Investment and planning initiatives.

It is suggested that membership of the Sustainability Governance Group includes Dr Anna Stevenson, Tim Emson, Beng-Cheng Chan, Pauline Clark, Dr Iain Ward, and George Schwass – we welcome advice from EMT regarding these and other appropriate members for this group.

The Sustainability Governance Group will:

- Review current Environmental Sustainability Initiatives
- validate alignment of current initiatives with the position statement and operational policy
- provide a recommendation on first order priorities of the Implementation strategy

2. Notes that the development and implementation of each of the initiatives is to be submitted for approval, in line with CDHB delegation policy and following the CDHB business case process

3. Notes and endorses the continuation of the current list of Sustainability Initiatives:

   - the Enviro-Mark programme, the 'Certified Emissions Measurement and Reduction Scheme' (CEMARs)
   - the Enviro-Mark programme, 'Energy Mark'

4. CDHB support the current formal travel demand management (TDM) programme developed by the Greater Christchurch Partnership at its sites. This TDM programme will be aligned with People and Capability's staff wellbeing programme and will focus on the staff commute. Further future work will be developed via the sustainability strategy in relation to work-related flying, and transport related to CDHB activities such as waste removal, laundry, catering, and boiler function.

These recommendations were accepted by EMT in March 2018.

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Appendices

Appendix One: DHB successes in environmental sustainability

Appendix Two: Frequently asked questions about climate change

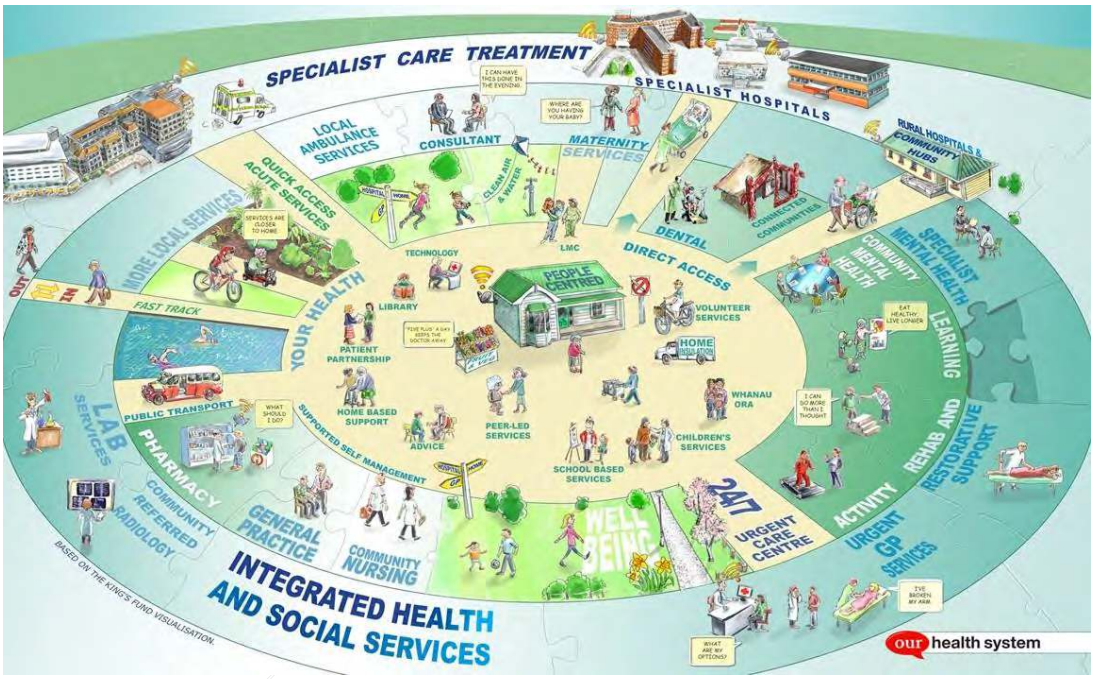
Appendix One: DHB successes in environmental sustainability

DHB SUCCESSES

IN ENVIRONMENTAL SUSTAINABILITY

A report to Community and Public Health

Canterbury District Health Board



CDHB Mission statement

To improve, promote and protect the health of the people in the community and foster well-being and independence of people who experience disabilities and reduce disparities

CDHB Values

Care and respect for others Manaaki me te whakaute i te tangata

Integrity in all we do. Hāpai i ā mātou mahi katoa i runga i te pono.

Responsibility for outcomes. Te Takohanga i ngā hua. 1

Authored by G. M. Keating April 2017

Executive Summary

This report gives information on successes in the environmental sustainability work of six District Health Boards (DHBs) that other DHBs can use in developing their own sustainability initiatives. Key informants from the four major metropolitan DHBs in the North Island (Auckland, Capital & Coast, Counties Manukau, and Waitemata) plus Bay of Plenty and Nelson Marlborough DHBs were interviewed in late 2016.

The overall picture is that DHBs have implemented many successful policies and practices that promote environmental sustainability, many individual staff and work groups have taken sustainability actions, and numerous sustainability actions in the health sector have financial benefits as well as benefits to environmental health. Supportive policies from a DHB and central government help individuals and the organisation as a whole to adopt more sustainability actions.

What were their successes?

All DHBs reported successes in energy management. Waste management and travel (both for work purposes and in commuting to and from work) were other areas of success, which different DHBs achieved through a range of approaches. All DHBs have methods of measuring ongoing progress in some targeted areas.

What systems and processes did DHBs use?

For several DHBs, a general principle underpinning their environmental sustainability work is that healthy environments are important for human health. From this perspective, DHBs (as health agencies) and individual health professionals have responsibilities to enhance, rather than undermine, the environmental bases of community health resilience.

While all six DHBs previously had individual programmes of work directed towards particular issues (e.g. energy, waste), most now have, or are moving towards, a more comprehensive approach that links the range of sustainability work across the DHB into an overall strategic work plan. The four metropolitan DHBs have organisational policies and staff time dedicated to sustainability. They have a formal multi-disciplinary structure that informs or oversees the sustainability work programme. All four have processes for communicating with staff about and engaging them in sustainability issues, to varying degrees.

All six DHBs reported that active informal staff champions or networks work on sustainability issues within their own areas. In some DHBs the initiative for sustainability actions came from the senior management team. However, commonly it was staff members who first proposed the DHB-wide sustainability programmes and then the leadership team acted on the initiative jointly with staff champions.

All the DHBs highly valued links with external organisations. All DHBs had networks that provided information. In addition to information and advice, some linked organisations (such as Energy Efficiency Conservation Authority and local councils) also provided financial investment or material resources. Individuals and DHBs as organisations made links. Some were local links, others made national and international connections.

What contributed to the success of individual projects?

All successful activities were based on commitment to the project. This commitment came from senior management or staff groups, or often both. An important reason for the success of some projects was

that management decided to change the physical environment; in other cases, local champions encouraged changes in the way that teams in particular services worked.

Financial feasibility was important for all successful activities, no matter what their size and scope. Major projects required a business case; single, staff-initiated, service-level projects could occur within existing resources. With dedicated staff time on the projects, it was easier for good ideas to move through the stages of clarification, design, business case development, monitoring, cycling through modifications, and to spread across the organisation.

Most of the successful projects paid attention to two specific factors. First, they changed the operating systems or environment. Second, they involved ongoing engagement with staff and support to make changes that were workable for staff.

Central government policies influenced both small and large activities. Financial and fiscal policies (including, for example, carbon price) influenced business case decisions on whether to start larger-scale projects. Across time, the presence or absence of a government policy setting for procurement or transport could influence DHBs' other ongoing activities.

Recommendations

The following are recommendations for DHBs considering how to develop their sustainability work, based on the information from the interviews. DHBs could expect some gains from adopting a subset of these recommendations. However, it is likely that if they carefully invest a modest amount of their resources in the whole package of recommendations, they will make greater longer-term gains in environmental health and achieve either financial neutrality or benefits.

Organisational leadership

- Align the approach to sustainability with the DHB's mission and values.
- Develop, communicate, implement and report on a DHB-wide policy on sustainability that is, and is seen to be, supported by the Chief Executive and leadership team.
- Encourage widespread leadership across the organisation through a formal, cross-disciplinary steering group, and enable informal teams and champions.
- Support staff to follow the health and sustainability positions of national and international health organisations.

Organisational resources

- In business cases, consider long-term costs and benefits, including whole-of-life-cycle for products and services.
- Fund a role (which could be incorporated as part of an existing staff position) to support the development of sustainability across the breadth of the DHB.
- Support data collection for meaningful implementation, tracking and reporting.

Organisational learning, modelling and communicating

- As an organisation, seek out and join local, national and international sustainability umbrella organisations so the DHB can gain and share knowledge.

- Use existing communication processes to inform staff, the governance board, patients and communities of the DHB's commitment to sustainability, and the success it achieves, and develop additional communication processes as needed.
- When interacting with peer organisations (both other health service organisations, and other types of organisations in your local community), discuss, model and learn with each other about practices and system factors that support sustainability.
- Provide opportunities within the DHB to develop and share knowledge, including information that staff bring from internal service-based initiatives, and from local, national and international health networks.

Staff opportunities for leadership

- Align your approaches to sustainability with ethical values of your health profession.
- Participate in or lead informal teams within your specific service to take sustainability actions.
- Participate (as appropriate) in formal, cross-disciplinary groups within the DHB.
- Support your peers, trainees and other staff to identify and act on the health and sustainability positions of our national and international health organisations.
- Encourage your health professional organisations (as appropriate) to discuss, model and learn with each other, and provide educational resources about practices and system factors that support sustainability.

Staff actions for learning, modelling and communicating

- Take opportunities within your DHB to develop and share knowledge, including information from your service-based initiatives, and from your local, national, and international health networks.
- As a health practitioner, seek out and personally participate in local, national and international health and sustainability organisations to gain and share knowledge.
- Use the opportunities for learning about sustainability in your professional organisations (as appropriate) and claim relevant continuing professional development credit.

Contents

Executive Summary.....
Recommendations.....i
1. Introduction.....1
2. DHB Successes in Environmental Sustainability.....1
What activities were successful and how did DHBs measure success?.....1
3. Policies, Processes and Resources Supporting Sustainability.....5
Policies, processes and staff resources.....5
Staff involvement.....5
External links, including certification.....5
4. Reasons for the Success of Sustainability Projects.....8
Features of DHBs that contributed to success.....8
Processes and strategies that contributed to success.....11
Influences outside the organisation that contributed to success.....14
5. Conclusions and Recommendations.....15
Acknowledgements, Funding and Disclosure.....17
Appendix I: Method and Informants.....18
Appendix II: Successful Projects.....20
Appendix III: Theatre Recycling Case Study Counties Manukau.....35
References.....40

1. Introduction

Health services have a substantial environmental impact.2 In recent times health professionals and health services have been seeking to reduce that effect.2–7 Community and Public Health (CPH) of the Canterbury District Health Board (CDHB) asked for information on successful actions taken to reduce greenhouse gases and improve environmental sustainability. Its aim was to gain more information on what an achievable sustainability approach in the CDHB could look like, as part of a reconsideration of its current activities. CPH agreed that the report on this study could subsequently be made publicly available and included in other research outputs.

Specifically CPH was looking for answers to the following questions:

- What approaches and activities for environmental sustainability and carbon reduction have other DHBs undertaken (including, for example, processes or staff positions)?
- Which activities do they see as successful?
- What are the characteristics (e.g. emissions source, implementation process) of successful activities?
- How have DHBs measured the success of activities?
- What do they see as the reasons for their success?
- What lessons have they learned that would help in scaling up or repeating the project?

The study first focused on the four major metropolitan North Island DHBs (Auckland, Capital & Coast, Counties Manukau and Waitemata). It later expanded to two additional DHBs (Bay of Plenty and Nelson Marlborough). Key informants in selected DHBs were invited to be interviewed. Informants gave written consent that their DHB would be named in this report and they personally could be identifiable.

Interviews were semi-structured and recorded. Notes were made from the interviews and supplementary reports or public information. Each person interviewed received a copy of the notes to correct or confirm. In this report, direct quotations from the DHB informants are in *italics.* Appendix I gives more information on the study informants and methods.

2. DHB Successes in Environmental Sustainability

All the DHBs interviewed identified successful environmental improvement programmes in relation to energy and travel, which they usually measured to guide action and monitor progress. Most also identified successes in waste management. In addition, two DHBs (Auckland and Waitemata) reported success with water management and two (Bay of Plenty and Auckland) with telehealth services. Auckland also reported success with medical gas management. While most programmes are site-specific, the three DHBs in the Northern region all participate jointly in the Northern Regional Alliance procurement programme.

Table 1 lists the projects that the six DHBs reported. For more information on individual projects, see Appendix II.

What activities were successful and how did DHBs measure success?

How the DHBs assessed the success of their sustainability actions depended on both the individual DHB and the type of action involved. Some metrics were part of routine management data that were relatively

easy to identify and report, such as amount and cost of coal, while some required dedicated data collection (e.g. use of rideshare or active commuter transport infrastructure). Others were not quantified but nonetheless viewed as successful (e.g. staff were using video-conferencing facilities, but no counts were kept). Table 2 identifies the numerical measures the DHBs reported for their activities.

Table 7: Major areas of environmental sustainability work reported by six DHBs

DHB	ENERGY	WASTE MANAGEMENT	TRAVEL – COMMUTING, BY STAFF AND PATIENTS	TRAVEL - WORK-RELATED, BY LAND AND AIR
AUCKLAND	Energy efficiency and management Sustainable building design principles	Procurement management Reduce and recycle, including PVC [plastic] recycling	Staff travel planning	In process: car fleet composition and use In process: support video-conferencing, review air travel activity
BAY OF PLENTY	Building management system Coal boiler replacement	Recycling – initially cardboard, then other including PVC	Commuter rideshare, bike infrastructure	Increasing availability of video-conferencing
CAPITAL & COAST	Completed plant and equipment upgrade with investment support from Energy Efficiency and Conservation Authority – ventilation – lighting – emergency generators	A combination of organisation-wide actions (e.g. PVC, recyclable drink cups) and service-specific actions (e.g. more careful separation of infectious waste; change ECG printing default)	Partner with regional council to make travel planning available	

Table 8: Major areas of sustainability actions reported by six DHBs (continued)

DHB	ENERGY	WASTE MANAGEMENT	TRAVEL – COMMUTING, BY STAFF AND PATIENTS	TRAVEL – WORK-RELATED, BY LAND AND AIR
COUNTIES MANUKAU	Several in process	Reduce – unneeded items in standard packs, unnecessary packaging Reuse – e.g. washable drink cups Recycle – better separation Supported by procurement agreements	Partner with public transport in council (staff, visitors and patients) Commuter rideshare Increasing amenities: – showers – bike security etc	Increasing availability of video-conferencing Reduced air travel Reduced footprint by shifting to economy class
NELSON MARLBOROUGH	Landfill methane partial substitute for coal Progressively retrofitting LED			Car fleet rideshare Shuttle between work locations Electric car trial
WAITEMATA	Completed – Energy – LED upgrade Several in process Other built environment in development	Recycling in all areas, PVC trial at Waitakere and Elective surgery centre Sustainable Procurement (in advisory capacity)	Commuter rideshare, bike infrastructure	

Table 9: Numerical measures of success reported

	ENERGY	WASTE MANAGEMENT	TRAVEL – COMMUTING, BY STAFF AND PATIENTS	TRAVEL – WORK-RELATED, BY LAND AND AIR	OTHER
AUCKLAND	Electricity and gas use	Waste to landfill by type Clinical record paper use			Medical gas management – stock, age, condition
BAY OF PLENTY		External audit	Rideshare premium Bike lock-up use		
CAPITAL & COAST	Energy consumption	Independent audit Kg recycling	Staff commute mode		
COUNTIES MANUKAU	Energy per floor area	Waste and recycling volumes, landfill costs Single-use items ordered	Public transport counts Rideshare signups Premium parking permit use Bike lock up use	Air travel total, business class Video-conference use	
NELSON MARLBOROUGH	Cost and amount of fuels by type Electricity cost			Cost of car travel in trial	
WAITEMATA	Monthly energy use	Monthly waste, recycling	Carpooling Bike infrastructure		Monthly water use

3. Policies, Processes and Resources Supporting Sustainability

The study asked DHBs about their organisational processes and resources for their sustainability work. Their responses covered plans and processes, staff resource, extent of staff involvement and relationships with external organisations.

Policies, processes and staff resources

The four larger DHBs (Auckland, Capital & Coast, Counties Manukau and Waitemata) have dedicated staff resource for sustainability activities. They also have or are developing formal sustainability strategy or policy documents and a mandated cross-organisation steering or advisory group with processes for communicating widely with staff. Nelson Marlborough and Bay of Plenty have no policies, current dedicated staff nor mandated cross-organisation group for sustainability work, although Bay of Plenty previously had a steering group that is being relaunched as the Green Team.

Table 3 lists the plans, processes and staff resources that the six DHBs reported.

Staff involvement

All DHBs reported that informal champions or teams of staff acted in their local areas to make their delivery of health care more environmentally sustainable. Nelson Marlborough and Bay of Plenty indicated that the number of staff-initiated local actions has varied with the level of support the organisation gave them. In Capital & Coast and Counties Manukau DHBs, a staff initiative led to the formal adoption of their DHB-wide sustainability approach. In Bay of Plenty, a staff initiative prompted the DHB to join the Sustainable Business Network.

Table 4 gives further information on staff involvement.

External links, including certification

All the DHBs had links to external organisations that provide information and support (see Table 5). Relationships with local Sustainable Business Networks, the Energy Efficiency and Conservation Authority (EECA), Enviro-Mark and local councils were common.

Auckland, Counties Manukau and Bay of Plenty noted that by participating in external groups they made highly valuable links and gained access to information, ranging from health-specific knowledge and data from international groups to particular details of services and options relevant in their own district. Bay of Plenty emphasised the value of external role models across the wide range of private and public sector organisations that are part of Sustainable Business Networks as mainstream business activity.

As part of their Certified Emissions Measurement and Reduction Scheme (CEMARS) certification, Auckland and Counties Manukau monitored greenhouse gases. The Auckland data emphasises the unusual greenhouse gas profile of hospitals: medical gas is their fifth-highest emission source, while their highest single emission source is staff air travel. Nelson Marlborough routinely monitors emissions from a number of sources (solid fuel, petrol, diesel, air miles, rental cars, electricity), although it does not participate in a certification programme.

Table 10: Sustainability plans, staff resources and processes contributing to sustainability work

	KEY DOCUMENTS	DEDICATED STAFF	FORMAL GROUP STRUCTURE	COMMUNICATION
AUCKLAND	CEMARS CarboNZero Emissions Management and Reduction Plan Annual Plan	Originally 1 FTE (2013), now less, merged with role of Business Transformation Manager	Sustainability Working Group; sponsored by CFO and Chief of Strategy. Plans and provides oversight of work programme based on the CEMARS Reduction Plan. Members from Facilities, Operations, Clinical Services, Procurement	Strong focus on staff communication, engagement, participation, leadership including staff inductions, staff newsletters, intranet, emails, workshops
BAY OF PLENTY	Under development, likely using Global Green and Healthy Hospital Framework	No dedicated staff; attendance at internal and external sustainability networking meetings by some staff recognised	Previously (2007–2012) Conservation Steering Group, led by CEO and CFO Recently informal Green Team has been upgraded to a strategic group	
CAPITAL & COAST	Under development	1 FTE Sustainability Officer created 2015 (uptake 2016) Facilities management	2011 Sustainability Steering Group – senior management, clinical, facilities and communications staff; co-chaired by SMO staff member and senior management team member	Regular sustainability column in the staff "Health Matters" newsletter and a specific monthly "green newsletter" for staff
COUNTIES MANUKAU	Environmental Sustainability Strategy 2012 Environmental Sustainability Annual Report	1 FTE Sustainability Officer Executive Programme Director's implementation team	Environmental Sustainability Advisory Group (across the organisation including clinicians) indicates options and priorities for projects, including business cases	Two websites Regular content in CEO blog Regular monthly newsletters with opt-in staff emails
NELSON MARLBOROUGH	–	No dedicated sustainability staff; major role for energy specialist	–	–
WAITEMATA	Sustainability policy 2014 Core design principles for Waitemata 2025	Since 2010, 1 FTE in Facilities and Development	Environmental protection group, chaired by member of Senior Executive Team	Regular communication with sustainability champions to provide information and seek ideas for work plan

Key: CEMARS = Certified Emissions Measurement and Reduction Scheme; CEO = Chief Executive Officer; CFO = Chief Financial Officer; FTE = full-time equivalent; SMO = Senior Medical Officer

Table 11: Staff involvement in sustainability activities

DHB	INFORMAL TEAMS	STAFF-INITIATED ACTIVITIES
AUCKLAND	Monthly sustainability forum for learning and information exchange, open to all staff	Input to design, training and learning for success, whether staff initiate individual projects with business support and empowerment, or vice versa
BAY OF PLENTY	Green Team – network of 30–50 people from all areas, clinical and non-clinical, meet and initiate sustainability activities within their own areas and resources	Staff initiated proposal to join Sustainable Business Network Many local actions Initial dedicated resource opened up channels for staff to take active steps
CAPITAL & COAST	Informal Green Initiative Group	Prior to Sustainability Steering Group: – localised staff grassroots initiative in theatre spread to form the informal Green Initiative Group – support of Clinical Leaders/Medical Reference Group – input of other health-sustainability advocates – a wide range of staff made suggestions
COUNTIES MANUKAU	Network of green teams	A small group of senior clinicians initiated strategy through an approach to CEO Currently active in advisory group and Green Teams Clinical leadership roles include initiating activities, understanding the local clinical context to design effective implementation, communication and education
NELSON MARLBOROUGH	Several informal green teams, across disciplines Management support for Green Teams varied across time with different senior leaders	Has varied across time
WAITEMATA	Sustainability champions	Senior executive team seeks ideas from staff sustainability champions

Table 12: Certification and external links

	SBN	EECA	GGHH	COUNCILS	ENVIRO-MARK	CERTIFICATION
AUCKLAND	✓	✓			✓	CEMARS 2015 Target: 10% greenhouse gas emission reduction in 5 years to 2020
BAY OF PLENTY	✓			✓		
CAPITAL & COAST		✓	✓	✓		
COUNTIES MANUKAU	✓	✓	✓	✓	✓	CEMARS 2011/12 Target: 20% greenhouse gas emission reduction in 5 years to 2017
NELSON MARLBOROUGH		✓				
WAITEMATA	✓	✓	✓		✓	Enviro-Mark Gold 2014

Key: CEMARS = Certified Emissions Measurement and Reduction Scheme; EECA = Energy Efficiency and Conservation Authority; GGHH = Global Green and Healthy Hospitals; SBN = Sustainable Business Network

4. Reasons for the Success of Sustainability Projects

This section gives a broad overview of reasons contributing to the success of the sustainability projects, across the DHBs overall. It does not reflect any individual DHB. For information on individual projects that were successful, see Appendix II.

Factors that contributed to a project's success related to:

- Features of the DHB ;
- the processes and strategies used, and the individuals or groups that used them;
- Influences outside the organisation.

These factors were highly inter-related: all of them influenced and were influenced by others.

Features of DHBs that contributed to success

DHBs that were making progress on sustainability typically had four features in common: commitment; using evidence to inform action; aligning the projects with the culture of the organisation; and making use of financial and material resources.

Commitment

Having the commitment of the organisation and of groups and individuals within it was essential to all successful projects. Examples of such commitment are: individuals educating themselves and others, or reducing their single-passenger transport trips; groups working out how to integrate a new approach into their work; and organisations adopting policies and plans that promote sustainability.

Senior management commitment to sustainability was a key to the success of many (but not all) projects. For some DHBs the only element of senior management commitment that mattered was the formal

adoption of policies. For others (Auckland, Capital & Coast, Counties Manukau), in addition to formally adopting policy, the Chief Executive Officer and others in the senior leadership team visibly participated in sustainability actions, as communicated through staff or public media. Their high-profile involvement was seen to demonstrate personal as well as organisational commitment.

Senior management commitment was essential for programmes that required new budget allocation of resources (staff time or other expenditure). However, for most sustainability projects in the majority of DHBs, senior management commitment alone was rarely sufficient. The success of projects in areas such as energy, waste management and transport needed additional commitment from staff work groups and individuals.

Some sustainability projects could be successful when staff groups and individuals were committed to them without a formal organisational policy or intention. Examples are small-scale recycling projects at Capital & Coast and Bay of Plenty. However, widespread success across different sustainability areas and different parts of the organisation needed the combined commitment of the organisation, small groups and individuals.

The level of commitment from organisations and individuals was not fixed; it varied across time, across individuals and within an organisation.

What influences senior management's commitment to sustainability?

Senior management were more likely to adopt sustainability policies when they could see the financial benefits and efficiency. The focus on finance could be nuanced, with some DHBs identifying the importance of considering costs and benefits in the longer term and considering the total balance of costs and benefits rather than narrow assessment within individual service budgets.

Several DHBs reported that senior management's adoption of general sustainability policies fitted with the organisation's culture and values. Two DHBs (Auckland and Counties Manukau) saw themselves as services focused on ongoing research and innovation and on health service quality. As they saw it, environmental sustainability is an extension of that culture.

Four DHBs (Auckland, Capital & Coast, Counties Manukau, and Bay of Plenty) indicated that their organisation's commitment to sustainability was a way to empower, encourage, engage with and recognise staff. Some of these DHBs identified that their approach to staff empowerment was linked with their explicitly stated priority to improve community health in parallel with hospital-based service delivery. When staff raised the issue of environmental sustainability in these DHBs, senior management gained the opportunity to both engage more closely with staff and support community resilience.

In most DHBs, staff have initiated many sustainability activities. Two (Counties Manukau, Capital & Coast) explicitly noted that their DHB began its formal sustainability programme in response to approaches from staff.

The governance board of the DHB may also influence the DHB's commitment. Both Auckland and Counties Manukau report on sustainability to their governance board.

What influences staff members' commitment to sustainability?

Most study informants repeatedly emphasised widespread enthusiasm among health service staff for a sustainable environment because of its impact on community health resilience. They identified this concern as the underlying motivation for staff commitment to actions in their DHB workplace.

Using evidence to inform action

The majority of DHBs (Auckland, Capital & Coast, Counties Manukau, and Bay of Plenty) spoke of the importance of access to knowledge and information and of the opportunity to learn. The types of information they found helpful were:

- the types of sustainability actions that have been successful elsewhere, especially in situations like their own;
- the actions that were happening within the DHB to which staff could contribute;
- baseline and monitoring data.

DHBs that had relationships with national or international sustainability organisations (Sustainable Business Networks, EECA, Enviro-Mark, Global Green and Healthy Hospitals) often described them as highly valuable sources of information.

Knowledge of successes elsewhere could spread though networks within and beyond the organisation, between colleagues across services and disciplines, nationally and internationally. Information on successes elsewhere spread more readily to people and service groups when organisations had joined networks and used internal communication processes.

DHBs with staff communication processes (including forums or groups) saw them as effective ways of sharing information on progress and successes across the organisation. Some of the DHBs actively engaged staff champions and opinion leaders; clinical leaders could have roles of helping to spread knowledge. Some DHBs used these networks for two-way communication, seeking input from staff for planning future activities.

Aligning projects with the organisation's culture

Both Auckland and Counties Manukau identified pre-existing social roles and norms that made it easier for their DHB to adopt sustainability projects and practices. Both DHBs valued ongoing clinical service innovations, service delivery changes, and research as part of clinical excellence and quality; and in both the senior management sought to respond to clinical staff concerns and empower staff action. Both these DHBs emphasised the leadership role of senior clinicians. In a similar way to the knowledge flows and influences described above, both the actions of individuals and formal actions of the organisation contributed to developing cultural norms in the organisation that supported future sustainability actions.

While not emphasising the role of clinicians, both Nelson Marlborough and Bay of Plenty noted that individual sustainability project processes could have wider influence on social norms and expectations.

Using financial and other material resources

Where projects needed a relatively low level of resource, work groups or individual departments could implement them within their own budgets and initiative. For major projects in all DHBs, it was necessary to make a business case to demonstrate their financial viability to senior management. Three DHBs (Counties Manukau, Nelson Marlborough, and Waitemata) noted that total costs and benefits need to be considered, across all budget areas and across the life cycle of purchases or investments (e.g. *don't get caught up in just unit price).*

Several DHBs had investment agreements with EECA. Through these investments those DHBs proceeded with projects that brought long-term financial benefit.

For many projects, it was essential to have available particular material resources that were available, reliable and readily usable. Examples are recycling bins, video-conferencing technology and transport booking systems.

Dedicated staff time

Most DHBs (Auckland, Capital & Coast, Counties Manukau, and Bay of Plenty) identified the value of having dedicated staff time for sustainability activities. The sustainability role (which could be combined with other roles in a staff position) contributed across multiple dimensions of success. The tasks included participating in planning, building support, initiating projects, identifying links with essential external parties and providing information and feedback. One important role was to contribute analysis for business cases, particularly getting the timing right by including sustainability costs and benefits early in decision-making. Another valuable role was communications and encouraging staff engagement in sustainability actions.

Where DHBs did not have an identified individual in a specified role, they could make some progress, depending on the extent to which other staff had approval to act. If senior management recognise that certain staff roles can include sustainability actions, they support individuals to make legitimate use of their time to share information and make links within and between organisations.

Processes and strategies that contributed to success

Study informants described both specific and general actions that contributed to success. Some were generic implementation processes or strategies (planning, engaging, executing, and reflective evaluation), while others related to details of particular actions in specific settings.

This section, for convenience, groups actions into relatively separate, abstract headings. However, the informants commonly emphasised that processes fed into each other and that some strategies could function in multiple ways (e.g. a staff forum can contribute to planning, engagement, education for a specific project, sharing successes or other knowledge).

Planning

Elements of successful planning for a sustainability project were: responding to the type of issue; tailoring to the local context; and timing. Some, but not all, projects operated with formal project management structures.

Type of issue

Most projects draw on multiple success factors *that can be characterised as technological, process-driven or behavioural.* Depending on the type of issue the project is addressing, one of these factors may be more dominant than the others. Technology has been particularly important to the success of the majority of energy-related successes. Behavioural factors were critical for recycling and travel projects, where physical resource and environmental change also often contributed to their success.

For more on how the type of issue interacted with multiple success factors, see "Changing physical resources and the environment" below.

Adapt and tailor to context

Most DHBs mentioned carefully considering *the specific issues in your own DHB* and *understanding the local clinical context to design effective implementation*. Relevant issues ranged from the size and physical location of services, barriers or opportunities related to external organisations, and precedents elsewhere in the organisation, to the influence of a few key individuals.

Timing and sequencing

Planning to get the timing right was a valuable part of a sustainability officer's role – they needed to be familiar with many issues across the organisation and link that knowledge to taking action at the right time. Getting the timing right had the two important purposes of:

- putting sustainability into contract decisions at the right time (e.g. procurement, building development)
- making use of knowledge, modelling or actions elsewhere to build commitment and contribution.

For example, changing the energy management system is easier to achieve when a DHB is refurbishing or constructing a building. Similarly, introducing physical changes to support behaviour changes (e.g. establishing bike commute infrastructure such as showers and secure storage) was easier when the DHB was planning changes to a building for other reasons. In relation to consumable items, a new procurement contract offers opportunities for bringing in additional waste reduction and recycling changes more smoothly.

Planned rollout is a way of progressively building staff and organisational knowledge, skill and commitment. Precedents and trials not only gave opportunities to work out *teething problems* but also offered working models, encouraged other staff and *socialised the idea of sustainability.*

Timing of education and promotion campaigns could be planned to build on actions elsewhere (such as to coincide with the local council's transport activities or Bikewise month).

Engaging

Building engagement and relationships was an essential element of all the successful projects. Engagement fed into several different strands of action. The most important was building commitment and encouraging participation. Other purposes of engagement were to plan and develop actions, share information, increase understanding and provide training, and for evaluation and learning.

Engagement was ongoing and cyclical. It also happened between different levels of the organisation in all directions – *top-down and grassroots.* Any part of the organisation could initiate engagement and the process may need engagement across all other parts *whether individual projects are initiated by staff with business support and empowerment, or vice versa.*

Dedicated staff time for sustainability was particularly valuable for engagement processes through *staff communication, engagement, participation.* This *opened up channels for staff to take active steps,* perhaps tracking down usable internal knowledge or packaging ideas into business cases or policy proposals that offer *solutions, not problems, for executive managers.*

The different methods used in engagement are briefly described below in "Communicating, modelling, educating and persuading".

Executing

As the "Type of issue" section above notes, the mix of strategies that contributed to a project's success depended on the specific situation of the DHB and the particular sustainability issue. This section discusses the strategies DHBs described in interviews. The most common successful strategies were changing physical resources and the environment, and communication-related strategies. Others were offering incentives and supporting users to make changes.

Changing physical resources and the environment

Changing the physical environment and available physical resources is a strategy that features in the majority of successful projects. The type of changes needed depended on the specific issue. In some situations, the change introduced a technological solution; in others the organisation contributed resources that individuals and teams could use to make changes to their work.

Some major environmental changes (such as installing automated building control or lighting systems, which all the DHBs in this study have adopted to some extent) depend on centralised technology-led strategies. Other such strategies included changing default settings for printers or changing procurement agreements for standard packs to eliminate unneeded items or packaging.

Technological solutions, backed by commitment from senior management, were successful when they were *well designed, easy to use, practical, few barriers to adoption, reliable*. After adopting them, the organisation is then usually able to monitor both financial and environmental benefits, although further fine-tuning may be needed.

Most projects included changes to physical resources as one part of a group of *careful change management* strategies.

Staff commuting is a behaviour-led change, but people can more easily change their behaviour when the DHB restructures the environment and provides supporting resources. Informants saw infrastructure for active commuting by staff (e.g. bike safe storage and/or showers at Counties Manukau, Waitemata and Bay of Plenty) as contributing to the progressively greater numbers of staff choosing to adopt active transport for commuting.

Success in recycling and work-related transport projects involved a combination of technology-led and behaviour-led strategies, along with attention to processes.

It was not enough, for example, to simply buy recyclable items, such as drinking cups or theatre packs. Crucial accompanying strategies were to provide meaningful information, education and modelling, along with enough recycling bins that were conveniently placed, from the users' perspective, to support staff separating out infectious, recyclable and reusable materials.

Similarly, successful changes in work-related transport (e.g. modifying the car fleet, booking systems for sharing travel between sites, video-conferencing options) went along with giving people opportunities to learn how to adopt the new approach and working to *help staff make the change.*

Communicating, modelling, educating and persuading

Three DHBs (Auckland, Capital & Coast, and Counties Manukau) used multiple types of communication approaches in their projects. Some were deliberate umbrella communications about sustainability in general; others were planned, issue-specific communication strategies. These DHBs also explicitly recognised the importance of informal, organic communication across the organisation.

In the interviews, the majority of DHBs (Auckland, Capital & Coast, Counties Manukau, Bay of Plenty, and Nelson Marlborough) emphasised the importance of communication strategies. Their descriptions touched on the purpose, who made communications and the means of communication.

Purpose? Multiple methods and communicators strengthened commitment, increased the ways that users worked with and integrated new approaches and enhanced the actions taken. DHBs had provided both formal and informal education, and skill training to help people learn about and effectively use new equipment or processes. Communications emphasising the environmental benefits of the new approach

could increase commitment and motivation to adopt the new system. Successful early adopters were identified (and opportunistically observed) as role models to strengthen commitment or illustrate the relevant skills, or both.

Who? DHBs had a wide range of people who played communication roles (communications staff, senior management, staff with designated sustainability roles, clinical leaders, peers). As the "Engaging" section notes above, the communication happened between different levels of the organisation in all directions.

How? The vehicles of communication included meetings and forums, newsletters, website and blogs, staff induction and issue-specific promotions.

Incentives

Two of the DHBs reported using incentives. Counties Manukau and Bay of Plenty offered the reward of premium parking for staff adopting ride-share as part of their package of action on staff commuter transport. Both reported uptake of the reward has been very modest.

Support for users

Several DHBs identified the general importance of helping people to make changes. These DHBs used their sustainability officer *to support process changes for implementation* although they gave few concrete descriptions in interviews.

Evaluative and iterative approaches

As Table 2 shows (see Section 2), all the DHBs measured the impact of at least some of their sustainability activities. They used this data for tracking progress, in audit for managing the activity, and for evaluating tests and pilot projects. Most DHBs identified the value of making incremental changes, adopting changes progressively, and ongoing learning. Some DHBs where Plan–Do–Study–Act (PDSA) cycles are well established in clinical quality improvement followed the same processes in their sustainability projects.

In addition, many DHBs used the data as part of communication activities to promote the project and celebrate successes, building commitment and morale.

Influences outside the organisation that contributed to success

Influences on a project's success that came from outside the DHBs included: the DHB's location and access to local government and community resources; and government policies.

Location, local government and community resources

A DHB's physical location contributed to successes in some areas that would not have been possible elsewhere. Piping methane from landfill is viable as a substitute for coal to heat Nelson Hospital. Under current costs, being close to the dump is one key element that makes this substitution economic for Nelson but not for other hospitals. At Wellington Hospital, on a public transport route with very frequent buses, and in a city where many residents are active and public transport users, the number of staff commuting on public transport is comparatively high.

All three Auckland DHBs stated that the Northern Regional Alliance makes sustainable procurement easier.

DHBs saw both local and international community sustainability organisations that share information as very valuable. Local Sustainable Business Networks could provide detailed local information; international organisations such as Global Green and Healthy Hospitals could share service-specific information.

Local and regional government programmes supported successful transport actions (Capital & Coast and Counties Manukau) and waste management projects (Bay of Plenty and Capital & Coast).

Government policies

Some study informants referred briefly to the presence or absence of central government policies and resources in relation to the DHBs' sustainability work. Policies they noted that have been supportive were:

- EECA's role as a source of investment funding for capital projects with positive but longer-term cost-benefits;
- the carbon charge (and consequential environmental costs of fuels), which influences cost–benefit decisions in business cases;
- support for sustainable procurement programmes.

5. Conclusions and Recommendations

This small study of six New Zealand DHBs gives a picture of current successes in sustainability as seen by key informants from these DHBs, supplemented in some cases by additional notes provided by informants and information from public websites. It was limited by the relatively small number of interviews conducted and the time available.

For most DHBs, sustainability actions have developed across many years with contributions from across the organisation – individuals, clinical and other work groups, departments, professional groups, management groups and governance. Individual projects build on previous actions and interactions within and beyond the organisation. For example, in its project of reducing carbon emissions through video-conferencing, Bay of Plenty built on previous clinical telemedicine and video-conferencing knowledge and experiences within that DHB and elsewhere. The physical resource of video-conferencing facilities is essential. Equally essential, across time, is that individual staff, enthusiastic early adopter champions, contributed their experiences, within the DHB and elsewhere, acted as role models and provided peer education. Current groups of staff together are contributing by changing their meeting style and learning to use the new technology.

Success in reducing the environmental impacts of DHBs came from the same types of processes and strategies recognised to support improvements in clinical health services. Leadership and champion commitment, resources, processes, information and system changes are all ingredients that can enable organisations and health care staff to plan, trial and modify actions for health care.8–12 Environmental sustainability successes, as the DHB informants have described it, follow these same paths.

The following are recommendations for DHBs and their staff when considering development in their sustainability work. They are based on my interpretation of the information provided. DHBs could expect some gains from adopting a subset of these recommendations. However, it is likely that if they carefully invest a modest amount of their resources in the whole package of recommendations, they will make greater longer-term environmental health gains with financial gains or net neutrality.

Organisational leadership

- Align the approach to sustainability with the DHB's mission and values
- Develop, communicate, implement and report on a DHB-wide policy on sustainability that is, and is seen to be, supported by the Chief Executive and leadership team.

- Encourage widespread leadership across the organisation through a formal, cross-disciplinary steering group, and enable informal teams and champions.
- Support staff to follow the health and sustainability positions of national and international health organisations.

Organisational resources

- In business cases, consider long-term costs and benefits, including whole-of-life-cycle for products and services.
- Fund a role (which could be incorporated as part of an existing staff position) to support the development of sustainability across the breadth of the DHB.
- Support data collection for meaningful implementation, tracking and reporting.

Organisational learning, modelling and communicating

- As an organisation, seek out and join local, national and international sustainability umbrella organisations so the DHB can gain and share knowledge.
- Use existing communication processes to inform staff, the governance board, patients and communities of the DHB's commitment to sustainability, and the success it achieves, and develop additional communication processes as needed.
- When interacting with peer organisations (both other health service organisations, and other types of organisations in your local community), discuss, model and learn with each other about practices and system factors that support sustainability.
- Provide opportunities within the DHB to develop and share knowledge, including information that staff bring from internal service-based initiatives, and from local, national and international health networks.

Staff leadership actions

- Align your approaches to sustainability with ethical values of your health profession.
- Participate in or lead informal teams within your specific service to take sustainability actions.
- Participate (as appropriate) in formal, cross-disciplinary groups within the DHB.
- Support your peers, trainees and other staff to identify and act on the health and sustainability positions of our national and international health organisations.
- Encourage your health professional organisations (as appropriate) to discuss, model and learn with each other, and provide educational resources about practices and system factors that support sustainability.

Staff actions for learning, modelling and communicating

- Take opportunities within your DHB to develop and share knowledge, including information from your service-based initiatives, and from your local, national, and international health networks.
- As a health practitioner, seek out and personally participate in local, national and international health and sustainability organisations to gain and share knowledge.
- Use the opportunities for learning about sustainability in your professional organisations (as appropriate) and claim relevant continuing professional development credit.

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I belong to OraTaiao: The New Zealand Climate and Health Council and am currently a member of its Executive Board.

Gay Keating

Appendix I: Method and Informants

The overall objective of this study was to gather information on successful actions to reduce greenhouse gases and improve environmental sustainability in the New Zealand health sector. In the first instance, this information was for CDHB, and subsequently would be communicated more widely.

The University of Otago Human Ethics Committee approved the project (D16/343).

I asked members of the Sustainable Health Sector National Network to identify key informants in DHBs. I then emailed and telephoned these individuals with an invitation to participate or suggest an alternative person to interview.

All DHBs approached identified an appropriate staff member who agreed to an interview. All those who spoke with me gave written consent to the recording of the interview and that their DHB would be named and they personally would be identifiable. Most interviews were by phone, except for the Capital & Coast interview where we spoke in person.

The interviews were semi-structured based on these questions:

- What have been the environmental sustainability and carbon reduction approaches and activities in your organisation (including e.g. processes or staff positions)?
- Which activities are seen as successful?
- What are the characteristics (e.g. emissions source, implementation process) of successful activities?
- How has success been measured?
- What has success been attributed to?
- What lessons have been learned that would support scaling up or replication of the project?

The interviews were audio-recorded. I made notes from the interviews and supplementary reports or public information. I sent the notes and draft report to each person for them to correct or confirm.

Information concerning activities, policies and practices, and staff was tabulated and reported. All data was then subjected to directed content analysis.13–15 For further information, please contact gay.keating@postgrad.otago.ac.nz or simon.hales@otago.ac.nz.

The people who spoke with me are listed in below, along with additional documents that DHBs provided or I accessed on public websites.

Auckland

Manjula Sickler, Business Transformation Manager. Additional information from the DHB's Emissions Management Reduction Plan, the DHB Annual Plans16 and CEMARS.17

Bay of Plenty

Debbie O'Byrne (Project Manager, Service Improvement) and Phil Shoemack; Green Team members. Additional information from Travel Plan 2009.

Capital & Coast

Chris Poynter Intensivist Anaesthetist Member Sustainability Steering Group. Additional information from notes and reports provided, and the EECA website.18

Counties Manukau

Debbie Wilson, Sustainability Officer. Additional information from the DHB's Environmental Sustainability 2015 Annual Report, and its Green Teams and Theatre Recycling case studies for Global Green and Healthy Hospitals (see Appendix III).

Nelson Marlborough

David Francis, Energy Specialist.

Waitemata

Michael Field, immediate past Sustainability Manager. Additional information from the DHB's Sustainability Policy, Core Design Principles.19, 20

Appendix II: Successful Projects

This appendix contains extracts from the interviews and supplementary information, with the main focus on factors contributing to success and lessons learned.

A. Overall approach

DHB	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
AUCKLAND	Shared vision – centre of excellence for health Shared learning, embracing change Ongoing learning – all groups of staff learning across organisation and discipline boundaries Organisation culture of service innovation, learning and development, clinical trials and research – sustainability projects, trials and implementation are part of that culture Significant staff input to design, training and learning for success, whether individual projects are initiated by staff with business support and empowerment, or vice versa CEO leading a culture of learning and development of innovative leadership skills across the organisation Embedding changes in behaviour by empowerment – building on the understanding that staff are highly educated, highly trained, highly committed	Dedicated sustainability person However, if financial pressures ensue then start with the Annual Plan, move onto a strategy and/or programme under CEMARS.

DHB	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
BAY OF PLENTY	Socialising the idea of sustainability within existing staff Recognising that younger staff expect organisations to be sustainable – robust sustainability programmes are a mechanism to build engagement with the new generation of staff Passionate individuals	Embed in routine way we do things, not dependent on individuals Meaningful measures that can be used to audit and manage activity; framework for action is important; commit to healthy communities and support building community resilience; stop isolating our hospitals from community Dedicated resource As there are many possible options that are raised by enthusiastic staff, to assess where to put organisational effort to gain the best results To celebrate successes Think of the human factor – implement new technology or equipment in a way that staff know how to get best of it e.g. tele and video-conferencing
CAPITAL & COAST	Leadership engaged in change, building from multiple staff initiatives and input, with support of clinical leaders/medical reference group Core group of staff, networked in the organisation to make best use of differences in skill sets, time available and mutual support and accountability Across time can use positive stories to support ongoing changes and troubleshoot other areas that need more attention Linkages to other health-environmental sustainability peers elsewhere in the country and internationally Each activity has a success factor that can be characterised as technological, process-driven, behavioural or a combination	Top-down and grassroots engagement Dedicated staff time to ensure successful processes, as well as metrics and communication Use of external partner organisations

DHB	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
COUNTIES MANUKAU	Increasing awareness and commitment to sustainability of staff across the organisation; everyone else wants the same things – contributing to a sustainable environment for healthy communities Early involvement in change processes – such as at the beginning of supply chain tendering processes, building development or change	Understand the specific issues in your own DHB Historical – clinician involvement in initiating the strategy Clinical leadership roles include initiation, understanding the local clinical context to design effective implementation, communication and education Talk to the heart, telling the story, it makes perfect sense Consider total costs and benefits, don't get caught up in just unit price. Ask simple questions Expect multiple benefits in the longer term, for health care quality, staff commitment and community benefit
NELSON MARLBOROUGH	Improved sustainability is a consequence of energy management and efficiency driven by cost	Ensure senior management support (including financial buy-in) Start by presenting clearly the ways that the project or programme aligns with senior management priorities Understand that everyone is very busy, so be clear how it fits with different priorities, be able to explain the benefits on many levels, and if behaviour change is needed, make it easy with few barriers to adoption until the new approach is ingrained
WAITEMATA	Senior management commitment Success is in formally adopted practices, supported by management	

B. Energy projects

DHB	ENERGY PROJECT	IMPLEMENTATION PROCESS FOR THE PROJECT	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
BAY OF PLENTY	Building Management System (BMS)	2007 install electronic management to maintain steady building temperature in new hospital build 2013 review – further gains possible depending on the way the system is used; implement additional staff training on using the new BMS system	New build gave an opportunity to change – implementable at minimal cost Make incremental changes – install, check, additional training, changes	Use previous successes as a model for future changes (eg opportunity for step change when renovating kitchen - equipment, food waste) Help staff make the change – the human factor – how to implement new technology or equipment so staff know how to get best of it
CAPITAL & COAST	Cutting electricity consumption	Upgrading plant and equipment (ventilation, lighting, emergency generators). This energy-efficiency initiative was carried out in collaboration with EECA	The optimisation of our plant is a technological solution (improved metering and modular control of fresh air handlers + LED lighting replacing fluorescent tubes) that gives users no choice	Use of metrics as a way to assess progress and also as a way to promote and reinforce the changes Communication and engagement about benefits obtained from initiative, internally and externally
COUNTIES MANUKAU	Energy consumption	Building and opening a large new building (the Clinical Services Block) with improved technologies with energy saving in mind resulted in beneficial energy metrics – not led by the ES [environmental sustainability] programme per se!	Staff engagement with regards to energy saving (turning lights and computers off) could account for some	
NELSON MARLBOROUGH	Substitute coal boilers on Nelson site by landfill methane	No use was being made of methane from landfill, it was being burnt on site Property officer put case which was agreed and implemented in 2005	Economics: distance to landfill – pipe length and cost	Financial viability depends on specific physical and technical factors and on cost point of the many elements involved. These change across time, including carbon charge

		Pipe from landfill takes methane to the hospital Burning methane replaced 60% coal usage (1000 tonne coal pa) Future options to optimise system performance		Compare at Wairau: Distance – cost of pipe infrastructure; quantity energy the landfill generates vs heating needs; co-generation of electricity on the hospital site currently not economically advantageous Note: carbon charge, environmental costs of coal and its trucking are not part of cost
	Retrofitting LED (note also reduction of Hg to landfill)	EECA – part funded as a single project Labour intensive so implemented progressively across the site	Financial benefits are clear	Make sure the lighting plan design works for the use of the relevant space Use a reliable and recognised product
WAITEMATA	* LED upgrade * Energy management software Built environment policy	Senior management support		

C. Waste management

DHB	WASTE PROJECT	IMPLEMENTATION PROCESS FOR THE PROJECT	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
BAY OF PLENTY	General recycling	Cardboard recycling from 2000; 2007 dedicated sustainability staff under facilities management Other types from 2008. (Note: Directives around sustainable procurement have not been continued under current government) Initially no recycling on site – added recycling options, removed rubbish bins Includes hazardous waste battery disposal	Initial resource of staff time Precedent set in some areas encouraged staff to come up with own ideas and suppliers to find solutions in own service Grassroots support Easy options for recycling	Use/keep own data (cf external agency such as city council audit holding data) Work with suppliers to manage waste – both recycling solutions and reducing unnecessary waste Need to maintain foot to pedal for continuing implementation Initial dedicated resource opened up channels for staff to take active steps Staff may need support to move beyond expressing concern that there is a need Have to come up with solutions to take to executive managers, not add problems
	Operating Theatre recycling PVC	In collaboration with Baxter, one of our suppliers They provided a grant for equipment for collection		
	Waste management – paperless systems	Done for the purpose of service improvement to patients and communities, that has sustainability benefits Progressively with availability of electronic and web-based systems	Ease and speed	

		Saves staff person time More efficient – both better effectiveness and lower costs		

DHB	WASTE PROJECT	IMPLEMENTATION PROCESS FOR THE PROJECT	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
CAPITAL & COAST	Improved segregation, increase recycling	Separating more recyclables from landfill disposal Theatre campaigns – packaging, paper Better segregation of infectious waste; clinician led; more recycling bins; change location and size of infectious yellow bins Process changes (e.g. re-program ECG machine printing) Waste minimisation plan to be developed	A combination of behavioural and process improvement factors (Still uneven across functional units)	
	Eliminate procurement of non-recyclable single-use cold drink cups	Styrofoam to paper cups Branding with Hospital Foundation logos	Leadership engaged in change – championed the initiative together with Hospital Foundation Staff morale – seeing visible implementation of their ideas for change, steps in right direction	
	Clinical service change – online lab reports	Previous duplication of same result online and printed copy Clinical Practice Committee and Patient Safety Group reviewed processes Printed duplicate eliminated		
	Product stewardship PVC (plastic) recycling	Staff concern at high level of PVC waste Staff Green Team identified a PVC recycler To be able to separate and transport materials, sustainability officer supported implementation process changes for appropriately robust systems	Careful change management implementation Existing scheme is free of charge Staff awareness from colleagues working in other areas – staff want to recycle, know there is an option to recycle, will use if recycling is easy to manage and does not increase their work	

	E.g. Waste separation that is ergonomic, easy and quick for staff to use Subscribed to existing product stewardship scheme by Baxter (provider of IV fluid bags) Set up separate collection of the PVC bags, and reverse logistic with producer	Plus communication prior and post implementation to ensure ease of use by staff Additional staff feel-good factor – recycled PVC goes to make children's playground materials; staff view that their recycling not only reduces emissions but is also going towards a public good

DHB	WASTE PROJECT	IMPLEMENTATION PROCESS FOR THE PROJECT	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
COUNTIES MANUKAU	General waste reduction	Use the quality improvement model of PDSA cycles that staff are already familiar with Establish Green Teams and clinical champions Information via a number of ways – website, opt-in emails, blogs, noticeboards Two aspects – organisation-wide and staff-identified specific issues *Organisation wide* Replace personal wastepaper bins with recycling bins plus desktop cubes Worm farm trial *Staff work areas identify their own areas for change*		
	OT recycling and theatre pack rationalisation (OT may generate up to 30% total hospital waste)	Project management framework (see Appendix III for more detail) Staff enthusiasm Working with suppliers to identify recycling options		
	Purchasing	Since 2013, working with Regional Alliance, developed environmental impact criteria for purchases: • amount and ability to recycle packaging materials • ability to recycle product • products from recycled materials	Sustainable approach familiar across the DHB Build in sustainability at the beginning of new supply contracts Align with suppliers – expect success in recycling	

	Stationery, foam single-use cups, food waste

D. Travel

DHB	TRAVEL PROJECT	IMPLEMENTATION PROCESS FOR THE PROJECT	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
BAY OF PLENTY	2006–2009 travel plan	Partial funding from New Zealand Transport Agency Identify rideshare when three or more staff use the same car Dedicated premium car parking Encourage use of public transport	Dedicated resource with expertise – brought in contactors	People with expertise Should set achievable scale of change Work with relevant external agencies (in this case the bus company concerning timing of public transport) Identify metrics that enable you to track changes
	Staff – bike commuting	Build on previous project, from 2009 (i) Promote the concept – link with Bikewise national promotions, particularly in February; encourage staff (ii) Make it easy to adopt – provide shower facilities and bike lock-up	Make bike commuting easier	Get in at the beginning of organisational change; when any office moves location, ensure refurbishing has shower facilities and bike lock up
	Staff – meetings and conferences	Follow from use in clinical areas for virtual consultations Access to hardware – only two locations, only operates within DHB Encourage staff uptake – start with enthusiastic users Tolerate teething problems	Equipment available Role models elsewhere Enthusiasts to lead the project Huge time-saving compared with long trips across the district Progressively become accustomed to a different way to interact, develop ways to deal with loss of nuanced information compared to face-to-face meetings	Find enthusiastic lead users – get them to lead the project and they will also commit to iron out bugs and convince others Understand that behaviour change is needed and this needs to be accommodated It will be situation-specific whether it will be better to implement step-wise across the organisation vs all together [in] one fell swoop
CAPITAL & COAST	Staff travel plan, from 2006	Temporary use of a travel planner	Staff resource committed to travel plan	

Pre-existing Wellington public transport use and infrastructure
Geography and staff living near hospital

DHB	TRAVEL PROJECT	IMPLEMENTATION PROCESS FOR THE PROJECT	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
COUNTIES MANUKAU	Staff and patient attendances at hospital sites	Staff travel plan began before Environmental Sustainability Strategy adopted; subsequently role merged with the SO [Sustainability Officer] role Multiple approaches: • active walk to work • reduce car use – "rideshare" car pooling • increase use of public transport Working closely with Auckland Transport (AT) Promotion to staff Information – three expos, travel website, monthly newsletters, information for new staff Provide options – bike lock-up Incentives – premium parking for cars displaying two rideshare permits, discounts for service at a particular retailer Give away HOP cards pre-loaded with some travel funding paid by AT Environmental Sustainability Advisory Group interested in a travel strategy for all involved in CM [Counties Manukau] health – patients, visitors, not just staff	Working with external agency – Auckland Transport	
	Work-related air travel	Working with Senior Medical Officers (SMOs) – information on carbon footprint of different travel and conferring options Increasing availability of video-conferencing facilities		

DHB	TRAVEL PROJECT	IMPLEMENTATION PROCESS FOR THE PROJECT	WHAT DO YOU SEE AS THE REASONS FOR SUCCESS?	WHAT LESSONS WERE LEARNED?
NELSON MARLBOROUGH	Staff shuttle and pool car rideshare for work travel	Transport office prior to 2012 developed a planning tool for use of DHB pool car travel Internal rideshare – when booking a trip, can see if someone else is already going Daily shuttle between hospitals	Convenient – a good service, well designed Management encouragement Obvious to staff that single car use is wasteful	System created with local user in mind Well designed, easy to use, practical, few barriers to adoption, reliable
	Electric car fleet evaluation – one year	Trial two cars Identified which routes it could be used on within a day's charge distance (Nelson – Richmond) – unsuited [to] longer trips	Level of available technology Explicit use of a trial with limited, highly specific rollout	Start with a trial basis Clarify where in the fleet it fits, who will drive Apply in right area – fleet duty where it is suited Trial gives an opportunity to familiarise users, "normalised the new", and reduce concerns by demonstrating that it's just another car – not any different

Appendix III: Theatre Recycling Case Study Counties Manukau

Theatre recycling:
Middlemore Hospital Counties Manukau Health

GGHH Agenda Goals
- **Leadership**
- **Waste**

Hospital Goal
Please state what Action Items the hospital hoped to accomplish. For example:
- **Reduce waste**
- **Reduce carbon dioxide emissions**

Progress Achieved
- Financial benefits (savings, spending reductions or costs reductions)
- Environmental benefit (reduced emissions)
- Human health benefit
- Other quantitative results (increased job satisfaction, improved morale, direct and indirect benefits)

The Issue

'Operating departments can produce up to 30% of the total hospital waste'.

The green theatre team was established during 2013 and consisted of a small team of clinicians and non-clinicians intent on making improvements to their practice that went beyond the usual quality, health and safety criteria. The aim of the team was to activate the organizations sustainability mission, raise awareness of sustainable practices and facilitate education to help stimulate ideas and actions for system improvements. Waste was identified as being a key problem in terms of waste volumes going to landfill. In general, theatre departments have been at the leading edge when it comes to recycling and theatre pack rationalization projects. Theatre departments lend themselves to such projects since they generate up to 30% of the total hospital waste. They use a large volume and range of single use products and consequently generate a large volume of waste; arguably, much of this waste is recyclable. Disposing of waste to landfill is often the most convenient and costly option. Making changes to the way people segregate and dispose of their waste is a process of change. The change process has to be managed in such a way that the desired behaviour is sustained. By reducing waste to landfill, volumes operational costs will be reduced and carbon emissions avoided. Reducing carbon emissions impacts the well-being of patients, staff and hospital workers, as well as the society outside the hospital walls.

Sustainability Strategy Implemented
The theatre green team believed by recycling they could save money, reduce emissions and improve morale all at the same time. As a means of addressing this issue of waste, a strategy was developed following a project management framework. In doing so, the process had rigour and resulted in a streamlined approach. The theatre recycling project came under the organizations' Environmental Sustainability programme and is one of the key successful intervention projects that took place over 2014/15.

Implementation process
The planning phase began with several meetings with key stakeholders. Consideration had to be given to what waste was being generated and importantly, of that waste, what could be readily recycled in

Auckland. This is important because there are local and regional variances as to what materials can and cannot be recycled. As part of the initial phase, materials were collected and once enough material was gathered, samples were given to the recycling waste provider. See the following table which shows details of recycling and waste streams:

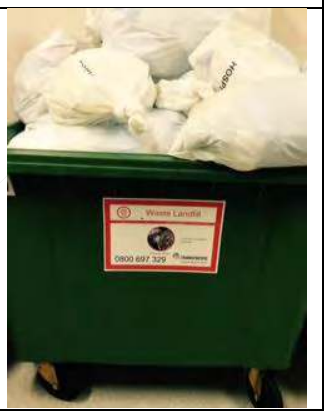
Paper and fine card into the **green bin**	**Mixed recycling** into the **blue bin**	**Soft plastic** into the **orange bin**	**General waste** into a white bag
Green bin needs to be emptied into the **large green paper bin.** This includes medication boxes, glove boxes, backing paper from syringe wrappers.	**Blue bin** needs to be emptied into the **large blue recycling bin.** This includes glass, aluminium and rigid plastic (no broken ampoules or aerosols please).	**Orange bin** needs to be emptied into **a large clear plastic bag.** This includes soft plastic packaging material, clear and opaque and **does not** include fluid bags, giving sets, gloves or kimguard.	Waste for landfill needs to be emptied into the dark green 660L wheelie bin (labelled as waste to landfill).
			

Table 1. Waste streams identification table

Once we understood what could be recycled, then resources could be put in place based around these items. In addition, prior to making any changes, waste counts were taken as means of benchmarking current practice. Pre intervention waste counts quantified the number of white bag (general waste) and yellow bag waste (medical waste). From then on in the team considered what education was required and what tools and resources were needed. In the interim the Sustainability Officer connected with the non clinical support services to map out the waste disposal process and make sure the waste was removed from the theatre and taken to the waste dock where it could be collected by the recycling provider. Any successful sustainable waste management programme involves meeting the requirements of three distinct elements: correct segregation at source, internal movement of waste to an internal collection point and external movement of waste from the collection point to the waste dock and beyond. Each element requires attention and consideration to ensure the right waste ends up in the right waste stream.

Collateral was developed including fact sheets and posters and the 'plastics' theatre became the first theatre to trial the system. Communication to theatre staff formed the next phase, whilst searching for appropriate recycling bins. The recycling project started as a trial and during that trial various different bins were tried out, and feedback was taken on the quality of the fact sheets and posters. All clinicians were involved who used the plastic theatres and this phase lasted several weeks to ensure each new tool was tried and tested effectively. By choosing to trial the project in one theatre, interest was raised as other teams often mentioned that they were also keen to recycle and were eagerly waiting for the trial to go live and across all theatres. During the trial the theatre department relocated into a brand new facility and time was allocated to the new area to ensure any new waste management procedures were fit for purpose at the new site.

Eventually the team decided they needed larger bins, and bins on wheels. Contact was made with a local supplier who agreed to make a trolley with wheels and designed this trolley to fit our purpose. A

small time in motion study also helped to show the advantage of capturing the waste in a trolley on wheels. The study revealed how orderly time was saved because they needed to take less frequent trips to the waste room since the waste was segregated and split into additional waste streams.

The bins and trolley were therefore made in NZ, adding more value to the whole programme since the Environmental Sustainability Programme is very interested in economic, environmental and social outcomes. Over the course of nine months and following on from a long period of engagement and evaluation, the project went live across all theatres. Since the trial period was over a few months, engagement was high. The project has been fully employed now since February 2015. Aside from a handful of people, all members of the theatre team have been actively engaged and segregating their waste very successfully.

Tracking Progress

Over the course of the implementation process and well into business as usual, feedback is provided as to how well the team are doing in terms of contamination rates. Waste bin analysis allows for snapshot auditing and feedback. Overall the contamination rates are very low. Waste being recycled totals approximately 800 kgs per week which equates to 26 wheelie bins. Medical and general waste volumes have decreased and costs of diverting waste to landfill lessened. The behaviour is considered the new norm and theatre departments are very keen to follow suit, in fact another trial has started on a different site.

Trolley and bins made in NZ by Pioneer 'fit for purpose'

Challenges and lessons learned

One of the most challenging aspects of the project was being able to effectively quantify the impact of adding in additional waste streams to all those involved in waste transportation post the theatre department. Adding any workload onto the non-clinical support services requires careful consideration of existing work capacity. Each of the three elements poses different challenges and requires each member of the team to work closely together in the planning and implementation phase.

Next Steps

Next steps include adding in PVC recycling and fully rolling out at the other main site.

Demographic information

CM Health is a major provider of both community- based and secondary health care services to the estimated 520,130 people residing in the Counties Manukau district. Counties Manukau Health is New Zealand's fast growing multicultural area, and is also home to more new immigrants than any other region.

CM Health operated services are delivered at 7 in-patient facilities and a number of community outpatient sites and community health sites across the District. The Middlemore Hospital and Manukau Health Park (comprising the SuperClinic and Surgery Centre) contain the largest elective, ambulatory and inpatient facilities.

There are 1,000 beds across these facilities, and the services discharge in excess of 115,000 people per annum (across acute, surgical, mental health, maternity and health of older people/ rehab), with Emergency Care seeing over 100,000 people per annum. There are also over 80,000 outpatient first appointments, and 215,000 follow-up events each year.

The organisation is one of the largest of New Zealand's District Health Boards and a significantly large employer in the Counties Manukau district, providing jobs for over 7,000 people across the region, 5,700 FTE. Counties Manukau Health employs over 400 Senior Medical Officers and over 480 medical trainees covering most specialty areas working within our various sites. Counties Manukau employs over 2,500 Nursing staff (Registered and HCA), and over 1,000 Allied Health and Technical Staff.

More information can be found on the website: www.cmdhb.org.nz

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How to Affect Green Change in a Large Organisation: Setting up Green Teams

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Problem

- Practising Sustainable Healthcare targeted waste minimisation in system wide innovative and sustainable ways to reduce the volume of waste going to landfill.

Context

- Programme outcomes required staff engagement.
- Programme implemented throughout Counties Manukau Health in administrative and clinical areas.
- Working in teams' areas identified relevant problems and solutions, fostering a sense of personal team responsibility and ownership.

Methodology

- Using the PDSA cycle for quality improvement:

PDSA = Plan, Do, Study, Act

Ideas tested and changes result in improvement

Intervention

- Recycling packaging from Operating Theatres at Middlemore Hospital, including soft plastics, paper and fine card.
- Critical care Reuse campaign: Staff using their own cups and providing visitors with reusable cups.
- 800 desk top cubes and recycle bins/removal of personal waste paper bins.

Measurement

- Waste volumes, medical and general waste counts.
- Critical Care ordered 7000 foam cups each week, ending up in landfill.
- General waste volumes (white rubbish bag count).

Results

- Theatres now recycle on average **800kg** per week.
- Critical care no longer order 7000 foam cups each week, saving **$2,800** per month.
- White bag counts have reduced by **20%**, based upon departmental pre and post waste counts.
- Tackling these issues using an Environmental Lens staff save money and 'feel good' at the same time.
- Saving money helps our organisation; resulting in positive patient outcomes.

Effects of Change

- Teams established: clinical champions identified.
- Changes made have shown improvements in recycling volumes and reduced waste to landfill charges, saving in excess of $100,000 in waste disposal costs.
- Approach is transferable across areas. Once a **Green team** is in place, many other ideas are generated as a result and other sustainability improvements made.

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A 'green team' is a team of informed, engaged people all aiming to activate the organisation's sustainability mission, raise awareness of sustainable practices and facilitate education to help stimulate ideas and actions for system improvements.

EPICC - Environmental Protectors in Critical Care (Green team)

Reusable cups for visitors to Critical Care

EPICC Notice Board

Theatre recycling bins

Desk top cubes

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Appendix Two: Frequently asked questions about climate change

Published September 2010

What is the difference between global warming and climate change?

The Earth is warming faster than it has in the past thousand years, hence the term global warming.

But climate change is a better description than global warming, as some areas may, in fact, cool. It also describes other effects like rising sea levels and more extreme weather.1

Is the 'greenhouse effect' the same as global warming?

No: The 'greenhouse effect' is the way the atmosphere traps some of the energy we receive from the Sun (infrared radiation or heat, ultraviolet and visible light) and stops it being transmitted back out into space. This makes the Earth warm enough for life. The problem is that scientists believe we are adding dangerously to the natural greenhouse effect with the gases from industry and agriculture. This traps more solar energy and increases the temperature leading to global warming.1

Isn't the climate always changing?

Yes. There is natural variability in the Earth's climate but the current climate change is very unusual as it's not exclusively part of a natural cycle. Natural factors include volcanic eruptions, aerosols and phenomena such as El Nino and La Nina (which cause warming and cooling of the Pacific Ocean surface).

Natural climate variations can lead to periods with little or no warming, both globally and regionally, and other periods with very rapid warming. However, there is an underlying trend of warming that is almost certainly caused by man's activities.

Natural variability will continue to bring warm and cool years, but because of climate change, the warm years will be warmer and more frequent.2

Aren't all these changes down to the Sun and natural factors?

No. Many factors contribute to climate change. Only when all factors are considered can we explain the size and patterns of climate change over the last century.

Although some people claim that the Sun and cosmic rays are responsible for climate change, measured solar activity shows no significant change in the last few decades, while global temperatures have increased significantly. Since the Industrial revolution, additional greenhouse gases have had about ten times the effect on climate as changes in the Sun's output.

Much of the relatively small climate variability over the last 1,000 years, but before industrialisation, can be explained by changes in solar output and occasional cooling due to major volcanic eruptions. Since industrialisation, CO2 has increased significantly. We now know that man-made CO2 is the likely cause of most of the warming over the last fifty years.2

Surely, the impact of human activity is small?

No. Greenhouse gases are produced naturally and commercially. Both types influence climate change.

All greenhouse gases combined are only a tiny part of the atmosphere, making up less than 0.5%. Yet it is scientifically proven that these gases trap heat, keeping the planet 30°C warmer than it would be otherwise and able to sustain life. Any changes in the levels of these gases, such as those recently brought about by human activity, will have a significant effect on global temperatures. Keeping the climate stable is important for the well-being of the Earth. But there is now very strong evidence that man-made greenhouse gases are causing climate change.

Man-made greenhouse gases have altered the balance and are causing climate change.2

If we're meant to have global warming, why is the weather so miserable a lot of the time?

This is the fundamental difference between weather and climate. Even in a warming climate we will still get individual weather systems which will bring 'miserable' weather. There is indisputable evidence that the climate is changing. The average global surface temperature has risen by 0.6 °C in the past 140 years. Globally, nine out of the ten hottest years ever recorded have occurred since 1990. Here in the UK, four out of five of the hottest years ever recorded over a 330-year period have occurred since then.1

But not all scientists agree though, right?

The overwhelming majority of climate scientists agree that human induced climate change poses a huge threat to the world. The Intergovernmental Panel on Climate Change is not run by any government – 'intergovernmental' means it answers to all 192 governments signed up to it. Its reports are written by independent scientists. It is one of the most rigorous scientific bodies that exists. It brings together many thousands of scientists from countries all over the world to put together the best assessments of climate science available.

The leaked emails from the University of East Anglia don't undermine the science – a view supported by the independent review that looked at this incident. There remains an overwhelming consensus, based on decades of climate science and the work of thousands of scientists around the world, which says that climate change is a real and a major threat.

Ref: http://actonco2.direct.gov.uk/actonco2/home/climate-change-the-facts/10-facts-you-should-know-climate-change.html#a3 (archived but still accessible)

Are you sure there's a link between temperature rise and CO2?

Yes. Temperature and CO2 are linked. Studies of polar-ice layers show that in the past, rises in temperature have been followed by an increase in CO2. Now, it is a rise in CO2 that is causing the temperature to rise. Concentrations of CO2 have increased by more than 35% since industrialisation began, and they are now at their highest for at least 800,000 years.

When natural factors alone are considered, computer models do not reproduce the climate warming we have observed. Only when man-made greenhouse gases are included do they accurately recreate what has happened in the real world2

Sources

1. Met office –FAQ: http://www.metoffice.gov.uk/climatechange/guide/faqs/#faq
2. 2. Met Office – How can I be sure? (In: Warming: Climate change – the facts)

After seven years the links given no longer work but similar information can be found at https://www.metoffice.gov.uk/climate-guide/climate-change

Ministry of Health Survey on Environmental Sustainability in New Zealand's District Health Boards

June 2018

Context

To better understand how we can help each other reduce the contribution the health sector makes to climate change, and how the sector can support the Government's ambition for a net zero emissions Aotearoa New Zealand by 2050.

Ultimately we would like all DHBs to

- understand the risks of climate change to their core functions
- understand how climate change in their areas of operation may change the numbers of patients they deal with, types of illnesses, frequency of interactions with the health system, etc
- have a plan to adapt to the changing climate
- understand their own greenhouse gas emission footprints
- have a plan to reduce emissions in line with the Government's ambition for a net zero emissions country by 2050
- understand the co-benefits of emissions reduction, climate resilience, and public health.

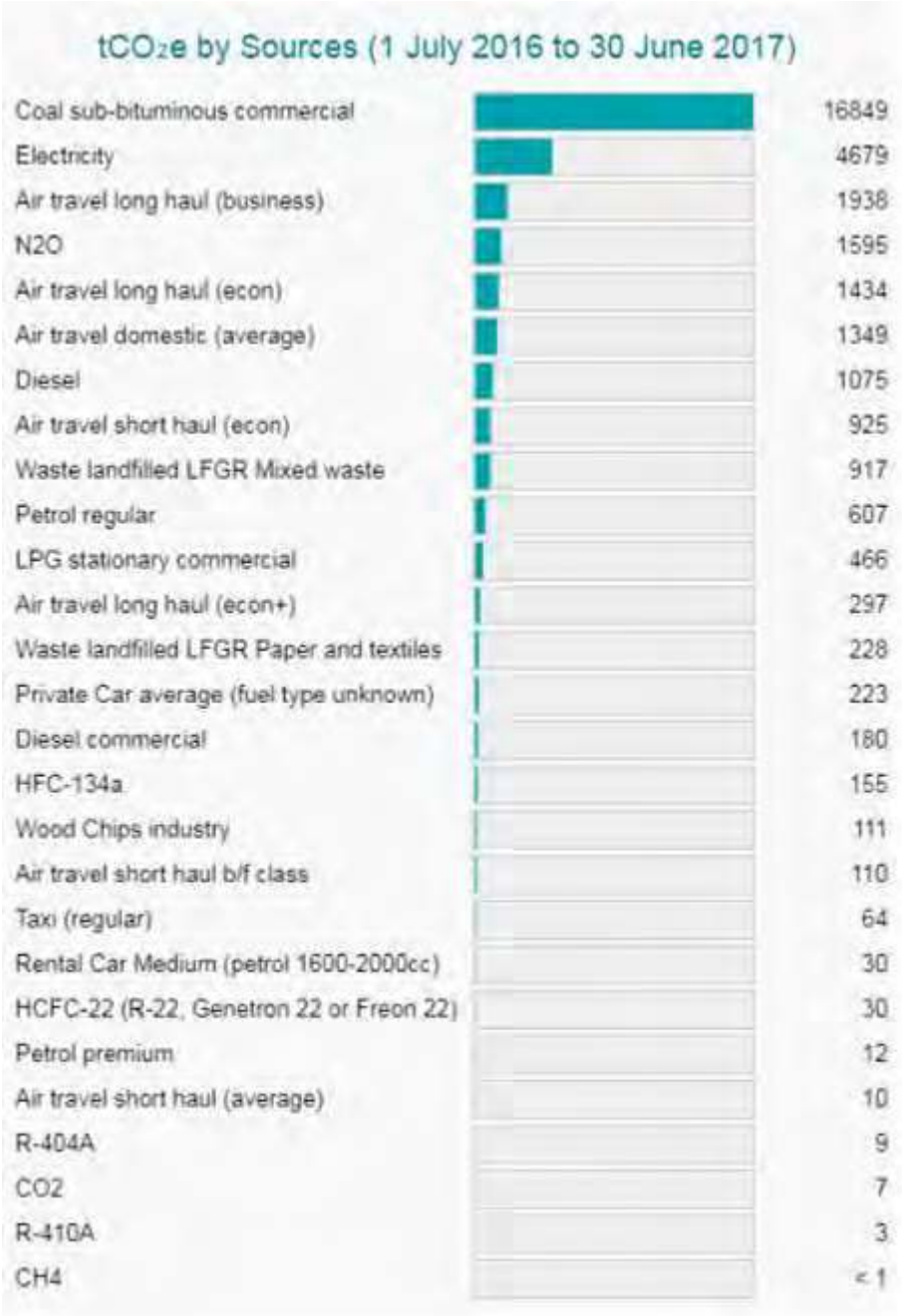
1	Name of DHB	Canterbury District Health Board

2	Does your DHB have any staff with responsibility for or an interest in environmentally sustainable healthcare and/or climate change that meet regularly? If not, is this something your DHB would be interested in starting?	There are a number of local area interest groups e.g. the Public health division has a 'Zero Heroes' group who meet monthly and Princess Margaret Hospital have a similar group. In response to a discussion paper the Executive Management team recommended in April 2018 that a DHB wide 'Sustainability Governance group' be created. This was one of a number of recommendations made that related to our performance on environmental sustainability issues. We have been progressing these in stages and hope to have the governance group in place by early next year.
3	Who are the staff member(s) responsible for leading this work on environmentally sustainable healthcare and/or climate change? Name, title, contact details.	There are no CDHB staff members currently who have a specified responsibility to lead on this kaupapa. **Dr Anna Stevenson, Public Health Physician,** 9(2)(a) [redacted] leads the Environmental Sustainability Programme area at Community and Public Health the public health division of the CDHB. **Mr Tim Emson is the Energy manager for CDHB and West Coast DHB, cell** 9(2)(a) [redacted] and has driven several major energy conservation programmes which have direct benefits from an environmental sustainability perspective. There are many staff at all levels who have a strong interest in this kaupapa.
4	Does your DHB have any environmentally sustainable healthcare and/or climate change initiatives in progress at this time? If so, could you please list them?	• CDHB has been working with Enviro-mark over a number of years. We are a certified Energy-Mark Silver organisation and are actively working towards Gold. • We are CEMARs (Carbon Emissions Measurement and reporting) certified and in 2018 were in the top 20 certified emissions reducers in New Zealand. • We are working towards the transition from coal to bio-fuel. This has been achieved at Burwood Hospital and is underway at Christchurch Hospital. Planning at Ashburton Hospital has begun. • Community and Public Health have an active 'Zero Heroes' group and have led many small scale projects in our division that continue to do with recycling, waste minimisation, active transport options, increased use of video-conferencing technology and staff education.
5	Does your DHB consider environmental impact criteria in procurement processes? If so, how?	CDHB procurement staff also supply the West Coast. There is considerable goodwill towards this kaupapa but in practice cost, operational (specifically transport across long distances) and legislative compliance requirements outweigh any consideration of environmental criteria. The CDHB is bound via contractual requirements to overarching commitments that do not necessarily enable attention to environmental issues e.g. air travel is purchased through a collective agreement with MBIE, petrol is purchased in a collective agreement with the NZ Police. Such contracts tend to be for many years and variations are difficult to negotiate.
6	Has your DHB done any work to identify assets at risk from seal level rise or other climate change impacts? If so, what was the outcome of this work?	The risk of flooding, tsunami and sea level rise was considered in the new build (outpatients and acute services building) as part of the consent process which resulted in changes to the design to comply with flood mitigation requirements.

7	Does the DHB have a measure of its current carbon/emissions footprint and if so what is it? a. If not, would it be helpful for you to know this? b. If not do you know what your DHB's main sources of emissions are?	CDHB has a certified emissions profile. See graphic at end of this document for a detailed breakdown of our emissions. Approximately 50% of our profile comes from coal. The next largest component is electricity use which is notable given the majority of our electricity is from hydro and 'clean'. This indicates that the DHB is a very large user of energy and affirms the importance of a stable energy supply. The next largest chunk of our emissions comes from air travel by staff and patients.
8	Would expert assistance in measuring your carbon footprint be helpful?	We are fortunate to have an Energy Manager who can assist with the requirements of CEMARs certification. This is a significant time commitment for him. Funding to support the development of expertise in this field by other staff would be welcomed.
9	Have your heard of the Certified Emissions Measurement and Reduction Scheme to help large organisations measure and manage down their own carbon footprint?	We are part of this programme
10	Has your DHB signed up to CEMARS?	Yes
11	Would your DHB be interested in joining CEMARS and working more closely with DHBs who are members of their network to reduce their carbon footprint?	Yes. The caveat to this is the cost (and opportunity cost) of belonging to this programme. We have chosen to go with CEMARs initially as it is the Gold standard and enables us to be confident of our baseline measurements and subsequent changes, however gaining funding for the certification costs has not been easy and we are reliant on the expertise of our Energy Manager to do the associated work. In the future we note that MFE are in the process of updating their 2015 guidance http://www.mfe.govt.nz/publications/climate-change/guidance-voluntary-corporate-greenhouse-gas-reporting-2015. It may be useful to work with MFE to ensure this new guidance can be easily utilised by DHBs and this may reduce the cost of emissions measurements- obviously a voluntary report cannot be considered to have the same degree of reliability as the audited CEMARs but it may be 'good enough' to begin with.
12	If your DHB has expertise and experience in initiatives to reduce its carbon footprint, would your DHB be interested in assisting other DHBs to do the same?	We already do via the National Sustainable Healthcare Network – monthly teleconferences.
13	Would your DHB like to learn from others who have expertise and experience in other areas to reduce the carbon footprint of healthcare?	We would be interested in this. As an example, our procurement staff appreciated a recent training on sustainability issues provided by NZ Healthcare and felt more like this would be beneficial. We note that significant change is more likely to happen with adequate funding and capacity combined with a joined up approach from central and local agencies. For example we know that several DHBs rely on coal for their main source of energy- substantial costs and expertise is required to make the change to

		'greener' alternatives. DHBs are generally not funded for capital costs like this and the professional expertise is very limited and will likely need to be sourced from overseas at least initially. (CDHBs energy manager came from the UK) Similarly the kinds of changes that will be required to reduce air travel will involve a multi-pronged strategy including increased availability and use of videoconferencing technology and facilities and ability to offset flights in a simple way. Such videoconferencing facilities should be used by all government agencies to reduce duplication of IT and the need for staff to re learn how to use the technology with every call they make.
14	In which of the following area would your DHB be most interested in working? a. waste, energy, procurement, infrastructure, transport or all? b. Other areas? Please provide examples.	In terms of achieving emissions reductions often the areas we can make the most significant change are not the most visible areas- procurement would be a good example of this. CEMARs has shown us that our efforts need to be focused on removing coal from our operations. Management of staff travel is the next biggest area for work on emissions reduction. Our staff and visitors are very aware of the huge amounts of waste generated in this health system so this would likely be the area we would choose to focus on to build community support for the kaupapa. b) New Building guidelines or directives such as green building council 'green star rating' to give improved minimum standards on energy and waste based on whole of life that can't be 'value-managed' out as has occurred with many environmentally sustainable specifications in the CDHBs new building programme .
15	Has your DHB undertaken any work to identify changes to patient numbers, types of illnesses etc expected under likely climate change scenarios?	No Research into this area will be undertaken when more robust data regarding health implications of climate change is developed that will enable viable modelling to be undertaken. Guidance from the Ministry of Health as to the sort of disease codes of interest and any relevant supporting information would assist with such modelling.
16	What would be the most helpful thing the Ministry of Health could offer to assist your DHB to progress towards environmentally sustainable healthcare?	• A clear lead from the Ministry of Health on expectations in this area would be the most helpful to us. The interest shown by the Ministry this year has already led to changes on the ground. • An alignment between the policy side of the Ministry and the operational arms would be beneficial. For example many of the aspects of sustainable design in CDHBs new building programme were 'value-managed' out of the final project due to fiscal constraints and the prioritisation of capital costs over operational costs. This contradicts the current policy guidance. • Funding to support a sustainability manager with dedicated budget for projects to reduce waste etc • Legislative change to support green building standards in all new healthcare facilities (preferably green star rated buildings with agreed monitoring of standards) The NZ Green building Council has recently released the Case for sustainable healthcare and they have a number of other useful guidance documents on office fit-outs, green star hospitals etc.

		• Ensuring the link between health benefits and environmental benefits is made clear and the 'co-benefits' argument applied to all projects e.g. the active travel project for our staff is as beneficial to staff health and wellbeing as it is for reducing our carbon emissions associated with transport. This is rarely understood or communicated. • Some sustainability projects cannot be undertaken by DHBs without infrastructural support at a National level – a good example of this is the need for recycling facilities nationally to manage ordinary waste and biohazardous substances. Currently despite regular calls from the public we cannot recycle even compostable coffee cups from our cafes because there are no facilities in the South Island that can manage this. There are many similar examples where national support is required for regional and local change to occur. • Bulk funding of CEMARs/Energy-Mark etc. • Capacity-building nationally on this issue e.g. the NHS SDU had a two day leadership course for senior managers and above. This would be a great model for New Zealand.


tCO2e by Sources (1 July 2016 to 30 June 2017)
Coal sub-bituminous commercial 16849
Electricity 4679
Air travel long haul (business) 1938
N2O 1595
Air travel long haul (econ) 1434
Air travel domestic (average) 1349
Diesel 1075
Air travel short haul (econ) 925
Waste landfilled LFGR Mixed waste 917
Petrol regular 607
LPG stationary commercial 466
Air travel long haul (econ+) 297
Waste landfilled LFGR Paper and textiles 228
Private Car average (fuel type unknown) 223
Diesel commercial 180
HFC-134a 155
Wood Chips industry 111
Air travel short haul b/f class 110
Taxi (regular) 64
Rental Car Medium (petrol 1600-2000cc) 30
HCFC-22 (R-22, Genetron 22 or Freon 22) 30
Petrol premium 12
Air travel short haul (average) 10
R-404A 9
CO2 7
R-410A 3
CH4 < 1

2018/19 Annual Plan – Canterbury DHB Climate Change Stocktake

Prepared in conjunction with the "2018/19 Annual Plan and Planning Priorities Guidance"

DHBs are asked to "commit to undertake a stocktake…to identify activity/actions being delivered, including procurement, that are expected to positively **mitigate** or **adapt** to the effects of climate change".

This template is intended to aid DHBs in identifying high level actions and activities being carried out in 2018/19 for this stocktake and is a guide only.

This document was prepared by Dr Anna Stevenson with input from many Canterbury DHB staff who have direct management responsibilities in the areas discussed.

Table of Contents

1. LEADERSHIP: Prioritize environmental health 2
2. CHEMICALS: Substitute harmful materials and chemicals with safer alternatives 3
3. WASTE: Reduce, treat and safely dispose of healthcare waste supporting the shift towards a circular economy 4
4. ENERGY: Implement energy efficiency and clean, renewable energy generation 5
5. WATER: Reduce hospital water consumption and supply potable water 7
6. TRANSPORTATION: Improve transport accessibility and safety by implementing a range of transportation strategies for patients and staff 7
7. FOOD: Purchase and serve sustainably grown, healthy food 10
8. GREENHOUSE GAS EMISSIONS REPORTING 11
9. BUILDINGS: Support green and healthy regenerative hospital design, construction and refurbishment 11
10. PROCUREMENT: Buy safer and more sustainable products and services 13
11. CLIMATE CHANGE ADAPTATION 13
12. OTHER 13

1. LEADERSHIP: Prioritize environmental health

Do you have a permanent sustainability manager/coordinator role?	No
Does your DHB have a sustainability policy in place?	No
Does you DHB have sustainability goals and targets?	Yes

We have a commitment to reduce our overall greenhouse gas emissions via the CEMARs programme. As our overall facility size will be considerably increased from our 2014 baseline measurements it is intended to use CO2kg/m2 as a measure with a reduction of 50% when the coal boilers are decommissioned. Our CO2 emissions will decrease from 153kgCO2/m2 to 78kgCO2/m2.

Planning is underway to set up a DHB wide Sustainability Governance Group. The GM for Finance is the Executive Management Team sponsor and the group will be chaired by a public health physician. This group will be responsible for the development of an environmental sustainability strategy for the Canterbury DHB.

Activity	Milestones	Comments
Waste Committee		We recognise our responsibility to have a waste committee under the Under NZS4304 standards for health and waste care. We will look to options for this when we have established the Sustainability Governance group in 2019.
Training and Education		Procurement managers attended recent sustainability training (organised by NZ Health Partnership). Video Link set up for Canterbury DHB staff to attend Sustainable Healthcare in Aotearoa New Zealand Forum 2017.
Meeting regulations and standards		Government Rules of Sourcing determined by MBIE (currently being revised), Procurement required to adhere to these which can limit sustainable initiatives being contracted.
Small-scale staff led 'green' groups		We are aware of Environmental Sustainability Groups initiated and led by staff at have been set up at Community and Public Health (Zero Heroes) and Princess Margaret Hospital (The Green Team) and the Christchurch Hospital anaesthetic department. There is also a staff initiated carpool group on Facebook which enables staff to connect up with other staff who commute from Rolleston to Christchurch Hospital.

		These staff led group's model sustainable behaviour to colleagues and bring small initiatives that could improve sustainability practices within Canterbury DHB to the attention of their leaders. They also offer tips and advice about how staff can implement sustainable activities into their everyday via notices and newsletters within their offices and occasionally via organisational wide communications.
The Choose Wisely Campaign	Began 2018	We participate in "The Choose Wisely" campaign which targets the use of unnecessary routine tests across a number of clinical services.

2. CHEMICALS: Substitute harmful materials and chemicals with safer alternatives

Please fill in our actions your DHB is taking in this area. Suggestions: policies and protocols, facility-specific chemicals action plan, participation in initiatives such as WHO-HCWH Global Mercury-Free Health Care, address the use of chemicals and materials of concern, etc.

Activity	Milestones	Comments
Asbestos removal		Proactive identification and removal process for DHB buildings. Maintenance and Engineering have a dedicated Asbestos Manager to coordinate this.
Dental Services – no heavy metals used.		Amalgam disposal is managed so that it does not go to waste.
Biodegradable chemical cleaners		New contract specifications will be added during contract review 2019/20 to include "environmentally friendly products which are effective against microbicrobials".
Review of Ecolab contract		Infection Control leads this process -needs around infection control are attributed a greater weighting than sustainability considerations. There is disagreement between various specialists about what constitutes adequate 'cleaning'. National guidance on this issue may be helpful.

3. WASTE: Reduce, treat and safely dispose of healthcare waste supporting the shift towards a circular economy

Please fill in our actions your DHB is taking in this area. Suggestions: paper usage, recycling, waste disposal, sustainable drinking cups, management of medical waste, anaesthetic gas, recycle dialysis water, packaging, cleaning products, etc.

Activity	Milestones	Comments
Recycling		Currently recycle plastics, glass, cardboard, paper, polystyrene, PVC theatre products and home dialysis packaging (Baxter's), batteries, fluorescent light tubes, heavy and light metals. Food waste is collected for use in farming.
Theatre Waste reduction		We use "Interwaste" who deconstruct and recycle metal and plastic waste from medical devices used in theatre (in conjunction with Johnson & Johnson).
Review of waste contracts 2019/20	2019/20	Incorporating sustainability specifications in procurement process - asking about packaging and reduction of this.
Reducing unsustainable waste in Staff & Retail cafes		Moving from plastic cutlery to wooden. New outpatients building café fully transitioned to wooden cutlery and biodegradable take-away food packaging materials.
Use of single-use coffee cups		Wish to move away from non-recyclable to compostable/ recyclable (Deepak) however significantly more expensive to procure ($25 per unit compared to $9), and in the South Island there is no way to recycle them currently.
Measuring waste	Q1/Q2 2019	CDHB has access to a Waste Education Officer as part of waste agreement with Waste Disposal Company. Waste audit completed with the assistance of Christchurch City Council "Target Sustainability" programme a couple of years ago. Plans to repeat in Q1/Q2 2019.
DHB Depot set up in 2017 prior to move of multiple services into new Outpatients Building.		Services who had furniture and equipment that they did not need to take to outpatients were encouraged to contact the depot who aimed to repurpose, recycle or sell items instead before considering disposal.
Paperlite Project	Run in 2017	Aimed to shift outpatient clinics from paper based clinical records to electronic. 14 out of 30 services achieved this.
Anaesthetic Gas Project	June 2017	Analysing flow rates and reducing long high-flow phrases through using real-time Cloud-based data. This Canterbury DHB/ GE project is

		a world first and resulted in 13% decreases in flow rates of noxious gases. Results of the study presented at the Euro-anaesthesia 2017 congress in Geneva.

4. ENERGY: Implement energy efficiency and clean, renewable energy generation

What are the main energy sources for heating and cooling? Tick all that apply:

Coal	☒	Electricity	☒	Other	☒
Gas	☒	Diesel	☒	Woody Biomass	

Please fill in our actions your DHB is taking in this area. Suggestions: heating, ventilation and cooling, lighting, alternative or supplementary energy sources, energy efficient products, etc.

Activity	Milestones	Comments
Full time Energy Manager		The energy manager began work in 2011. The job has expanded recently to cover the West Coast DHB as well.
Use of Energy-Pro		Energy-Pro is a cloud based energy monitoring software. CDHB was used as a test case with Enviro-mark to try and link to the e-manage system (which is what we use to gain the information needed to undertake CEMARs). The West Coast DHB has been using Energy-Pro for over a year now allowing CDHB to better understand what is happening in energy usage. This will enable more strategic planning in the future.
Energy mark silver certified systems	Achieved bronze certification 2016, Silver in 2017.	Received bronze certification in 2016, silver in 2017. Canterbury DHB has undergone the required audit to be certified as having achieved Gold status. Subject to peer review processes this is likely to be achieved by end of 2018.
Projects to eliminate coal use underway		Burwood Hospital has already transitioned to bio-fuel (2016), Christchurch Hospital in progress and plans have begun to move Ashburton Hospital from Coal to a greener form of energy. As time moves on and technology improves/expertise increases each project needs to be fully reassessed. Bio

		fuel may or may not be the correct option this time round. Gray Hospital is installing a new coal boiler. In the future this boiler has the capacity to be converted to wood pellets. Pricing shows that at this point the use of biofuel would cost around $100K pa extra and this is not deemed cost-effective currently.
LED lighting projects		Approximately 60% of lights across the CDHB are LED. There are lighting replacement projects in Christchurch Hospital and Ashburton. The new parts of Burwood Hospital are LED light. The Spinal unit has T5 fluorescents which are on a par with LED. Lighting review to be done in Christchurch Women's in February 2019.
Efficient Chiller replacements		The more efficient chillers are the less damaging they are to the ozone. The older R22 gas chillers cannot be restocked with the gases they run on so will have to be replaced in next decade- this will reduce noxious gases and improve energy efficiency. New chillers have been commissioned and installed in labs and in oncology. A very old chiller will soon be replaced in Parkside (Christchurch Hospital). New chillers with corresponding environmental benefits will be installed in ASB and outpatients. The rate of change is linked to the demolition of the Riverside building and refurbishment of the Parkside building.
BMS monitoring HVAC systems		This is a fairly large building management system (one of the biggest in the south island) used to monitor building and energy consumption. Currently auditing at Ashburton, have audited at Burwood. Ensures, for example, that we are not heating and cooling at same time.
Air-conditioning sensors in corporate		Air con used on an as needed basis in offices.

5. WATER: Reduce hospital water consumption and supply potable water

Please fill in our actions your DHB is taking in this area. Suggestions: framework for net-zero water use, water conservation strategies, move away from water intensive equipment, landscaping, eliminate sale of plastic water bottles, community projects, waste diverted from landfills etc.

Activity	Milestones	Comments
Trial DCI & biofume water treatment on cooling towers.		Canterbury DHB is trialling a new biofume water treatment on the new chiller in the labs. Chemicals are used to treat the water to prevent legionella and scale etc. The new system doesn't use chemicals and dumps less water than previous systems. The manufacturers also claim that it keeps cooling surfaces cleaner so we will use less energy to run the system. The trial started six months ago on an old chiller and one month ago (10/18) on a new chiller. EECA have given us 40% of funding for the system so we will be reporting on the success of this this after summer.
Monitoring water consumption		Currently on city reticulated system as bores were damaged in Earthquake and are being repaired. Canterbury DHB will be back using our own bore within a year and will restart monitoring consumption then. Nalco has taken on bacteriology monitoring.

6. TRANSPORTATION: Improve transport accessibility and safety by implementing a range of transportation strategies for patients and staff

Please fill in our actions your DHB is taking in this area. Suggestions: ambulances/fleet, active transport, parking, telemedicine, public transport, air travel, travel survey completed? etc.

Activity	Milestones	Comments
Healthy Commute Programme	Began late 2018	Following a successful pilot in the ICU the programme is being slowly rolled out to staff around the Christchurch campus. The preferred delivery mode is individual behaviour change interviews but where this is too difficult a web based service has been

		developed, using the 'Max' HR service portal. Work is underway to ensure that all staff receive a transport intervention at induction.
Clever Commuter Programme	Began early 2016	Programme which was an early predecessor to Healthy Commute Programme. Information based programme, which provided info for staff online as to different commuting options. Information still available, however has been superseded by Healthy Commute Programme which is more interactive in approach.
Staff travel survey completed in 2016	Completed 2016	Has informed the Healthy Commute (Travel Demand Management) Programme.
Yoogo shared electric cars.	Began early 2018	CDHB was a foundation signatory to this central city shared car programme. Due to shared car model across multiple organisations, cars are not kept on site but in centralised locations. There has been limited uptake by staff. The closest carpark (approx. 5 minute walk) is perceived as too far away for staff when compared to access to taxis or onsite petrol fleet cars.
Electric bikes	CPH purchased bikes in 2016	The Public Health Unit brought two electric bikes for staff to use for transport to meetings in the central city. These have given several staff the confidence to purchase their own e-bikes and overall use of active transport by staff has risen.
Measurement of staff air travel		Orbit provide km's travelled by air for staff each year. Off-setting any carbon emissions is not possible via Orbit system and is reliant on individual staff members off-setting their travel directly with the airline. When compared to the ease of obtaining airpoints the task of gaining offsets for flights seems very difficult for staff. Air travel is 18% of our total emissions approx. 32,000 tonnes 17/18 year. We have noticed an increase in long-haul business class flights and are still investigating the potential causes of this.
Switched to SMARTRAK fleet car booking online application	From July 2016	This enables accurate data to be collected around fleet car use. Our petrol usage equates to 572 tonnes CO2 pa.

		Fleet car km's travelled are also measured via log books. CDHB belongs to National Police Fuel contract with BP fuel. This contract does not incorporate any sustainability considerations.
Taxi tender		Taxis are often used for short trips by staff. The proportion of hybrid vehicles in fleet is considered as part of awarding the contract.
Active Transport health promoters continues to support ICECyles Programme		ICECycles (Inner City East Cycles) is a programme which restores bikes and provides them to low income groups. This is programme is supported by the Canterbury DHB via one of Community and Public Health's health promoters.
Participating in Bike to Work Days, promoting Bike Expo		Canterbury DHB actively encourages staff to participate in NZTA Bike to Work Days, Bike challenges and Bike Expos by promoting these through internal communication channels.
Electric driving units used by orderlies and delivery staff on Christchurch Campus.		Electric 'trollies' implemented to transport linen, hospital supplies and hospital waste around campus.
Hospital Shuttle for patients		We have contracted with Christchurch City Council for use of a recently built car-parking building for patient car-parking. A shuttle is then provided by the DHB to bring patients to Christchurch Hospital. This reduces emissions as patients can drive directly to the Lichfield Street carpark (or use Public Transport as the main Bus Exchange is located close to the Park & Ride base) rather than circling the CBD near the hospital searching for parking.
Telehealth		The use of telehealth is increasing within all South Island DHBs. All DHBs are using or developing the use of telehealth for contact with patients by clinicians. Many clinical departments are conducting MDM meetings from within or across DHBs via telehealth. Among the many advantages of this is the reduction in the need for patients, their carers and clinicians to travel to receive or give care, which is both good for the environment and funding. This is especially effective for patients who usually travel long distances between DHBs for care.

		Two important developments include the completion of the National Telehealth Stocktake and the agreement of a South Island Telehealth Strategy. The MoH Telehealth Leadership Group, are conducting a National Stocktake of all telehealth activity and resources relating to telehealth in DHBs, NGOs and Primary Care. The results of this work will be published in late January 2019. All South Island DHBs have contributed to this work. The findings will be compared with a similar stocktake undertaken on 2014. The South Island Strategy has taken a step forward with the formation of a South Island Telehealth Implementation Group. This group's role will be to advise CEOs of the strategic direction for the Telehealth Strategy and lead telehealth development for the South Island DHBs. The group will be made up of representatives from all DHBs and craft groups. The need for staff air-travel to conferences/ education is being reduced at times through use of VDI and Zoom.

7. FOOD: Purchase and serve sustainably grown, healthy food

Please fill in our actions your DHB is taking in this area. Suggestions: reducing meat and dairy, purchase local and sustainable food products, self-grown vegetables, food waste, etc.

Activity	Milestones	Comments
In-house food service		CDHB has an in-house food service. Vegan menus have been added to the staff & retail café menus. Efforts are made to source local produce, however this is constrained by availability and quantity. Hillmorton Hospital Kitchen employs locals to make café food on site which is transported to other Canterbury DHB sites.
Small vegetable garden is kept by long-term patients who reside in supported		MPI food standards and regulations limit ability for Canterbury DHB to grow own produce for patients/ visitors.

accommodation at Hillmorton Hospital.		
Procurement tender considerations- ‘		Bidfood is the primary supplier which is a national company with a local depot thus reducing food miles. The company were not contracted on the basis of this however- they met other tender criteria which takes precedence: quality, yield, price criteria, manufacture rebates and discounts.

8. GREENHOUSE GAS EMISSIONS REPORTING

Does your DHB measure and manage its GHG emissions? Yes Please fill in our actions your DHB is taking in this area. Suggestions: membership in emissions certification programme, actions taken to improve measurement capability

Activity	Milestones	Comments
CEMARS certified base year 2014/15		In 2017/18 we showed a 20% in reduction in overall emissions and the trend for the current year is looking good.

9. BUILDINGS: Support green and healthy regenerative hospital design, construction and refurbishment

Please fill in our actions your DHB is taking in this area. Suggestions: green building certifications, recycled materials, local building materials, sustainable materials, insulation, Volatile Organic Compounds (VOC), water use, natural light, green spaces, etc.

Activity	Milestones	Comments
Canterbury DHB Facility Development Principles	2012	The (recently dissolved) Clinical Board was tasked to develop principles for the design and build of the new hospital. Principle 7 reads- *Systems and processes will be designed, built and operated to support environmental sustainability. This would for example include minimising the energy requirements of buildings, choosing non-toxic building materials, maximising operational energy efficiency, reducing wastage and supporting sustainable transport.*
Replacement of standard lighting with LED		Replacing fluros with LED lighting as need arises. All new buildings have LEDs installed.
Use of smart controls and auto lights		Installed in all new buildings
Scoping and tenders for including sustainable		Solar, recycled hot water, air blades, cycle storage and other measures identified for

design into capital projects		new builds as per recommendations within Green Hospitals approach. However, to date most sustainable specifications have been removed from final design by the Ministry as they are not considered cost-neutral despite considered best practice under Green Hospitals. Sustainable design is always considered and incorporated within facilities development concept plans- but fiscal constraints mean these plans cannot be actioned.
Building fit-outs- tender respondents tends to include “green” aspects		Criteria for contracts based upon: “fit for purpose” and “price”. It is difficult for sustainable fit outs to meet the “price” criteria in comparison to a cheaper option which is also “fit for purpose”.
Building materials		Use of non-toxic, flame retardant materials in new builds.
Energy conservation		Positioning of new builds to maximise solar gains. Patient rooms at Burwood are naturally ventilated and have solar fins on windows.
Water conservation		Sensor taps and toilets with half flush capability installed in new buildings.
Design of clinical spaces		Project “recurring rooms” used to ensure consistent space design across organisation. This reduces need to re-design or renovate spaces and ensures clinicians are familiar with environments no matter their location. This also helps the procurements process as it is already understood as to what equipment etc. is best suited to all environments.
Recycling materials	Started 10 years ago	Carpet tiles are now used which are easily replaced without having to replace large areas. Carpet tiles in buildings which are no longer in use may be uplifted and used in alternative locations.

10. PROCUREMENT: Buy safer and more sustainable products and services

Please fill in our actions your DHB is taking in this area. Suggestions: sustainability criteria incorporated into procurement decision criteria, buy safer and more sustainable products and services, source from socially and environmentally responsible vendors, reduce waste, and consider product life cycle environmental impact etc.

Activity	Milestones	Comments
Sustainability questions are included in tenders		Questions as to where materials are sourced, ensuring fair trade and employment practices which meet human rights standards etc are included in tenders. There remains tensions between free trade agreements and local sourcing of products and services.
Procurement Policy which spans CDHB/WCDHB		CDHB is looking to redevelop its procurement policy in line with recent MBIE guidance when the fourth edition of the government rules of sourcing is available (expected Feb 2019).
A work flow process to assess consumables and procedures	First official meeting Jan 2019 but already signed up to utilise ECRI https://www.ecri.org/	This is intended to streamline purchasing of consumables used across the DHB. An example would be medicine pots – ranging from a 2 cent compostable pot to a 40 cent plastic pot. An environmental component will be built into the assessment criteria.

11. CLIMATE CHANGE ADAPTATION

Please fill in our actions your DHB is taking in this area.

Activity	Milestones	Comments
Climate change adaptation- designing for flood/ tsunami		New buildings (outpatients and acute services building) were as part of the consent process assessed for flood/ tsunami risk which resulted in lifting of the floors to comply with flood mitigation requirements.

12. OTHER

Recommendations which would support DHBs to mitigate and adapt against climate change:
1. The Ministry of Health needs to lead with a consistent understanding and enabling of environmental sustainability requirements and a 'united voice' (eg. between MoH policy makers and MoH capital works contract holders). This could encompass new facilities and building programmes, national guidance on appropriate cleaning materials and methods, and support for recycling facilities ranging from old used equipment to disposable items to management of health-care facility waste in all its forms (cytotoxics, coffee cups, surgical waste etc) This 'united voice' should extend to PHARMAC which currently has disincentives to recycling some products (cheaper when brought in bulk).
2. The co-benefits for the health status of the communities we serve are factored into environmental decisions e.g. support for active travel of staff will have both health and environmental benefits.
3. Use of Green Building Tools for all health-care facilities along with adequate funding to achieve such standards and evaluation packages to ensure the required reduction in environmental harm is being achieved. https://www.nzgbc.org.nz/greenstar
4. Design Labs which have been developed at Canterbury DHB are mandated across DHBs to ensure as much as possible that environmental 'innovations' will achieve their stated goals in their first iteration.
5. MoH should host and fund DHB sustainability forums (e.g. energy use and design forums, funding of "study trips" of new builds across DHBs, shared best practice and success case studies).
6. Improved VDI- MoH and DHBs all on same system and use promoted in preference for staff travel for short meetings.
7. Make off-setting of carbon emissions for staff easier (e.g. work with MBIE on Orbit contract) actively lead by example and support video-conferencing or other solutions that are less carbon intensive than flying.
8. Advocate for and contract for the development of appropriate facilities to dispose of recyclable and/or compostable material. This is a national issue and other government agencies may appreciate involvement in this area. This would include nappies.
9. Central government policy or legislation around use of packaging to reduce unnecessary packaging.
10. Access to glass refund programmes.
11. Financial assistance to purchase Electric vehicles as appropriate and install and pay running costs of charging stations.
12. Support uptake of innovations to reduce plastic consumption in DHB activities. One example would be compostable water bottles www.forthebettergood.com

Canterbury
District Health Board
Te Poari Hauora o Waitaha

Terms of Reference
Transalpine Environmental Sustainability Governance Group
February 2019

Background	Health services have a substantial environmental impact. In recent times health professionals and health services have been seeking to reduce that effect. Currently the most rapid ecosystem change is global climate change. Estimates suggest that approximately 10% of New Zealand's carbon emissions are generated from health system activities. Other ecological processes, such as reducing biodiversity, changes in disease vectors and extreme weather events, are all linked to climate change and are interweaving with societal dynamics in ways that can amplify risks to health. DHB's must meet a number of legislative requirements and contribute to international agreements that New Zealand is party to where those agreements link health, wellbeing and environmental outcomes. The Minister of Health's 'letter of expectations' to Canterbury and the West Coast DHB 2018/19[1] and 2019/20[2] is clear that we need to 'implement a strong response to climate change' and contribute to the government's 'priority outcome of environmental sustainability'. The World Health Organisation has described an environmentally sustainable health system as one which '*improves, maintains or restores health, while minimizing negative impacts on the environment and leveraging opportunities to restore and improve it, to the benefit of the health and well-being of current and future generations*' [3] The Canterbury and West Coast DHB Executive Management Team (EMT) has recognised the contribution that the DHBs can make in adopting a sustainable development approach to healthcare. In 2018 they formally endorsed implementation of the four recommendations of the *'Canterbury Health System: A health promoting district health board'* paper (at end of this document).

[1] https://nsfl.health.govt.nz/dhb-planning-package/201819-planning-package/supplementary-information-201819-planning-guidelines-0
[2] https://nsfl.health.govt.nz/system/files/documents/pages/generic_loe_2019-20.pdf
[3] *Environmentally sustainable health systems: a strategic document WHO Regional Office for Europe*. WHO (2017) [34, p. IV].

Canterbury
District Health Board
Te Poari Hauora ō Waitaha

Purpose	The TESGG will provide leadership, advice and oversight across the Canterbury and West Coast DHBs on matters pertaining to environmental sustainability. It will champion the adoption of a sustainable development approach across Canterbury and West Coast DHB services and processes.
Scope	The TESGG is an internal governance group which will look primarily at activities within the Canterbury and West Coast DHBs. Alignment of interactions with external organisations to achieve the aims of a sustainable development approach as described here may occur under the oversight of the TESGG. Natural links may be established with the Canterbury Clinical Network via updates as information provision only. The TESGG will build strong links to the Community & Public Health Environmental Sustainability Work Programme under which progress of this group will be reported. Existing links are to be maintained with the South Island Alliance Sustainability Working Group and the Sustainable Health Sector National Network where cross DHB environmental sustainability initiatives can be shared.
Objectives	1. To lead and advise on the adoption of a sustainable development approach across the Canterbury and West Coast DHBs. 2. To oversee and identify appropriate resource across the Canterbury and West Coast DHBs to carry out the recommendations of the 'Canterbury Health System: A health promoting health board' paper.
Guiding Principles	• Taking a **Sustainable Development Approach** to health care and health services which meets the needs of the present without compromising the ability of future generations to meet their own needs. • Taking a **health promoting health system approach** which optimises the mix of health promotion, disease prevention, treatment and rehabilitative care to achieve equitable health outcomes. It recognises its own potential for causing harm and seeks to minimise and mitigate this harm. • Taking a **whole of system approach** which recognises that all parts at all levels of the Canterbury and West Coast DHBs

	have a role in contributing towards environmental sustainability and achieving a health promoting health board. • Ensuring the **best use of resources** whilst not inhibiting innovation in an emerging and rapidly changing sector. • Ensuring **fiscally responsible approaches** underpinned by cost-benefit analysis of co-benefits and financial savings • Support of the principles of the **Treaty of Waitangi** and in acknowledgement of the tribal philosophy of Ngāi Tahu which is central to this work: *Mō tātou, ā, mō kā uri, ā muri ake nei – for us and our children after us.*
Accountability and Reporting	To the CEO and Executive Management Team (EMT) of the Canterbury and West Coast DHBs. Some activities under this group may also be reported to the Ministry of Health as per routine annual reporting cycles.
Membership	*TBA*
Chairperson	The chair will be a Public Health Specialist from Community and Public Health. Changes in the chairperson role will be agreed by the group and may be appointed by EMT.
EMT sponsor	The EMT sponsor is appointed by the CEO of the Canterbury and West Coast DHBs.
Quorum	Half the members, plus the Chair.
Frequency of Meetings	A minimum of eight (8) meetings a year at 6 weekly frequency. Meetings will be timetabled for the entire year by the TESGG administration support. Meeting location will rotate between members' workplaces.
Agenda	Agendas will be circulated no less than five days prior to the meeting, including any material relevant to the agenda.
Minutes	Minutes will be drafted by the TESGG administration support and circulated to group members within seven days of the meeting. Minutes remain confidential until agreed by the quorum.
Review	This Terms of Reference will be reviewed annually and may be altered intermittently to meet the needs of the Canterbury and West Coast DHBs.

Canterbury
District Health Board
Te Poari Hauora ō Waitaha

'Canterbury Health System: A health promoting district health board'
EMT endorsed recommendations as at March 2018

1. Endorse the set-up of a Sustainability Governance Group to provide direction and guidance on the:
    - Definition of "Environmental Sustainability"
    - Development of a CDHB Environmental Sustainability Position Statement
    - Development of a CDHB Environmental Sustainability operational Policy. The Policy will provide guidance on the implementation of a sustainable development approach for logistics, operations, clinical and strategic staff in their daily work.
    - Development of a 5 year Implementation strategy, to enable the Sustainability Policy to be actioned in every aspect of our
        i. Operations,
        ii. Teaching and learning
        iii. Investment and planning initiatives.

    The Sustainability Governance Group will:
    - Review current Environmental Sustainability Initiatives
    - validate alignment of current initiatives with the position statement and operational policy
    - provide a recommendation on first order priorities of the Implementation strategy

2. Notes that the development and implementation of each of the initiatives is to be submitted for approval, in line with CDHB delegation policy and following the CDHB business case process

3. Notes and endorses the continuation of the current list of Sustainability Initiatives:

    - the Enviro-Mark programme, the 'Certified Emissions Measurement and Reduction Scheme' (CEMARS)
    - the Enviro-Mark programme, 'Energy Mark'

4. CDHB support the current formal travel demand management (TDM) programme developed by the Greater Christchurch Partnership at its sites. This TDM programme will be aligned with People and Capability's staff wellbeing programme and will focus on the staff commute. Further future work will be developed via the sustainability strategy in relation to work-related flying, and transport related to CDHB activities such as waste removal, laundry, catering, and boiler function.

Programme Plan 2018-19	
Title: Environmental Sustainability	Date approved by DLT: Date updated:
Purpose: Increasing Environmental Sustainability Practices	

Manager: Tanya McCall
Co-ordinator: Bronwyn Larsen
Public health specialists: Anna Stevenson (Lead)**;** Ramon Pink
Administration support: Tracy Abbot

Lead team: Policy Team
Supporting teams: All staff have a role to play

Contributing staff members:

1. Anna Stevenson
2. Bronwyn Larsen
3. Tanya McCall
4. Kirsty Peel
5. Matt Willoughby
6. Kirsty McLeod
7. Judy Williamson
8. Denise Tully
9. Alizon Paterson
10. Angela Sheat
11. Bruce Waddleton
12. Meg Christie
13. David Brinsdon
14. Helen Barbour
15. Ann Vanschevensteen
16. Maree Thomas

Key relationships/stakeholders (noting main purpose/focus of relationships, and a lead CPH person for each)

Stakeholder	Purpose	CPH lead
1. CDHB Sustainability governance group	To lead environmental sustainability work across CDHB	Anna, Bronwyn
2. Ministry of Health	Meeting objectives under annual plan, contributing to environmental health action plan	Anna, Tanya
3. CPH Zero Heroes group	Linking work plan of group to programme plan	Tanya
4. CDHB Energy Manager(Tim Emson)	Supporting CEMARs and Energy-Mark work	Anna
5. CDHB Facilities Management	Encouraging environmental sustainability initiatives during design and building of capital projects	Bronwyn, Kirsty
6. CDHB Support services	Encourage environmental sustainability in decisions related to transport and operations.	Bronwyn
7. ECan	Build relationships and input via submissions and JWP around work which includes environmental sustainability components	Bronwyn, Kirsty, Matt
8. Territorial Local Authorities	Build relationships, support environmental sustainability initiatives via upstream working	Bronwyn, Kirsty, Chantal, Alizon, Matt, Judy, Denise, Bruce, Angela (as appropriate)

		opportunities, submissions and JWP when appropriate.	
	9. Greater Christchurch Partnership	Build relationships, support environmental sustainability initiatives via upstream working opportunities, joint working.	Anna, Sandy and Bronwyn
	10. Sustainable Health Sector National Network	Build relationships, share environmental sustainability initiatives across regions and gain support for CDHB sustainability work.	Anna and Bronwyn
	11. South Island Alliance Public health Environmental Sustainability Working Group	Build relationships and carry out joint work with other South Island PHUs around environmental sustainability initiatives.	Anna and Bronwyn
	12. Sustainable Health 4 Canterbury	Build relationships with environmental sustainability champions across CDHB once re-convened.	Anna
	13. Ora Taio – NZ Climate and Health Council	Maintain relationships and support work.	Anna

Key links to other programmes

1. Healthy Physical Environments – Much of their work relates to the quality of our environment
2. Healthy Public Policy
3. Communicable Disease (link between Climate Change and vector control/surveillance)
4. Supporting Community Action
5. Evidence, Research and Evaluation

Our key priorities for 2018/19 are:

1. To develop a Sustainability Governance Committee to oversee recommendations from the Health Promoting Health Systems paper endorsed by EMT and Clinical Board in 2017.
2. To maintain and build awareness and action relating to current links and potential opportunities for work which incorporates environmental sustainability across CPH.
3. To maintain links with national and local environmental sustainability networks and groups.

Rationale:

Legislative rationale:

All DHBs are subject to the requirements of the New Zealand Public Health and Disability Act 2000. Under section 22 (Objectives of DHBs), a DHB needs to:

- 22(a) improve, promote, and protect the health of people and communities
- 22(j) exhibit a sense of environmental responsibility by having regard to the environmental implications of its operations.

In addition, under section 23 (Functions of DHBs), a DHB needs to:

- 23(1)(g) regularly investigate, assess, and monitor the health status of its resident population, any factors that the DHB believes may adversely affect the health status of that population, and the needs of that population for services
- 23(1)(h) promote the reduction of adverse social and environmental effects on the health of people and communities.

Political/Wider systems rationale:

A 'Sustainable development' approach was defined and described in the 1987 Brundtland Report,[i] as *'meeting the needs of the present without compromising the ability of future generations to meet their own needs'*.

Statistics New Zealand have portrayed our country's progress towards a sustainable development approach by attaching indicators to the generally agreed target dimensions – social cohesion, environmental responsibility and economic efficiency (Figure 1)[ii].

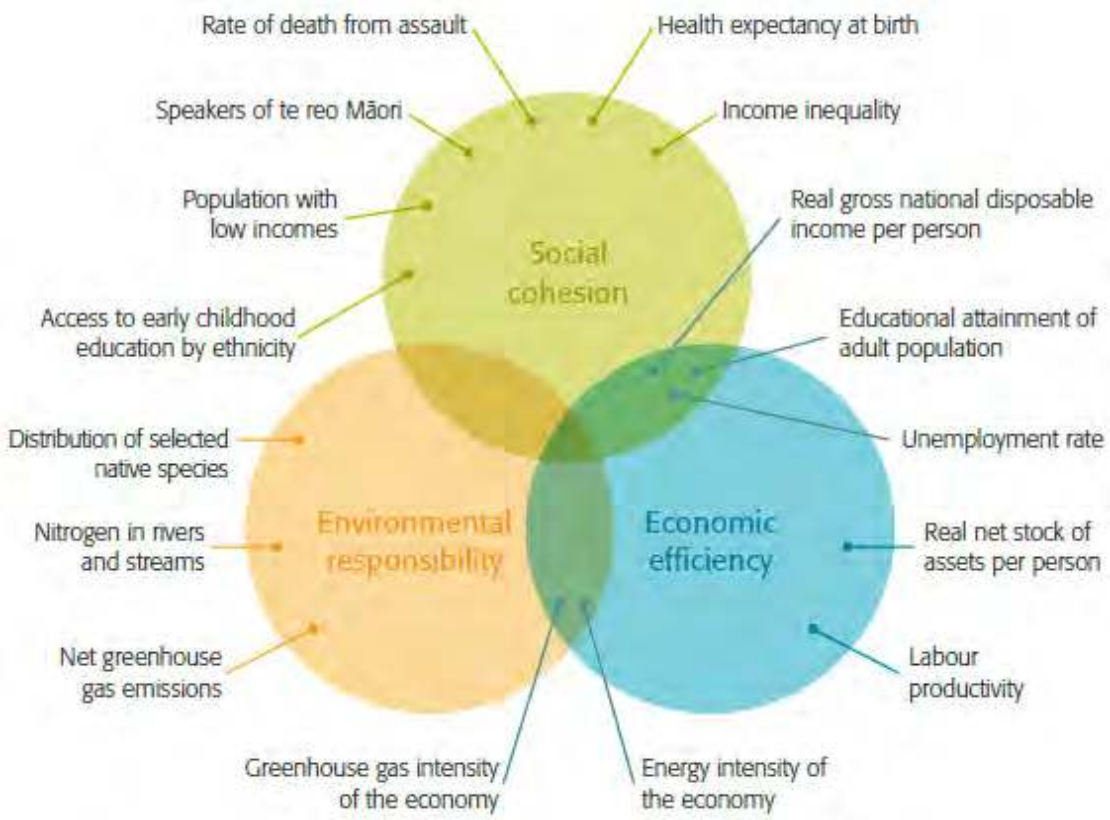


Figure 1. Relationship between target dimensions and key indicators[ii,1]

More recently Treasury New Zealand have developed and piloted a 'Living Standards' framework – this work is being updated in 2018.

The current government has released a policy programme which states: 'The Green Party supports a transformative Government which implements the United Nations'17 Sustainable Development Goals. In this parliamentary term, the Green Party has a number of priorities to progress the implementation

[1] Statistics New Zealand now (2018) reports on the following indicators: adult educational attainment, disposable income, unemployment rate, assets and infrastructure, labour productivity, energy intensity, greenhouse gas intensity, access to early childhood education, health expectancy, income inequality, physical safety, population with low incomes, speakers of te reo Māori, greenhouse gas emissions, river condition, distribution of selected native species (http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-progress-indicators/Home.aspx).

of the Sustainable Development Goals. The Labour-led Government shares and will support these priorities.' They include the following goals: A sustainable economy, Healthy environments and a fair society.
See https://www.greens.org.nz/sites/default/files/NZLP%20%26%20GP%20C%26S%20Agreement%20FINAL.PDF for the list of priorities under these headings.

The Ministry of Health is currently writing an Environmental health Action Plan (EHAP) to support NZ's commitments to WHO's Western Pacific Environmental Health Plan and our signatory commitments to the Paris accords and the Sustainable Development Goals.

In the 2018/19 annual plan DHBs are required to undertake an audit of work relevant to environmental sustainability.

Canterbury DHB rationale:
A paper describing what a health promoting health system might look like with specific reference to Environmental sustainability has been endorsed by EMT (October 2017) and the Clinical Board (December 2017). A number of recommendations in that paper require more work before they can be operationalised.

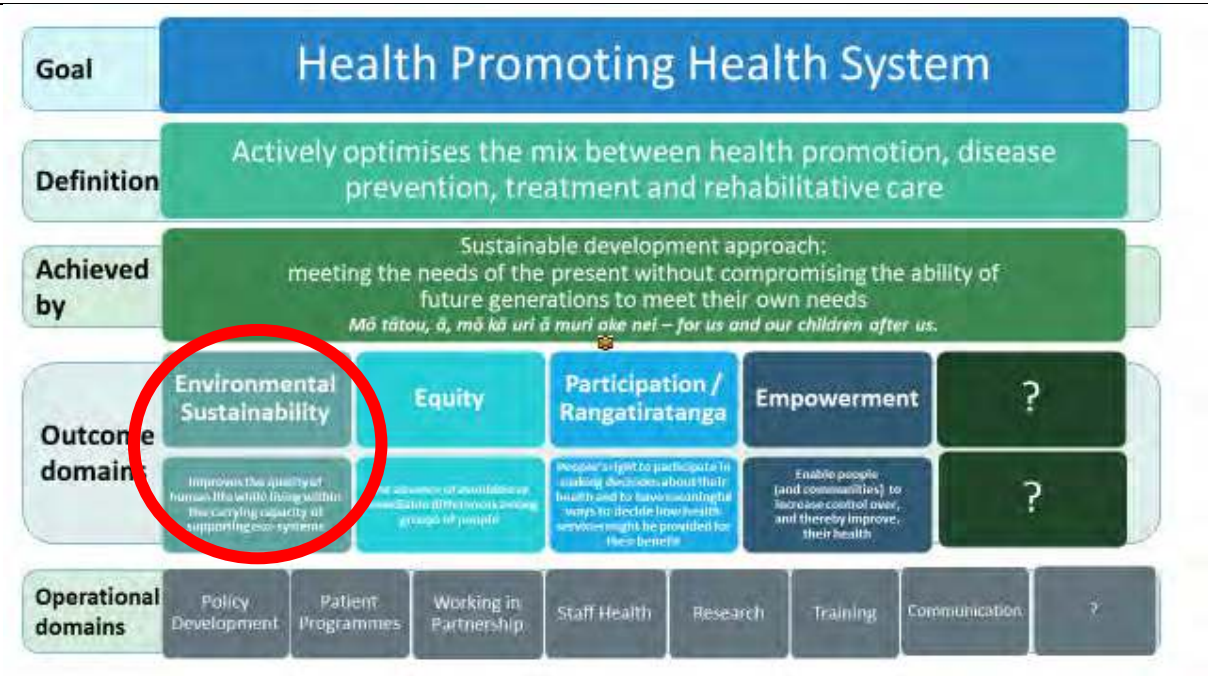


Figure 2. Overview of a health promoting health system model

Environmental Sustainability refers in this instance to actions that 'Improve the quality of human life while living within the carrying capacity of supporting eco-systems.'

The CDHB has been awarded Energy-mark Silver certification which reflects the outstanding work of the Energy Management team in this area.

Our CEMARs profile demonstrates a 20% reduction in carbon emissions over the last three years which is a fantastic result. The profile enables us to identify areas we can do considerably better in reducing the harm our system does to the environment. This includes travel and waste.

Waiora, healthy environments, is a key outcome of the current Canterbury Māori Health Framework[iii] (Figure 3). The concept of waiora represents the importance of the environment – from housing to the wider effects of climate change – and its impact on the health and wellbeing of individuals, whānau and communities. Achieving waiora will mean that the environment in which Māori, and all New Zealanders, live, work and play is safe.

Waiora is an essential element of pae ora, healthy futures. As described in He Korowai Oranga,[iv] pae ora encompasses three interconnected and mutually reinforcing elements:

- Mauri ora – healthy individuals
- Whānau ora – healthy families
- Waiora – healthy environments.

Pae ora urges everyone in the health and disability sector to foster new ways of delivering services, thinking beyond confined definitions of health and accepted delineations. As outlined in the Canterbury Māori Health Action Plan 2016–17,[v] CDHB continues to explore ways to strengthen its role in supporting the aspiration of pae ora for Māori.

Kaitiakitanga reflects the concept of environmental guardianship. A key value for Ngāi Tahu, kaitiakitanga encompasses protecting the people, environment, knowledge, culture, language and resources for future generations.

Similar values are reflected in the CDHB Vision Tā Matou Matakite *'to improve, promote, and protect the health and wellbeing of the Canterbury community. Ki te whakapakari, whakamanawa me te tiaki i te hauora mō te oranga pai o ngā tāngata o te rohe o Waitaha*.'

Figure 3. Canterbury Māori Health Framework 2016–17[iii]

The value is also acknowledged in legislation: section 2 of the Resource Management Act 1991 states that people managing resources under the Act must take kaitiakitanga into account.

One aspect of kaitiakitanga is mahinga kai, which is a management concept, a way of thinking about simultaneously protecting and using resources. Meaning to 'mahi ngā kai' (work the food), mahinga kai provides an opportunity to adopt a holistic organisational framework to guide outcomes that are woven together through its values.

Ngāi Tahu interprets mahinga kai in its broadest sense to include food for body, mind and spirit. The concept of mahinga kai exemplifies the complex, interconnected cultural beliefs and practices of Ngāi Tahu in relation to the environment.

This programme is intended to deliver on one of the core components of a Health Promoting Health System – Environmental sustainability.

Hauora Māori:

Environmental health is an important component of He Korowai Oranga, and of Ngāi Tahu's kaupapa. Improving our status as leaders in Kaitiakitanga is important.

Toitū te marae a Tāne-Mahuta, Toitū te marae a Tangaroa, Toitū te tangata.

If the land is well and the sea is well the people will thrive.

See box above for more detail.

Quality improvement:

CPH has a quality improvement strategy. This year this programme will concentrate on particular aspects of the quality strategy: clear robust planning and reporting, and effective communication to staff and communities.

Improving environmental health is critical to hauora. The GM Māori Heath will be invited to be on the governance group. Appropriate Tikanga will be agreed with the governance group on formation.

Evaluation:

Evaluation will comprise a review of progress towards completion of intended actions after a year and the impact of those actions towards achieving the kaupapa.

Communications: Existing communications tools (SIPHAN etc) will be utilised and a communications plan developed
Risks and mitigation – The primary risks to this programme are largely outside of our control. They include, the strong focus of our DHB on achieving financial security as soon as possible, the embedded culture of government bureaucracies which does not currently include environmental sustainability concerns and the cultural inertia associated with system change. – Our mitigation strategies include building strong networks within and external to the DHB, ensuring we are well aligned with the current government's priority action areas, focusing on action within Community and Public Health and developing an engaging communications strategy.
Reporting: This programme will report progress and successes against its specified priorities in six-monthly reports to the Ministry and our DHBs.

Outcomes	2018-19 Activities	Responsibilities
Reduced environmental impact within and outside our health system *Priority 1: Develop a Sustainability Governance Committee to oversee recommendations from the Health Promoting Health Systems paper endorsed by EMT and Clinical Board in 2017*	Work with previous members of Sustainability advisory group to convene a Sustainability Governance Committee.	Anna
	Implement recommendations from Health Promoting Health Systems paper	Anna
	Chair the Sustainability Governance Committee and manage the administration requirements	Anna and Bronwyn
	Support the Canterbury DHB Energy Manager with CEMARs and Energy-mark work	Anna

	Re-build and nurture Sustainable Health 4 Canterbury staff advocacy group	Anna and Bronwyn
	Gain wider CDHB support and funding for CEMARs	Anna and Tim Emson
	Support Energy Manager to maintain Energy-Mark silver certification	Anna and Tim Emson
	Develop a newsletter for CDHB staff focusing on environmental sustainability.	Anna (meeting chair and content lead) Bronwyn
	Run one event in the Calendar year for interested staff	Anna (meeting chair and content lead) Bronwyn
	Present at Grand Round on CDHB and Environmental sustainability	Anna
Reduced environmental impact within and outside our health system *Priority 2: Maintain and build awareness and action relating to current links and potential opportunities for work which incorporates environmental sustainability across CPH.*	Maintain CPH Zero Heroes group, develop a work plan	Tanya, Anna and Bronwyn
	Support water quality work and strengthen communication of linkages between this work and environmental sustainability within CPH and with partners.	Denise, Judy, Kirsty
	Strengthen links between air quality work and environmental sustainability within CPH and external partners.	Emma, Matt
	Explore environmental sustainability being incorporated as a component of staff wellbeing	Ann V
	Develop environmental sustainability resources for use during CPH induction	Zero Heroes group

	Strengthen link between promotion of physical activity, commuting choice and environmental sustainability	Meg, Bronwyn
	Recommend plan changes which support environmental sustainability and improved health outcomes in submission work.	Bronwyn and Kirsty
Reduced environmental impact within and outside our health system *Priority 3: Maintain links with national and local environmental sustainability networks and groups.*	Maintain links with Ora Taio – NZ Climate and Health Council	Anna
	Maintain active membership of Sustainable Health Sector National Network	Anna and Bronwyn
	Actively participate and support the work of the South Island Alliance Public health Environmental Sustainability Working Group	Anna and Bronwyn

[i] Brundtland, G.H. (1987). Our common future - call for action. *Environmental Conservation*, 14(4): 291-294.
[ii] Statistics New Zealand (2011). *Key findings on New Zealand's progress using a sustainable development approach: 2010*. Wellington: Statistics New Zealand. Accessed August 2017 from: http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/Measuring-NZ-progress-sustainable-dev-%20approach/key-findings-2010/further-discussion-sustainable-development.aspx
[iii] Canterbury District Health Board. (2016). *Māori Health Plan 2016-17*. Christchurch: Canterbury District Health Board.
[iv] Ministry of Health. (2014). *The Guide to He Korowai Oranga – Māori Health Strategy*. Wellington: Ministry of Health.
[v] Canterbury District Health Board. (2016). *Māori Health Plan 2016-17*. Christchurch: Canterbury District Health Board.

Planetary Health

Implications of Climate Change for you and me, the health sector and what we need to do

Regional Climate Change Working Group
Dr Anna Stevenson, Public Health Physician, Canterbury District Health Board
February 27 2019

Melbourne November 2016

The Ultimate Determinant of Health

Planetary Health

Recent environment-human health events of note

- The contamination of Darfield's drinking water supplies in 2012
- The '1 in 50 years' floods in Christchurch in 2014
- The contamination of Havelock North's drinking water supplies in late 2016
- The Port Hills Fires February 2017
- The winter storms of 2017 affecting Dunedin, Oamaru, Timaru, Christchurch and to a lesser extent the rest of the country.

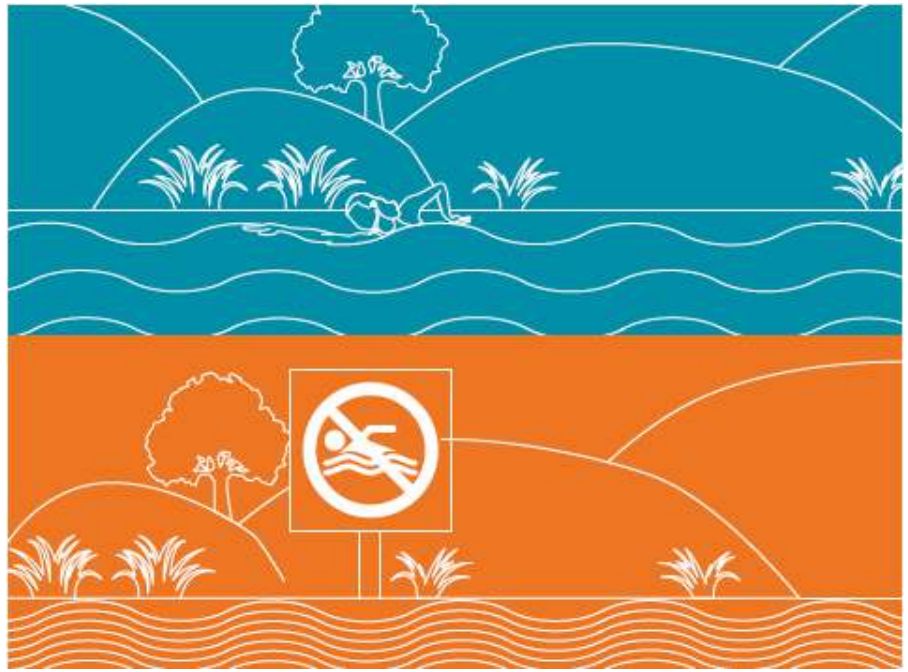
Health impacts of Climate Change in NZ

- Direct impacts
- Biological systems
- Social systems
- Infrastructure systems

Direct impacts

- Heat
- Sea level rise
- Storms
- Heavy rain & flooding
- Drought
- Infrastructure damage

Biological system changes



- Waterborne illness
- Foodborne illness
- Vector-borne disease
- Allergies
- Loss of species

Social system changes

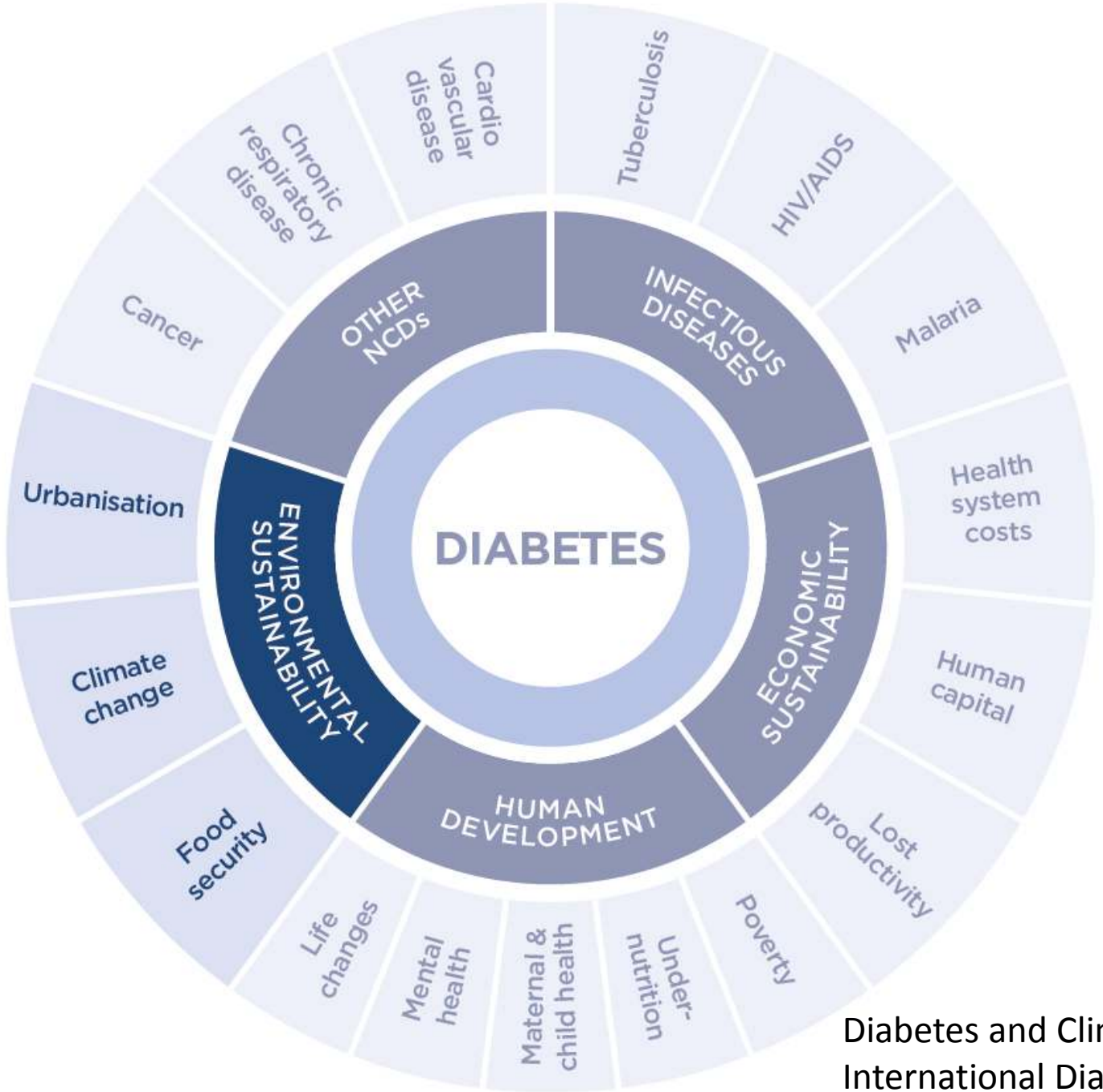
- Service withdrawal
- Unplanned retreat
- Displacement/migration
- Housing pressures
- Financial recession
- Threats to governance

Impacts on the health sector

- Infrastructure damage
- Increased presentations to primary care and hospitals through direct and indirect effects:
  - Direct injuries from extreme events
  - Hospital and emergency room admissions increase at temperatures above 18–20°C for those with mental health or psychiatric conditions
  - Asthma and COPD are affected by outdoor air quality and pollen
  - Algal blooms; food- and water-borne diseases; vector-borne diseases

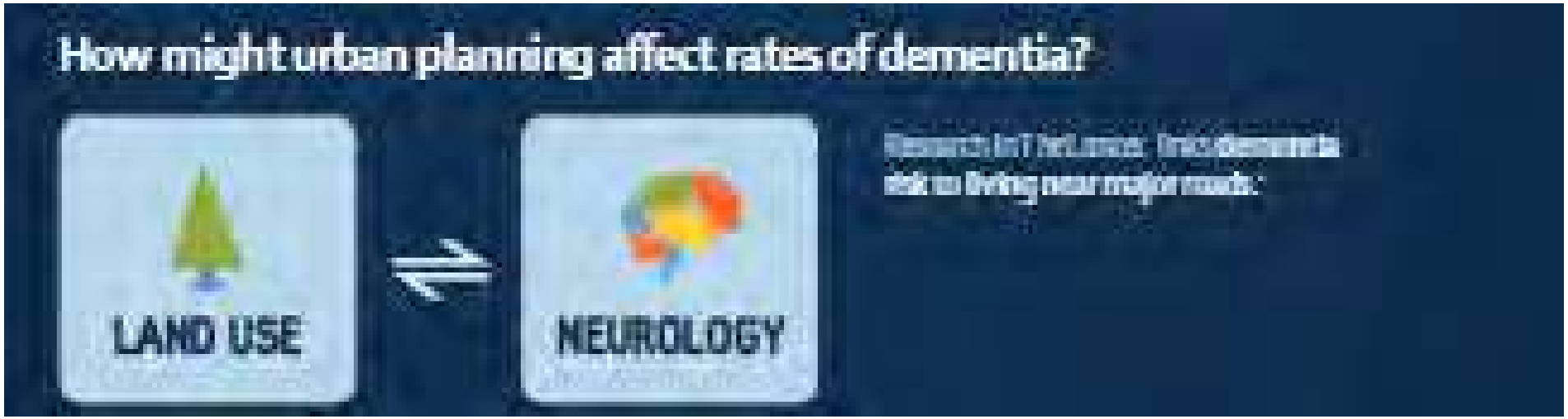
Impacts on the health sector (cont.)

- Disruption to healthcare access
- Supply chains impacted (e.g. pharmaceutical, medical, food)
- Staff impacted personally, limiting their response



Diabetes and Climate Change Report
International Diabetes Federation June 2012


SHELTER
DISEASE
COMMUNITY
WELL-BEING
TEMPERATURE
WATER
AIR
FOOD
$35.69
$35.00


How might urban planning affect rates of dementia?
LAND USE
NEUROLOGY


How does our daily commute affect our health?
TRANSPORT
RESPIRATORY MEDICINE


A decline in which animal population is linked to vitamin A deficiencies in humans?
ZOOLOGY
HUMAN HEALTH


Which mineral deficiency in humans is related to CO_2 emissions?
AIR
NUTRITION
Read a study in The Lancet Global Health on how atmospheric CO_2 reduces zinc in plants and the humans who eat them.

- **SEVENTY-FIRST WORLD HEALTH ASSEMBLY 2018 A71/10**

- **Health, environment and climate change**
- **Report by the Director-General**

Known avoidable environmental risk factors cause at least 13 million deaths every year and about one quarter of the global burden of disease. Air pollution alone causes about 6.5 million deaths a year, or one in eight of all deaths, placing it among the top global risks to health.

To be considered May 2019 at World Health Assembly

Approaches that focus on treatment of individual diseases rather than the improvements of determinants of health will be insufficient to tackle modern environmental health challenges. Single determinant approaches are unlikely to achieve expected improvements in health equity and well-being, given the complex interaction of factors at the level of borders between countries, society and the individual.

P3 para 11

New Zealand Public Health and Disability Act 2000

-22(j) exhibit a sense of environmental responsibility by having regard to the environmental implications of its operations.

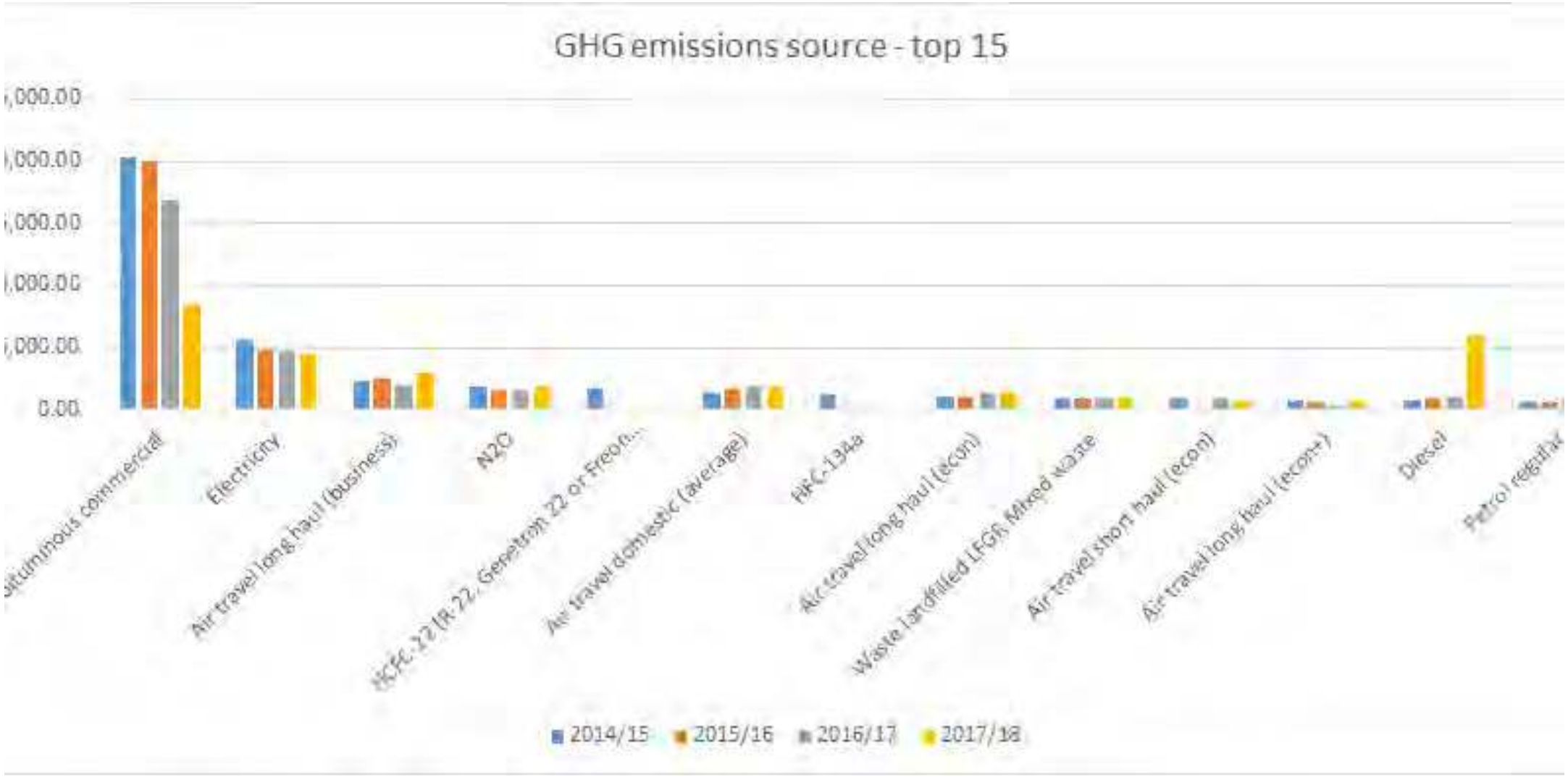
In addition, under section 23 (Functions of DHBs), a DHB needs to:

-23(1)(h) promote the reduction of adverse social and environmental effects on the health of people and communities.

Health sector contribution

- International studies suggest that a country's healthcare sector contributes an estimated 3% to 8% of total greenhouse gas emissions
- Hospitals use about twice as much total energy per square foot as traditional office space.
- Contributors to these emissions includes: energy use; procurement and use of resources (including pharmaceuticals); waste; and transport.

CDHB GHG footprint




TOP CARBON REDUCTION
By CEMARS® & carboNZero^CertTM certified organisations
%
Percent absolute reduction of mandatory emissions since base year of certification (tCO2e)
Kapiti Coast District Council
Curious Film
Hall McMaster & Associates Limited
Auckland War Memorial Museum
Brother International (NZ) Limited
AVS Air Systems
University of Canterbury
Manaaki Whenua - Landcare Research
Premier Hygiene Limited
Insulpro Manufacturing Limited
Energy Efficiency and Conservation Authority (EECA)
SOAR Print
3R Group Limited
Auckland International Airport Limited
Counties Manukau Health
Auckland District Health Board
Canterbury District Health Board
Lamb & Hayward Funeral Directors
Waitaki Biosciences (a division of Pharmazen Limited)
KONE Elevators Pty Ltd (New Zealand)
-80% -70% -60% -50% -40% -30% -20% -10% 0%
46,483
tCO2e reduced
33% average reduction
Combined footprint of 119,590 tCO2e
ENVIRO-MARK SOLUTIONS
All reductions certified as of April 2018

UK Clinicians sound alarm and beg for help

Climate change is a very real threat to health in the UK through both the physical and mental harm resulting from an increase in frequency and severity of extreme weather events, such as heatwaves. But acting on climate change presents a profound opportunity to improve health as many of the drivers of climate change – fossil fuels, over-consumption, and poorly designed cities – also cause ill health themselves, through air pollution, unhealthy diets, and physical inactivity. **We therefore also call on the government to enshrine a principle of maximising the health benefits of reaching net zero,** through, for example, increases in active transport, healthier diets, and reductions in air pollution.

“To forestall the planetary catastrophe that [David] Attenborough and the IPCC predict, the UK must take the lead, set an international example, and become carbon net zero by 2030,” the letter says. “We therefore call on the UK government and parliament to legislate for the UK to be carbon net zero by 2030 and to work with institutions across the country to ensure that this goal is achieved.”

“We simply don’t have time to procrastinate over this. Policies need to be introduced now that will reduce the use of fossil fuels, clean up our air, and support active and healthy lifestyle choices, which in turn will protect our societies and our planet.”

The signatories argue that the government response needed to tackle climate change is akin to the Allied war efforts that defeated Nazi Germany in 1945.

“The existential crisis provoked by climate change requires a similar mobilisation,” the signatories write. “In the past, this action was for war; now, it must be to prevent the violence of climate breakdown.”

What is the Ministry of Health working on?

- Environmental Health Action Plan
  - Linked to Sustainable Development Goals (SDGs)
- Active transport work programme
  - Including input to *Government Policy Statement of Transport*
- Urban sustainability and air quality
- Climate Change Environmental Health Indicators

What is the Ministry of Health working on?

- ESR:
  - *Climate Change and Environmental Health* report
  - Further plans for work on adaptation in the health sector
- Interagency work encouraging a health lens
  - Interagency work on Sustainable Development Goals (SDGs)
  - Zero Carbon Bill (MfE)
  - Climate change adaptation technical working group (MfE)
  - Just Transitions Unit (MBIE)
  - Living Standards Framework (Stats and Treasury)

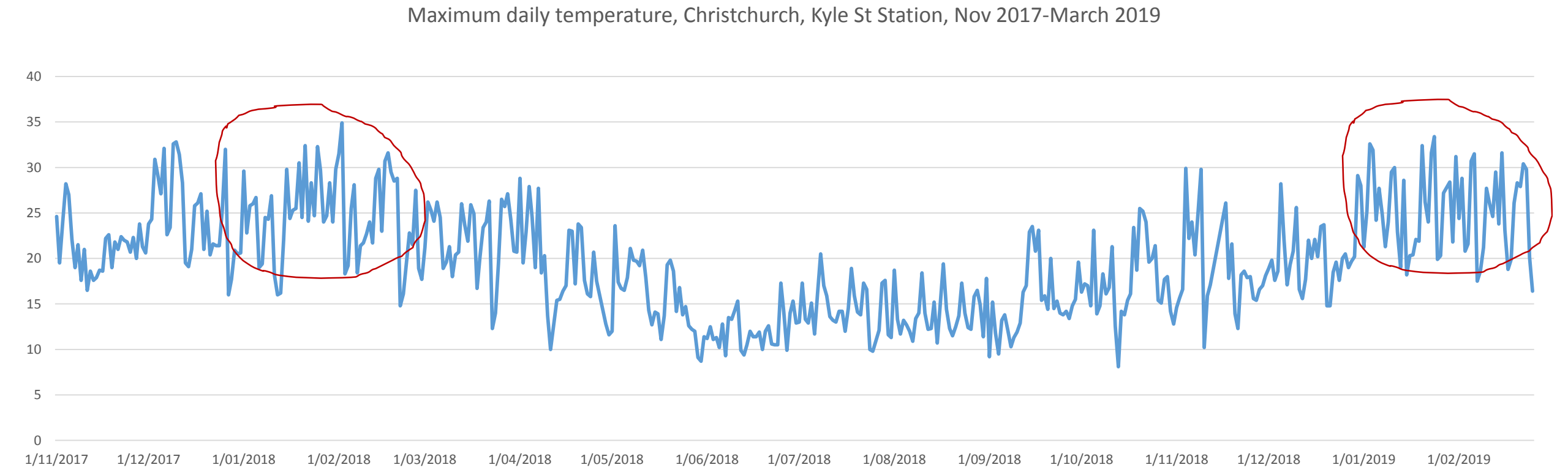
Heat Health Plan Guidelines

Record heatwave pushes hospitals into emergency measures

How Record Heat Wreaked Havoc on Four Continents

In India, Summer Heat May Soon Be Literally Unbearable

'Furnace Friday:' Ill-Equipped for Heat, Britain Has a Meltdown


Maximum daily temperature, Christchurch, Kyle St Station, Nov 2017-March 2019
40
35
30
25
20
15
10
5
0
1/11/2017
1/12/2017
1/01/2018
1/02/2018
1/03/2018
1/04/2018
1/05/2018
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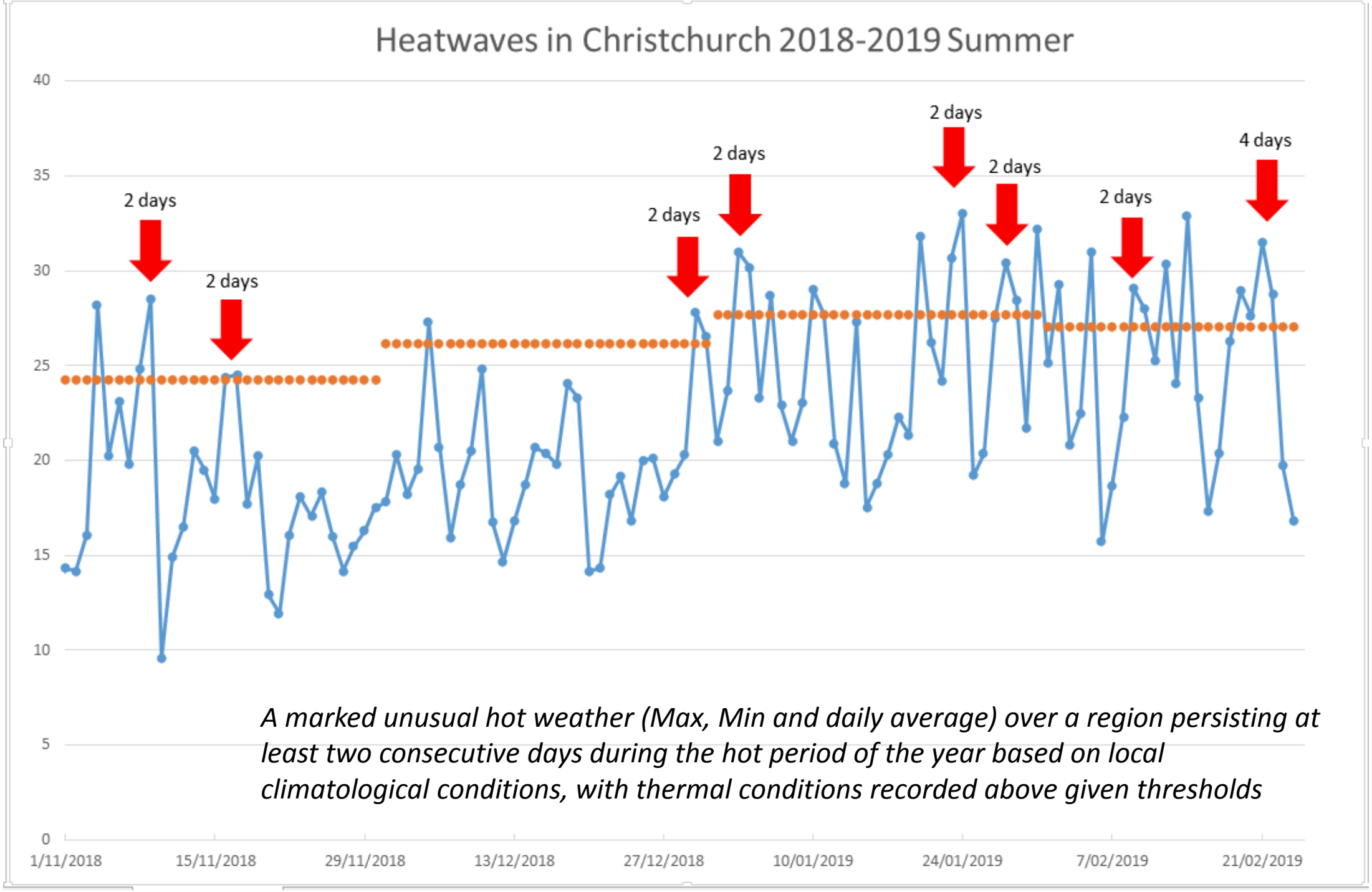


A marked unusual hot weather (Max, Min and daily average) over a region persisting at least two consecutive days during the hot period of the year based on local climatological conditions, with thermal conditions recorded above given thresholds

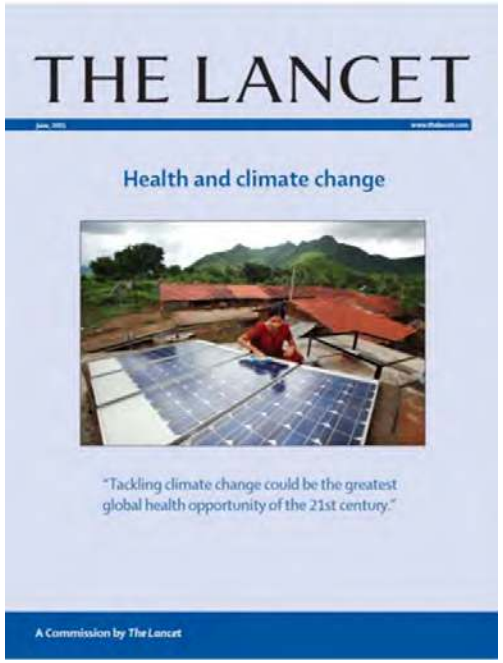
Grant Robertson 21 Feb 2019 – achieving wellbeing

- a whole of government approach. This is about stepping out of the silos of agencies and working together to assess, develop and implement the plans to improve well-being.
- intergenerational outcomes. We have to focus on meeting the needs of present generations at the same time as thinking about the long-term impacts on future generations.
- we need to move beyond narrow measures of success.

Working together

- Arbovirus control
- Emergency Management (in particular capacity building on the heat plan)
- Recreational water – quantity and quality improvements
- Potable water - quantity and quality improvements

The Opportunity



"Tackling climate change could be the greatest global health opportunity of the 21st century"

The Lancet, 2015

Further reading

- *Human Health Impacts of Climate Change for New Zealand* (Royal Society)
  - Available at https://royalsociety.org.nz/what-we-do/our-expert-advice/all-expert-advice-papers/climate-change-and-health/
- *Climate Change and Environmental Health* (ESR)
  - Available at https://www.esr.cri.nz/our-services/consultancy/climate-change-and-environmental-health/

Transalpine Environmental Sustainability Governance Group

Action Notes/Minutes

Date: 22 February 2019 **Time:** 1:00 pm – 3:00 pm

Venue: Room 115, CDHB Corporate Offices

Present: Alison Watkins, Andrew Summers, Anna Stevenson, Beng-Cheng Chan, Bernice Marra, Brad Cabell, Hector Matthews, Ian Ward, Justine White, Kaye Johnston, Lizzie-Johnston Walker, Marie Lory, Matthew Long, Natalie King, Rachel Cadle, Ruth Teasdale, Tim Emson, Janice Lavelle for Sally Nicholls and Tracy Abbot (minutes)

Apologies: Dan Hartwell, Felicity Woodham, George Schwass, Kirsten Beynon, Pauline Clark, Pauline Tootell, Philip Wheble, Shona Macmillan, Terry Walker, Toni Gutschlag, Winn MacDonald

Absent:

Action Register	Responsibility	Date due
Membership – Advise Anna Stevenson of any roles or people missing from the group – Rachel Cadle to seek RMO representative – Justine to seek a Care Starts Here representative	All Rachel Cadle Justine White	
Definition of 'Environmental Sustainability' – - Consideration of the definition deferred until SIPHA's final definition is known.	Anna Stevenson	
Terms of Reference – Change wording to "all parts of the CDHB **at all levels**." (in whole of systems approach) – Further feedback to be sent to Anna by 1 March – Anna to produce another version.	Anna Stevenson All Anna Stevenson	
Visit by Julie Ann Genter – Request for input will be emailed to all – Anna to collate content once received	Anna Stevenson	

	Item	Discussion/Action	Respons-ibility	Date due
1.	**Introductions**	**Welcome and Introductions** The chair welcomed everyone to the meeting and relayed an inaugural message from Hector Matthews. Hector requested the group to reflect on kaitiakitanga remembering that the health of the individuals depends on the health of the environment. A round of introductions was held. **Membership of Group** Members were asked to consider what other roles should be represented in the group. **ACTION:** Advise Anna Stevenson of any roles or people missing from the group **ACTION:** Rachel Cadle to seek RMO representation on this group **ACTION:** Justine to talk with P & C to see if a Care Starts Here rep can be added to this group		
2.	**Review Terms of Reference**	The ToR were discussed, points made:- – Scope should include encouraging and facilitating individuals to make changes – Green teams at work to deliver grass roots actions		

		– A cultural change is needed to make it everybody's business – The three pillars / Care Starts Here could be linked to this work – Sustainability is not an add on to usual work **ACTION:** Addition to whole of system approach "all parts of the CDHB **at all levels**." **ACTION:** Feedback to be sent to Anna by 1 March, Anna will produce another version.		
3.	**Review of Progress against Recommen-dations**	The recommendations agreed to by EMT in 2018 were reviewed:- **Establish Sustainability Governance Group** Group is now up and running **Definition of 'Environmental Sustainability'** A definition developed by WHO is being considered by the South Island Public Health Alliance (SIPHA) **DEFERRED:** Consideration of the definition deferred until SIPHA's final definition is known. **Operational Policy** – to be developed **Five Year Implementation Strategy** – to be developed **Review Current Initiatives** – Two stocktakes were completed in 2018 in response to MoH requests. – Next step is to look at what can go in the next stocktake – Comments on emissions: o CDHB is the first NZ DHB to get Gold Status for Energy Mark (CEMARS carbon footprint included with meeting papers) o In 2018 CDHB was one of the top 20 carbon reducers. Next year total emissions from will, however building area will also increase. New buildings are more energy efficient so emissions per square metre may decrease. o After the coal boilers the next biggest source of emissions is business class air travel o Emissions from medical gasses are also significant – Potential projects: o Reducing emissions from international air travel o Reducing use of pre-packaged drinks in plastic bottles o Improved gas scavenging at the ASB **Travel Demand Programme** The hospital campus travel demand programme has been running for some months, funding is nearing an end.		
4.	**Visit by Julie Anne Genter – Associate Minister for Health**	The visit is an opportunity to show what has been done and to ask for more support. Media can be involved, meeting to be held in town rather than at Burwood. **Stories to cover:** – Burwood - Boilers Project – CEMARS certification process **Requests:** – Support for building green buildings - twelve month fiscal deadlines mean that many sustainable features which would have considerable benefits over many years are not able to be included in new buildings. – Recycling conversation –opportunities to remove material from the waste stream are disappearing. What is the government planning for this? – Procurement legislation / Sourcing Rules – any help here? – Transport - ? – CEMARS certification – is bulk funding to cover fees for DHBs possible? **ACTION:** Request for input will be emailed to all, Anna to collate content		

5.	**Waste Reduction**	**Drinking** – Purchasing are investigating the use of fully compostable butterfly cups for hot drinks – Plastic cups at water fountains are much cheaper than any greener cups available at the moment – Providing costing to promote move away from disposal cups has been useful – Providing more drinking fountains could be an option (but plenty of taps with potable drinking water close at hand)		
6.	**Other upcoming events**	– 10:30 to 1230 on Thursday March 28 visit by Julie Anne Genter – Grand Round Presentation by Anna Stevenson on March 29 – Second Sustainable Healthcare Forum – Ora Taiao: NZ Climate and Health Council – to be held on 8 May in Wellington and via Zoom		
	Next Meeting: **Future Meetings:**	**10:30 to 1230 on Thursday March 28 – venue TBA** **TBA**		

Very brief notes for Net Zero Emissions Workshop 5/12/18

1. Why is your organisation doing this?

Canterbury DHB is working to lower our greenhouse gas emissions because

The **link between the health of the environment and the health of the humans who live in that environment** is the genesis of modern evidence based public health and clinical care.

Economic mandate- Close to home examples include Havelock North water contamination and Port Hills fires – massive dis-ease in communities and huge economic costs

The looming environmental disaster is climate change which is driven by the rapid change in greenhouse gases generated from fossil fuel use over the last two centuries.

Ethical mandate- International evidence estimates that **Health systems are responsible for between 3-8% of greenhouse gases**. In New Zealand we haven't done that work but it seems likely that we are nearer to the 8% end of the spectrum as we are:

- similar to other 'developed' countries with that level of emissions,
- NZ DHBs are dependent on Coal as a primary energy source,
- NZ lags behind Europe in its uptake and experience with highly energy efficient technology
- New Zealand's building codes are not fit for purpose to face today's challenges.

Legislative mandate- The NZ Public Health and Disability legislation mandates DHBs to reduce environmental effects on the health of people and communities.

This year the Government has asked all DHBs to address adaptation and mitigation of climate change beginning with a requirement to undertake an audit of environmental sustainability measures that are already happening.

2. How hard has it been and how long has it taken?

Hospitals require large amounts of high temperature hot water and steam they also need to be warm places for sick frail patients. The 5 main CDHB hospitals consumed 106GWh of all types of energy including coal in the last financial year.

Coal has been the cheapest energy source available to Christchurch Hospital since it was built 140 or so years ago.

We started looking at biomass in 2009 as an alternative to coal this is considered to be CO_2 neutral.

Canterbury DHB has been officially tracking our emissions using the Enviro-mark programme CEMARs since 2014.

The CEMARS audit had shown us that **50% of CDHB greenhouse gas emissions come from coal**, so it became our target to eliminate coal and potentially reduce our CO_2 emissions close to this amount.

We have replaced the Burwood Hospital boiler in 2016 and we are now working on the new boiler house for Christchurch hospital with the Ministry of Health that will end the 140 year reign of coal and replace it with biomass in the 2020/21 FY.

The new build is much more energy efficient than current buildings. But using bio-fuel instead of coal is the real game-changer when it comes to emissions.

We estimate that the energy requirements of the new and expanded Christchurch hospital with the Acute Services Building when its' up and running would be around 65 GWh of fuel. If we were still using coal as our energy source this would generate around 20,000 tonnes CO_2emissions but with biomass only 335 tonnes CO_2. **Using biomass instead of coal as our primary energy source means we can reduce our estimated emissions currently from coal by around 98%.** That about 19,500 tonnes less CO2 into the atmosphere. Every year.

Ashburton hospital also has coal boilers and plans are underway to replace them representing a reduction of around 2,300 tCO_2e

For the work we have already completed our CEMARs profile has shown that we have reduced our total greenhouse gas emissions by 20% over our baseline measurement three years ago, making us one of the country's top 20 reducers. This represented a reduction of 8,135 tonnes CO_2e.

Summary - Canterbury DHB has been actively working to reduce its energy use and reduce greenhouse gas emission for over a decade. Our heat energy has historically been sourced from coal. Moving to more human and environmentally friendly energy sources has been a difficult and expensive journey requiring us to upskill our staff and take risks by being the first in the country to trial new technology. We have been supported by EECA and we are very encouraged by the leadership this government is taking in this area. The rising cost of Coal as the Emissions trading Scheme kicks in really helps us make the business case going forward.

3. What is the cost/benefit trade-off to-date and moving forwards?

Economically, at this point, the capital cost of moving to bio-fuel is very large. The capex costs of changing from coal have been offset to an extent because we needed to replace either building, plant or infrastructure either due to age or earthquake damage or vulnerability.

EECA have provided seed funding for several of our energy projects providing reassurance to everyone involved that this is the right approach. We have won several awards for energy management including being well on track for Gold energy-mark certification.

1. Energy Mark Bronze 2016
2. Energy Mark Silver 2017
3. CEMARS certified 2017 with Top 20 reducer award for the certified reductions in 2018.
4. EECA Highly commended in the public sector award 2018.
5. EECA Commended in the Energy & Emissions reduction category.

Operating costs are more affordable compared to coal now that the ETS is starting to have an impact. Now that coal is starting to be more realistically priced (That is externalities are being addressed using the Polluter Pays principle) it's making it much easier for CDHB to do the right thing by our patients and our community

4. What are the commercial, social and environmental benefits for you

As mentioned the capital costs of making the transition from coal to greener forms of energy have been very high. The rising cost of coal as the Emissions trading scheme does make the business case long term much more convincing from a purely economic view.

There are undoubted health and environmental benefits. Reducing or eliminating our use of coal enables us to reduce sulphur emissions AND greenhouse gas emissions. Our new boilers are far more efficient at removing fine particulates with the final amounts filtered out by electrostatic precipitators -which is a big win for our communities' health and wellbeing.

As public concern about fossil fuel use increases there are reputational benefits to us in pursuing this path. It enables us to stand on an equal footing with our partners in Christchurch City, for example CCC who are aiming to be operationally Carbon neutral by 2030. Commercial benefits will become apparent over the lifespan of the boilers as the price of coal increases to more realistic levels.

After Coal our emissions footprint shows us that next biggest source of emissions is travel related – particularly air travel. Addressing that will be complex but we are committed.

Summary of CEMARS certification

Canterbury District Health Board

Year 3 of 3 year certificate period

Canterbury District Health Board meets the requirements of CEMARS® certification having measured its greenhouse gas emissions in accordance with ISO 14064-1:2006 and committed to managing and reducing its emissions in respect of the operational emissions of its organisation, excluding University of Otago, Canterbury Laundry services, and West Coast DHB operations at CDHB sites.

Canterbury District Health Board
Te Poari Hauora ō Waitaha

Introduction[1] – The Canterbury DHB is the second largest DHB in the country by both geographical area and population size - serving 510,000 people (12% of the New Zealand population) and covering 26,881 square kilometres and six Territorial Local Authorities. The DHB is also the single largest employer in the South Island, employing over 9,000 people. The Canterbury DHB uses funding received from Government to purchase and provide health and disability services for the Canterbury population. Based on the size and demographic mix of our population (age, ethnicity and socio-economic factors), Canterbury receives around 11% of the total health funding allocated to DHBs - over 1.4 billion dollars.

A cornerstone of health promotion is Canterbury District Health Boards 'Health Promoting Health Systems' work stream. The expectation that the work programme will 'advance human development, sustainability and equity as well as improving health outcomes.' The quality of the environment that our communities live in directly and indirectly impacts on their level of health and wellbeing. Examples of this include acute illnesses related to drinking water quality and climate change which if not well managed will lead to food insecurity, water insecurity, epidemics of emerging infections, and human conflict.

Complementing this, the people of Canterbury have made it clear in a number of consultations that they are concerned about the health of their environment and they want positive changes to ensure on-going personal and environmental health. The South Island DHB Alliance has recently identified environmental sustainability as a priority action area and begun a work programme, participation in the CEMARS programme is one part of this programme.

Boundary – Figure 1 below shows the organisational structure used for describing the organisation's greenhouse gas (GHG) emissions inventory, and what business units were included in the inventory in the context of the entire organisational profile. The parts of the structure (business units) in blue have been identified as being within this emissions inventory. Business units excluded from the inventory are shown in red.

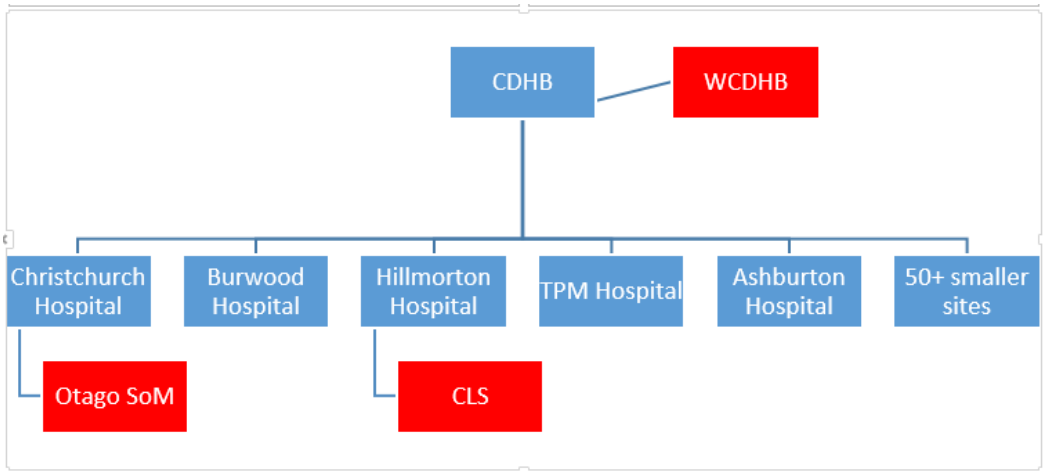


Figure 1: Organisational structure showing business units included and excluded.

[1] **Disclaimer:** This Disclosure Statement is a summary of the verified information considered for certification and the certification decision. It should not be taken to represent the full submission for certification. Whilst every effort has been made to ensure that the information in this Disclosure Statement is accurate and complete, Enviro-Mark Solutions Limited does not, to the maximum extent permitted by law, give any warranty or guarantee relating to the accuracy or reliability of the information.

Canterbury District Health Board

Year 3 of 3 year certificate period

Consolidation approach – The operational control consolidation approach has been used to account for operational emissions with reference to the methodology described in the GHG Protocol and ISO 14064-1:2006 standards.

Base year – 01/07/2014 to 30/06/2015

Measurement period – 01/07/2016 to 30/06/2017

Emissions source inclusions – The operational GHG emissions for the organisation by emissions source are shown in Figure 2 below.

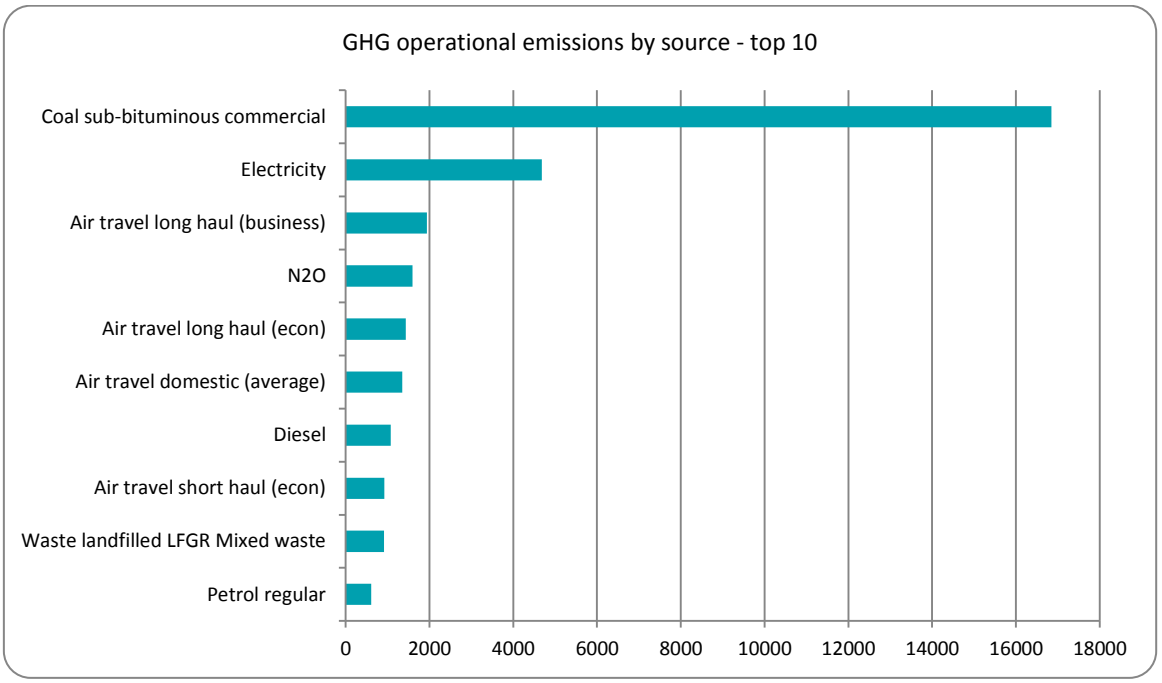


Figure 2: GHG emissions by emissions source (tCO_2e).

Emissions as tonnes of carbon dioxide equivalents (tCO_2e) for this period were:

Emissions summary by scopes		Units
Scope 1 total	21,128.99	**tCO_2e**
Scope 2 total	4,679.16	**tCO_2e**
Scope 3 total	7,493.52	**tCO_2e**
Mandatory scope 3	7,493.52	*tCO_2e*
Additional scope 3	0.00	*tCO_2e*
One-time scope 3	0.00	*tCO_2e*
Total inventory:	33,301.67	**tCO_2e**

Emissions source exclusions – The following emissions sources were excluded from the inventory for this measurement period:

- Freight and couriers – calculated to be *de minimis*
- Refrigerant holdings - the refrigerant holdings are not currently recorded. The intention is to capture this data for future measurement periods

Emissions reduction commitments – A GHG emissions management plan and reduction targets have been developed which include:

Canterbury District Health Board

Year 3 of 3 year certificate period

- Replacement of coal boiler with wood biomass
- Implementation of energy management plan
- Upgrade of lighting
- Replacement of older equipment with energy efficient models

Emissions reductions summary against last year's plan – An absolute reduction in Scope 1 and 2 emissions of 7,718.97 tCO2e in FY 1617 has been achieved against base year. A reduction in emissions intensity (for Scope 1, 2 and mandatory Scope 3 emissions) of 3.10 tCO_2e/$M has been achieved; based upon a 3 year rolling average.

Verified by – Enviro-Mark Solutions Limited

Data quality score – Good

Threshold of materiality – Excluded emissions do not exceed 5% of the total footprint within the organisation boundary stated.

Level of assurance – Reasonable

Certification status – CEMARS certified organisation

Certificate number – 2018003J, Year 3 of 3 year certificate period

Valid until – 30 April 2019 - ext

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