Health Impact Assessment of the Regional Policy Statement

Regional Form and Energy Draft Provisions

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Better Health For The Greater Wellington Region
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Executive Summary

A community’s health and well-being is primarily determined by social, cultural, economic and environmental influences and not just by its health services. As such, the non-health sector has a great scope in its ability to improve the health of a population through policies and plans that affect the determinants of health.

This rapid Health Impact Assessment (HIA) was conducted to assess the impact of two sections of the draft provisions of the Regional Policy Statement (dpRPS) on health and well-being within the community. It was conducted by Regional Public Health (RPH) in partnership with Greater Wellington Regional Council (GRWC). By assessing the health impacts of the dpRPS, the HIA aims to improve the health of the community and reduce inequalities throughout the greater Wellington region.

The dpRPS is a large document containing twelve resource management topics. The two topics that this HIA assesses are the Regional Form and Energy provisions.

The HIA focused on four health determinants identified at the scoping workshop. These included access to services, physical activity, housing, and a change in emissions of greenhouse gases. There were other considerations recognised at the scoping workshop including identifying important vulnerable populations, parts of the dpRPS to consider and the temporal scale of the HIA.

There were many issues raised during the appraisal workshop in relation to the two sections of the dpRPS on all four health determinants. From these issues a set of recommendations was developed in five sections. These sections and some of the major recommendations include:

1. **Collaboration and consultation**
   - Both the Regional Form and Energy provisions should have explicit recognition of the necessity for collaboration and consultation with GWRC and local councils with: other councils; iwi; Pacific peoples groups; community organisations; private developers; and any other key stakeholders.

2. **Positive aspects that should be maintained and enhanced**
   - Regional Form policies and objectives that aim to create high connectivity within the region should be maintained, strongly supported and encouraged.
   - Regional Form policies and objectives that aim to maintain compact form and limit urban sprawl within the region should be maintained, strongly supported and encouraged.

3. **Housing**
   - There should be greater emphasis on housing affordability and quality within the policy and an explicit recognition of the importance of housing to health and well-being.
   - The Regional Form policy should encourage and promote the development of a coherent housing policy framework.
4. Promotion of activities and education

- The Regional Form provisions should encourage councils to educate and train all those involved in the design, construction, management and maintenance of buildings and urban form on the impact of these activities on health and well-being.

- The Energy provisions should encourage councils to develop and disseminate educational tools related to energy efficiency in the home.

5. General recommendations

- Both the Regional Form and Energy provisions should have a focus on maintaining or enhancing equity in the community.

- Both the Regional Form and Energy provisions need to ensure that vulnerable populations are prioritised within the community.

Currently, the Regional Form and Energy sections of the dpRPS contain some aspects that will have positive health impacts. However, there is a real possibility that certain aspects may have negative health impacts or increase inequalities. Adopting the recommendations from this HIA can enhance the positive impacts, mitigate the negative impacts and reduce inequalities.

Following the completion of this HIA, GWRC released the Draft Regional Policy Statement for the Wellington region (dRPS). The new dRPS merged all twelve resource management topics of the dpRPS and placed them under strategic headings (such as Policy direction for district and regional plans and Non-regulatory policies). This meant that the Regional Form and Energy policies were dispersed throughout the dRPS. Although many of the policies of the dpRPS remained essentially the same, their numbers had changed to accommodate the new format of the dRPS. These number differences are referred to as appropriate throughout the document.
Introduction

Regional Public Health (RPH) undertook a Health Impact Assessment (HIA) of two of the draft provisions of the Regional Policy Statement (dpRPS). It was conducted in partnership with the Greater Wellington Regional Council (GWRC).

The Regional Policy Statement

The RPS ‘sets the policy framework for promoting the sustainable management of natural and physical resources’.

A Regional Policy Statement must:
- Identify the important resource management problems in a region (issues)
- Outline what is to be achieved by a Regional Policy Statement (objectives)
- Describe what is to be managed, where and how, to make progress towards the objectives (policies)
- State who is going to implement the policies and by what mechanism (methods)

Greater Wellington Regional Council

The RPS, however, cannot use rules to directly control resource use. An RPS can only give effect to certain matters through the rules of regional or district plans.

The dpRPS contains twelve resource management topics. The two topics that this HIA assesses are the Regional Form and Energy provisions.

Following the completion of this HIA, GWRC released the Draft Regional Policy Statement for the Wellington region (dRPS). Although the policies of the dpRPS remained essentially the same, their numbers had changed to accommodate the format of the dRPS.

Tables 1 and 3 briefly summarise the policies from the dpRPS Regional Form and Energy provisions. The title and description relate directly to the dpRPS policy and policy number. The equivalent dRPS policy number is also given. However, it should be noted that the exact wording of the matching dRPS policy may vary slightly. Policies that vary to a greater extent between the dpRPS and dRPS are highlighted in Tables 2 and 4.
Table 1. Summary of policies of the Regional Form draft provisions

<table>
<thead>
<tr>
<th>dpRPS number</th>
<th>drPS number</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>31</td>
<td>Urban design principles – district and regional plans</td>
<td>Ensures plans, the Regional Land Transport Strategy and relevant applications are consistent with the urban design principles: context; character; choice; connections; creativity; custodianship; and collaboration.</td>
</tr>
<tr>
<td>2</td>
<td>51</td>
<td>Urban design principles – resource consents and notice of requirement</td>
<td>Policy 3 ensures that local authorities will work together to promote and implement the region’s urban design principles.</td>
</tr>
<tr>
<td>3</td>
<td>69(a)</td>
<td>Urban design principles – promotion</td>
<td>Ensures plans, the Regional Land Transport Strategy and relevant applications are consistent with the urban design principles: context; character; choice; connections; creativity; custodianship; and collaboration.</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>Structure planning</td>
<td>Ensures major developments are integrated and of high quality.</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>Land-use activities within the regional CBD and regional centres</td>
<td>Encourages a range of land-use activities within Wellington central business district (CBD) and other regional centres.</td>
</tr>
<tr>
<td>6</td>
<td>29</td>
<td>Key centres and public transport nodes</td>
<td>Encourages high density development at key centres and public transport nodes.</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
<td>Industrial based employment locations</td>
<td>Protects key industrial based employment locations from reserve sensitivity effects arising from non-industrial activities.</td>
</tr>
<tr>
<td>8</td>
<td>55</td>
<td>Regional focus areas</td>
<td>Recognises the importance of six regional focus areas that are predicted to come under significant development pressure or provide significant development opportunities.</td>
</tr>
<tr>
<td>9</td>
<td>52</td>
<td>Development to support the region’s compact form</td>
<td>When considering relevant applications, local authorities shall have regard for the region’s compact form and development of regional centres and regional focus areas.</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
<td>Retail activities</td>
<td>When considering relevant applications, councils shall consider the potential effects of the proposal to erode the viability and vibrancy of the region and to create unsustainable demands on infrastructure.</td>
</tr>
<tr>
<td>11</td>
<td>69(b)</td>
<td>Rural residential development</td>
<td>Manages rural residential development by promoting best practice guidance about location and design.</td>
</tr>
<tr>
<td>12</td>
<td>69(c)</td>
<td>Quality open space network</td>
<td>Recognises the role of the open space network in defining the region’s compact form and encourages improvement.</td>
</tr>
<tr>
<td>13</td>
<td>8(a) &amp; 9</td>
<td>Nationally and regionally significant infrastructure – plans</td>
<td>Ensures plans and relevant applications recognise the social and economic benefits of nationally and regionally significant infrastructure and provide for the efficient operation, maintenance and upgrade of that infrastructure.</td>
</tr>
<tr>
<td>14</td>
<td>37</td>
<td>Nationally and regionally significant infrastructure – resource consent and notice of requirements</td>
<td>When considering relevant applications, councils shall have regard to the efficient use of infrastructure and co-ordination with the funding, development, implementation and operation of infrastructure.</td>
</tr>
<tr>
<td>15</td>
<td>54</td>
<td>Sequencing of land use and co-ordination with funding</td>
<td>Enhances housing choice and affordability by promoting a range of housing types and housing developments.</td>
</tr>
<tr>
<td>16</td>
<td>69(d)</td>
<td>Housing choice</td>
<td>Enhances housing choice and affordability by promoting a range of housing types and housing developments.</td>
</tr>
</tbody>
</table>

Source: Regional Form draft provisions, GWRC
Table 2. Summary of major differences between Regional Form policies of the dpRPS and dRPS

<table>
<thead>
<tr>
<th>dpRPS number</th>
<th>dRPS number</th>
<th>dpRPS Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>31</td>
<td>Urban design principles – district and regional plans</td>
<td>Policy 31 no longer relates to district and regional plans, but only the Regional Land Transport Strategy. Reference to the urban design principles has been replaced with maintaining and enhancing a compact, well designed and sustainable regional form.</td>
</tr>
<tr>
<td>2</td>
<td>51</td>
<td>Urban design principles – resource consents and notice of requirement</td>
<td>No significant change.</td>
</tr>
<tr>
<td>3</td>
<td>69(a)</td>
<td>Urban design principles – promotion</td>
<td>No significant change.</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>Structure planning</td>
<td>No significant change.</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>Land-use activities within the regional CBD and regional centres</td>
<td>Policy 28 has added “…so as to maintain and enhance their viability and vibrancy”.</td>
</tr>
<tr>
<td>6</td>
<td>29</td>
<td>Key centres and public transport nodes</td>
<td>No significant change.</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
<td>Industrial based employment locations</td>
<td>No significant change.</td>
</tr>
<tr>
<td>8</td>
<td>55</td>
<td>Regional focus areas</td>
<td>Policy 55 has had two further Regional Focus Areas added to make a total of eight.</td>
</tr>
<tr>
<td>9</td>
<td>52</td>
<td>Development to support the region’s compact form</td>
<td>The specific reference to the Wellington city CBD, regional centres and Regional Focus Areas has been removed in Policy 52.</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
<td>Retail activities</td>
<td>There is no longer an equivalent policy in the dRPS.</td>
</tr>
<tr>
<td>11</td>
<td>69(b)</td>
<td>Rural residential development</td>
<td>No significant change.</td>
</tr>
<tr>
<td>12</td>
<td>69(c)</td>
<td>Quality open space network</td>
<td>No significant change.</td>
</tr>
<tr>
<td>13</td>
<td>8(a) &amp; 9</td>
<td>Nationally and regionally significant infrastructure – plans</td>
<td>The original policy has been integrated throughout two dRPS policies that also include statements on renewable energy generation and transmission. Cultural benefits are recognised.</td>
</tr>
<tr>
<td>14</td>
<td>37</td>
<td>Nationally and regionally significant infrastructure – resource consent and notice of requirements</td>
<td>Policy 37 has recognised cultural and environment benefits.</td>
</tr>
<tr>
<td>15</td>
<td>54</td>
<td>Sequencing of land use and co-ordination with funding</td>
<td>No significant change.</td>
</tr>
<tr>
<td>16</td>
<td>69(d)</td>
<td>Housing choice</td>
<td>Policy 69(d) has wording change and added “…to meet the community’s social and economic needs”.</td>
</tr>
</tbody>
</table>
### Table 3. Summary of policies of the Energy draft provisions

<table>
<thead>
<tr>
<th>dpRPS number</th>
<th>dRPS number</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1           | 8(b)        | Renewable energy production and transmission – plans                  | Ensures plans and relevant applications:  
  a) recognise the social, economic and environmental benefits of;  
  b) provide for the efficient development, operation, maintenance and upgrade of;  
  c) manage activities that adversely affect, renewable energy production and transmission |
| 2           | 37          | Considerations – renewable energy production and transmission         |                                                                                                                                              |
| 3           | -           | Considerations – effects on renewable energy production and transmission |                                                                                                                                              |
| 4           | 10          | Transport energy use and CO₂ emissions                               | Ensures the Regional Land Transport Strategy (RLTS) recognises the need to reduce the consumption of non-renewable transport fuels and CO₂ emissions from transportation. |
| 5           | 11          | Travel demand management – Regional Land Transport Strategy           | Ensures the RLTS and district plans encourage travel demand management mechanisms to reduce or off-set vehicle kilometres travelled and CO₂ emissions. |
| 6           | 11          | Travel demand management – district plans                             |                                                                                                                                              |
| 7           | 12(a)       | Energy efficient design – district plans                             | District plans should promote energy efficient subdivision.                                                                                   |
| 8           | 12(a) & (b) | Energy efficient alterations and small scale renewable energy generation – district plans | District plans should provide for energy efficient alterations to existing buildings and developments and the use of small scale renewable energy facilities. |

Source: Energy draft provisions, GWRC
Table 4. Summary of major differences between Energy policies of the dpRPS and dRPS

<table>
<thead>
<tr>
<th>dpRPS number</th>
<th>dpRPS Title</th>
<th>dRPS number</th>
<th>dRPS Description</th>
<th>dRPS Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8(b) Renewable energy production and transmission – plans</td>
<td>37</td>
<td>Policy 8 has changed wording and recognised cultural benefits.</td>
<td>Policy 37 has recognised cultural benefits.</td>
</tr>
<tr>
<td>2</td>
<td>Considerations – renewable energy production and transmission</td>
<td>37</td>
<td>There is no longer an equivalent policy in the dRPS.</td>
<td>No significant change.</td>
</tr>
<tr>
<td>3</td>
<td>Considerations – effects on renewable energy production and transmission</td>
<td>10</td>
<td>No significant change.</td>
<td>No significant change.</td>
</tr>
<tr>
<td>4</td>
<td>Transport energy use and CO₂ emissions</td>
<td>10</td>
<td>Policies have been combined with no significant change.</td>
<td>Policies have been combined with no significant change.</td>
</tr>
<tr>
<td>5</td>
<td>Travel demand management – Regional Land Transport Strategy</td>
<td>11</td>
<td>Policies have been combined with no significant change.</td>
<td>Policies have been combined with no significant change.</td>
</tr>
<tr>
<td>6</td>
<td>Travel demand management – district plans</td>
<td>11</td>
<td>Policies have been combined with no significant change.</td>
<td>Policies have been combined with no significant change.</td>
</tr>
<tr>
<td>7</td>
<td>Energy efficient design – district plans</td>
<td>12(a)</td>
<td>Policies have been combined with no significant change.</td>
<td>Policies have been combined with no significant change.</td>
</tr>
<tr>
<td>8</td>
<td>Energy efficient alterations and small scale renewable energy generation – district plans</td>
<td>12(a) &amp; (b)</td>
<td>Policies have been combined with no significant change.</td>
<td>Policies have been combined with no significant change.</td>
</tr>
</tbody>
</table>

Health Impact Assessment

HIA and health determinants

HIA is a practical approach by which a policy or proposal is assessed for its potential effects on people’s health and well-being. HIA recognises that health and well-being is greatly influenced by factors outside the health sector. That is, a community’s health and well-being is primarily determined by social, cultural, economic and environmental influences and not just by its health services. It also builds on the understanding that health inequalities are largely determined by unequal distribution of, and access to, material resources such as income, employment and housing. HIA also uses the accepted broad definitions of health and well-being from the World Health Organisation and Māori models of health (figures 1 and 2).
These determinants of health affect well-being in various ways, both by direct and indirect causal pathways. Determinants can also affect the status of other determinants with this interaction producing various health outcomes. An example of this interaction and some causal pathways is shown in figure 3.

These models show that due to the expansive nature of health determinants, the health of a population is predominantly established in the community and not through health service delivery. Because of these facts the non-health sector has a great scope in its ability to improve the health of a population through policies and plans that affect the determinants of health.
HIA aims and objectives
HIA aims to identify the positive and negative health effects of a policy as well as the effects of a policy on health inequalities. Once these effects have been identified recommendations are developed to enhance the positive, diminish or remove the negative, and reduce inequalities.

HIA is a process advocated by the New Zealand Government. It is a well established international approach that is developing its use in New Zealand with positive results. The use of HIA has several advantages including improving intersectoral collaboration and community participation and promoting community well-being. Notably, HIA can also assist agencies to ‘fulfil statutory obligations for community health and well-being, for example under the Local Government Act 2002 and the Building Act 2004’.6

Reasons to conduct an HIA vary and include:
- To assist policy-makers in sustainable development
- To assist policy-makers to address public health requirements of policy
- To assist policy-makers to incorporate evidence into policy-making
- To promote cross-sectoral work
- To promote participation and consultation
- To improve health and reduce inequalities
- To assist policy-makers to consider Treaty of Waitangi implications

Public Health Advisory Committee5

Ultimately, however, HIA aspires to introduce or enhance a health perspective into policy-making.
Health Impact Assessment and its importance to the Regional Policy Statement

RPH identified GRWC’s RPS as a significant document in terms of its potential impact on the health and well-being of the community. The RPS was considered suitable to an HIA as it:

- Affects many health determinants
- Affects a large number of people including future generations
- Promotes cross-sectoral work between RPH and GWRC

Further to these reasons, statutory obligations also support conducting an HIA on the RPS. The purpose of the Resource Management Act 1991 is ‘to promote the sustainable management of natural and physical resources’. In the Act ‘sustainable management’ is defined as:

Managing the use, development, and protection of 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 [emphasis added] while:

a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Resource Management Act 7

The Act also states that the purpose of an RPS is to achieve the purpose of the Act. Therefore, it is clear that there is an expectation when drafting an RPS to provide for the social, economic, and cultural wellbeing and for the health and safety of a community. HIA offers one way to deliver this provision by identifying the potential direct and indirect health effects of the RPS on the community. HIA can then help inform decisions about the health consequences that may arise from the RPS.
Conducting the HIA

HIA is a staged process that can be conducted ‘rapidly’ or ‘comprehensively’. Due to time and resource constraints this HIA was conducted as a rapid HIA. The process (outlined in figure 4) involves screening the policy to ensure that it is appropriate for HIA, conducting workshops, assessing evidence and research, reporting findings and presenting recommendations.

Figure 4. The health impact assessment process

Taken from A Guide to Health Impact Assessment®
Aims and objectives

**Aim**
To improve the health and well-being of the community and reduce inequalities throughout the greater Wellington region by providing a useful submission to GWRC for the draft provisions of the Regional Policy Statement.

To improve the health and well-being of the community and reduce inequalities throughout the greater Wellington region by providing a useful resource for submissions to GWRC for the draft Regional Policy Statement.

**Objectives**
To provide evidence about the links between health and Regional Form and health and Energy.
To suggest recommendations to enhance the positive and decrease the negative health impacts, and reduce potential inequalities, of the draft Regional Policy Statement.

Screening and scoping

A rapid screening process was undertaken by a few members of RPH to determine whether the Regional Form and Energy draft provisions of the RPS were suitable for an HIA. It was agreed that these RPS draft provisions were suitable for an HIA as the RPS affects many health determinants and affects a large number of people including future generations. It was also considered useful to conduct an HIA on the RPS as it promotes cross-sectoral work between RPH, GWRC, other councils and the community.

**Health determinants**
A scoping workshop was conducted on 9 August 2007 at RPH (for a list of attendees please see acknowledgements). Given the limited time and resources available only four health determinants were selected for consideration in the HIA process. Although the four selected health determinants were chosen as they have relevance to both Regional Form and Energy, it was recognised that this list was by no means exhaustive. There are many important health determinants that were not selected due to resource constraints. The four selected health determinants were:

1. **Access to services** including:
   a. Employment
   b. Amenities e.g. supermarkets, marae, schools, health services, etc
   c. Recreation
   d. Public transport
2. **Physical activity** including:
   a. Walkability and pedestrian priority
   b. Perceived and actual safety
3. **Housing** including:
   a. Affordability, quality and choice
   b. Energy efficiency
4. **A change in emissions of greenhouse gases**

**Populations considered**
The workshop attendees favoured an inclusive approach in relation to the populations that were considered in the HIA. However, it was also recognised that
particular regard should be given to certain populations vulnerable to the effects of Regional Form, Energy and the selected health determinants. With this acknowledged, the population considered in the HIA process was the whole population of the greater Wellington region with particular regard to the following vulnerable populations:

- Elderly
- Children and young people
- Māori
- Pacific peoples
- Refugees and migrants
- People with disabilities
- Rural communities

Other considerations
The scoping workshop identified several other considerations important for the HIA. First of all, it was decided that the most tangible components of the dpRPS to consider were the policies and methods. There was less need to consider issues, objectives and anticipated environmental results. The effects of specific policies as well as the overall consequences of the provisions were to be contemplated in the HIA process.

It was also decided that the temporal scale of the HIA should not be limited to the ten years that this RPS will be in force. Effects that may occur beyond this timeframe should also be considered.

Finally, two assumptions were set out at the workshop. They were: an understanding that the Wellington population is aging and that there will be an increase in the proportion of Māori and Pacific peoples in the future; and that the recommendations should remain within the scope of the current legislative framework.

Appraisal

A half-day appraisal workshop was hosted by GRWC on 26 September 2007 (for a list of attendees please see acknowledgements). The workshop was held in order to consider evidence linking policies to selected health determinants and then determine what, if any, practical changes can be made to the policy to promote and protect health and well-being.

Prior to the workshop, evidence was gathered and summarised for the workshop participants. This included summaries of the dpRPS, defining HIA and health determinants and a profile of the greater Wellington region community. After conducting a literature search and review, a document linking Regional Form and Energy to the health determinants and health impacts was presented to workshop attendees (see Appendix 1).

Following the presentation of background material, workshop participants were split into two groups. Each group was given two health determinants to discuss during the workshop: access to services and physical activity in one group and housing and a change in greenhouse gas emissions in the other. Due to time constraints, discussion on physical activity as a health determinant was very limited, although both groups raised it during discussion on the other health determinants.
Each group was given a set of questions to aid and guide discussion as necessary. Discussions, however, were not limited to these questions and were carried out in a semi-structured fashion. The questions were:

i. How might the implementation of the statement affect health and well-being directly or indirectly?
ii. What is the causal pathway for this impact on health?
iii. Who is likely to be affected? Are some groups likely to be affected more than others?
iv. What evidence supports the answers above? E.g. past experiences, facts, research, existing data sources
v. What key factors might encourage, prevent or mitigate the health impact?
vi. What possible actions could be taken to enhance the positive or diminish the negative impacts? Who are these recommendations directed at?

Following the appraisal workshop, results from discussions on each health determinant were categorised into common themes. Recommendations were then suggested under the most common and important themes identified. A draft of the workshop findings and recommendations was then circulated among workshop participants for comment prior to collation of the final report.

**Study limitations**

There were several limitations of this HIA, often related to the time and resource constraints. First of all, this HIA was selectively limited to only two sections of the dpRPS. The combined dpRPS is a large document for which an HIA of this scope could not be conducted. Although it may be possible to transfer some of the recommendations from this HIA to other RPS sections, some recommendations are specific to only the Regional Form or Energy sections.

The time constraint of the HIA meant that time between inviting stakeholders and holding the workshops was limited. Several stakeholder groups were, therefore, unable to attend both or either workshop. Also, there was limited time to scope for a range of stakeholder groups. This meant that representation at the workshops from Māori, Pacific groups, community groups, and other organisations (such as the Energy Efficiency and Conservation Authority and Wellington School of Medicine and Health Sciences) was not as strong as it may have been with a longer timeframe. Consultation with these stakeholders from the beginning would have been ideal.

It was not feasible to conduct a full day appraisal workshop as potential attendees had other work commitments. Ideally, a full day workshop may have provided more time for discussions on recommendations. This is particularly so for the physical activity health determinant that was not fully discussed due to the time constraints.

It is acknowledged that this HIA was limited to only four health determinants. Again, this was a conscious decision made at the scoping workshop due to time and resource constraints and the rapid nature of the HIA. Clearly, there are other important health determinants not included in this study.

Finally, the policies discussed in this document relate directly to the dpRPS policies and not the dRPS policies (released in March 2008). The policies of the dRPS differ slightly from the dpRPS policies (as highlighted in Tables 2 and 4).
Community Profile

A summary profile of the greater Wellington region community was provided to participants at both workshops. This was to enable workshop participants to make informed assessments when deciding on health determinants and populations to consider as well as how the RPS may impact on certain populations.

Environment

The greater Wellington Region comprises eight territorial authorities covering Wellington City, Porirua, Kapiti, Lower Hutt, Upper Hutt, South Wairarapa, Carterton and Masterton. This covers a land area of 813,005 hectares and a maritime area of 786,700 hectares, with 497km of coastline. With 320km of river channels and 280km of stopbanks, GWRC are responsible for one of the largest flood protection schemes in New Zealand. Other than flooding, other natural threats include earthquakes, tsunami, erosion and wildfire.

Figure 5. The Greater Wellington Region

![Map of Greater Wellington Region]

Demographics

The population of the Wellington Region in 2006 was 448,956. By 2026 Wellington Region’s population is projected to increase by 48,000. The proportion of the working-age population (those aged 15-64 years) varies greatly over the region ranging from 73% in Wellington City to 57% in Kapiti Coast District. The proportion of...
older people (those aged 65 and older) also varies across the region from 22% in Kapiti Coast District to only 7% in Porirua City. By 2026, the proportion of older people in South Wairarapa District is projected to be high at 32%.

In the Wellington Region, 69.8% of the population belongs to the European ethnic group, while 12.8% belong to the Māori ethnic group (compared to nation figures of 67.6% and 14.6% respectively). Table 5 shows the ethnic population percentages for the territorial authorities in the Wellington Region.

Table 5. Total response ethnic population percentages for Wellington Region’s territorial authorities, 2006*

<table>
<thead>
<tr>
<th>Territorial Authority</th>
<th>Māori</th>
<th>Pacific</th>
<th>Asian</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wellington City</td>
<td>8</td>
<td>5</td>
<td>13</td>
<td>81</td>
</tr>
<tr>
<td>Porirua City</td>
<td>21</td>
<td>26</td>
<td>5</td>
<td>66</td>
</tr>
<tr>
<td>Kapiti Coast District</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>93</td>
</tr>
<tr>
<td>Lower Hutt City</td>
<td>17</td>
<td>10</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>Upper Hutt City</td>
<td>14</td>
<td>5</td>
<td>4</td>
<td>88</td>
</tr>
<tr>
<td>South Wairarapa District</td>
<td>13</td>
<td>2</td>
<td>2</td>
<td>94</td>
</tr>
<tr>
<td>Carterton District</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>95</td>
</tr>
<tr>
<td>Masterton District</td>
<td>17</td>
<td>3</td>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td><strong>New Zealand</strong></td>
<td><strong>15</strong></td>
<td><strong>7</strong></td>
<td><strong>9</strong></td>
<td><strong>78</strong></td>
</tr>
</tbody>
</table>

* Totals do not add to 100% as total response ethnicity figures are used

Source: Statistics New Zealand

Socio-economic indicators

In the Wellington Region 46.3% of people aged 15 years and over have a post-school qualification compared to 39.9% throughout New Zealand. Unemployment in the Wellington Region is similar to national figures (5.2% and 5.1% respectively). Approximately 16% of the population live in New Zealand Deprivation Index areas 9 and 10: many are of Māori and Pacific ethnicity.

In the Wellington Region, 55.1% of households own the dwelling compared to the national average of 54.5%. This percentage ranges from 50% in Wellington City to 68% in Carterton District. Access to telephones, cellphones and the internet is generally higher in the Wellington Region compared to New Zealand as a whole.

Health Status

The Wellington Region comprises the three district health boards Capital and Coast, Hutt Valley and Wairarapa. The major health problems in the region are similar to the rest of New Zealand. These include cardiovascular disease, diabetes, cancer, depression and suicide. The strategic plans from the three district health boards all identify both Māori and children as important target populations in regard to health.
Reports on selected health determinants

This section presents a summary report on each of the four health determinants identified in the scoping workshop and of the issues raised at the appraisal workshop. The full health evidence review can be found in appendix 1.

NB: The policy numbers mentioned in this section relate to the dpRPS policy numbers. For the equivalent dRPS policy numbers please refer to Tables 1 and 3.

Access to Services

Background

Accessibility has many components: can services be accessed with reasonable cost, in reasonable time and with reasonable ease? \(^\text{14}\) Accessibility is therefore affected by factors such as physical location, cost, knowledge of service, reliability and safety issues. Access to services can be improved not only by careful consideration of the location and delivery of services but also via transport to and from the services.

It is important to understand that accessibility varies throughout the community due to the differences the above factors have on different sections of the community. This makes certain groups in the community more vulnerable to reduced access to services. The elderly, those of lower socio-economic position and people with disabilities often have fewer resources to mitigate the negative factors affecting accessibility and may face greater barriers to access. \(^\text{15}\) Māori and Pacific peoples have lower access to health, education and employment services. \(^\text{16,17}\)

For the purpose of this HIA the services identified in relation to access were:

i. Access to workplaces and employment
ii. Access to amenities e.g. supermarkets, marae, schools, health services, etc.
iii. Access to recreational facilities
iv. Access to public transport

Review of available information

Access to services can impact on health.

Access to workplaces and employment
There is substantial evidence that unemployment is detrimental to both physical and mental health. In New Zealand, people who are unemployed report lower health status than employed people. \(^\text{16}\) There are several factors potentially affecting this. Unemployment is a stressful event and can lead to a reduction in disposable income. There is also the loss of social and psychological benefits of being in paid employment. Other factors include social isolation, decreased self-esteem and the effects on subsequent employment.

Access to amenities
Access to a variety of amenities can affect health. Access to health care services can obviously affect health greatly. This is particularly so for access to primary health care. \(^\text{18}\) Lower education attainment is associated with poor health status. \(^\text{16}\)
Appropriate nutrition is a key determinant of health. As such, access to quality food outlets is essential to eating well. A diet with high levels of fats and sugars is a risk factor for several health conditions including heart disease, diabetes and some cancers. Without access to healthy food such as fresh fruit and vegetables, poor diets may be more common.

**Access to recreational facilities**
Access to a variety of social, cultural and recreational facilities is also important for physical and mental well-being. For example, access to parks and walkable green spaces is associated with lower cardiovascular disease risk, higher functional status and longevity. Access to recreational facilities increases the likelihood of physical activity.

**Access to public transport**
Finally, there is considerable literature highlighting the importance of access to public transport in relation to health. Access to public transport not only affects health directly (e.g. through increased physical exercise) but also indirectly by affecting access to all the other services mentioned above.

**Regional form and access to services**
Without appropriate regional form and urban design, access to services can be hindered. One of the key barriers to access identified by the UK Social Exclusion Unit was ‘services and activities located in inaccessible places’. Other barriers included ‘the availability and physical accessibility of transport’ and ‘safety and security’ of the physical environment. All of these barriers have a direct relationship to regional form.

**Energy and access to services**
Energy can impact on access to services both directly and indirectly. Energy itself is a service with differential access within communities. Locally produced energy improves access in a community and, through greater reliability, can help maintain access to other services. Local energy production can also create jobs and access to employment. Indirect effects of energy on health include future increased energy costs, which will disproportionately affect those of lower socio-economic position as well as communities reliant on external sources of energy (e.g. rural communities).

**Issues raised in the workshop**

**Vulnerable populations**
Concern for vulnerable populations was regularly discussed throughout the workshop. It was recognised that while some policies have the ability to improve access to services for vulnerable populations, others may negatively affect access to services for these populations.

Many of the urban design principles (Regional Form policies 1-3) have the potential to benefit vulnerable populations. This is particularly so if territorial authorities (TAs) collaborate effectively for the benefit of these populations. However, if the vulnerable populations are ignored, accessibility inequalities may widen.

Access to amenities could be reduced for those of low socio-economic position under Regional Form policy 5. A focus on land-use activities within the regional CBD and regional centres could potentially lead to greater isolation of lower socio-economic groups from these centres and the subsequent reduced access to services.
Development around key centres and public transport nodes (as identified in Regional Form policy 6) was seen as a great opportunity to improve access to services for people with disabilities. However, goals to support walking, cycling and the use of public transport are important for all areas and not restricted to ‘key centres’.

There was concern that an emphasis on the ‘Regional Focus Areas’ as identified in Regional Form policy 8 could negatively affect certain communities and their access to services. It was considered that a Grenada/Gracefield road link might reduce access to services for Petone residents. However, access to recreational facilities (i.e. the beach) may improve. Concentrating facilities and economic activities along the ‘Wellington City growth spine’ may lead to the relocation of lower socio-economic groups out of the city and reduce their access to workplaces and amenities.

Creating and maintaining communities
A common theme throughout the workshop was the need to create and maintain community character and vibrancy to ensure improved access to services. It was commented that several Regional Form policies had the potential to maintain and improve community vibrancy and the services they provide. Appropriate structural planning as outlined in policy 4 will improve the development of community services and, presumably, access to those services. Supporting compact form within the region (Regional Form policy 9) was also seen as a positive step towards improving access to services. It is believed that maintaining compact form will encourage community vibrancy and limit urban sprawl. Both are positive steps towards people’s access to services.

Other policies have the ability to positively affect community vibrancy and character, but vulnerable populations must not be disadvantaged. For example, while rural residential development (Regional Form policy 11) may create communities and offer urban children rural experiences, the effect of development on existing rural communities should be considered.

An emphasis on development in the ‘Regional Focus Areas’ (Regional Form policy 8) may improve community vibrancy along the ‘growth spine’ but is likely to reduce vibrancy in the rest of the region. This may have a negative impact on social cohesion and access to services.

Public transport, walkability and cyclability
Access to public transport was often mentioned as an important factor with regard to Regional Form. The walkability and cyclability of the environment was also seen as important. It was thought that the ‘urban design principles’ (mainly Regional Form policies 1 and 2) would improve public transport for many groups (e.g. those without cars) although access to public transport could be an issue for the elderly and people with disabilities.

Encouraging development around public transport nodes (Regional Form policy 6) will not only improve access to public transport but could also improve the walkability/cyclability of the community. It was considered important to appropriately locate services so as to encourage walking and cycling in the community.

Recognising the quality open space network (Regional Form policy 12) was seen as a positive step in maintaining and improving access to recreational facilities. It was suggested that vulnerable populations need to be considered in relation to the open space network, particularly children and the elderly.
Collaboration
As mentioned above, several policies in the Regional Form draft provisions have the ability to improve access to a range of services. It was recognised, however, that in order to achieve the positive outcomes effective collaboration between key stakeholders must occur. This key point was touched on in the promotion of the ‘urban design principles’ (Regional Form policy 3) but requires emphasis throughout the statement. Collaboration across the region will help in positively implementing the management of nationally and regionally significant infrastructure (Regional Form policies 13 and 14). Effective collaboration of land-use activities in regional centres (e.g. Regional Form policy 5) may limit unnecessary duplication and lead to sharing of facilities.

Housing
Housing was discussed as a significant issue with major health implications. It was recognised that a policy on housing choice (Regional Form policy 16) could have the most impact on health compared to the other policies in the statement. It was also recognised that there was a great need for improved access to affordable housing in Wellington.

There was concern that the housing policy may be ineffectual as it is implemented via non-regulatory, voluntary methods. However, it was also understood that regulatory methods on housing choice may not be possible through the Regional Policy Statement. Further concerns were raised that there were no incentives for developers to enhance housing choice and affordability.

Further issues on housing are discussed in the Housing section for this report.

Physical Activity

Background
Physical activity provides a wide range of health benefits. Factors affecting how much physical activity people engage in are not limited to their individual characteristics. The physical and social environment can play a large role in encouraging physical activity. This can include the walkability and cyclability of the environment as well as both the perceived and actual safety of a community. Physical activity levels are also linked with access to services. For example, locating amenities close to residential areas can encourage walking and cycling to those amenities, while improving access to recreational facilities can also increase physical activity levels.23

The evidence for inequalities in physical activity in New Zealand is mixed. Although in New Zealand there is no association between low income and physical inactivity, low income is a barrier to being physically active.24 International research suggests older people are more likely to be physically inactive.24 25 It is also known that the built environment substantially impacts the ability of people with disabilities to be physically active.25

Review of available information
Regular physical activity provides a wide range of health benefits such as reduced risk of premature death, cardiovascular disease, type 2 diabetes and some cancers (e.g. breast and colon cancer).26 Physical activity can confer other benefits to
individuals. This includes a reduction of obesity levels in New Zealand. Obesity is a risk factor of a wide range of health problems including cardiovascular disease, type 2 diabetes, high blood pressure, gout, osteoarthritis, gallstones, obstructive sleep apnoea and some cancers.

Along with positive effects on disease processes regular physical activity can improve mental health. There is some evidence that physical exercise can improve the sense of well-being and enhance self-esteem while reducing symptoms of depression and anxiety.

Along with New Zealand’s increasing rate of obesity, an estimate from the late 1990s suggested 2,600 deaths a year are attributable to physical inactivity. This is 9% of all deaths per year.

**Regional form and physical activity**
The regional form of a community can either enhance or hinder the opportunities for physical activity. A paper reviewing 16 studies found that important factors that affect physical activity levels include accessibility to facilities, opportunity for activity and the urban aesthetics. Surprisingly, the review found few associations between safety and levels of physical activity.

A further review of urban design, transportation and physical activity found higher rates of cycling and walking in communities with more land-use mix, greater connectivity and higher density, while communities with high levels of urban sprawl have low rates of physical activity. Street design and housing density are also important factors affecting physical activity levels.

**Energy and physical activity**
Evidence for how energy can impact on physical activity is very limited. As mentioned above, the aesthetics of the surroundings can affect and individual’s likelihood of engaging in physical activity. Large-scale energy projects may reduce the attractiveness of an area, which may lead to a decrease in physical activity levels. Conversely, energy projects may improve opportunities for exercise and promote physical activity. For example, the development of Lake Karapiro provided greater opportunity for physical activities.

Energy may indirectly affect levels of physical activity. If energy costs were to increase, sections of the community may find themselves with less disposable income. This, in turn leaves them less able to participate in the community, more socially isolated and less likely to engage in physical activity.

**Issues raised in the workshop**
Due to the time constraints of the workshop, a specific discussion regarding physical activity as a health determinant in relation to the draft provisions was afforded less time compared to the other health determinants. However, some issues relating to physical activity were raised.

**Public transport**
It was recognised that public transport can play a key role in encouraging physical activity in the community. As such, developing key public transport nodes (Regional Form policy 6) could help increase physical activity levels. Services and public transport must be located appropriately to ensure people have somewhere to walk or cycle to.
Open spaces
Open spaces were also considered to be important for encouraging physical activity (Regional Form policy 12). The open space policy was seen as a positive step towards creating and maintaining the region’s open space network. There should, however, be considerations of children and the elderly within the policy. One suggested example included encouraging apartment blocks and high-density residential housing developers to provide places for children to play.

Connectivity
The Ministry for the Environment document *The Value of Urban Design* highlights the importance of high density, high quality public spaces and, in particular, high connectivity in promoting physical activity in the community. The issue of connectivity was raised at the workshop. Connectivity was seen as an issue that was associated with many of the Regional Form policies. It is explicitly mentioned in policy 1 and also associated with compact form, public transport development and development of Wellington’s ‘growth spine’.

Housing

**Background**

New Zealanders spend the majority of their time at home. On average, 65% of our time is spent at home with these figures rising to 90% for some populations (e.g. preschool children and the elderly). As such, the home environment clearly has the ability to significantly affect our health. There is extensive evidence linking housing to illness and injury. There is also positive evidence that better housing improves health.

Due to the effect housing has on health, housing has the ability to maintain and widen health inequalities. There are several groups that are at greater risk of the negative health effects of housing. In particular, this includes both Māori and Pacific peoples. In comparison to the general population these two groups have higher rates of rental tenure, lower rates of home ownership, lower incomes, higher levels of household crowding and are more likely to report cold and damp in their homes. These are all risk factors for poorer health outcomes. Children and the elderly are also at risk. Not only are children and the elderly more likely to live in cold houses, but they are also particularly susceptible to the effects of cold and damp homes.

Important elements of housing identified for this HIA were affordability, quality and choice. There should also be a consideration of energy efficiency.

**Review of available information**

**Affordability**

Housing cost can restrict income available for other resources. Unaffordable housing can adversely affect health by leaving less money for food, especially nutritious food, home heating and health services. Unaffordable rents may also force families into substandard housing with the consequent health risks.

**Housing quality**

The quality of New Zealand houses is generally poor, with many homes being uninsulated. Excessive winter mortality in New Zealand is high by international standards and is likely to be due to variation in indoor temperature. Poor housing
insulation and heating poverty are associated with higher excess winter mortality. A cold house also places physiological stress on its occupants, particularly the old and the very young.\textsuperscript{41} Living in a damp and mouldy house increases your risk of a range of respiratory diseases including asthma.\textsuperscript{41}

Poor housing can increase the risk of injury for a variety of reasons. These include a lack of fencing, faulty electrical wiring and exposed heating sources. Again, children and the elderly are particularly vulnerable.\textsuperscript{35}

\textbf{Crowding}

Household crowding continues to be a problem in many areas of New Zealand. Crowding is associated with a variety of infectious diseases including meningococcal disease, tuberculosis and acute rheumatic fever.\textsuperscript{42} There is also evidence that crowding is stressful for both children and adults. In children, crowding is associated with increased emotional problems, bed-wetting, developmental delays and reduced school achievement.\textsuperscript{35}

\textbf{Energy efficiency}

Improving the energy efficiency of houses can improve general health and well-being and reduce respiratory illnesses.\textsuperscript{37} Improving energy efficiency can also lead to improved housing quality and reduced long-term housing costs.\textsuperscript{43}

\textbf{Regional form and housing}

Regional form can have both negative and positive impacts on housing. Rehousing and community regeneration can adversely affect well-being. Rehousing has been shown to increase reported illness episodes and also lead to increased mortality.\textsuperscript{39, 40} Housing relocation, however, can lead to better employment and improved health when relocating people from deprived areas to middle income areas.\textsuperscript{39}

\textbf{Energy and housing}

Energy can impact on housing, mostly in the form of energy efficiency, home heating and housing location. Improving energy efficiency within the home can have a variety of benefits. Energy efficiency will reduce household energy costs in the long term.\textsuperscript{17} It can also improve housing quality immediately. For example, replacing inefficient heating options, such as open fires, can improve indoor air quality. Retrofitting houses with insulation to improve cold, damp and mouldy homes as well as improve energy efficiency has been shown to improve self-reported health, reduce days off school and work, and reduce GP visits and respiratory hospital admissions.\textsuperscript{41, 44}

\textbf{Issues raised in the workshop}

\textit{Managing affordability, choice and quality}

Although it was recognised that affordability, choice and quality are all important components of housing, it was also acknowledged that a change in one component can affect another. For example, improving housing quality may reduce affordability. Managing these conflicts (e.g. ensuring affordable housing is not of poor quality) is paramount to ensure that vulnerable populations are not disadvantaged and that health inequalities are not increased.

It was discussed that the housing choice policy (Regional Form policy 16) was a positive step towards improving housing in the region. However, it was considered that there should be a greater emphasis on affordability as well as choice. This would hopefully benefit vulnerable populations such as Māori, Pacific peoples and lower socio-economic groups.
Housing quality can affect health in a variety of ways as mentioned above. As such, it was deemed important that housing quality be explicitly recognised in a housing policy. This would hopefully encourage the development of quality housing and its subsequent positive benefits for health.

**Collaboration**
As with Access to services, collaboration was considered an important issue for housing. Several partnerships were identified as essential towards effective housing policies. First of all, iwi must be an equal partner within the policy. Other community stakeholders that need to be involved in the process include Pacific peoples and refugees. Clearly, effective collaboration and communication between councils is important, while other sectors can help implement policies. These include the housing development sector (where mixed portfolio housing could be encouraged) and energy groups (to promote sustainability and energy efficiency).

**Housing policy framework and structural planning**
It was acknowledged that process towards providing affordable and quality housing choice is somewhat hindered by development administration. Goals and objectives under various legislation differed, such as the Building Act, Resource Management Act and Local Government Act, and presented barriers to affordable and quality housing development. The development of a coherent housing policy framework could remedy these conflicts.

Along with the differing legislation, the various departments involved in building and structural planning (e.g. Department of Housing and Development, Ministry for the Environment, and Local government) made the process of housing development cumbersome. Improving the management of this process was recognised as an important issue. This could include the consenting process and structural planning (including a consideration of affordability, quality and choice).

**Housing and energy**
It was recognised that the RPS has only limited scope to direct councils in terms of housing and energy (e.g. unable to instruct on ‘investing in’ or ‘funding’). It was, however, suggested that there is scope for including promotion of healthy housing in terms of a physical resource and energy sustainability and efficiency. Promoting and encouraging healthy and energy efficient homes could be an important part of the housing policy. Information and collaboration are possible mechanisms by which this could be achieved.

A change in greenhouse gas emissions

**Background**
There is now clear evidence that the global climate is changing as a result of greenhouse gas emissions created by humans. The main greenhouse gases include:

- Methane from farm animals and waste
- Carbon dioxide from burning fossil fuels
- Nitrous oxide from soil
- Synthetic gases like sulphur hexafluoride, perfluorocarbons and hydrofluorocarbons

Department of the Prime Minister and Cabinet, 2002
New Zealand’s greenhouse gas emissions are continuing to rise.\textsuperscript{47} One of the major contributors greenhouse gas emissions is transport. In New Zealand, more than 40% of carbon dioxide emission is attributable to transport.\textsuperscript{24} Energy consumption is also a major contributor to greenhouse gas emissions. Currently, New Zealand’s energy consumption is increasing in most sectors including domestic, industry and transport.\textsuperscript{47}

It is expected that the effects of climate change will disproportionately affect certain populations. The increase in extreme temperatures that climate change is expected to produce will have greatest effect on children and the elderly. Those with pre-existing respiratory and cardiovascular disorders are also more likely to be affected.\textsuperscript{24} As Māori and Pacific peoples have higher respiratory and cardiovascular disease rates, they will also be disproportionately affected by climate change. Finally, certain geographical areas may be more vulnerable to the increase in extreme weather events. For example, the impacts of droughts and flooding on the rural community can be great, while low lying areas are more prone to flooding.

\textbf{Review of available information}

In New Zealand, climate change and increasing temperatures have the ability to affect health in a variety of ways.

There are several direct effects of climate change that would affect the health of New Zealanders. It is predicted that climate change will not only lead to increased temperatures in New Zealand but also an increase in the frequency and intensity of extreme weather events, including flooding and droughts.\textsuperscript{45, 48} Extremes in temperature, both hot and cold, lead to increased mortality rates.\textsuperscript{45}

As the climate changes, the profiles of diseases will change. A change in the range of vectors and infective parasites in New Zealand could make dengue fever, Japanese encephalitis and Ross River virus significant health risks.\textsuperscript{45, 48} Warmer temperatures and increased rainfall could support the spread of infections such as campylobacteriosis, cryptosporidiosis and giardiasis through contaminated water supplies.

It is predicted that climate change will lead to a rise in sea level which could significantly affect New Zealand. A sea level rise would cause increased coastal erosion, damage to infrastructure (particularly sewage and wastewater disposal) and destruction of arable land leading to decreased food production.\textsuperscript{48} All these would have indirect effects on the health of New Zealanders. Pacific Island nations are very vulnerable to rising sea levels and may not be able to sufficiently adapt to the changes.\textsuperscript{45} This could lead to increased migration of people from these countries to New Zealand.\textsuperscript{45} The increased migration and aid commitments to Pacific Island nations would cause resource constraints in New Zealand.

There are several other mechanisms by which greenhouse gas emissions can impact on health. These are outlined further in appendix 1.

\textit{Regional Form and a change in greenhouse gas emissions}

Public transport systems, service accessibility, connectivity and land-use mix are all aspects of regional form that can affect transport options. These are discussed in further detail in both the \textit{Access to services} and \textit{Physical activity} sections of appendix 1.
Energy and a change in greenhouse gas emissions

Although it is likely that energy consumption will continue to rise, greenhouse gas emissions can be affected by how energy is sourced and produced. A continued reliance on fossil fuels will lead to increased greenhouse gas emissions. However, switching to renewable and sustainable energy production could lead to reduced greenhouse gas emissions. A stronger focus on energy efficiency and small-scale energy production may also lead to a reduction in greenhouse gases. Local areas in New Zealand that import most of their energy from other regions should consider how that energy is sourced and produced.

Issues raised in the workshop

Connectivity

Improving connections between communities was considered essential for being able to reduce greenhouse gas emissions. As previously mentioned, transport is a large contributor to greenhouse gases in New Zealand. Urban form with high connectivity can lead to a reduction in the number of journeys made by private car. It was recognised that encouraging walking, cycling and the use of public transport was fundamental to reducing greenhouse gas emissions. Two key urban form concepts that can encourage walking, cycling and the use of public transport are connectivity and compact form. These concepts are mentioned throughout the Regional Form policies and could be emphasised in terms of their benefits towards restricting greenhouse gas emissions and improving health.

Promotion

It was discussed that councils need to be proactive in promoting and encouraging a reduction of greenhouse gases. This could be through policies and methods in the Regional Policy Statement, but also by encouraging councils to lead by example.

It was noted that all policies within the Energy draft provisions were regulated. With this in mind, it was believed that there is scope for inclusion of non-regulatory methods. This could be particularly useful in promoting both energy efficiency and the need to reduce greenhouse gas emissions to the community.

Other considerations

There were other considerations discussed at the workshop in relation to greenhouse gas emissions.

Small-scale energy production and the development of local renewable energy resources were seen as strong positives of the provision. Although there are some considerations of the effects of this type of energy production development, explicit recognition of the effects of health and well-being is important. Small-scale energy production has the ability to produce and widen health inequalities and the beneficiaries of these developments should be carefully considered. For example, lower socio-economic groups may be unable to afford the initial costs of small-scale energy projects and not benefit from this development.

Linking the Energy provisions to other strategies was acknowledged as an important method to enhance the positive aspects of the provisions. This is particularly the case with linkages to the Regional Land Transport Strategy (Energy policy 5) and was recognised as a positive of the draft provisions.
**Summary of reports on selected health determinants**

Table 6 is a summary of the potential effects of some of the policies of the Regional Form and Energy draft provisions. As the table shows, many of the policies are likely to positively affect health outcomes. However, it must be noted that many of the policies (although benefiting overall community health) have the potential to *increase* health inequalities. Some of the policies have a broad scope of implementation and therefore have the potential to either increase or decrease inequalities depending on how the policies are implemented. It is also important to recognise that health can be affected by what is *omitted* from the RPS. As such, this table should not be read in isolation from the overall report and its recommendations.

In Table 6, the left-hand side of each health determinant column (i.e. the pluses and minuses) represents the positive or negative effect of the relevant policy on health. The right-hand side of the columns (i.e. the arrows) represents the effect of the policy on health inequalities. An upward arrow is detrimental to health by *increasing* inequalities while a downward arrow *reduces* inequalities.
Table 6. Summary of selected policies and their potential effects on the four health determinants†

<table>
<thead>
<tr>
<th>dpRPS Policy†</th>
<th>dRPS policy †</th>
<th>Access to services</th>
<th>Physical activity</th>
<th>Housing</th>
<th>A change in emissions of greenhouse gases</th>
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**Key**

+ Likely to positively affect health determinant and improve overall health
++ Very likely to positively affect health determinant and improve overall health
- Likely to negatively affect health determinant and reduce overall health
↓ Likely to decrease health inequalities in the community
↑ Likely to increase health inequalities in the community
↑↓ Potential to either increase or decrease health inequalities in the community

† NB: Table 6 refers to the policies of the dpRPS. The equivalent dRPS policies are numbered in the second column.
Conclusion

Both regional form and energy can strongly influence health outcomes. As such, these sections of the RPS are important in relation to the health and well-being of the community. An holistic view of health is an essential part of understanding how the RPS can affect community health. It must be recognised that the health of a population is predominantly established in the community and not through health service delivery; the non-health sector has a great scope in its ability to improve the health of a population through policies and plans that affect the determinants of health.

In New Zealand, socio-economic inequalities are strongly linked to health inequalities. These inequalities have tended to increase over the last two decades. It is also important to realise that both socio-economic and health inequalities have negative affects on all sectors of society. As such, any policy that has the ability to affect health outcomes should not only focus on improving those outcomes but should also have an increased focus on equity. Vulnerable populations need to be prioritised wherever possible.

The Regional Form and Energy sections of the dpRPS provide some positive aspects that may improve community health. However, there is a real possibility that certain aspects may have negative health impacts or increase inequalities. Appropriate consultation and collaboration is a vital characteristic that needs to be explicitly recognised within the RPS. The inclusion of a housing policy within the Regional Form provisions is applauded. However, this policy can be modified to enhance its benefit and to reduce inequalities.

Informed urban design, sustainable energy development and improved housing policy and development can assist in reducing socio-economic and health inequalities. Currently, the Regional Form and Energy sections of the dpRPS contain some aspects that will have positive health impacts. However, there are also some aspects that will have negative health impacts and increase inequalities. The RPS needs to focus on equity in the community and ensure that vulnerable populations are prioritised. Adopting the recommendations from this HIA can enhance the positive impacts, mitigate the negative impacts and reduce inequalities.
Recommendations

Collaboration and consultation

Throughout the discussions in the workshop there was repeated emphasis on the need to incorporate effective and meaningful collaboration and consultation in the implementation of the Regional Policy Statement. This included collaboration not only between key stakeholders but also to linking the RPS to other important documents (such as the Regional Land Transport Strategy). Appropriate collaboration and consultation will lead to interventions that are well catered for the community, use community resources efficiently and have greater ownership and ‘buy in’ from the community. These all lead to an intervention that is more likely to be successful and improve the health and well-being of the community.

Recommendation

- Both the Regional Form and Energy provisions should have explicit recognition of the necessity for collaboration and consultation by GWRC and local councils with: other councils; iwi; Pacific peoples groups; community organisations; private developers; and any other key stakeholders.

Positive aspects that should be maintained and enhanced

There are several aspects of both the Regional Form and Energy draft provisions that have clear potential to benefit health and well-being in the community. These aspects should be maintained and strongly supported within the provisions and recognition of their importance to health and well-being should be acknowledged.

Recommendations

- Regional Form policies and objectives that aim to create high connectivity within the region should be maintained, strongly supported and encouraged.

- Regional Form policies and objectives that aim to maintain compact form and limit urban sprawl within the region should be maintained, strongly supported and encouraged.

- In order to maintain consistency with the above two recommendations, Policy 31 of the dRPS should reinstate reference to district and regional plans, as well as provide explicit reference to the region’s urban design principles. (These provisions were in the initial wording of dpRPS Regional Form policy 1)

- The Regional Form policy related to quality open space networks should be maintained and supported, with improvements to ensure vulnerable populations, such as children and the elderly, also benefit from the policy.

- The Regional Form housing policy should be maintained and supported, as well as enhanced by implementing the housing recommendations below.
Energy policies and objectives that aim to improve energy efficiency should be maintained and supported, as well as enhanced by implementing promotional tools as outlined below (including energy efficiency within the home).

Small-scale renewable energy generation should be strongly supported and encouraged while also ensuring vulnerable populations, such as lower socio-economic groups, benefit from the development and that there are not adverse effects for these populations.

The explicit recognition of cultural benefits in several policies of the dRPS should be maintained, strongly supported and expanded throughout the RPS.

**Housing**

Housing was identified at the workshop as a significant issue with major health implications: the housing policy could have the most impact on health compared to the other policies. Sections related to housing in both the Regional Form and Energy provisions require careful consideration for their impact on the health and well-being of the community as well as their role in potentially affecting health inequalities.

**Recommendations**

- Due the importance of both housing affordability and housing quality (and not simply housing choice) Regional Form policy on housing should be renamed to reflect this. For example, ‘Housing affordability, quality and choice’.

- There should be greater emphasis on housing affordability and quality within the policy and an explicit recognition of the importance of housing to health and well-being.

- Incentives could be established to encourage developers to ensure housing affordability improves with a range of housing options, perhaps through shared equity.

- The Regional Form policy should encourage and promote the development of a coherent housing policy framework.

- The Regional Form policy should encourage partnerships with private and community organisations to promote the supply of affordable housing.

- There should be explicit promotion of energy efficient housing in the Energy provisions with acknowledgement of its importance to health and well-being.
Promotion of activities and education

Encouraging councils to be proactive in promoting certain activities was recognised as an important part of the provisions. Although this relates to several aspects of the provisions, it is of particular importance in relation to greenhouse gas emissions.

Recommendations

- The Regional Form provisions should encourage councils to educate and train all those involved in the design, construction, management and maintenance of buildings and urban form on the impact of these activities on health and well-being.

- The Regional Form provisions should encourage councils to develop and disseminate educational tools related to creating and maintaining housing quality (e.g. how to prevent dampness and mould; the health benefits of home insulation).

- The Energy provisions should encourage councils to develop and disseminate educational tools related to energy efficiency in the home.

- The Energy provisions should encourage councils to lead by example by creating energy efficient work environments.

General recommendations

Finally, there are two recommendations that relate to all aspects of the RPS.

Recommendations

- Both the Regional Form and Energy provisions should have a focus on maintaining or enhancing equity in the community.

- Both the Regional Form and Energy provisions need to ensure that vulnerable populations are prioritised within the community.
Appendix One: Regional form, energy and health evidence review

The literature search was conducted on Medline and Embase databases. A variety of terms were used including *regional form, urban design, energy, access to services, physical activity, housing, greenhouse gases and climate change*. Other literature was found through a search of the grey literature and websites (e.g. Ministry of Health and Ministry for the Environment).

Access to Services

*What is the evidence that access to services impacts on health?*

**Access to workplaces and employment**
There is substantial evidence that unemployment is detrimental to both physical and mental health. In New Zealand, people who are unemployed report lower health status than employed people.\(^\text{16}\) There are several factors potentially affecting this. Unemployment is a stressful event and can lead to a reduction in disposable income. There is also the loss of social and psychological benefits of being in paid employment. Other factors include social isolation, decreased self-esteem and the effects on subsequent employment.

**Access to amenities**
Access to a variety of amenities can affect health. Access to health care services can obviously affect health greatly. This is particularly so for access to primary health care.\(^\text{18}\) Without access to primary health care, individual health needs can go unattended and potentially lead to further health complications. Primary health care services can also influence other health determinants, including economic, social and individual factors.\(^\text{18}\)

Education is vital to determining someone’s socio-economic position and consequently their health. Lower education attainment is associated with poor health status.\(^\text{16}\) In general, this is because education level determines people’s social and economic position and thus their health. Also, people who are well-educated are more likely to make healthier lifestyle choices e.g. decisions around diet, smoking, alcohol and exercise.

Appropriate nutrition is a key determinant of health. As such, access to quality food outlets is essential to eating well. A diet with high levels of fats and sugars is a risk factor for several health conditions including heart disease, diabetes and some cancers.\(^\text{19}\) Without access to healthy food such as fresh fruit and vegetables, poor diets may be more common.

**Access to recreational facilities**
Access to a variety of social, cultural and recreational facilities is also important for physical and mental well-being. For example, access to parks and walkable green spaces is associated with lower cardiovascular disease risk, higher functional status and longevity.\(^\text{20}\) Access to recreational facilities increases the likelihood of physical activity.\(^\text{20}\) This is further discussed in the physical activity section.
Access to public transport

Finally, there is considerable literature highlighting the importance of access to public transport in relation to health. Access to public transport not only affects health directly (e.g. through increased physical exercise) but also indirectly by affecting access to all the other services mentioned above.

How does regional form impact on access to services?

Without appropriate regional form and urban design, access to services can be hindered. One of the key barriers to access identified by the UK Social Exclusion Unit was ‘services and activities located in inaccessible places’. Other barriers included ‘the availability and physical accessibility of transport’ and ‘safety and security’ of the physical environment. All of these barriers have a direct relationship to regional form.

Services and activities located in inaccessible places

Accessibility to services is affected by urban sprawl. Cities with increased urban sprawl often have decreased accessibility to services. Urban sprawl can increase travel times and lead to increased traffic congestion. A city that maintains compact form, however, reduces physical distance as a barrier to access and allows for more journeys to be made by foot. Other characteristics of urban sprawl include inadequate public transport and zoning that divides neighbourhoods from offices, shops and restaurants.

As already mentioned, access to green space can impact health status. Regional form that allows for the preservation and development of green spaces can obviously improve access to these recreational sites.

Availability and physical accessibility of transport

If there is limited access to transport then there is limited access to a wide range of services. Inadequate public transport is the main reason identified by people with difficulties accessing services. Public transport accessibility is affected not only by the routes travelled by the system, but also by the timing and cost of services.

Those without cars are also at risk of decreased access to services. People living in rural areas without cars have reduced use of health services. Regional form and urban design can improve access to services for this group of people.

Safety and security

The safety and security of the urban and rural environment are important factors in determining people’s willingness to navigate the environment. Although services may be geographically close, they are unlikely to be used if placed in an area considered unsafe. A further characteristic of urban sprawl is streets that are unsafe for pedestrians.

How does energy impact on access to services?

Energy can impact on access to services both directly and indirectly.

Energy itself can be seen as a service with differential access within communities. A community that has greater reliance on local energy production is likely to have improved energy access. Locally produced energy may also be more reliable which helps maintain access to other services. Local energy production also has the potential to create jobs within the community, hence increasing access to employment.
It is expected that energy costs in the future will increase. This is likely to disproportionately affect rural areas and communities that rely on external supply of energy. This will, in turn, reduce disposable income levels that may lead to decreased access to a variety of services as mentioned above.

**Who is most affected by access to services?**

There are several groups that are vulnerable to decreased access to services. In relation to access to employment, unemployed youth are at greatest risk of detrimental health outcomes compared to other unemployed people. Also, Māori, Pacific peoples and young adults have higher unemployment rates than the general population.

With regard to access to education, Māori and Pacific peoples are less likely to leave school with a qualification. The majority of members of minority ethnic groups (including refugees and migrants) have literary skills below that required to effectively meet the demands of everyday life. Access to health services are lower for Māori, Pacific peoples, immigrants and people with disabilities.

The negative effects of urban sprawl disproportionately affect the elderly and those of lower socio-economic position. This is because these groups have fewer resources to mitigate the negative effects and will consequently have reduced access to services. Elderly people also have a variety of barriers in relation to transport that can affect their access of other services.

Rural communities are clearly affected by access to services, partly due to their geographical isolation. However, geographical isolation is not the only barrier to access. Services in rural communities are often of lesser quality than the urban equivalents.

**What regional form interventions help to improve access to services?**

A variety of regional form interventions can help improve access to services and the list below is by no means exhaustive.

Ensuring transport systems are well linked to amenities can help access to these services. Improving physical accessibility and availability of services, such as developing transport systems or open, green spaces will help tackle accessibility. Reducing the need for travel can also help. This may include locating amenities in town or local centres and taking careful consideration when locating public services. Land-use planning policies that promote suitable developments can also reduce travel need.

Proper regional form interventions can also improve access in vulnerable groups. For example, designing the urban environment to meet the needs of people with disabilities is an effective method for improving access for this group.

**What energy interventions help to improve access to services?**

Providing resources to communities to become more efficient and self-sufficient in their energy use can improve access. This is particularly important for vulnerable groups. Allowing community ownership of energy resources will lead to increased employment opportunities and increased business profits. This improves access to
employment for the local community. It may also increase certainty of supply, particularly in rural areas.

By improving energy efficiency of homes and businesses, the indirect effects may lead to increased access to services. One pathway includes reduced spending on energy leaving more money for food, education and health.17

**Physical Activity**

*What is the evidence that physical activity impacts on health?*

Physical activity provides a wide range of health benefits.

**Premature death**

Men and women who are physically active have a reduced relative risk of death from between 20% and 50%.26 There is also evidence that there is a dose response in relation to this association. That is, people with the highest levels of physical activity are at the lowest risk for premature death.26

**Cardiovascular disease and type 2 diabetes**

Regular physical activity reduces the risk of developing cardiovascular disease and type 2 diabetes in the general population.26 There is also evidence that physical exercise can improve the health and reduce the risk of further cardiovascular events for people with known cardiovascular disease.26 Physical activity is an effective intervention in both the primary prevention and management of type 2 diabetes. Premature death in diabetics can be reduced by 54% following a small increase in physical activity (more than 2 hours walking per week).26

**Cancer**

Routine physical activity is associated with a reduced risk of some cancers. This is particularly so for breast and colon cancers: relative risk reductions range from 20-40%.26 In addition to this, physical activity in those with established cancer can provide significant health benefits and improve the overall quality of life.26

**Other benefits of physical activity**

Physical activity can confer other benefits to individuals. This includes a reduction of obesity levels in New Zealand.19 Obesity is a risk factor of a wide range of health problems including cardiovascular disease, type 2 diabetes, high blood pressure, gout, osteoarthritis, gallstones, obstructive sleep apnoea and some cancers. Levels of obesity are rising in New Zealand: recent figures show over 50% of New Zealanders are either overweight or obese.19 Levels of overweight/obesity are higher in Māori (about 60%) and Pacific (about 80%) populations compared to the general population.19

Evidence suggests that physical activity can prevent loss of bone mineral density and, hence, osteoporosis and may also help maintain bone density in those with already low bone density.26 This has particular relevance for older people who are at the greatest risk of this disease. Physical activity can also reduce the risk of fall-related injuries.56

Regular physical activity can improve mental health. There is some evidence that physical exercise can improve the sense of well-being and enhance self-esteem while reducing symptoms of depression and anxiety.27
Along with New Zealand’s increasing rate of obesity, an estimate from the late 1990s suggested 2,600 deaths a year are attributable to physical inactivity. This is 9% of all deaths per year. The study also predicted physical inactivity levels to rise. Although internationally New Zealand is a relatively active nation, only 62% of the adult population is active. The Ministry of Health currently recommends “aiming for at least 30 minutes of moderate intensity activity on most days of the week”.

**How does regional form impact on physical activity?**

The regional form of a community can either enhance or hinder the opportunities for physical activity. Although there has been some research into this area, the mechanisms of environmental influences on physical activity are poorly understood.

A paper reviewing 16 studies found that important factors that affect physical activity levels include accessibility to facilities, opportunity for activity and the urban aesthetics. Measures of accessibility included geographical location, physical barriers to access (e.g. busy road to cross, steep hill to climb), lack of facilities and cost of facilities. Opportunities for activity included the presence of sidewalks, awareness of facilities and satisfaction of facilities. Measures of aesthetics included pleasant and attractive neighbourhood, enjoyable scenery and appeal of neighbourhood. Surprisingly, the review found few associations between safety and levels of physical activity.

A further review of urban design, transportation and physical activity found higher rates of cycling and walking in communities with more land-use mix, greater connectivity and higher density. These are all factors that are associated with decreased urban sprawl. Indeed, it is also suggested that communities with high levels of urban sprawl have low rates of physical activity. Street design and housing density are also important factors affecting physical activity levels.

Transportation within the urban environment can affect levels of obesity. Those who spend longer in their cars on a daily basis had increased risk of obesity while those who walk daily had a decreased risk of obesity.

Despite a number of regional form factors being associated with physical activity levels, there are still few studies investigating this relationship, but the research continues to grow. The Ministry for the Environment document *The Value of Urban Design* highlights the importance of high density, high quality public spaces and, in particular, high connectivity in promoting physical activity in the community.

**How does energy impact on physical activity?**

Evidence for how energy can impact on physical activity is very limited. As mentioned above, the aesthetics of the surroundings can affect an individual’s likelihood of engaging in physical activity. Large-scale energy projects may reduce the attractiveness of an area, which may lead to a decrease in physical activity levels. Conversely, energy projects may improve opportunities for exercise and promote physical activity. For example, the development of Lake Karapiro provided greater opportunity for physical activities.

Energy may indirectly affect levels of physical activity. If energy costs were to increase, sections of the community may find themselves with less disposable income. This, in turn leaves them less able to participate in the community, more socially isolated and less likely to engage in physical activity.
**Who is most affected by physical activity?**

The evidence for inequalities in physical activity in New Zealand is mixed. Although in New Zealand, there is no association between low income and physical inactivity, low income is a barrier to being physically active. International research suggests older people are more likely to be physically inactive. It is also known that the built environment substantially impacts the ability of people with disabilities to be physically active.

In New Zealand, Māori and New Zealand European have the highest rates of physical activity of close to 70%. Pacific adults have lower rates (63%) while adults from other cultures have the lowest rate of just over 50%. It is also known that rates of physical activity are declining in children.

**What regional form interventions help to improve physical activity?**

There is some evidence that urban engineering interventions can improve physical activity rates, although not all interventions have been rigourously evaluated. There are some urban improvements that could improve the safety, accessibility and attractiveness of the environment. This may in turn lead to increased levels of walking and cycling as a mode of transport. These measures could include: marked cycle and walking routes; improved footpaths; traffic calming interventions; improved lighting; and planting trees.

Developing and providing facilities for recreational use may also improve physical activity levels. These facilities could be targeted to populations at the greatest risk of physical inactivity e.g. elderly and minority cultures.

Overall urban development can also provide opportunities to promote physical activity. Strategies to increase land-use mix, maintain medium to high density and improve street connectivity can be effective health interventions. Providing services such as shops and public transport within a 10 minute walk from homes or work is likely to increase journeys made by foot.

Due to the limited evaluation of many urban design interventions to improve physical activity, such interventions should be supported by programmes from other sectors in order to maximize community benefit.

**What energy interventions help to improve physical activity?**

Energy interventions to improve physical activity are limited. Energy projects should ensure that the surrounding environment maintains its aesthetic qualities. A loss of aesthetics could potentially reduce physical activity levels. There must also be a focus on sources of energy that are low in air pollutants and that are energy efficiency. This may reduce air pollution – an identified barrier to cycling and walking.
Housing

What is the evidence that housing impacts on health?

Housing has the ability to affect health status. Despite the considerable amount of literature linking housing and health it must be remembered that housing is also linked to many other health determinants, such as socio-economic status and income.

Affordability

Housing cost can restrict income available for other resources. Unaffordable housing can adversely affect health by leaving less money for food, especially nutritious food, home heating and health services. Unaffordable rents may also force families into substandard housing with the consequent health risks. These include increased risk of some infectious diseases, cardiovascular and respiratory conditions, and negative effects on mental health. Housing rental costs have increased significantly since the 1980s and at a disproportionate rate to the Consumers’ Price Index. In general, housing costs have a large impact on the ability of low-income people to meet their basic needs.

Although not necessarily related to housing affordability, people in rented accommodation have higher mortality rates than owner-occupiers, even after adjusting for other socio-economic variables.

Crowding

Household crowding continues to be a problem in many areas of New Zealand. Crowding is associated with a variety of infectious diseases including meningococcal disease, tuberculosis and acute rheumatic fever. There is also evidence that crowding is stressful for both children and adults. In children, crowding is associated with increased emotional problems, bed-wetting, developmental delays and reduced school achievement.

Housing quality

Although there are no agreed criteria for assessing housing quality, sub-standard houses are often cold, damp and mouldy and have decreased indoor air quality. Living in a damp and mouldy house increases your risk of a range of respiratory diseases including asthma. A cold house also places physiological stress on its occupants, particularly the old and the very young. Cold stress has been identified as the dominant climatic factor in cardiovascular deaths. Excess winter deaths may be prevented by improving domestic heating.

Hazards and injury

Poor housing can increase the risk of injury for a variety of reasons. These include a lack of fencing, faulty electrical wiring and exposed heating sources. Again, children and the elderly are particularly vulnerable.

Energy efficiency

Improving the energy efficiency of houses can improve general health and well-being and reduce respiratory illnesses. Improving energy efficiency can also lead to improved housing quality and reducing long-term housing costs.

How does regional form impact on housing?

Regional form can have both negative and positive impacts on housing. Rehousing and community regeneration can adversely affect well-being. Rehousing has been
shown to increase reported illness episodes and also lead to increased mortality.\textsuperscript{39, 40} Community regeneration can also lead to increased rents and decreased disposable income for food and health services. Housing and area regeneration can displace original residents and cause undue stress and a disruption of social networks. Living in an apartment can adversely affect mental health, accessibility and risk of domestic injury.\textsuperscript{40} Regional form that limits the development of apartment blocks may improve overall community health. Housing relocation, however, can lead to better employment and improved health when relocating people from deprived areas to middle income areas.\textsuperscript{39}

Well-planned urban improvements can increase community connectedness and improve health status.\textsuperscript{37} Other positive impacts of the improvements include increase in perceived safety and greater area satisfaction.\textsuperscript{40} However, social exclusion and community division can occur, particularly for those living on the margin of these improved areas.

Community regeneration can lead to gentrification of the neighbourhoods concerned. The potential negative and positive health impacts of this process are not well understood.\textsuperscript{40}

\textbf{How does energy impact on housing?}

Energy can impact on housing, mostly in the form of energy efficiency, home heating and housing location.

Improving energy efficiency within the home can have a variety of benefits. Energy efficiency will reduce household energy costs in the long term.\textsuperscript{17} It can also improve housing quality immediately. For example, replacing inefficient heating options, such as open fires, can improve indoor air quality.

Home heating options can also affect housing. Gas may be seen as a cheaper way to heat homes. However, unflued gas heating produces high levels of air pollutants such as nitrogen dioxide and carbon monoxide.\textsuperscript{35}

Local energy projects both large and small may affect housing. Energy projects may alter the aesthetic qualities of the community environment. They may also pose actual or perceived health risks to residents. These and other factors may affect house prices and rental costs within the affected community.

\textbf{Who is most affected by housing?}

Several groups of people may be more vulnerable to the effects of housing than others.

Māori and Pacific peoples are at risk for several reasons. Firstly, Māori and Pacific peoples have higher rates of rental tenure than the general population.\textsuperscript{16} This places them at higher risk of market rent variations. An increase in market rentals is likely to affect Māori and Pacific peoples to a greater degree than the general population. Rates of home ownership for this population are declining more rapidly than for other people\textsuperscript{36} meaning the vulnerability is likely to increase. Māori and Pacific peoples also have significantly lower incomes compared to other ethnic groups.\textsuperscript{16} This further compounds this issue.
Māori and Pacific households are also more likely to be crowded and to report cold and damp within their homes. Recent reports suggest that household crowding is increasing for the Pacific and migrant populations.

Children and the elderly are also at risk. Not only are children and the elderly more likely to live in cold houses, but they are also particularly susceptible to the effects of cold and damp homes.

Consideration of people with disabilities is important. This group is often affected by access difficulties in the built environment.

**What regional form interventions help to improve housing?**

Several interventions may help improve housing. However, firm data on the effectiveness of the interventions is lacking.

Relocation and community regeneration can improve mental health and social connectedness. However, the adverse affects of housing regeneration must be considered and managed at an early stage in the development process.

Rehousing by medical priority improves both general well-being and mental health.

Housing developments should be considered with particular interest to the ease of access to open spaces and public transport. This could be facilitated by concentration of housing. This intervention may lead to an increase in house prices in some areas and this risk will have to be managed.

Consideration of culturally appropriate housing is also important. Housing policy, regulation and design often confer to Pakeha cultural norms. Despite a large proportion of state housing being occupied by Māori and Pacific families, the housing may be poorly suited to these populations.

A community building approach has also been advocated. This involves engaging neighbourhoods about their own improvement initiatives, which may reduce isolation and improve social connectedness.

New Zealand councils that actively address affordable housing do so in a variety of manners including:

- Developing a coherent housing policy framework with housing in planning documents
- Have partnerships with private and community organisations to promote the supply of affordable housing
- Actively invest in housing initiatives including grants, land banking, land swaps, land leases, rates rebate and lending
- Improve management of consenting processes and infrastructure planning

Centre for Housing Research, 2007

It must be considered that any housing improvements may have adverse effects (e.g. increased rents) and these effects should be managed early and appropriately.
What energy interventions help to improve housing?

One of the main ways energy can affect housing is by improving the energy efficiency of homes. This can be achieved in a variety of manners. Improving energy efficiency can alleviate respiratory symptoms as well as improve general well-being. Strengthening building codes locally to ensure that houses are designed, built and renovated in energy efficient ways has been advocated in New Zealand. Retrofitted houses with insulation to improve cold, damp and mouldy homes as well as improve energy efficiency has been shown to improve self-reported health, reduce days off school and work, and reduce GP visits and respiratory hospital admissions. There is good evidence that installing heaters and supplying grants for heating costs has improved child health.

A change in greenhouse gas emissions

There is now clear evidence that the global climate is changing as a result of greenhouse gas emissions created by humans. The main greenhouse gases include:

- Methane from farm animals and waste
- Carbon dioxide from burning fossil fuels
- Nitrous oxide from soil
- Synthetic gases like sulphur hexafluoride, perfluorocarbons and hydrofluorocarbons

What is the evidence that greenhouse gas emissions impact on health?

In New Zealand, climate change and increasing temperatures have the ability to affect health in a variety of ways.

There are several direct effects of climate change that would affect the health of New Zealanders. It is predicted that climate change will not only lead to increased temperatures in New Zealand but also an increase in the frequency and intensity of extreme weather events, including flooding and droughts. In New Zealand, flooding is a significant natural disaster that is predicted to increase with climate change. Droughts would place increased pressure on water supplies. Extremes in temperature, both hot and cold, lead to increased mortality rates.

As the climate changes, ecological systems will be disturbed. As a consequence the range and activity of vectors and infective parasites will change. In New Zealand dengue fever, Japanese encephalitis and Ross River virus could become significant health risks.

The profiles of diseases spread directly from human to human will also change as the climate changes. Warmer temperatures and increased rainfall could support the spread of infections such as campylobacteriosis, cryptosporidiosis and giardiasis through contaminated water supplies. With expected increase in flooding events in New Zealand, regular contamination of water supplies could pose a significant threat to health. Climate change may also increase the incidence of coastal algal blooms. New Zealanders who eat contaminated shellfish would become ill, while indirect effects on health could occur as a result of the loss of marine life.
Ozone layer recovery is expected to be hindered by climate change. The resultant ultraviolet radiation exposure can cause adverse health outcome, such as skin cancer.\textsuperscript{45}

It is predicted that climate change will lead to a rise in sea level which could significantly affect New Zealand. A sea level rise would cause increased coastal erosion, damage to infrastructure (particularly sewage and wastewater disposal) and destruction of arable land leading to decreased food production.\textsuperscript{48} All these would have indirect effects on the health of New Zealanders. Pacific Island nations are very vulnerable to rising sea levels and may not be able to sufficiently adapt to the changes.\textsuperscript{45} This could lead to increased migration of people from these countries to New Zealand.\textsuperscript{45} The increased migration and aid commitments to Pacific Island nations would cause resource constraints in New Zealand.

At the local level, greenhouse gases affect air quality. Vehicle emissions can cause a variety of health effects including increased cardiovascular disease, respiratory symptoms and central nervous system complaints.\textsuperscript{24, 51}

\textbf{How does regional form impact on greenhouse gas emissions?}

One of the major pathways that regional form can affect greenhouse gas emissions is through transport options. In New Zealand, more than 40% of carbon dioxide emission is attributable to transport.\textsuperscript{24} Public transport systems, service accessibility, connectivity and land-use mix are all aspects of regional form that can affect transport options. These are discussed in further detail in both the \textit{Access to services} and \textit{Physical activity} sections.

\textbf{How does energy impact on greenhouse gas emissions?}

Clearly, energy consumption is a major contributor to greenhouse gas emissions. Currently, New Zealand’s energy consumption is increasing in most sectors including domestic, industry and transport. Consequently, New Zealand’s greenhouse gas emissions continue to rise.\textsuperscript{47}

Although it is likely that energy consumption will continue to rise, greenhouse gas emissions can be affected by how energy is sourced and produced. A continued reliance on fossil fuels will lead to increased greenhouse gas emissions. However, switching to renewable and sustainable energy production could lead to reduced greenhouse gas emissions.\textsuperscript{47} A stronger focus on energy efficiency and small-scale energy production may also lead to a reduction in greenhouse gases.\textsuperscript{17}

Local areas in New Zealand that import most of their energy from other regions should consider how that energy is sourced and produced.

Home energy use and heating can impact greenhouse gases. This impact is discussed further in the \textit{Housing} section.

\textbf{Who is most affected by greenhouse gas emissions?}

Children and the elderly are vulnerable populations in relation to greenhouse gas emissions. With the increase in extreme temperatures that climate change is expected to produce, children and the elderly will be disproportionately affected. Those with pre-existing respiratory and cardiovascular disorders are also more likely to be affected.\textsuperscript{24} As Māori and Pacific peoples have higher respiratory and
cardiovascular disease rates, they will also be disproportionately affected by climate change.

The populations mentioned above are also at increased risk from air pollution. Low-income areas also tend to have higher road density and traffic volumes, which decreases local air quality. Certain geographical areas may be more vulnerable to the increase in extreme weather events. For example, the impacts of droughts and flooding on the rural community can be great, while low-lying areas are more prone to flooding.

What regional form interventions help to improve greenhouse gas emissions?

Some regional form interventions discussed in the Access to services, Physical activity and Housing sections, particularly around transport and housing quality would also be able to improve greenhouse gas emissions.

Strategies to reduce car dependence include encouraging walking and cycling, reducing parking provisions and appropriate land-use planning. Increasing public transport availability must be considered in line with sustainable energy use (i.e. how is public transport powered?).

Several areas have been identified from a regional form perspective that can respond to climate change. These include urban design planning, managing local roads, funding passenger transport services and administering building regulations. It is also suggested that the Resource Management Act and the New Zealand Urban Design Protocol could be used to ensure urban form improves energy efficiency and reduces air pollution. The emissions produced from future urban development should be considered.

What energy interventions help to improve greenhouse gas emissions?

Many energy interventions that could also reduce greenhouse gas emissions are discussed in the Housing section, with particular regard to energy efficiency.

Several government strategies are available for use in order to respond to climate change and greenhouse gas emission. These are highlighted in New Zealand’s climate change solutions: An overview and in particular include the New Zealand Energy Efficiency and Conservation Strategy, New Zealand Transport Strategy and Sustainable Land Management and Climate Change Plan of Action.

Raising public awareness is an important initiative in order to take action on greenhouse gas emissions. Regulating activities that produce greenhouse gases as well as monitoring emissions are interventions that may reduce emissions.

Finally, a focus on renewable and sustainable energy is likely to reduce emissions. Common renewable energy sources in New Zealand include, hydro, geothermal and wind. Increases in local and small-scale energy production are also predicted to be beneficial.
References

46. Department of the Prime Minister and Cabinet. Climate change: The government's preferred policy package. Wellington: Department of the Prime Minister and Cabinet, 2002.