



**KĀPITI COAST**  
**DISTRICT**  
**PLAN**  
**REVIEW**

**DISCUSSION DOCUMENT**  
**GLOBAL CHANGE:**  
**ISSUES AND PRESSURES**

The Council is reviewing the District Plan and invites you to  
have your say.

Be involved and help shape Kāpiti for future generations.

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# 1

## INTRODUCTION

This discussion paper is one of a set of papers which look at a range of sustainability issues that are important to consider during the District Plan Review process. The District Plan is Council's main regulatory tool for managing development, subdivision and land use.

By law, each provision of a District Plan has to be reviewed every 10 years. Much of the current District Plan hasn't been changed since it was completed in 1999.

Some of the thinking in the current Plan is now 15 years old, so it is also important to respond to new issues, opportunities and community direction.

Some of the principles underlying the Plan may remain the same but we also need to think about new pressures on the environment that have arisen or increased in the past decade.

It's also important to respond to "community vision" as expressed in the Community Plan and in Local Outcome Statements from communities such as Greater Ōtaki, Waikanae North, Otaihanga, Paraparaumu Beach, Paraparaumu Town Centre, Raumati Beach, Raumati South, and Paekākāriki.

The Review is carried out as one of Council's obligations under the Resource Management Act 1991(RMA), which has a focus on the sustainable management of natural and physical resources, and management of the effects of activities on the environment.

The intention of these papers is to ensure that the District Plan Review successfully converts a range of concerns and directions into RMA 'speak' without losing integrity.

The Council aims to have a District Plan Review that:

- Addresses implications of significant global issues (including climate change)
- Increases the ability of the community to deal with change, through resilience and innovation
- Reduces pressures on the natural environment and resources
- Increases the ability of people to work and live locally in a sustainable way
- Reduces pressure on people's day to day lives (e.g. cost of travel, noise); and
- Respects Kāpiti Coast culture

We have written this round of Discussion Papers to provide a sustainability framework for discussion and consultation on various aspects of the District Plan Review, and to stimulate discussion and feedback on some of the initial ideas being considered. Topics we have dealt with in this phase include:

1. Global Change: Issues and Pressures
2. Biodiversity
3. Natural Hazards and Managed Retreat
4. Food and Rural Productivity
5. Landscape, Character and Heritage
6. Infrastructure and Essential Systems
7. Urban Form and Transport

Readers are invited to complete the submission form at the end of the paper, supporting conclusions they agree with, as well as offering additional ideas and constructive feedback.

After feedback is received on these discussion documents the next steps in the District Plan Review process will be as follows:

- Publication of additional discussion documents including potential objectives and policies
- Production of the Draft District Plan for consultation, based on community feedback
- Notification of Proposed District Plan provisions for formal public submissions
- Submissions and Further Submissions under the RMA
- Hearings
- Council Decisions (providing some legal effect)
- Appeals to the Environment Court (if any)
- The new District Plan Provisions become Operative (with full legal effect)

**For more information on the District Plan Review visit: [www.kapiticoast.govt.nz](http://www.kapiticoast.govt.nz), particularly [www.kapiticoast.govt.nz/districtplanreview](http://www.kapiticoast.govt.nz/districtplanreview), where you can find the Scoping Discussion Document (March 2010).**



## 2

# EXECUTIVE SUMMARY

This paper considers the impacts of climate change, peak oil impacts (or rising costs of energy) and population change on the Kāpiti Coast and considers the role of the District Plan in minimising the impacts of global pressures on the Kāpiti Coast environment.

The majority of the 46,000 people who live in the Kāpiti Coast District live on a fairly flat coastal plain that extends along the western margin of the Tararua Ranges. Much of this coastal plain is only marginally above the existing sea level and is split at various points by a series of relatively swift flowing streams and rivers with steep catchments, all of which present varying levels of natural hazard risk to the surrounding settlements which have grown up around them. Climate change projections of sea level rise and increased storm intensity will create an increasing risk of natural events having a devastating impact on most of the urban areas on the Kāpiti Coast.

Peak oil and volatile energy prices associated with peak oil will impact on the District as a fringe settlement by making transport more expensive and difficult and increasing household energy costs. This could have significant economic, environmental and social impacts for residents of the District.



Global population changes including global population growth, the aging population resulting from the post war baby boom, high levels of urbanisation and international migration mean that there will be increasing pressure on and competition for the natural resources in the District.

These global change issues mean that there will be a long period of uncertainty and change for the District. There is a need for communities to be resilient to cope with these multiple pressures and be able to adapt to new technologies and ways of life.

The District Plan has a potential role in enabling people and communities to deal with change and this review needs to consider how to respond to these significant global issues and pressures to enable the Kāpiti Coast to build resilient communities.



# 3

# ISSUES, CHALLENGES AND TRENDS

## Global issues

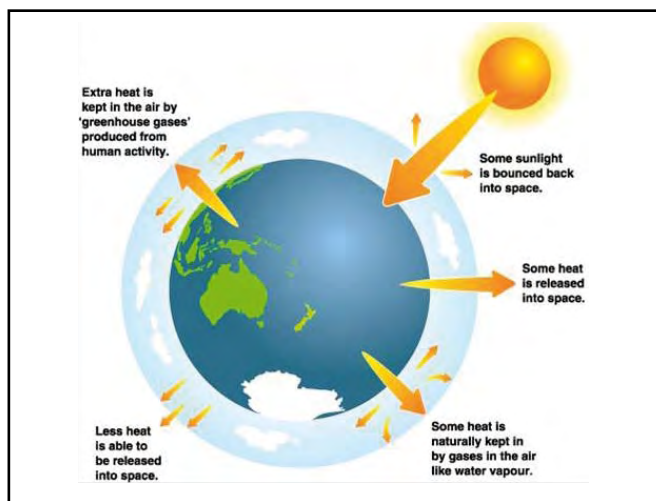
There are three major global issues which will affect the District Plan review for the Kāpiti Coast District. This discussion paper will look at these and the ways that the District can respond to these pressures through the review. The global issues are: climate change; peak oil and global population structure.

This paper will outline these three issues, their relevance for the Kāpiti Coast and potential responses that can be included in the District Plan.

## Climate change

The first issue to consider is climate change. Climate change is a change in the weather patterns over periods of time that range from decades to millions of years. In recent usage, especially in the context of environmental policy, climate change usually refers to changes in modern climate. The global atmosphere has been slowly warming with almost one degree of warming recorded during the 20th century. It may be qualified as human influenced climate change, more generally known as "global warming". In some cases human influence on the climate is direct and unambiguous (for example, the effects of irrigation on local humidity), while in other instances it is less clear.

An increase in global temperature will cause sea levels to rise and will change the amount and pattern of precipitation, probably including expansion of subtropical deserts. Other likely effects include changes in the frequency and intensity of extreme weather events, species extinctions, acidification of oceans and changes in agricultural yields.



**What is Climate Change?**

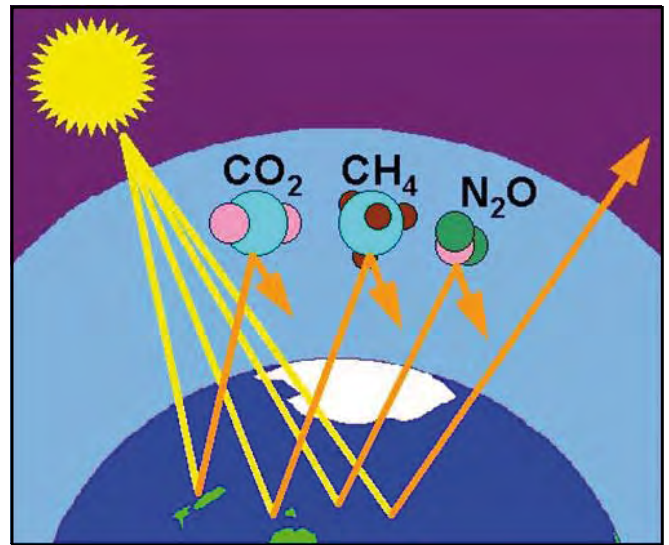
## What is causing Climate Change?

Greenhouse gases (including carbon dioxide, methane, and nitrous oxide) trap heat in the Earth's atmosphere.

At natural levels, these gases keep the Earth's climate at a stable temperature.

Levels of these gases in the atmosphere are now increasing rapidly due to human activity, causing more heat to be trapped.






This is causing the Earth's temperature to rise.



**Causes of Climate Change**

Of most concern is the increase in CO<sub>2</sub> levels due to emissions from fossil fuel combustion, followed by aerosols (particulate matter in the atmosphere) and cement manufacture. Other factors, including land use, animal agriculture and deforestation, are also of concern in the roles they play, both separately and in conjunction with other factors, in affecting climate, microclimate, and measures of climate variables.

### Greenhouse Gases - Sources

- Carbon dioxide (CO<sub>2</sub>): burning processes; mainly fossil fuels 
- Methane (CH<sub>4</sub>): anaerobic oxidation; wetlands, ruminants, rice farming, landfills, natural gas 
- Nitrous oxide (N<sub>2</sub>O): use of nitrogen-based fertilizer 
- Halocarbons (CFC, HCFC, HFC): anthropogenic: spray can propellant, refrigeration 
- Sulphur hexafluoride (SF<sub>6</sub>): anthropogenic: inert gas in computer industry, aluminium smelting 

**Gas Sources**

Presently the focus is on ways to reduce further human impact and to find ways to adapt to change that has already occurred.

Climate change is currently projected to have the following impacts on the Kāpiti Coast. These are expressed as a range as there are several scenarios considered when making predictions.

	By 2030	By 2090
<b>Temperature</b>	<b>0.2 to 1.7 °C</b>	<b>0.6 to 5.1 °C</b>
<b>Annual rainfall</b>	<b>-2% to +8%</b>	<b>-7% to +14%</b>
<b>Winter rainfall</b>	<b>-1% to +10%</b>	<b>0% to +26%</b>
<b>Increase in Intensity of extreme rainfall events</b>	<b>1.6% to 13.6% (5.9% mid-range scenario)</b>	<b>4.8% to 40.8% (16.4% mid-range scenario)</b>
<b>Sea level rise</b>	<b>0.06m to 0.18m</b>	<b>0.18m to 0.8m</b>
<b>High tides</b>		<b>37% to 100% of high tides exceed current high tide level (MHWPS)</b>
<b>High wind events</b>	<b>Increased frequency of westerly winds</b>	<b>Increased frequency of westerly winds</b>

*Source: Updated Climate Change Scenarios for the Kapiti Coast, NIWA client report AKL-2007-091, November 2007*

This means that there is a greater expectation of flooding, coastal erosion, water shortages, drought, high winds and extreme weather events occurring more frequently in the future due to the impacts of climate change.

### Sea level rise

Global sea level change is one consequence of climate change which is likely to have significant implications for the Kāpiti Coast. Sea level change, for much of the last century, has generally been estimated using tide gauge measurements collated over long periods of time to give a long-term average. More recently, altimeter measurements, in combination with accurately determined satellite orbits, have provided an improved measurement of global sea level change.

Sea level rise is very sensitive to increasing temperature, beyond 2 degrees of warming there is an increasing risk that the Greenland and West Antarctic ice sheets will melt, causing ongoing sea level rise of over 1m per century for many centuries. If governments are successful in drastically reducing global emissions and meeting the 2 degrees target, sea levels will still rise but could stabilise at a much lower level.

The latest projections are that the sea level may rise by up to 1.5m by 2100 in New Zealand.



## Peak Oil

The second global issue is peak oil. Peak oil is where due to inescapable natural factors related to the discovery and development of oil resources, global oil production reaches a peak and then goes into irreversible decline. This will result in supply shortages and volatile and increasing oil prices. As the world is critically dependent on oil products for transportation and trade, producing plastics, pesticides and more, the consequences of peak oil will be severe and will impact widely, increasing the costs and availability of food and other commodities, causing economic recession and hardship. While there will always be debate about the exact timing of when oil production will peak, the majority of reputable independent analyses put it well within the next 10 years, making it far too soon to avoid or significantly delay. Any preparation and transitioning to alternatives to oil that can be done before the peak occurs will lessen its impact.

The Kāpiti Coast District is utterly dependent upon a ready supply of affordable oil. Oil drives our transport system, including road building, and is the basis of our construction, and food production (fertilizers and agrichemicals) systems. The cost of oil also has a direct impact on our ability to buy other goods and services.

## Changing population demographics

The global population is growing and is predicted to exceed 9 billion people by 2050 on some growth scenarios. This growth is due largely to a direct function of the fertility rate as well as the quality of healthcare systems (lower mortality rates, particularly for infants). However this is of much lesser importance in developed countries as fertility rates have dropped significantly, in some cases like Western Europe, Japan and South Korea below replacement rate.

There is an increasing trend towards urbanization. Since 1950, the world's urban population has more than doubled, to reach nearly 3.16 billion in 2005, about 48.7% of the global population. It is generally accepted that the global population will continue to increase especially in developing countries.

Current global trends indicate a growth of about 50 million urbanites each year, roughly a million a week. More than 90% of that growth occurs in developing countries which places intense pressures on urban infrastructure, particularly transportation. By 2050, 6.2 billion people, about two thirds of humanity, are likely to be urban residents.

Rural to urban migration has been a strong factor of urbanization, particularly in the developing world. The reasons for urban migration are numerous and may involve the expectation to find employment, improved agricultural productivity which frees rural labor or even political and environmental problems where populations are constrained to leave the countryside.

The influences of the post-war baby boom and succeeding baby bust on population structure will work their way out before the middle of the century. This may lead to shortages of skilled labour as “baby boomers” leave the workforce. It is also clear that there is a trend in developed countries to larger houses but fewer people per household. On the Kāpiti Coast there is a lack of working age people remaining in the district when compared with young and older people. There is also a steady movement of young people from New Zealand to other countries.

The growth in international migration has been an important factor in the urbanization of major gateway cities, such as Los Angeles, Miami, New York, London and Paris. This process has a tendency to take place in the largest cities, but there is a trickle down to cities of smaller size.

The issue of immigrants and refugees for New Zealand and the Kāpiti Coast will inevitably arise. This may include refugees as a result of climate change impacts on Pacific Island nations. Who those immigrants or refugees will be is a major uncertainty, as are where these immigrants will live and how they might become involved with the economy.

Growth surges will challenge developing countries while aging populations will challenge developed countries and migration pressures will challenge all countries.

## Anticipated effects of global changes

Climate change and peak oil mean that Kāpiti Coast communities will be at risk of more frequent and severe rain events which cause widespread flooding, sea level rise which causes coastal erosion, possible salt water intrusion into groundwater and coastal flooding, at the same time that costs of living are increasing rapidly due to the rising, but unstable prices of oil.

Amidst all of this the growing global population will put pressure on New Zealand to accept more immigrants, especially ‘climate change refugees’ from Pacific nations as the population ages and there is a potential shortage of labour.

These factors will potentially lead to increased pressure on and competition for resources, including water, food and fuel, environmental impacts and increased costs to households.

## Possible global change scenarios for the Kāpiti Coast

The Kapiti Coast consists of a series of small communities located primarily on a coastal plain and in the lower foothills of the west coast of the North Island. It is a metropolitan edge community where a large percentage of residents commute out of the District to work (approximately 40% of the working population).

The economy of the Kapiti Coast has relied on population growth and distorted population structure. The structure is distorted by both a high percentage of local jobs in the construction industry or retail and a high percentage of elderly people and children located in the District. Many of the existing communities were developed as rural towns but have now become disconnected from their primary functions. There is significant potential to create stronger local and regional connections and a more mature urban form with a wider range of local employment.

The Kāpiti Coast District community is particularly vulnerable to the impacts of global pressures given its high proportion of older people on low, fixed incomes and high number of young people on low wages. Income levels in the Kāpiti Coast District are lower than those in Wellington City, as is the incident of single occupant households, many of whom are over 65.

The Council has looked at two possible futures for the District in light of these global changes and has called them “resource scramble” and “managed transition”.

Scenarios are useful when it comes to considering how the Kāpiti community could or should respond.

### Scenario 1- Resource Scramble

In this world, events outpace actions.

- Globalised economy, growth focus
- Disruption from 2012 peak in conventional oil production, move to coal
- Petrol \$5-\$10/litre from 2012 to 2025
- Long-term sea-level rise 1m per century

KAPITI	2030	2090
Temperature	+1.7C	+5C
Sea Level	+20cm	+80cm
Intensity of Extreme Rainfall Events	+9%	+40%

*Based on the following scenarios:*

*IPCC A2 scenario, CSIRO Fuel for Thought peak oil scenario, Waikato Choosing futures “Crowded House” scenario, Landcare Research “No8 Wired” scenario, Shell “Scramble” scenario.*

This scenario is characterised by a steady rise in oil prices that is punctuated by a series of supply and price shocks caused by economic or political events or acts of nature leading to significant supply disruptions.

The worst case for this scenario, in terms of oil prices, would be an early peak in production before alternatives are to hand followed by a sharp and sustained rise in prices and economies scrambling to control what oil remains while putting in place alternatives. There have been a number of reports that suggest that current in-ground reserves are significantly overstated, to the extent that the market is operating under false pretences and that a supply crunch is imminent.

### Scenario 2 – Managed Transition

In this world, actions anticipate events.

- Greater global co-operation, sustainability focus
- Petrol \$2-\$3/litre from 2012 to 2025 (CSIRO)
- Managed transition away from oil because of economics and climate change, so no catastrophic “peak oil”

KAPITI	2030	2090
Temperature	+0.7C	+2C
Sea Level	+10cm	+25cm
Intensity of Extreme Rainfall Events	+6%	+16%

*Based on the following scenarios:*

*IPCC B1 scenario, CSIRO Fuel for Thought peak oil scenario (slow decline/fast response), Waikato Choosing futures “Nature Counts” scenario, Landcare Research “The Shire” scenario, Shell “Blueprints” scenario.*

The best case scenario (Scenario 2) is a gradual transition to a less oil dependent society in which affordable alternatives are developed. In this case, prices would tend to rise slowly and steadily as alternatives become available.

The Council has considered these two scenarios and the impacts of each for the District. The Council’s overall approach in response to these scenarios is to have a managed transition through mitigation and adaptation. This will mean that policies and responses need to be robust to a range of possible futures, rather than relying on a single “forecast”. This paper explores in some detail the implications of these scenarios and Council’s proposed response to them.

The community’s desire to respond will also be affected by which scenario comes to pass. While one section of the community will readily support a prompt transition to a vibrant post oil economy, the support of others in the community will be more directly linked to the price of oil.

## Issues and challenges

### Economic issues

Energy is essential to the wellbeing of the District and the people that live in it. We rely upon it to heat our homes so we can stay healthy, to get around and to work. At the same time, when energy is in short supply, disrupted or expensive, it can have a real impact on our lives and the District's economy.

Volatile oil prices have significant costs for residents in all aspects of life as most residents typically operate with a fixed budget. More money spent in one area means less being available to spend elsewhere. So, as the price of petrol rises, there's less money available to spend on other essentials such as food, healthcare and housing.

Higher oil prices also have a direct impact on the price of food as our agricultural system and food prices are directly linked to the price of oil for oil based fertilizers and other agrichemicals as well as transport for distribution. Clearly transport will be significantly impacted by peak oil. This will mean that lots of commodities that need to be transported, for example food, will become more expensive to access in the future. So, while for most people the clearest sign of rising oil prices is on the sign at the local petrol station, it is also clearly indicated by the price of a loaf of bread.

As the price of oil rises, so to does the price of alternatives such as gas, electricity, ethanol and other biofuels. New Zealand's electricity system is dominated by hydro, it is dependent upon gas and coal fired generation to meet peak demand and it is peak demand that sets power prices. In addition if biofuels become more common the decline in food crops, such as maize, due to the use of the land for biofuel could create accelerated food prices and possible food shortages. (See *Food & Rural Productivity*)

Overall, there will be less money for non essential goods and services which in turn will lead to reduced demand and a broad slow down in the local and national economy leading to higher unemployment. At the same time, the ability to service debt (such as mortgages) and pay rates will fall leading to higher arrears and defaults.

Volatile energy prices and the uncertainties associated with it will have environmental costs for several reasons. For example, if homes don't have adequate insulation or efficient hot water systems (such as solar or heat pump systems) that leads to money being spent unnecessarily. The production of the energy that is used unnecessarily has its own environmental impacts, such as greenhouse gas emissions, which would be avoided if the energy didn't have to be produced in the first place.

Another impact relates to the security of oil stocks and markets to disasters. This can include terrorism or natural disaster situations inflating prices or creating breaks in supply chains due to the loss of shipping ports, damage to oil pipelines, oil spills etc. An example of this is following Hurricane Katrina in 2005, many municipalities were left to fend for themselves when their oil stopped flowing: A huge amount of their motor fuels was cut off; they didn't seem to quite realize how much of their finished fuels came through the pipelines.

### Social issues

The Kāpiti Coast will face more severe impacts from peak oil due to the physical structure of the community. Widely dispersed communities that are dependent upon private car use to drive to the supermarket or to access other services such as schooling or healthcare are likely to have more significant impacts related to oil costs.

Many community assets (roads etc) and future developments (new housing developments) that are considered from now on will be in use long after the world has transitioned to a post oil economy. Therefore it is appropriate that peak oil is a major driver of development decisions in the District Plan.



## Environmental issues

The most likely impacts are increased consumption of natural resources and increased risk taking to extract resources. The environmental damage from risky oil exploration which goes wrong leading to massive oil spills or leaks could occur. Similarly alternative energy options, for example nuclear power or biofuels, could cause significant environmental issues.

There are likely to be considerable issues about access to some resources including water and energy, which are already being seen in some parts of the country. Water in Canterbury and to a lesser degree on the Kāpiti Coast has become a significant constraint for businesses and agricultural producers. In the future competition for labour is likely to become an issue as well.

The increased population coupled with worsening natural hazards will be likely to place a high demand for local food production. The loss of 'usable' productive land due to past population growth will be further squeezed by floods and erosion.

Water quality and biodiversity could be adversely impacted by droughts and new disease vectors and the capacity of the environment to absorb waste products. This leads to a reduction in the level of ecosystem services (*see Biodiversity paper*) that can be delivered by the environment.

All of this could result in individuals and communities that have a significantly reduced capacity to deal with change in an environment undergoing significant long term changes.

## Opportunities

Where there is uncertainty created there are always opportunities created for innovative answers to the problem. There is an opportunity to consider whether there are products that can assist in dealing with change/ mitigation of impacts that can be developed on the Kāpiti Coast. The types of opportunities could include innovative ways to turn "waste" into energy, create cheap and reliable micro-electricity generation technologies, have a local food economy which doesn't rely on imports or exports, or create carbon capture projects which qualify for emissions credits in the Emissions Trading Scheme. Any technology or system which increases the ability of local communities to be more resilient to the predicted shocks and pressures resulting from climate change, peak oil and global population pressures would be desirable for the District.

## Response

Climate change and peak oil are clearly linked and need to be thought of in conjunction otherwise the solution to one may worsen the other. For example possible solutions to secure energy supplies may increase the amount of greenhouse gasses and therefore accelerate the climate change impacts. Conversely, mitigation of climate change effects may worsen poverty and inequality associated with rising energy costs.

There is clearly a need to prioritise solutions, in terms of both policy and investment decisions, that reduce both greenhouse emissions and oil dependence to achieve a more sustainable future.

The impacts of constrained fuel supply on private travel demand need to be considered. This requires new thinking about adaptation and reorganization of urban forms as a strategy for energy demand reduction rather than just densification. Some people in low paying jobs may no longer be able to afford to drive to work and so may lose their income.

**There is clearly a need to be able to respond to significant changes in energy prices and supply. What could this mean for the District?**

**Will it mean that Council needs to provide opportunities for "power points" in public car parks to recharge electric cars or will it mean that asphalt is too expensive to use for road surfaces (as it is made from oil products)? Will the Kāpiti Coast be able to have a local food and knowledge economy and reduce the need for residents to commute to other areas to work?**

# INTERNATIONAL, NATIONAL AND REGIONAL LEGISLATION

The most relevant legislation is outlined briefly below.

## Kyoto Protocol

New Zealand has committed to reducing greenhouse gas emissions as part of the Kyoto Protocol. The Kyoto Protocol is aimed at stabilising greenhouse gas concentration to prevent a "dangerous anthropogenic interference". As of November 2009, 187 states have signed and ratified the protocol.

## Resource Management Act: 1991(RMA)

The 2005 amendments introduced as other matter in section 7; "*the effects of climate change*" and "*the benefits to be derived from the use and development of renewable energy*".

Council is required to avoid or mitigate natural hazard risks under section 31 of the RMA.

## New Zealand Coastal Policy Statement (NZCPS) and other National Policy Statements

The NZCPS is a mandatory national policy statement which sets guidelines that regional and District Plans must comply with.

The District Plan must give effect to National Policy Statements and Regional Policy Statements.

There is currently a proposed National Policy Statement (NPS) on 'Renewable Energy' and an operative NPS on Electricity Transmission. These policy statements set electricity generation and transmission as a national priority.

The government has indicated that it is considering having a NPS on Climate Change Impacts or Sea Level Rise.

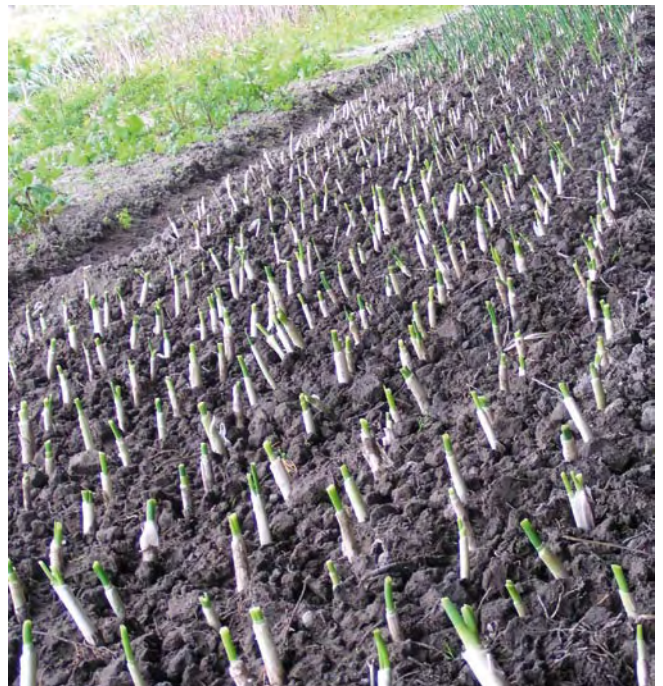
## Wellington Regional Policy Statement and Regional plans

There is currently an Operative and Proposed Wellington Regional Policy Statement (WRPS). The WRPS sets out policies which must be "given effect to" in District Plans and other policies to be considered as part of resource consents. The proposed WRPS has policies promoting compact regional form, the use of renewable energy and avoidance of natural hazards, all of which have relevance to this paper.

The District Plan must not be inconsistent with any regional plan. There are currently a set of regional plans for the Wellington region, the most relevant to this paper is the Wellington Regional Coastal Plan.

The Regional Coastal Plan applies to activities and uses of resources within the coastal marine area that are covered under the Resource Management Act 1991. Activities covered include:

- reclamation and draining of the foreshore and seabed
- building and modifying structures
- destruction, damage or disturbance of foreshore or seabed
- deposition of substances on foreshore or seabed
- introducing exotic plants
- discharging contaminants to land, water
- discharging contaminants to air
- taking, using, damming, or diverting water
- surface water and foreshore activities such as driving on beaches



## 5

# DISTRICT PLAN CONSIDERATIONS

The District Plan has the potential to minimise some of the risks identified as being associated with global issues and pressures. The District Plan is a key tool to manage subdivision and development in the district. This means that the District Plan can identify areas where development is 'permitted' and can occur easily if simple performance conditions are met and areas where development should be carefully controlled. The RMA states that when making District Plan provisions the impacts of climate change, the efficient end use of energy and the benefits of renewable energy are amongst the things that need to be considered. This gives the Council a mandate to look at climate change and peak oil issues as part of this District Plan review.

There are two main ways to respond to these global impacts. These are commonly known as mitigation and adaptation.

**Mitigation** is generally action taken to reduce the impact of change. For example, climate change mitigation is action to reduce the potential effects of global warming by reducing the extent of greenhouse emissions in the atmosphere. Most often, mitigations involve reductions in the concentrations of greenhouse gases, either by reducing their sources or by increasing their sinks.

There is currently an increased effort to develop new technologies and sciences and carefully manage others in an attempt to mitigate global warming. Unfortunately most means of mitigation appear effective only for preventing further warming, not for reversing existing warming

**Adaptation** involves acting to minimise, or ideally avoid, the adverse effects from the impacts of global warming and or peak oil on people and the environment. An example of this is moving settlements away from hazard prone areas to reduce the loss of life and property associated with the hazard. The capacity and potential for human systems to adapt (called adaptive capacity) is unevenly distributed across different regions and populations. Adaptive capacity is closely linked to social and economic development. The economic costs of adaptation are potentially large, but also largely unknown but there is wide agreement that adaptation will be more difficult for larger magnitudes and higher rates of climate change.

Adaptation can be spontaneous or planned, and can be carried out in response to or in anticipation of changes in climatic or other conditions. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards.

Kāpiti District must prepare for the effects that climate change and peak oil consequences will bring. If governments internationally are successful in limiting

temperature rises to two degrees these effects could be modest. If not, they could be extreme. The choice we need to make is whether to adapt to significant climate change impacts or adapt to a radically different way of life to avoid those impacts. This will mean finding new ways of generating and using energy.

The current distorted population structure in the District will make adaptation relatively difficult and potentially decrease the capacity for community resilience.

## Resilient communities

Household or neighbourhood resilience can be achieved in a variety of ways. Partly this is related to the degree of self-sufficiency that can be achieved at the household level, such as storing rainwater for reuse, micro generation renewable energy systems (such as solar panels), growing fruit and vegetables, growing medicinal plants and gaining first aid skills. But resilience also depends on support and co-operation within neighbourhoods and communities, as full self-sufficiency is rarely achievable.

Resilient communities are able to adapt to sudden change as well as long term transition. Building resilience in the face of peak oil and climate change will need to take account of economic, energy and transport resilience.

**Economic resilience** – The New Zealand economy is particularly dependent on the ongoing health and welfare of our life-sustaining systems, e.g. agriculture (quality or rural water and water allocation) and tourism (scenic protection and transport). It is also dependent on oil-based energy. Maintaining these sectors of the economy in their present form will be difficult given the pressures of climate change and peak oil. Preparation is needed now to assess how they may adapt and change so they can contribute positively to New Zealand's prosperity in the future.



**Energy resilience** – Energy use in the district is dominated by transport (liquid fuels) and residential energy (electricity and gas). Some energy is used by industrial and commercial activities but this is not as significant as in many other parts of the country.

Renewable energy in New Zealand is primarily from hydropower and comprises approximately 73% (in 2009) of the electricity generated, a ratio that has been falling for decades while load growth has been met primarily by natural gas-fired power stations. As of February 2010, New Zealand had an installed wind generation capacity of 497 MW. The high proportion of renewable generation means electricity supply is relatively resistant to external shocks. The key vulnerability for the country and the district as with most areas relates to use of petrol and diesel for passenger transport and freight.

**Transport resilience** – Transport energy use is affected by a number of factors, some of which can be affected by the provisions of the District Plan, while others will be affected by regional and national policy decisions and individual actions. These include:

- Travel demand – urban development and access to community facilities, shops and work
- Mode – the provision of practical, fit for purpose travel options such as walking and cycling, public transport and private cars (including increasing private car occupancy through car pooling etc)
- Fuel availability and efficiency – access and ability to use biofuels and electricity in public transport and private cars and the use of more efficient vehicles

Issues around travel demand and transport modes are also discussed in the *Urban Form and Transport* Discussion paper.



## Best practice response

### Potential District Plan actions

#### Mitigation actions

There are several areas where mitigation can occur. The first is increasing the use of renewable energy sources to replace fossil fuels for energy generation. The potential technologies include: wind, solar, tidal photovoltaic cells and biofuels. The District Plan can ensure that it is easy to develop renewable energy systems at a variety of scales in appropriate locations.

Another option is to increase energy and transport efficiencies. Transport choices have a potentially significant role to play in reducing emissions by increasing the use and efficiency of public transport and increasing walking and cycling. These transport options may only occur when fuel prices make private car use unaffordable for many people.

The District Plan can require travel demand management be assessed as part of major development projects and that walking, public transport and cycling opportunities are maximised when new development occurs in the District. The District Plan also has some ability to require that buildings and developments are oriented to make the most use of passive solar heating and cooling.

The District Plan can direct and concentrate the location and type of development in the District. This can reduce emissions by concentrating intensive residential development around shops and services, including public transport systems to maximise the opportunities for local employment and minimise the need for residents to travel.

The other component of mitigation is to reduce the amount of greenhouse gases in the atmosphere by creating carbon sinks. This is generally achieved through increasing the amount of woody vegetation in the environment as plants use up carbon dioxide in the atmosphere as they grow. The District Plan can restrict the removal of existing areas of significant vegetation and carefully manage forestry operations as well as requiring planting to occur as part of new developments.

#### Adaptation actions

Even the most stringent efforts to reduce emissions would still not prevent further climate change impacts, nor is there a possibility of avoiding the impacts of peak oil, making adaptation essential. It is now also clear that without mitigation, climate change would likely reach such a magnitude as to make adaptation impossible for some natural systems.

With regard to adaptation, the effects of climate change will not begin to bite seriously for decades. The issue of sea level rise and increased storm intensity is however being felt in some locations already. It is important to begin to adapt as soon as possible to enable adaptation to be as smooth as possible. This is even more important in terms of peak oil impacts which are already being felt

as the price of oil rises. The major concern is the rapid acceleration of change that is predicted to occur, rather than current trends using data from the last 50 years.

New buildings and infrastructure that are put in place have a lifetime of 100 years or more. Therefore it is important to update planning frameworks now to anticipate this long term change. The District Plan is the main regulatory tool to manage land use and development in the District. This means that the District Plan can have a significant role in adaptation to global pressures.

Actions can be taken to help communities and ecosystems cope with changing climate conditions, such as the construction of flood walls to protect property from stronger storms and heavier precipitation. Protection from impacts is not always appropriate and moving out of harm's way may be a preferable strategy. The District Plan can specify whether protection systems are an appropriate way to manage natural hazard risks or not. It can also ensure that development does not intensify in hazard prone areas.

The preservation of local food producing land and the planting of agricultural crops and trees more suited to warmer temperatures and drier, or more variable, soil conditions are also actions that will be needed to adapt to predicted changes. The District Plan can ensure that productive land is not developed for urban uses. The District Plan can also ensure that key resources such as water are used efficiently and that households include non-potable water systems.

The District Plan has a potential role in supporting economic resilience. However this requires that the long term value of air, water and soils is placed above short term economic gains. The District Plan has the potential to enable the development of a wide range of local business opportunities but it cannot require people to take up the opportunity created by land use zoning.

There is comparatively little locally produced energy. All fossil fuels are imported into the District (although gas, and some liquid fuels, are produced within New Zealand). The District is assumed to have a reasonable supply of solid wood fuel for domestic heating. Little electricity is produced within the District. The District Plan can ensure that it does not place undue barriers in the way of developing sustainable and renewable energy resources.

Direct temperature increases will need to be factored in: requirements for heating and cooling of buildings will be different in 50 to 100 years time as hotter summers will place a greater demand on water supplies and air conditioning systems. Housing and energy designs and technologies need to respond to this. The District Plan can require that houses are located on sites to maximise the opportunities for passive heating and cooling.

## **Non-District Plan mitigation and adaptation actions**

Internationally there is also the option of trading emissions with sinks. This is known as emissions trading or carbon credits.

We can also increase fuel efficiency - of vehicles through hybrid, plug-in hybrid, and electric cars and improving conventional automobiles, and through individual-lifestyle changes and changing business practices.

More radical proposals which may be grouped with mitigation include biosequestration of atmospheric carbon dioxide and geo-engineering techniques ranging from carbon sequestration projects such as carbon dioxide air capture, to solar radiation management schemes such as the creation of stratospheric sulfur aerosols. These technological fixes are still largely theoretical and have not yet been properly assessed in terms of negative environmental side-effects.

## **Kapiti Coast District Council's overall approach**

The Council has stated in the Development Management Strategy and the long Term Council Community Plan (LTCCP) that managed transition through mitigation and adaptation is the desired direction. This will be based on policies and responses that are robust to a range of possible futures, rather than relying on a single forecast.

## **Current District Plan**

The current District Plan does not address the issues of peak oil and climate change as these were not recognised as significant issues at the time the current plan was developed. However flood modelling undertaken in 2004, which is included in the District Plan, took projected climate change into account. It is important to note that the climate change scenarios which were considered in 2004 are now outdated and climate change impacts are projected to be far more severe.

In relation to population change the District Plan considered the demographic predictions at the time it was developed.

The District Plan does have policies, rules and standards to manage natural hazards, promote walking and cycling, minimise stormwater runoff, require water demand management and energy efficiency (in some specific areas) and manage densities to create a compact urban form. These current provisions will assist in both mitigating and adapting to the global issues and pressures.

## Gaps

These global change issues are likely to have severe impacts for the District that were not contemplated in 1999. This review needs to incorporate these factors into development and land use planning in the District.

An overall review of the current zoning system needs to be undertaken to look at the district from a 'constraints mapping' basis. This starts with identifying natural systems including areas where interventions are desirable to improve the quality and effectiveness of these natural systems to be resilient to shocks. The aim of the review is to best enable the Kāpiti Coast to become resilient communities in terms of economic, energy, food and transport resilience.

## Recommended District Plan Review actions

### Carrying capacity or ecological footprint concepts

A carrying capacity assumes that it is possible to measure the ultimate population for the District based on the land available for particular uses such as food and energy production, housing and open space, taking into account the ecological and hazard constraints for the District. The District Plan review should explore carrying capacity as a concept and assess options against the theoretical carrying capacity for each resource. This is discussed in more detail in the *Biodiversity* discussion paper which is part of this series of District Plan review discussion papers.

### Managed retreat

The District Plan is a key tool to enable managed retreat from areas at high risk from natural hazards associated with climate change. This is discussed in more detail in the *Natural Hazards and Managed Retreat* discussion paper which is part of this series of District Plan review discussion papers.

### Integrated land use and transport planning

Planning to minimise the need to travel by car to work, shop, go to school, and access medical and other community services is a key method of reducing the impact of peak oil for the community. This also has the benefit of acting to reduce greenhouse emissions related to transport. This is discussed in more detail in the *Urban Form and Transport* discussion paper which is part of this series of District Plan review discussion papers.

This review should ensure that the District Plan provides for housing choice, with affordable housing possible in areas close to shops, education and services including public transport.

## Local food production

Providing the best opportunities for a wide range of food to be produced in the Kāpiti Coast District enables the district to be more resilient to price shocks associated with peak oil prices, enables more local employment, reduces the need for food to be imported and therefore reduces transport emissions. This is discussed in more detail in the *Food and Rural Productivity* discussion paper which is part of this series of District Plan review discussion papers.

The District Plan should allow for farmers markets and street fairs to be easily established to maximize opportunities for a local food economy. These also encourage social interaction to build social capital and resilience as well. The District Plan should also enable food to be grown in urban areas including on public land as community gardens.

## Sustainable forestry

Forestry is one way to increase the vegetation available to mitigate greenhouse gas emissions and sequester carbon. Carbon capture forestry needs to be undertaken in a specific way to retain the embedded carbon in the long term. One method of this is coppicing. This is discussed in more detail in the *Biodiversity* discussion paper which is part of this series of District Plan review discussion papers.



## Renewable energy

One means of reducing carbon emissions is the further development of renewable energy such as wind power. Most forms of renewable energy generate no appreciable amounts of greenhouse gases.

There are also investigations into underwater turbines that do not require a dam. And pumped-storage hydroelectricity can use water reservoirs at different altitudes to store wind and solar power.

The District Plan should increase local energy supply by enabling the development of small scale renewable energy from photovoltaic, small scale wind and micro hydro systems, and heat from solar hot water systems.

This may require special rules for small scale renewable energy systems which fall outside of normal height plane and distance to boundary rules. An example is allowing a roof to be built to comply with the height plane rules and for roof-mounted solar electricity or hot water panels to be added to the roof even when the panel would otherwise breach the height plane.

## Infrastructure design

The District Plan should require that infrastructure be designed for the worst case scenario within the life of the infrastructure and also include a plan to retreat from hazard prone coastal and floodplain areas. There should be a requirement to design with natural systems to minimise energy use to run infrastructure. This is discussed in more detail in the *Natural Hazards and Managed Retreat* and *Infrastructure and Essential Systems* papers which are part of this series of District Plan review discussion papers.

## Housing

District Plans and the Building Code are the key tools regulating the way housing is developed in New Zealand. The Building Code has a minimum standard for home insulation. Energy efficiency in all new homes including the choice of appliances is difficult to influence with the District Plan, but it is important that the District Plan does not create barriers to more sustainable housing forms. The District Plan should include passive solar requirements to achieve summer shading but allow winter sun into dwellings.

## Build Community resilience

The District Plan should not unnecessarily reduce the ability of individual households and neighbourhoods to provide all the resources and skills needed to live. This is particularly important in the light of combined climate change and peak oil shocks that will occur.

## Resilience Indicators

- **Percentage of food consumed locally that was produced within a given radius**
- **Ratio of car parking space to productive land use**
- **Amount of traffic on local roads**
- **Number of businesses owned by local people**
- **Percentage of local trade carried out in local currency**
- **Proportion of the community employed locally**
- **Percentage of essential goods manufactured within a given radius**
- **Percentage of local building materials used in new housing developments**
- **Number of 16 year olds able to grow 10 different varieties of vegetables to a given degree of basic competency**
- **Percentage of medicines prescribed locally that have been produced within a given radius**



# 6 CONCLUSION

There are significant global issues and pressures facing the District as a result of Climate Change, high energy costs and population pressures which need to be considered in the District Plan review. The District Plan can enable development and prevent significant environmental damage. Both of these techniques are recommended in this paper.

Summary of District Plan Review actions as a result of global change issues:

	1	2	3	4	5
<b>Possible new concepts</b>	Protect Productive potential (for local food growing)	Enable sustainable forestry including in urban areas.	Set energy efficiency budgets for developments.	Enable renewable energy generation at multiple scales.	Consider using ecological footprint or carrying capacity as an assessment tool for development.
<b>Concepts to continue and/or Strengthen</b>	Strengthen Natural hazards planning to enable managed retreat .	Reinforce compact urban form around neighbourhood centres.	Prevent new development in hazard prone areas.	Strengthen linkages which support public transport.	Carrying capacity/ thresholds – infrastructure.
<b>Barriers to Remove</b>	Have specific (less strict) height controls for micro-energy generation.	Facilitate home occupations – signage, parking, broadband local employment.	Revise residential yard requirements to allow greater flexibility of house design.	Allow mixed housing options including minor household units, group housing.	

## REFERENCES

Kāpiti Coast District Council

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Operative District Plan 1995

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<http://www.kapiticoast.govt.nz/Planning/Community-Plan/Local-Outcomes/>

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<http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/coastal-management/nz-coastal-policy-statement.pdf>

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[http://www.gw.govt.nz/assets/importedfiles/1566\\_regionalpolicyst\\_s3033.pdf](http://www.gw.govt.nz/assets/importedfiles/1566_regionalpolicyst_s3033.pdf)

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Future Scenarios for NZ: Classic Edition

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National Institute of Water & Atmospheric Research

Updated Climate Change Scenarios for the Kapiti Coast, client report AKL-2007-091, November 2007 (can be provided on request)

The Permanent Forest Sink Initiative

<http://www.maf.govt.nz/forestry/pfsi/>



## DISCUSSION DOCUMENT: GLOBAL CHANGE

**Your details**

Your Name: \_\_\_\_\_

Organisation (optional): \_\_\_\_\_

Address: \_\_\_\_\_  
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E-mail: \_\_\_\_\_

Phone: \_\_\_\_\_

Please note that all submissions (including names and contact details) or a summary of submissions may be made publicly available at council offices and public libraries and on the Kāpiti Coast District Council website. Personal information will also be used for administration relating to the subject matter of the submissions, including notifying submitters of subsequent steps and decisions. All information will be held by the Kāpiti Coast District Council at 175 Rimu Road, Paraparaumu, with submitters having the right to access and correct personal information.

Please post this form to:

Kāpiti Coast District Council  
Attn: District Plan Review  
Private Bag 60601  
175 Rimu Road  
PARAPARAUMU 5254



You can also submit your response on our website:

www.kapiticoast.govt.nz, send it in an e-mail to [districtplanreview@kapiticoast.govt.nz](mailto:districtplanreview@kapiticoast.govt.nz), or drop it off at Council Libraries or Service Centres.

NOTE: Please number your answers if you are not using this form.

**Please do this by 5pm, Monday 15  
November 2010**

**Questions****1. Have we summarised the issues accurately?**
 Yes       No
Comments: \_\_\_\_\_  
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\_\_\_\_\_**2. What do you think of the new ideas for the District Plan Review? Are we on the right track?**

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**3. What have we missed?**

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**4. Would you like to receive further updates on the District Plan Review?**
 Yes       No
**Preferred method of communication**
 Email       Post       Phone

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**5. Do you want updates on all topics or specific topics only?**
 All       Specific (Please list)

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Please attach additional pages if necessary.