PART B:
SUSTAINABLE DISTRICT

1. Sustainable Economy

1.1 Economic Profile

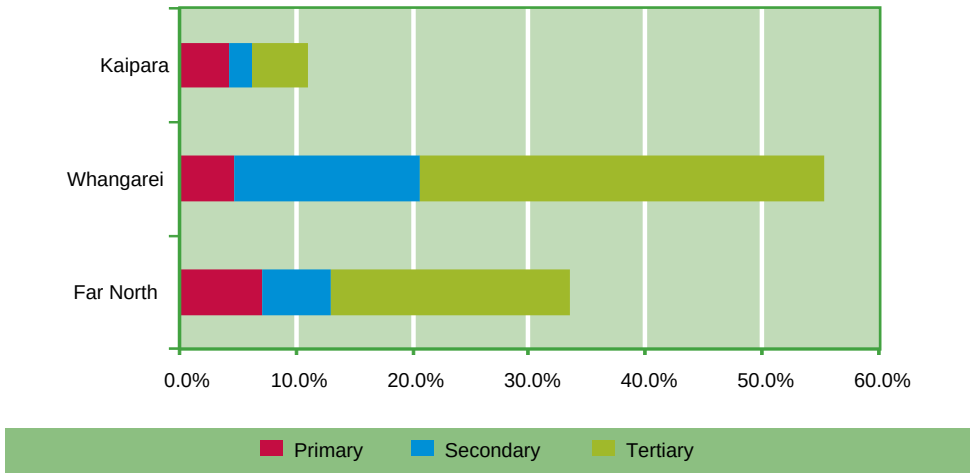
Infometrics Ltd was commissioned to prepare a series of reports about the local economy. The main focus of these reports was the Northland regional economy. However, wherever possible, information on the economy of Whangarei District was also prepared. This chapter therefore includes material about both the Northland Region and Whangarei District.

Northland Regional Economy

Northland's economy is among the smallest of the 16 regional economies in New Zealand. Northland's gross domestic product (GDP) was $4,470 million in the year to March 2008 (in current prices) which accounted for approximately 2.5% of New Zealand's total GDP. In basic terms, GDP sums up total revenues of all industries within a specified area, and then removes costs of raw materials, services and components that were sourced from outside the area. GDP is essentially a measure of economic activity that focuses on productivity. In this case, the sum of all economic activity for both the egion and districts were calculated, and then costs of inputs from outside either the region or the respective district removed from gross revenues.

Whangarei District is the largest contributor to Northland's GDP, accounting for more than half (54.0%) of the region's value added, whilst Far North District contributes slightly more than a third (34.6%) and Kaipara contributes about 11%. Figure 31 also illustrates that Far North District has the biggest primary industry sector in the region, whilst Whangarei District has the largest secondary and tertiary industry sectors.

Figure 31: **Share of Northland GDP, Year to March 2008**

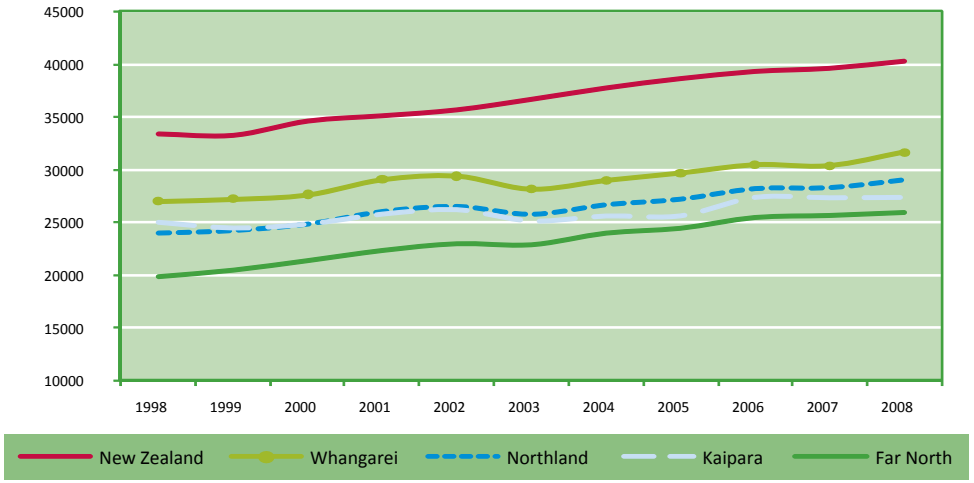


Source: Infometrics, 2009.

The regional GDP equates to around $29,000 per person, which is one of the lowest per capita figures for any region. In the same period, the New Zealand GDP was around $172 billion, which equates to around $40,400 per person (Figure 32). Figure 32 also indicates that Whangarei District has the highest per capita GDP within Northland ($32,000), but also that it is still much smaller than the per capita figure for New Zealand. Of the Northland districts, Far North has the lowest per capita GDP, with Kaipara District in an intermediate position.

The low figures for Northland, as a whole, are of concern. If Northland and Whangarei are to increase wealth within the region and the district, per capita GDP must be increased to be more in line with the rest of New Zealand.

Figure 32: **GDP Per Capita (2008 prices)**



Source: Infometrics, 2009.

Northland's economy has grown more slowly (3% per annum) than the national economy over the past ten years (3.3% per annum). Economic growth in Northland was also volatile; over the past ten years annual growth has varied from 5.4% in 2001 and 5.2% in 2006 to around -1.4% in 2003. The contraction in 2003 was led by the agricultural sector and caused by a serious drought. National economic growth is expected to average an increase of just 2.2% per annum in the ten years to March 2018. The outlook for Northland is very similar, with growth forecast to average 2.2% per annum.

There has been divergent growth between the three districts. Over the 10 years to March 2008, the strongest growth occurred in the Far North, averaging 3.5% per annum. The Whangarei economy expanded on average by 2.8% per annum, and Kaipara by 1.6% per annum. At the same time, the national economy grew at 3.3% per annum. However, the ten year growth figures mask more complex growth dynamics. The pace of growth appears to have eased in the Far North, with growth averaging 3.0% per annum from 2003 to 2008, compared with an average of 4% per annum from 1998 to 2003. The pace of growth increased in both Whangarei (from 2.0% to 3.5% per annum) and Kaipara (from 1.4% to 1.9% per annum) between 2003 and 2008.

Over the next 10 years (2008-2018), growth prospects are strong for Whangarei and Kaipara, which are both expected to average 2.4% per annum economic growth, while growth in the Far North is expected to average 2% per annum. However, the continuing economic recovery following the global recession appears to be slow, and these rates of growth may be considered optimistic over the short to medium term.

Structure of the Northland Regional Economy

There are three main sectors within most economies: primary industries based on the production of commodities from natural resources; secondary industries based on manufacturing, construction, and infrastructure; and tertiary industries based on the provision of finished goods and services to businesses.

Northland is considerably more dependent on primary industry (contributing 15.4% to GDP) than the national economy (7%). Secondary industry's contribution to the Northland economy (23%) is also slightly higher than the same measure at the national level (20.5%). However, tertiary industries are smaller contributors, providing 50.6% of regional GDP, compared with the contribution of 63.2% in New Zealand as a whole. Major industries that account for a notably larger share of the Northland economy than the same industries measured at the national level include agriculture, forestry and fishing, electricity, gas and water supply, government administration and defence, and health and community services.

As an industry sector, manufacturing is the largest in Northland, contributing 16.6% of value added to the region's economy in the March 2008 year. Second largest is agriculture, forestry and fishing (14.7%) followed by business and property services (11.9%). Tourism makes a larger contribution (5.8%) to GDP in Northland than it does at the national level (5.0%). However, Northland's share of national tourism GDP is significantly lower than its share of total guest nights and total tourism expenditure due to lower average daily spend by tourists, and leakage of spend to other parts of the country.

Industries that made the largest contribution to Northland's growth over the past ten years were other health and community services (11%) and real estate (10.6%). Additionally, forestry and logging and wood product manufacturing combined contributed 17.2% of total growth. Tourism contributed 5.5% of the growth increment. Conversely, meat and dairy manufacturing have been strong contributors to growth in the national economy but have declined as contributors to growth in Northland. Communication services and finance and banking have also made significantly larger contributions to growth in the national economy than to the Northland economy.

The fastest growing industries in Northland over the past 10 years were services to finance and insurance (11.8%), local government administration (10%), wood product manufacturing (8%), other health and community services (8%), machinery and other equipment manufacturing (7.2%), other construction (6.7%), and real estate (6.7%).

Retail trade is the largest employer in Northland accounting for 12.5% of total employment but only 6.5% of GDP. Tourism accounts for 11.2% of total employment in Northland but only contributes 5.8% to total GDP. Other industries which make larger contributions to employment than GDP include accommodation, cafés and restaurants (5.3% and 1.7%), other construction (8.0% and 3.6%), pre-school, primary and secondary education (6.4% and 3%) and other health and community services (8.8% and 5.4%).

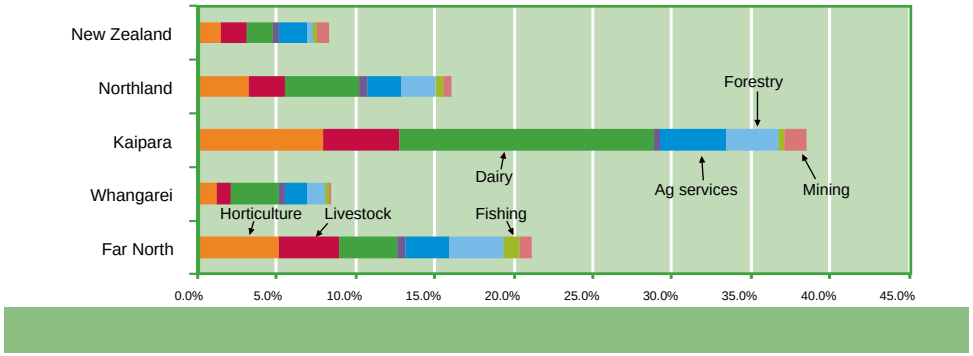
Structure of the Whangarei District Economy

In Whangarei District, the contribution of primary industries to local GDP is 8.2%, and this is reasonably close to the national contribution of 7%. The key difference with this national average is the greater importance of dairying in Whangarei (3% contribution to the district's total production compared with 1.7% contribution nationally). Secondary industries contribute 27% to local GDP, compared with the national contribution of 20.5%. Amongst secondary industries, the contribution of manufacturing to local production in Whangarei is also substantial, with 20% of production in Whangarei coming from manufacturing activities, compared with a national contribution of 13%. However, a large component of manufacturing in Whangarei is related to activities at Marsden Point Oil Refinery, which has a 10% contribution to the local GDP. The contribution of tertiary industries to local GDP is 53.7%, which is substantially less than the contribution of tertiary industries nationally at 63.2%.

Primary Industries in Whangarei District

As Figure 33 below illustrates, Whangarei District is less reliant on primary production than either Far North or Kaipara Districts. In Whangarei, however, the dairy industry, agricultural services, and forestry are relatively important. The dairy industry is very important to Kaipara District's economy.

Figure 33: **Primary Industries' Contribution to GDP**



Source: Infometrics, 2009.

Secondary Industries in Whangarei District

The importance of manufacturing to the three districts is more even, but is relatively more important in Whangarei. Wood processing is the second most important manufacturing activity for Whangarei, representing 2.3% of the district's total production. Cement (1.2% of total production) and transport equipment manufacturing (1.2%) are two other important areas of manufacturing in Whangarei.

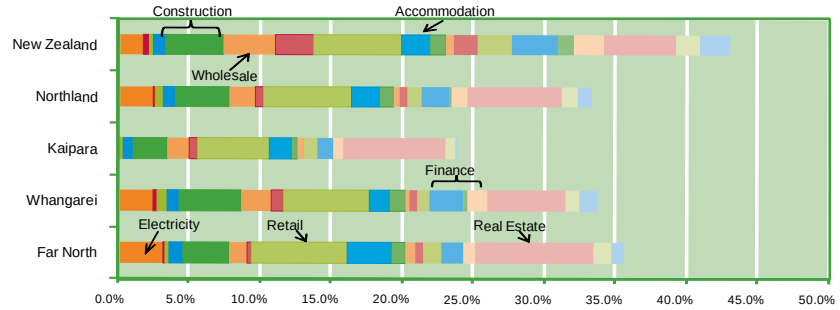
Figure 34: **Secondary Industries' Contribution to GDP**

Source: Infometrics, 2009.

Tertiary Industries

In terms of tertiary industries, retail trade (6.2% of total economic activity), cultural and recreational services (6%), real estate (5.4%), central government (5.4%), construction (5%), and local government (4.7%) are the major contributors to the Whangarei District economy. Whangarei's most important tertiary industries by contribution to GDP are presented in Figure 35 and Figure 36. Because of the number of tertiary industry types, these are separated into services primarily generated from private sources or public sources. Private services contribute 34% of Whangarei's total economic activity, whilst public services contribute 25%.

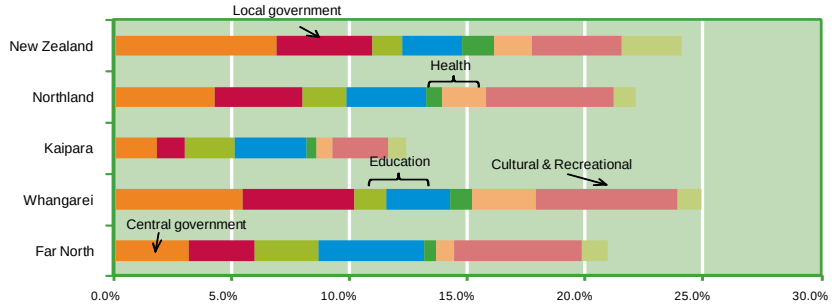
Figure 35: **Tertiary Industries' Contribution to GDP (Private)**



Source: Infometrics, 2009.

Cultural and recreational services stand out amongst public services, whilst real estate stands out amongst private services as being key contributors. Please note that slightly different scales are being used for Figure 35 and Figure 36.

Figure 36: **Tertiary Industries' Contribution to GDP (Public)**



Source: Infometrics, 2009.

Table 12 indicates the key industries that contribute the most to GDP in Whangarei. Manufacturing industries are a notable omission from this list. This is because there are many different types of manufacturing industry, 15 in all. Wood product manufacturing is the largest contributor at 2.3%. Tourism has also been omitted, as it is not measured at the national level. However, its contribution to GDP is estimated at 5.2%, which would make it a high contributor.

Table 12: **Industries with Largest Contribution to Whangarei GDP 2008**

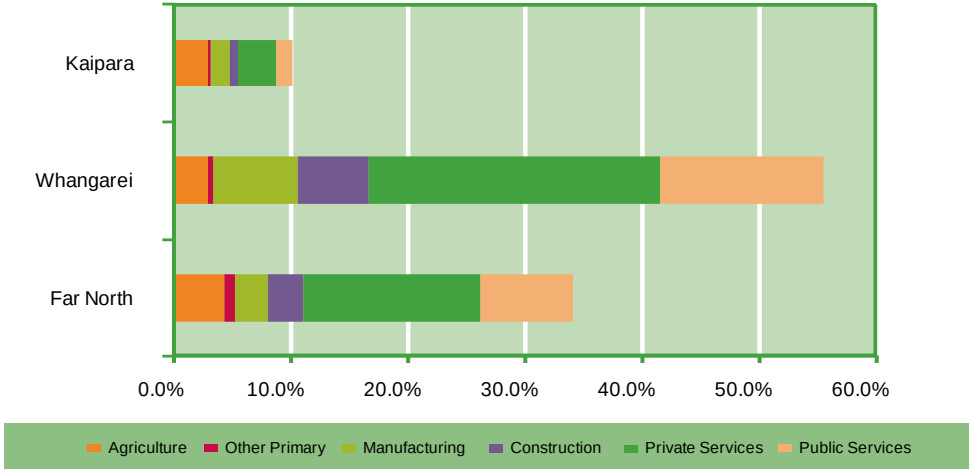
1	Oil and gas (including petroleum refining)	9.9%
2	Retail trade	6.2%
3	Other health and community services	6.0%
4	Other business services	5.4%
5	Real estate	5.4%
6	Central Government administration and defence	4.7%
7	Other construction	4.3%
8	Dairy and cattle farming	3.0%
9	Pre-school, primary and secondary education	2.8%
10	Hospitals and nursing homes	2.7%
11	Electricity generation, transmission and distribution	2.5%
12	Finance and banking	2.4%

Source: Infometrics, 2009.

Employment

Another important measure of the local economy is employment numbers. In Northland, there are approximately 63,000 jobs, and Whangarei provides approximately 55% of the total (or 34,650). Figure 37 illustrates the share of key industries in regard to employment.

Figure 37: **Share of Employment by Different Industries 2008**



Source: Infometrics, 2009.

Some industries or sectors are quite labour intensive and tend to have a lot of jobs associated with them. Industries or sectors with very large numbers of jobs (over 3,000) include retail trade, construction, business services, health and community services, and the manufacturing sector. Other industries with high numbers of jobs (more than 1,000) include the education sector, hospitals, wholesale trade, and central government administration. Thus, important labour intensive industries in Whangarei are retail trade, health services, education, construction, and business services. Important capital intensive industries are oil refining, real estate services, electricity distribution, and finance.

Table 13: **Percentage of Total Jobs in Whangarei by Industry 2008**

1	Retail/Trade	12.3%
2	Other health and community services	9.8%
3	Other construction	9.1%
4	Other business services	8.7%
5	Pre-school, primary and secondary education	5.3%
6	Hospitals and nursing homes	4.4%
7	Accommodation, restaurants and bars	3.8%
8	Wholesale trade to non trade sectors	3.3%
9	Central Government administration and defence	3.1%
10	Personal and other community services	3.0%
11	Wood product manufacturing	2.7%
12	Dairy and cattle farming	2.4%

Source: Infometrics, 2009.

Whilst it is omitted from Table 13, the tourism industry was estimated to provide 8.6% of local jobs, which makes it a large contributor.

Cross-sector Industries

Whilst previous tables focussed on individual industries, connections exist across different industries. Several clusters of important industries can be identified, whether by share of GDP or employment.

Table 14: **Share of Jobs and GDP in Whangarei by Industry Clusters 2008**

Sector	Jobs	GDP
Agriculture, fishing and food processing	7.1%	8.9%
Mining, mineral processing, and oil refining	2.1%	11.3%
Forestry, wood and paper processing	3.3%	3.6%
Other manufacturing	6.8%	5.0%
Utilities	0.8%	3.5%
Construction and real estate	12.6%	10.5%
Accommodation, retail, and wholesale	20.5%	10.6%
Transport	2.9%	2.0%
Communication	0.5%	0.7%
Finance and business services	13.4%	12.0%
Government	13.8%	6.1%
Health	14.2%	8.7%
Education	7.0%	3.7%
Other services*	15.0%	13.4%

Source: Infometrics, 2009.

*Other services include imputed rents and unallocated items such as indirect taxes

In terms of production, key clusters are finance and business services (contributing 12% of GDP in 2008), mining, mineral processing (including cement production), and oil refining (11.3%), accommodation, retail and wholesale trade (10.6%), and construction and real estate services (10.5%). Most of these industry clusters are also important sources of employment. Table 14 also indicates that health services and education are also very important as a source of employment for Whangarei District.

Whilst tourism is not included in Table 14, at 8.6% share of employment and 5.2% contribution to GDP, it holds a high rank as an employment cluster, and medium rank as a GDP cluster.

Surprisingly, forestry, wood and paper manufacturing is a small industry cluster in both Whangarei and Northland (4% of employment and 4.2% of GDP). However, this industry cluster has been one of the biggest contributors to GDP growth in both Whangarei and Northland at 15.7% and 16.2% respectively.

District Industries and Employment

In addition to the information prepared by Infometrics, there are other sources of data available that can help build a picture of local businesses. Statistics New Zealand collates business demography data, which puts together information about employment numbers and firm size by geographical area (Statistics New Zealand, 2007).

There are approximately 30,000 employees (excluding self-employed who number about 6,000) and 9,500 firms located in Whangarei District. The majority of businesses are considered either self-employed/sole operator (6,300) or have 1-5 employees (2,030). Micro-businesses (1-5 employees) employ approximately 4,750 staff. There are approximately 460 small businesses (6-9 employees), which employ a total of 3,300 people. Small-medium sized businesses (10-19 employees) number approximately 400 and employ around 5,300 staff. Medium sized enterprises (20-49 employees) employ 6,100 staff across 210 businesses. Large-medium firms (50-99 employees) number around 50, and employ about 3,100 staff. The biggest employers (100+ employees) number just under forty and provide employment to around 7,500 staff.

Most self-employed/sole-operators are in property and business services, agriculture, forestry and fishing, and construction. Micro-businesses (1-5 employees) are generally involved in property and business services, retail trade, and agriculture, forestry and fishing. Small enterprises (6-9 employees) are involved in retail trade, construction and manufacturing. Small-medium businesses (10-19 employees) are primarily in retail trade, property and business services, and accommodation, cafés and restaurants. Most of the medium sized businesses (20-49 employees) are involved in retail trade, education, and property and business services. Schools and community services provide most of the medium sized employers. Larger employers (50-99 employees) are generally found in manufacturing, health and community services, education, and retail trade.

The largest employers (over 100 staff) are spread across several sectors, with larger manufacturing businesses employing around 1,700 employees, education services around 880 employees, property and business staff around 350, retail trade around 900, and health and community services employing around 2,500 staff. Local government administration also provides two of the largest employers.

Most large employers or prospects for employment are located in Whangarei City, with approximately 17,400 employees working for 2,900 employers. Other nodes of employment include Kamo with 2,750 employees, Maunu with 2,240 employees, Otaika with 1,450 employees, and Marsden Point/Ruakaka with 1,330 employees. Other settlement nodes outside these five areas share approximately 3,800 jobs between them. Finally, there are approximately 1,100 employees working outside of any settlement node. Sole-operator/self-employed businesses are spread throughout the district, with no obvious central location. Most micro-businesses are found in central Whangarei. Overall, the importance of Whangarei City to the local economy, in terms of employment, is obviously very high.

Further Information: Infometrics, 2009, Historical Performance of the Northland Economy

1.2 Drivers of Economic Growth

Economic growth in Whangarei, and Northland, is influenced by a variety of factors. It is difficult to gauge how the economy will develop over the next 50 years. However, it is possible to identify factors that have driven recent growth. Some of these factors can give direction as to where and how growth may occur over the longer term. The following material is sourced from the Infometrics Report "Drivers of Economic Growth in the Northland Regional Economy". Three approaches were used by Infometrics to understand the factors that have influenced growth. They included an investigation of industry multiplier effects, an analysis of leading indicators, and an investigation of industry spill-over affecting growth.

Multiplier Analysis

Multiplier analysis is a technique which measures the amount of added value generated for an area's economy resulting from a dollar increase added in a specific industry. This technique helps identify linkages between local businesses, and can identify when spending in one industry leads to further purchases of goods within an area. Low multipliers are associated with business that are owned and operated outside of the area, have low levels of purchases from local firms, or have high purchases from firms outside the area. Industries with high multipliers tend to have beneficial effects on local economies as they purchase goods and services locally, which in turn can lead to further spends by these local businesses.

Industries in Northland that have the highest multipliers include meat and dairy manufacturing (3.4), residential construction (3), electricity generation (2.4), wood product manufacturing (2.4) and forestry and logging (2.3). Thus, these industries either purchase a wide range of local goods and services or are locally owned. The industries with low multipliers include oil and gas extraction and distribution plus refining (1.1), real estate (1.3), communication services (1.3), and finance and banking (1.4). The multipliers for Whangarei tend to be similar to those of Northland.

Despite some industries having low multipliers, the size of the industry may mean that it still has considerable impact on the local economy. When the multiplier value is combined with the actual significance of an industry, it is possible to see which industries have the largest local spends that continue to circulate locally (Table 15). Forestry and logging, retail trade, and other health and community services stand out as major industries with significant impact on the district economy through local purchasing.

Table 15: **Multiplier Analysis – Weighted Impact for Whangarei**

1	Forestry and logging	198.46
2	Retail trade	178.51
3	Ownership of owner-occupier dwellings	151.08
4	Other health and community services	149.99
5	Oil and gas extraction and distribution	149.22
6	Other construction	147.66
7	Wood product manufacturing	125.19
8	Central Government administration and defence	112.06
9	Wholesale trade to non-trade sectors	99.64
10	Other business services	99.57
11	Meat and dairy manufacturing	99.11
12	Real estate	95.91

Source: Infometrics, 2009.

Looking forward, the multiplier analysis in Table 16 is more future orientated. This table looks at the marginal impact of different industries on growth within Whangarei's economy. A marginal impact is based on the growth/decline potential of a given industry, and how it may contribute to wider growth levels across the whole economy. The marginal impact value thus combines data from industry trends with its respective multiplier. Wood product manufacturing, forestry and logging, other health and community services, and other construction have all emerged as being important to growth in Whangarei's economy.

Table 16: **Multiplier Analysis – Marginal Impact for Whangarei**

1	Wood product manufacturing	2.57
2	Other health and community services	2.07
3	Other construction	1.81
4	Forestry and logging	1.81
5	Other business services	1.39
6	Real estate	1.29
7	Retail trade	1.27
8	Central Government administration and defence	1.01
9	Services to finance and insurance	0.71
10	Local government administration	0.7
11	Road freight transport	0.61
12	Electricity generation, transmission and distribution	0.59

Source: Infometrics, 2009.

Leading Indicators

Leading indicators analysis is a technique that examines the extent to which external events precede changes in economic activity in Northland. In terms of leading indicators, increases in guest nights and non-residential construction activity in Northland are most strongly associated with future increases in economic activity in Whangarei. Other indicators of future growth are house prices in Whangarei and arrivals/departures of external migrants.

Table 17: **Key Leading Indicators of Economic Activity in Whangarei**

1	Northland Region - Guest nights
2	Northland Region- Non-residential consents
3	Whangarei – Departures
4	Auckland Region - Guest nights
5	Whangarei - House prices
6	Whangarei – Arrivals

Source: Infometrics, 2009.

For Northland as a whole, there appears to be local and regional effects from changes in the Auckland economy, e.g. increases in guest nights, retail sales, external migration arrivals, house prices, and car registrations in Auckland are generally associated with future increases in economic activity in Northland.

Conversely, increases in interest rates and increased dwelling construction activity in Auckland are associated with declines in economic activity in Northland and Whangarei. In essence, economic activity in Auckland exerts an influence on economic activity in Whangarei and Northland.

Spillover Impacts

Spillover impact analysis is a technique that identifies those industries where changes in output are associated with a greater than expected change in area-wide economic activity, as benefits

of growth in one industry "spill-over" to industries that are not directly involved with that industry. The industries with the highest growth dividend for Whangarei are shown in Table 18. High growth dividends are associated with high spill-over. Whilst agriculture has the highest spill-over impact in Whangarei, various manufacturing industries and those industries associated with tourism feature prominently.

Table 18: **Estimate of Implicit Industry Growth Dividends for Whangarei**

1	Agriculture	4.75
2	Textile and apparel manufacturing	3.11
3	Non-metallic minerals manufacturing	2.8
4	Wood and paper product manufacturing	2.58
5	Cultural and recreational services	1.79
6	Local government administration	0.79
7	Machinery and equipment manufacturing	0.78
8	Metal product manufacturing	0.73
9	Food, beverage and tobacco manufacturing	0.4
10	Accommodation, restaurants and bars	0.38
11	Furniture and other manufacturing	0.35

Source: Infometrics, 2009.

Many industries with implicit industry growth dividends for Whangarei were also applicable to Northland. The main exceptions to this were in the finance and insurance and personal and other community service industries which had more potential to Northland as a whole, whilst food, beverage and tobacco manufacturing, and furniture and other manufacturing had more potential in Whangarei.

Employment Projections by Industry

The Infometrics Report (2009) contains projections about growth and decline of industries out to 2030. The population in Whangarei District is projected to be approximately 100,000 by 2030. Over time, it can be expected that the labour requirements for different industries will also change. This is based upon trends in an industry (growth/decline), labour needs, and implications from an ageing demographic. These labour force projections are based on a continuation of recent trends in the local economy. If the trends for an industry change, then the labour requirement projections will also change.

In the Whangarei District, the industries with the highest projected increase in labour requirements were other business services, central government services, hospital and nursing homes, other health and community services, and transport equipment manufacturing. In some industries labour requirements may decline in Whangarei District, and these include forestry and logging, other food manufacturing, retail trade, and wholesale trade to non-trade sector. Reduced labour requirements can be due to a decline in an industry, or could be due to increased mechanisation and capital investment.

For Northland as a whole, the largest employment increases are expected to be in sectors such as hospitals and nursing homes, central government administration and defence, and pre-school, primary and secondary education. Some increases in employment opportunities within some engineering firms and some primary production industries are also expected. In parts of the region that serve as the main base for business services, central government and health provision would be expected to see increased employment. In this case, it would be locations such as Whangarei City and Maunu (largely due to the presence of the hospital) which would likely see the highest increase in employment opportunities.

Demographic Changes

Like many places in New Zealand and, more widely, in the United States, Europe, Japan, Korea and China, the average age of the local population is increasing. This is happening as so-called 'baby-boomers', who formed a large post-war bulge in many demographies, are beginning to retire without necessarily having large youthful populations or new job entrants to replace them in the workforce. A similar situation is occurring in Australia, where it is further compounded by ongoing major skills shortages.

An ageing population dynamic will challenge present ideas about retirement age, work patterns, and local infrastructure needs. This statement is not suggesting that an ageing population is inherently disadvantageous, but instead simply highlights the need for planning to avoid major shocks in the national and local economies. There are both benefits and disadvantages in an ageing population. An ageing population will have quite different infrastructural demands, whether preferred recreational opportunities, health needs, preferred business services, and different models of living. These needs, especially those connected to health, can require higher levels of skilled professionals. Attracting skilled professionals may need investment in assets that are beneficial to these types of workers.

A sustainable community needs a reasonably balanced population structure, e.g. relatively balanced levels of youth, early working cohorts, mature working cohorts, late working cohorts, and retirees within the population. This is important as each age group often has different sets of preferences and interests, competitive instincts, and abilities, which will have a cascading impact on the viability of local business opportunities, sports and recreation clubs, and the provision of infrastructure, both physical and social. For example, the longevity of social infrastructure such as sports clubs is dependent on a pool of players, coaches and administrators, with differing roles appealing to different age cohorts.

Safety can also be indirectly impacted by age group imbalances. Different age groups have diverse recreation preferences, and these preferences are reflected by where and when each group is most active. Increased use of public space by different user groups is a key component of crime prevention in which the opportunities for crime are reduced because there are more people out and about in public spaces. Age group variety can lead to maximising use of public spaces. Some age groups tend to be more mobile, and thus more visible. Even visiting friends for dinner can lead to increased travel trips within an area, and thus increase vigilance on the streets.

Likewise, local business communities depend on quality workforces with different levels of experience. The general level of goods and services available in a provincial city tends to be smaller than those offered in a metropolitan area. Smaller business communities have fewer opportunities to specialise, and will often have a more general focus in order to garner a range of clients. To a certain extent, this is to be expected, and often provincial cities have a wide range of lifestyle opportunities to compensate for the lack of some cultural or recreational services. But an imbalance in population cohorts may lead to declines in the present availability of cultural or recreational services.

When population age imbalances occur, certain business do better than others if their particular target population is increased through demographic changes. Should this situation become extreme, the overall effect can be a decline in the variety of goods, services, and facilities available to the local population as customer thresholds for some businesses drop. Whilst key target customers differ from business to business, it is the overall diversity of businesses and services that can encourage business vitality within cities, along with a reputation for being vibrant and resilient.

Further Information: Infometrics, 2009, Drivers of Economic Growth in Northland Economy

1.3 Development Strategies

Whilst it is projected that approximately 55,000 more people will live in the district over the next 50 years, it is not possible to say exactly what these people will do, and what skills such new residents might bring. The Sustainable Futures 30/50 Demographic Profile Report (2009) notes the ongoing loss of younger population cohorts and a steadily increasing median age for many communities. Population ageing will provide both opportunities and constraints for local economic development. But in order to increase opportunities and mitigate constraints, it is evident that some thought needs to be given to how Whangarei might attract skilled workers across all sectors, and retain more younger people in the district.

Whilst the availability of land and choice is a key factor in decisions made by firms, local labour skills availability, quality of life attributes, and potential to attract suitable staff increasingly play a role in business relocation, establishment, or expansion decisions. Three main methods are often used when trying to improve local economies. These include the attraction of new employers to the district, ongoing support and development of local enterprises, and the growth in key population cohorts that lead to other opportunities for economic development. These three methods have in common a requirement for a skilled, readily available workforce.

According to Statistics New Zealand projections, the bulk of future growth in New Zealand over the next 20 years will be located around Auckland, in the Waikato around Hamilton, in the Bay of Plenty near Tauranga, parts of Wellington, in Canterbury near Christchurch, and Queenstown Lakes. Most of these areas are associated with increasing urbanisation. Overall, 62% of growth in New Zealand is expected to be located in the Auckland Region alone. Businesses and potential future employers will be taking note of these trends.

Different regions in New Zealand have employed different strategies to attract skilled migrants, such as the development of a festival culture in Taranaki, the original fees free tertiary education scheme at Southland Polytechnic in Invercargill, and the immigration campaigns in the United Kingdom that promoted Hawkes Bay as a destination to live and work. Whilst New Zealand has not faced the same degree of labour competiveness between individual cities that has occurred in the United States or Europe, New Zealand continues to face increasing competition from work opportunities in Australia.

Historically, New Zealand workers are relatively mobile and are prepared to migrate for the right job. However, with an ageing population both nationally and globally, attracting skilled labour may be more difficult than in the past (Department of Labour, 2008). In the event of continued job mobility but fewer skilled workers, there may be competition between cities, with those that offer higher wages and/or higher quality of life experiences having an edge over areas offering lower wages or lesser experiences. If skilled labour conditions continue to tighten globally, it would be expected that other attributes of potential job locations will increase the attractiveness of some jobs. This is where the promotion, and reality, of quality of life will assist in both attracting and retaining skilled staff.

Given the ageing population and presently low skill base in Whangarei District, there may be difficulties in generating high quality local employment opportunities in current conditions. Therefore it may be necessary to develop strategies that increase local skills through education or through attracting skilled labour to the district. Both are critical to the success of small and medium sized enterprises. Having a skilled, stable workforce may then lead to further employers setting up businesses. Efforts are being made to increase the local skills sets through various education and training programmes, especially at Northland Polytech.

Understanding the motivation of skilled labour when choosing jobs has been the subject of research, especially in the United States, and the four main theories outlined below are currently the focus of much attention. Not surprisingly, these theories have one feature in common: the availability or potential access to a wide set of amenities, whether biophysical or cultural. Places offering a wide set of attributes and amenities are increasingly seen as important factors in local economic development, whether in marketing the diversity and vitality of a central business district or in leveraging off amenities and environmental attributes to attract skilled labour.

Amenity is not just important in terms of living locations, but is increasingly seen as important in developing high quality working environments and can help improve productivity. A brief examination of the employment section in many New Zealand papers, or using web-based job sites, will show an emphasis on lifestyle opportunities, or use of phrases such as diversity, pristine environment, amenity, world class services and so on when advertising for staff.

The following strategies are offered as a think-piece for Council, businesses and the community to consider when developing initiatives to improve the local economy and help retain and attract skilled working aged residents to the district. One particular theory is not offered as a panacea for the district, but there may be elements from each that are relevant to Whangarei District's future economic development.

Creative Class

This theory is based on work from the United States, which suggested that most urban economies are driven by the so-called 'creative class'. According to the theory, productive processes have shifted from being mainly dependent on access to raw materials to productive processes based more on non-tangible elements such as knowledge. This has occurred as global trade has led to greater exchanges of raw materials. This has also resulted in some changes from the classic model of employment where people followed jobs, to one in which some jobs start to follow talented people. The rise of internet based businesses has also enabled some freedom of choice in where to live. Under this model, it becomes important to attract talent. The creative class theory has captured the attention of many decision makers world-wide, but it must be acknowledged that most places that use this strategy tend to be larger cities, which may already have knowledge intensive industries.

The creative class does not just include artists, musicians, and artisans, but also other professionals that use creativity in their work, such as information technology, health (especially health professionals) or education and research. Those localities that promoted wider community diversity had a reputation for tolerance and safety, and had a range of potential leisure and recreational activities that tend to attract more creative people. These would, in turn, give more strength to the local economy where they may act as attractants for more entrepreneurs. Favoured locations generally have ethnic and racial diversity; have walkable, vibrant, mixed-use central business districts; a variety of cultural and historical amenities; and outdoor recreational opportunities. The night time economy can also be important in developing opportunities to attract skilled and educated younger age groups.

The enhancement of the Whangarei urban area, especially in the central business district, would seem to be critical under this scenario. Proposals such as the Whangarei 20/20: Living the Vision, proposals to introduce more mixed-use development in the central areas, some residential intensification in suitable locations, the second harbour bridge, the proposed Hundertwasser Museum, the Hatea River circular walkway, the proposed cultural centre at Hihiaua, central business district improvements, Vitalise Whangarei (put forward by the Northland Chamber of Commerce), and development of the William Fraser Reserve on Pohe Island all have the capacity to improve the amenity of the central urban area. Under this approach, landscape, amenity and recreational opportunities, along with a safe and attractive urban environment are treated as assets and are marketed as such.

Compared with larger metropolitan areas, Whangarei District does not presently have a wide selection of jobs dedicated to creative type work. Whangarei City does have a central core area, is close to Auckland, and may develop sufficient population and amenities to attract more talented people and businesses. And, as the burgeoning local arts and food scene in Whangarei and Northland suggests, there are growing numbers of people living in Whangarei attracted by lifestyle factors such as local food options, arts and culture and leisure activities. There is potential to attract more creative people through an increase in urban amenity and, given the ageing population, health professionals would appear to be a critical target. Another possibility would be joint ventures with Northland Polytech in knowledge based industries, business services, and information technology, etc.

Amenity-led Development

This theory is seen as more applicable to rural areas than creative class theories. It is founded on the concept that amenity, where the scenic, recreational, and entertainment values of an area are high, can lead to changes in migration patterns. 'Sea-change' and 'tree-change' are terms coined in Australia for those communities that have seen rising levels of migration as people move from the larger cities to smaller communities located on the coast, near forests, and near the alpine districts. In some cases, 'sea change' reversed years of slow population decline in many communities. In the USA, states in the Rocky Mountains and in the Southwest have seen a growth in the migration of people seeking alternatives to the larger cities.

The theory developed as an alternative to the prevailing view that rural areas are simply places of commodity production. According to this theory, rural landscapes have the capacity to draw in other skills, especially where farming has become increasingly mechanised with a corresponding decline in local labour opportunities. Some skills can be geared towards other opportunities such as tourism ventures, but may simply be remote work using the internet. A key part of amenity-led development is to ensure a high level of easy public access to a wide variety of experiences, mostly outdoors, and including environmental based activities.

Amenity-led migration strategies are typically used to broaden the skill base in some rural areas, or have led to more entrepreneurs moving into the area who may create opportunities for local employment. Reasonably sized firms in the United States have located in smaller cities where amenities are not only evident, but also have much variety in terms of recreational choices that are easily accessible. Thus, amenity-led development may create opportunities to attract new businesses. However, new migrants bring new skills to an area, but also bring different sets of values that can create conflict, and this conflict needs to be managed. The Queenstown Lakes area is an example of such development. Notably, amenity-led development is seen as complementing traditional industries, not replacing them.

Amenity-led development is likely to be important to the future prospects of the growth nodes of Hikurangi, Parua Bay, and Waipu, and to a lesser extent Marsden Point/Ruakaka. All three locations have particular characteristics, and these need to be maintained or enhanced, dependent upon the character of the settlement. Developing more villages with a defined core will also be beneficial to amenity-led development strategies.

Business Improvement Districts (BID)

The focus of this theory is on developing stronger core business areas within a district or city, ranging from the central business district to local suburban shopping areas as "delightful, clean and safe" that in turn attract more businesses and more variety in local services. The basic premise is that, with majority agreement between businesses within a defined area, a targeted rate will be levied by the local council on behalf of an incorporated association. The monies raised will be used to develop projects, events, and ideas to promote the business district. The local council is responsible for raising the monies and also ensuring that the monies are spent on BID projects. The development of a targeted rate can be struck over all businesses meeting certain criteria in an area, meaning that costs are distributed widely, especially if all benefits are likewise distributed widely.

Actual projects are chosen by the association, and can range from graffiti control through to beautification projects and business recruiting. Not all BIDs are retailing centres, with some light industrial and manufacturing areas also looking to improve viability through recruitment of other businesses and crime prevention. Many BIDs are consolidated around the development of amenity – ranging from higher levels of safety, through to attractive light industrial areas that promote productivity. In New Zealand, BIDs have mainly been set up within the wider Auckland Region, including North Shore, Auckland City, Rodney District, Waitakere and Manukau. Different themes for each improvement district will often emerge, dependent upon local strengths. For example, North Shore has seven BIDs and each has a particular theme. These include Northcote that uses food and associated events for promotion, whilst Birkenhead Town Centre uses the natural environment for its promotion.

Whilst a BID is more of a tool than a strategy, it is a tool available to private businesses and business groups that want more input into local initiatives to improve business opportunities. Whilst local government can assist local businesses, other concerns and issues often compete for limited funds from general rates. The most applicable locations for such a strategy are the five urban villages of Kamo, Tikipunga, Onerahi, Otaika and Maunu, especially those with core business areas that can be further enhanced.

Cluster Development

The cluster theory implies that developing a cluster of related and supporting industries would lead to local sophistication and diversification of services, which combined with demanding customers, would drive local innovation processes. This would, in turn, enable more competitive advantages to accrue locally. Whilst Business Improvement Districts are primarily used for the promotion of an established business community, cluster-led development strategies concentrate on attracting a more targeted set of industries and businesses, particularly those that have complementary connections.

For example, the development of a private health business cluster would seek to attract a selection of businesses in the health industry, including pharmacies, private hospitals, rest homes, dentists, physiotherapists, and alternative health practitioners. Alternatively, a cluster development focussing on food manufacturing would seek to develop links between producers, manufacturers, promoters, and marketers in producing an holistic approach to development. In Whangarei, a marine industries cluster may assist existing marine industries and attract new marine industries.

Large scale examples of this approach include works carried out around Brisbane in the development of the Southbank for education and research, or in Hamilton near the University, where a host of research and development sectors have located. A small scale version of this could include the development of local tourism cooperatives in some parts of the district that compete with other locations in Northland and New Zealand, or perhaps the development of industries using a wider set of marine resources. Of the nodes, Whangarei City and Marsden Point/Ruakaka are the places where cluster development is most relevant. Whangarei City has the advantage of a wide pool of resources, individuals and businesses to draw on, whilst Marsden Point/Ruakaka has a relatively blank slate to start from.

Further Information: Whangarei District Council, 2010, Development Strategies Report

1.4 Minerals and Aggregates

The Whangarei District has some history of high value mineral extraction, but most recent mining activity has been in bulk commodity aggregates, limestone and sand extraction. Some of this quarrying activity supports the cement manufacturing works located at Portland, which exports to markets nation-wide. Other quarrying activity is significant in terms of providing the material for construction of our infrastructure, such as roads and buildings, to support growth. Aggregates and minerals are finite and fixed location resources. Therefore, identifying and protecting future resources is important. Any constraints on access, such as tenure of the land and/or conflicting land uses, may affect future availability of resources.

In 2005, mineral production contributed around $22 million to the Whangarei economy. Mining and quarrying directly employed 41 people and cement production employed 407 people in the year to March 2008. As the single largest employer in mining and cement manufacture, Golden Bay Cement, which operates the Portland Cement Works and the Portland Quarry, employs 141 staff. It is estimated that this generates another 293 jobs in the Whangarei District. In monetary terms the operation adds approximately $60 million per annum in value to the district economy and $243 million to the gross output of the district (Tonkin and Taylor, 2008).

The mining and quarrying sector, as a whole, is not currently a major contributor to GDP in Whangarei. However, as the population of the Whangarei District and the Northland Region continues to grow so too will the demand for these resources. We may also see demand for resources in the Whangarei District increase as the Auckland Region continues its northwards expansion and pressure is put on its resource stocks.

Mineral Resources

Minerals generally have a high value and there is potential for export out of the region (and New Zealand). Metals, in most cases, have large international markets so if any quantity can be produced in the Whangarei District it could be readily sold. Industrial (including non-metallic) minerals may require the identification of markets and therefore production quantity may be limited. Metallic and non-metallic minerals occur in the Whangarei District and have been extracted in the past. Opportunities for future extraction have also been identified.

Hot spring mercury (cinnabar) was discovered at Puhipuhi in 1892 and mined between 1917 and 1945, producing 31 tonnes of mercury. Since the 1980s exploration of the Puhipuhi field has targeted gold mineralisation. There has been no mining of gold from Northland, although a large number of hot-spring gold-silver prospects are known. Copper deposits are recorded at Pakotai, Parakao and Purua and bog iron has been mined intermittently in the past from a deposit near Kamo (Christie and Barker, 2007).

Manganese deposits are present in a belt of Waipapa Group rocks which extend from the Far North to Whangarei Harbour. The most significant manganese deposits in the Northland Region have been mined, but several other smaller deposits are present, including 150,000 tonnes of mineralised rock at Hukerenui. Polymetallic vein zinc and lead deposits are present at Reef Bay, near Kauri Mountain. There has been no past production of zinc and lead in Northland and further detailed geological mapping would be required to accurately assess its future potential.

Deposits of rhyolite-hosted halloysite clay and volcanic-related kaolinite clay have been recorded at Ocean Beach and McLeod Bay, and a known bentonite clay deposit is located at Puhipuhi. Geological information also suggests that there may be undiscovered deposits across parts of the district. The Northland east coast feldspar sand deposits contain large resources of glass grade alumina. Processing would be required to remove peat and heavy minerals but there is sufficient tonnage present to establish a major plant (estimated 240 million tonnes) at Ruakaka (Christie and Barker, 2007).

Aggregates (and Coal) Resources

Bulk commodity resources in the area include aggregate, dimension stone, limestone, sand, and coal. Aggregate production is a significant industry within the Whangarei District. A map of aggregate and coal locations is shown in Figure 38. Almost all of the mineral production within the Whangarei District (with the exception of decorative stone) is aggregate, sand or limestone primarily used for building or infrastructure.

The Otaika Quarry is one of only two quarries within Northland that produce more than 500,000 tonnes of rock aggregate per year. Two quarries in Otaika and Waipu produce between 100,000 and 500,000 tonnes of rock aggregate annually, and there are a large number of small (<50,000 tonnes per year) aggregate quarries worked intermittently. Several quarries produce concrete aggregate, sealing chip and other high quality aggregates. Small quantities of building and dimension stone are currently quarried in the Whangarei District, including scoria at Kamo. Sand for construction is currently mined in Bream Bay.

Table 19: **Mineral Production in Whangarei District 2005**

Commodity	Tonnes
Building and dimension stone	1,200
Clay for brick, tiles, etc.	-
Clay for pottery and ceramics	-
Decorative pebbles including scoria	45,000
Limestone and marl for cement	990,880
Limestone for agriculture	33,804
Limestone for industry and roading	-
Rock for reclamation and protection	8,797
Rock, sand and gravel for building	356,939
Rock, sand and gravel for roading	590,188
Rock, sand, gravel and clay for fill	338,031
Sand for industry	1,942
Total tonnes	2,366,781
Total $ value	$22,090,134

Source: Christie and Barker, 2007.

The Whangarei District produced 1,024,684 tonnes of limestone in 2005 (990,880 tonnes used for marl and cement, and 33,804 tonnes for use in agriculture). The district has two main limestone units – crystalline Whangarei Limestone and argillaceous Mahurangi Limestone. Both are used in the manufacture of cement at the Golden Bay cement plant at Portland. Whangarei Limestone is quarried at Wilsonville, 20km north of Whangarei, and other smaller sites and quarries are spread across the district. Mahurangi Limestone is quarried at Tikorangi Hill at Portland, and supplies 75% of cement raw kiln feed. It is also used as a road aggregate, and lime is used for binding unsealed road, in stabilisation of road aggregates, and in the manufacture of agricultural fertilisers.

There are no active coal mines in the Whangarei District, but over 2 million tonnes were produced at the coalfields of Hikurangi, Kamo, Kiripaka and Whareora between 1865 and 1982. Even though some coal may remain in local fields, high sulphur content, and large national resources make future extraction unlikely. Unless a new local industry develops which could provide the impetus to develop a field, significant use in the future is unlikely. Peat deposits occur in the Hikurangi area although no assessment has been made of their potential future value (Christie and Barker, 2007).

Future Production

Christie and Barker (2007) analysed potential future production of mineral and aggregate resources in the Northland Region. In the Whangarei District, annual production could increase an estimated 467% ($125,304,811 from $22,090,134 in 2005). The production scenario is a combination of expanding existing production, primarily in aggregates, limestone and sand, and new mining operations for several metallic and non-metallic minerals. Walton (2007) utilised this scenario to determine the potential economy-wide impacts. In this case, Whangarei District's GDP would be lifted by nearly $98 million, of which over $50 million would be in sectors other than mining.

The future of the mining industry in Whangarei District is likely mainly to involve an increase in production of aggregates and limestone, particularly as the population and economy continue to grow. Demand for aggregate in Northland has correlated well with population growth in the past five to six years, according with the hypothesis that an expanding population requires additional housing and infrastructural assets, thus creating demand for building materials, including aggregate. Demand for aggregate and limestone is also linked to wider economic and population growth beyond the district. The continued urban expansion of the Auckland Region could promote demand for exporting aggregate resources available in the Whangarei District, particularly as those in Auckland become scarcer.

Figure 38: **Aggregate and Coal Resource Locations in the Whangarei District**

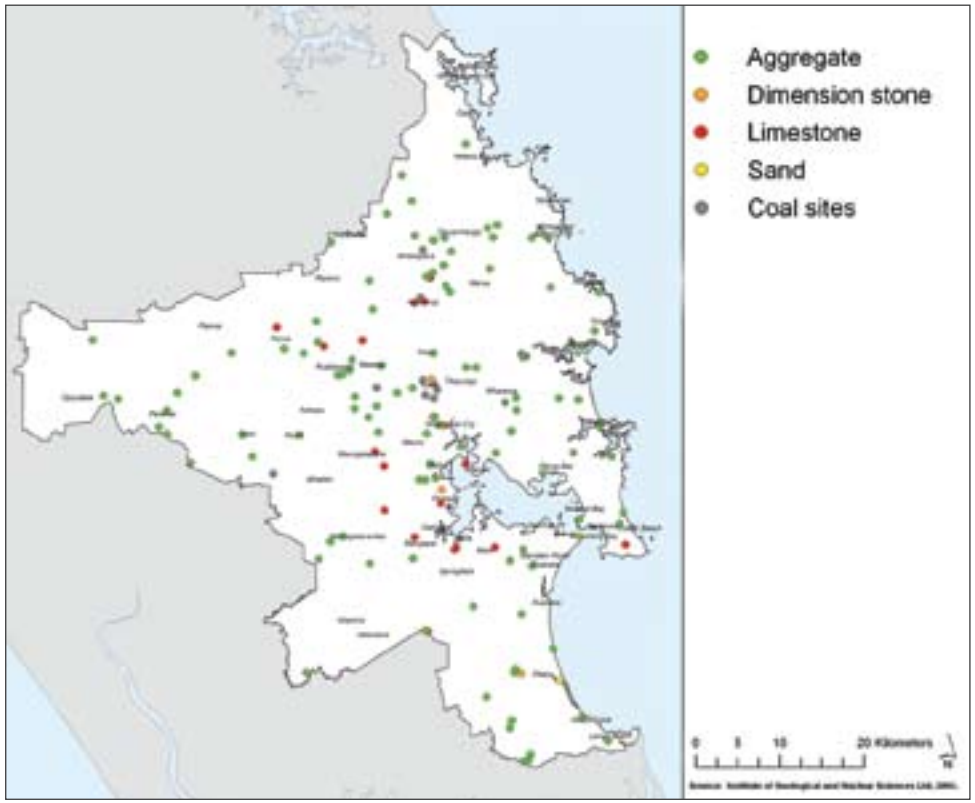
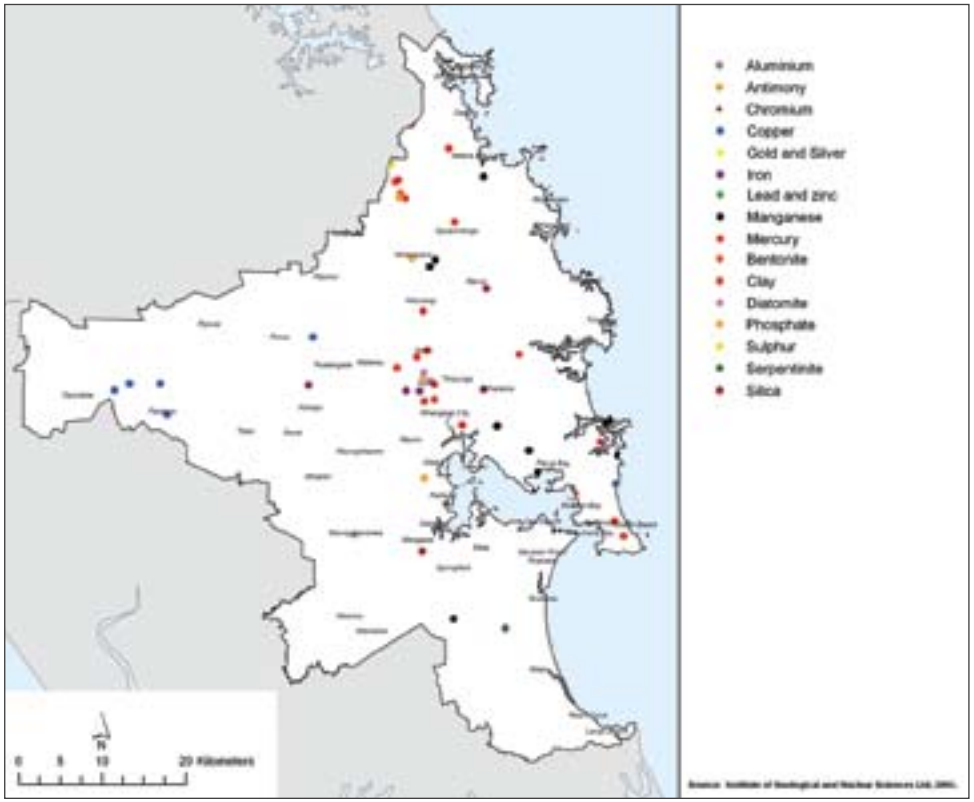


Figure 39: **Known Metallic and Non-Metallic Mineral Sites in the Whangarei District**



Two key concerns related to resource management issues associated with the extraction of minerals and aggregates are: managing the environmental effects of extraction, and planning for the future of the resources so they are not 'sterilised' (locked up) by other development and surrounding land uses. Managing the environmental effects of extraction is addressed in district and regional plans prepared under the Resource Management Act 1991, and include water quality, air discharges, noise from operations and associated traffic, ecological and landscape impacts, and reverse sensitivity issues. Whilst these issues might appear complex, many can be avoided and managed by proactive spatial planning and through the resource consent process.

In the Whangarei District, planning for the future extraction of minerals and aggregates is partly addressed by using mineral extraction area zoning in the District Plan. This provides for the operation of existing quarrying activities and the use of buffers to separate mining from surrounding land uses. However, this does not protect future aggregate resources. Aggregates and minerals are finite and location-fixed. Other activities may expand into places where minerals are located, making it harder to obtain consent to undertake mining. Potential future resources need to be identified and protected from being sterilised, particularly if they have the potential to contribute to the district's future economic well being.

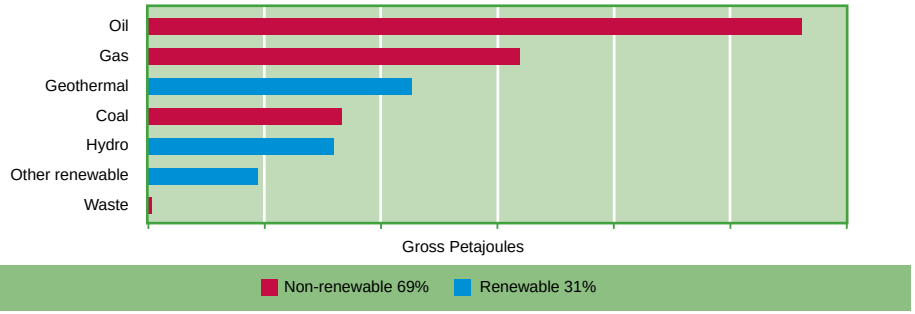
Further Information: Whangarei District Council, 2010, Minerals and Aggregates Report

1.5 Energy Resources

New Zealand's energy consumption is growing by around 2% per annum (faster than the global average). Demand growth is strongest in the industry and transport sectors. In 2008 around one third of New Zealand's total primary energy supply was secured from renewable energy sources, one third from imported oil products and the remaining third from indigenous natural gas and a mix of local and imported coal (Figure 40). Like the rest of New Zealand, Whangarei and Northland will need a broad mix of energy sources, technological advances and efficiency improvements to meet growing energy needs. Whangarei and Northland's future economic development is dependent on reliable energy supply.

The era of near total reliance on cheap and abundant fossil fuels is drawing to a close. Instead, we will have to rely on a mix of energy sources and improved efficiency in the future. However, it is likely that fossil fuels will continue to be the primary source of energy over the medium term. Petrol and diesel will continue to provide most of our transportation fuels. It is predicted that oil production will peak in the next 10-20 years, and oil prices could be rising substantially by around 2030. Efforts to find alternative transport fuels, and more efficient and cleaner ways to use oil, will intensify. Natural gas supplies from New Zealand fields might not meet demand beyond 2015 and prices are rising and will continue to do so.

Figure 40: **New Zealand Primary Energy Supply 2008**



In 2007, the total energy consumption in the Whangarei District (excluding the oil refinery) was approximately 8 petajoules, around 48% of the total energy used in Northland (one petajoule is roughly equal to all the electricity used by Nelson in a year). The five largest user sectors of energy were private transport (24%), transport and storage (21%), households (15%), wood processing and wood products (11%), and concrete, clay, glass and related minerals manufacture (3%). The remaining 26% was shared by other minerals manufacture, chemicals and related products/plastics, dairy agriculture, mining, construction, wholesale and retail trade, and other small sectors. The New Zealand Oil Refinery uses around 15 petajoules per annum which is roughly equal to the energy used by all of Northland. The refinery uses a mix of electricity, natural gas and oil, of which oil is the largest component.

Security of Energy Supply

Marsden Point Oil Refinery is the only oil refinery in New Zealand, and is owned and operated by the New Zealand Refinery Company (NZRC). The Refinery produces petrol, diesel, jet fuel, fuel oil, bitumen and other petroleum products. Most of the products are consumed in New Zealand. In 2008, the refinery supplied approximately 85% of New Zealand's oil consumer energy and approximately 92% of the Auckland Region's petroleum and aviation fuel needs. NZRC also owns and operates the high pressure petroleum pipeline that runs from Marsden Point to the Wiri Oil Services Terminal in South Auckland. The 170km long pipeline is the principal means of transport for bulk fuel to the Auckland Region. A separate line carries aviation fuel to Auckland International Airport.

The ongoing efficient and effective functioning of NZRC's assets is of critical importance to the national and regional economies. Auckland's economy is heavily dependent on the petroleum products refined by NZRC and supplied to the region via the pipeline. Northland and Whangarei's economy benefits from the contribution to GDP and employment provided by the Refinery in addition to the fuel products produced. Moreover, the presence of the Refinery in New Zealand is strategically important since it provides far greater fuel supply security than would be the case relying solely on the importation of refined products.

In the electricity sector, the stability and security of supply to Northland is a significant issue for Whangarei and the Northland Region. Northland does not currently generate significant electricity. Current electricity generation in Northland is made up of Ngawha Geothermal (25 MW) and Wairua River Hydro (between 5 MW and 11 MW). Forecasted peak electricity demand in Northland in 2010 is approximately 875 MW. Northland is currently able to generate less than 5% of its peak electricity demands and therefore gets the majority of its electricity supply from the National Grid. Northland is very reliant on a secure supply of electricity being maintained through Auckland City.

There are concerns at the capacity and reliability of the current cross-Auckland transmission system arrangements. At present, Northland is supplied from the south by the 220kV double circuit Henderson to Marsden A transmission line and the 110kV Henderson to Maungatapere A line. From Maungatapere there is a 110kV double circuit line to Kensington and a 110kV double circuit line to Kaikohe that carries on as a 110kV single circuit line to Kaitaia. There are also two 50kV single circuit Maungatapere to Dargaville lines. Any disruption to transmission from Henderson to Marsden Point puts security of supply at risk for much of Northland, including Whangarei.

Future Energy Sources

Currently there is no oil or gas production in Northland. The Northland Basin is considered to be one of New Zealand's most prospective exploration theatres. Any discovery of new oil and gas could bring substantial economic benefits at both regional and national scales. Imports of liquefied natural gas (LNG) could also supplement supplies from New Zealand fields if efforts to accelerate gas exploration do not bring new discoveries. In this instance, Marsden Point could be a suitable site for development of LNG storage and re-gasification facilities with its ready access to transport infrastructure.

Despite coal being mined at the coalfields of Hikurangi, Kamo, Kiripaka and Whareora between 1865 and 1982, coal mining is an unlikely prospect for Whangarei or Northland as a source of energy. More likely over the longer term, although not an immediate prospect, is the potential for a coal, oil or gas fired power plant at Marsden Point/Ruakaka. Such a facility has been proposed a number of times in the past and future proposals cannot be ruled out. Even in this instance, however, coal is likely to come from outside the region.

Given uncertainties surrounding the future of non-renewable energy sources (e.g. oil or gas reserves) or local large scale power generation plants (e.g. coal-fired units), along with rising costs of liquid fuel and electricity which have the potential to cause negative economic impacts, it is necessary to look at development of renewable energy resources to provide Northland and Whangarei with a secure energy supply.

Renewable Energy Sources

Renewable energy plays a significant role in New Zealand's primary energy supply with over 30% of New Zealand's total primary energy supply coming from renewable sources. The latest international comparisons show New Zealand has the third highest percentage of renewable primary energy supply of all OECD countries, behind only Norway and Iceland. New Zealand still has substantial untapped renewable energy resources for electricity production. Generation from renewable energy resources is growing more rapidly and is likely to make up an increasing share of capacity in the future.

In terms of renewable energy resources in Whangarei District, hydro potential is considered to be limited. Modernisation and upgrading of the water turbines and generators at the existing Wairua Falls hydropower scheme can realise an increase in additional energy of around 5 MW. Otherwise, there is potential for one or two small hydroelectric power stations, one at Titoki Bridge on the Mangakahia River and one on the Wairua River between the Parua and Wairoa Bridges, each of a similar capacity of about 5 – 10 MW. However, the amount of hydro electricity they can generate into the future is not great and is likely to depend on future rainfall, particularly in relation to climate change.

The transport sector in New Zealand runs almost entirely on oil. It will be necessary to move from oil to alternative fuels for transport to increase supply security. In addition, renewable fuels may be more affordable than oil in the long term. There is potential for production of both transport fuels and energy from biomass in Northland. The use of woody biomass in the wood processing industry is expected to grow. Forestry and wood processing residues have potential to deliver more than 100 million litres of ethanol per year or 430 GWh/year of electrical energy in the Northland Region. Production could be substantially increased by using other industrial by-products and wastes that contain sugar and starch.

Solar energy – the energy from sunlight – is the most abundant form of renewable energy. Whangarei and the Northland Region have reasonably high sunshine hours of around 2,200 per annum. There is potential for solar thermal systems (hot water) to be installed in new buildings and to promote passive solar energy use through building design. Over time, it may become economic to retrofit buildings with solar thermal systems and possibly, if costs are reduced, with photovoltaic systems. Over the longer term, there is considerable potential in Northland and Whangarei to increase the use of solar energy for both domestic and commercial use.

In terms of wind energy, the Whangarei District is not considered to be one of the potential areas in the Northland Region with sufficient wind capacity. The Far North and the west coast south of Dargaville are more promising. The prospects at Ahipara and Glinks Gully are reported to be in the 20-50 MW range, whereas Rototuna and Pouto are in the 200-300 MW range. If these projects were to go ahead, there could be a significant contribution to the security of supply of electricity to the Northland Region and to the national electricity network. In addition to such substantial developments, small scale wind turbines (<10 kW), which are used for remote power supply, can successfully be operated in areas with lower wind speeds.

Geothermal power is already used as an energy resource in the Northland Region, with the Ngawha geothermal system generating 10 MW of electrical power since 1998. Further expansion of the Ngawha project in 2008 increased output to 25 MW. However, there appears to be little further capacity for geothermal power generation in the region.

In regard to marine power (wave and tidal), it is unlikely that the Whangarei District will generate power from this source, given the offshore conditions. The potential for marine energy is more promising along the western coast of Northland, particularly the Hokianga and Kaipara Harbours. In the Kaipara Harbour, resource consents have been granted to a project involving 200 submerged marine turbines at the mouth of the harbour, although these consents are currently under appeal. This scheme, if completed, would have a maximum generating capacity of around 200 MW (electricity for approximately 250,000 homes). This could greatly increase energy security in the Northland Region.

Overall, combined generation over the next 50 years for the Northland Region from biomass, hydro, solar, wind, tidal, and geothermal (especially solar, wind and tidal energy) has the potential to supply most or all of Northland's electricity needs. Not only could Northland be self-sufficient in electricity over the next 50 years, part of its liquid fuel needs could be met by production of biofuels. Moreover, the supply of both electricity and biofuels would be from renewable sources – mainly solar, wind, marine and biomass.

Figure 41: **Electricity Generation and Distribution, Northland**

Further Information: Whangarei District Council, 2010, Energy Resources Report