



Green Jobs in Auckland – an Update

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Green Jobs in Auckland – an Update

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1.0 Background

The global financial crisis amongst other recent developments has highlighted the need to look at economic growth models through new lenses and a much more critical approach to consumption and production practices. New Zealand and Auckland, similar to other countries and cities are re-thinking global models of growth within the challenge of moving towards a cleaner, low-carbon economy.

1.1 Strategic framework

The importance of this for Auckland is reflected in the Auckland Plan chapter 8: Auckland’s response to climate change and chapter 6: Auckland’s economy; and in the Auckland Economic Development Strategy cross-cutting theme: Creating a sustainable eco-economy. The Auckland Plan also identifies as one of six transformational shifts to achieve the vision being to – ‘strongly commit to environmental action and green growth’.

The Auckland Plan (Chapter 8) lays out a commitment and foundation for Auckland to transform to a liveable, highly energy resilient, low carbon city through a focus on green growth. It sets a bold target of reducing greenhouse gas emissions by 40 per cent by 2040 (based on 1990 levels). The draft Low Carbon Auckland– Auckland’s Energy Resilience and Low Carbon Action Plan –endorsed by Auckland Council’s Regional Strategy and Policy Committee in February 2014 for public consultation will deliver on these commitments.

The draft Action Plan sets out a 30-year pathway and 10-year plan of action structured around five areas of transformation: transforming the way we travel, transforming the way we use and generate energy, transforming our built environment and green infrastructure, transforming to zero waste, and transforming forestry, agriculture and natural assets. It identifies green growth as a cross-cutting theme and green growth opportunities are identified across these five transformation areas. Green growth is defined in the Auckland Plan (page 170) as a *means to create jobs and economic growth while reducing costs and environmental impacts over the long term*.

1.2 Report purpose

This report is one of many reports and research to inform the development of the Auckland Energy Resilience and Low Carbon Action Plan. The focus of this report is on the green sector, more specifically green jobs in Auckland. The report by Dr Catherine Murray in 2008, *Green jobs: potential in the Auckland region* was the first attempt at measuring the green sector in Auckland and the potential for green jobs in the region, using the Auckland Economic Futures Model (EFM). This report provides an update of Murray’s work using the latest results from the EFM, to provide a broad understanding of the green sector in terms of its value added and employment contribution, and green jobs in Auckland.

2.0 Understanding green jobs

The concepts of green economy and green jobs are relatively new and have gained importance over the last couple of years to a large extent because it is seen by many as an answer to the multiple crises facing the world in recent years, namely the food, climate, financial and economic crises. The fast-growing population, climate uncertainty, scarce resources, volatile fossil fuel prices and dependence on imported energy are just some of the risks and opportunities that call for decisive action and innovation.

2.1 International definitions of green jobs

One of the first attempts at identifying a definition for green jobs was the 'Green Jobs Initiative' a collaborative work of the United Nations Environment Programme (UNEP), the International Labour Organisation (ILO), and the International Trade Union Confederation (ITUC) launched in 2007. The International Employers Organisation (IEO) later joined the Initiative in 2008.

Significant work has also been undertaken by other overseas agencies in an attempt to define green jobs, with three international examples listed below:

Green jobs is work in agriculture, industry, services and administration that contributes to preserving or restoring the quality of the environment (UNEP, ILO, IOE, ITUC 2008)

Green jobs are those in a sustainable economy. A sustainable economy is one which makes lower demands on natural resources, which is more energy efficient, which uses energy from renewable sources; and which does not generate damaging pollution and wastes. A sustainable economy is labour intensive, producing long-lasting, durable jobs. Green jobs are also jobs that contribute to environmental protection, such as manufacture and installation of pollution control equipment or recycling plants – Canadian Labour Congress

Green jobs as either:

- (a) Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources;*
- (b) Jobs in which worker's duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources (US Bureau of Labour Statistics 2010)*

While a common theme that comes out of these definitions is around preserving or restoring the environment, it is widely accepted that the concept of green jobs has not been precisely defined and universally agreed as yet.

Hence, there is growing demand for both statistical data and for conceptual guidelines on the measurement of green jobs and the need to agree on a method to accurately measure the green economy's size and rate of growth and to identify the jobs associated with it. A concerted effort is currently being undertaken by the ILO to seek agreement on a definition of 'green jobs' which could provide a basis for any method of data collection, reference period or time unit and that could refer to all workers. A concept paper on this was presented by the ILO to the 19th International Conference of Labour Statisticians in October 2013.

2.2 Green jobs defined in the New Zealand context

There are two recent reports aimed at defining green jobs in the New Zealand context. This section provides a brief summary of these two reports.

The first report undertaken by the Environment Institute of Australia and New Zealand (2009) entitled *Who are the Green Collar Workers? Defining and identifying workers in sustainability and the environment* looked at data on occupation by industry. The report identified three factors that describe a 'green collar worker' and based on these criteria and on analysis of the occupational groups defined in the Australian and New Zealand Standard Classification of Occupations (ANZSCO), two types of green collar workers were identified:

- a. *managers, professionals and technicians who work in green organisations or who have green skills and responsibilities within other organisations that may not be considered green*
- b. *services, clerical, sales and semi-skilled workers who work in green organisation.*

The second report by Hancock A (2010) *How green is my occupation classification?* sought to investigate the feasibility of how a statistical classification, namely ANZSCO, can address the emerging requirement to measure growth of green jobs and green skills in the New Zealand labour market. The report identified green jobs as: jobs that produce goods and services that benefit the environment or conserve natural resources through the use of sustainable, environmentally friendly, processes and technologies. The key finding from the report is that ANZSCO provides the best statistical framework for classifying and measuring green jobs. Creating a 'green' classification going forward however will require some key conceptual adjustments to ANZSCO as there will be a need to consider the changes to qualifications and industry that will occur as the New Zealand labour market and economy becomes more green.

For Auckland, Murray (2008) looked at the concept of green jobs and its relevance to the Auckland labour market by measuring the number of green jobs in the Auckland region, using a regional input-output model of the Auckland economy. The report used the methodology to measure green jobs developed under a joint project of the UNEP, ILO and ITUC in 2008. This report is discussed further in the next section.

2.3 An overview of Murray (2008) report

As previously mentioned this report provides an update of Murray's (2008) work using the latest results from the EFM, to provide a broad understanding of the green sector in terms of its value added and employment contribution, and green jobs in Auckland. The following sections provides a summary overview of Murray's (2008) report; namely the key drivers for green jobs and the methodology used in classifying Auckland's green sector.

2.3.1 Drivers of green jobs in Auckland

The two key drivers associated with green jobs identified in Murray (2008) are summarised here.

State/regulatory framework - this is a significant driver in New Zealand. Government plays a key role in the sector through its government led environmental industries and jobs associated with

environmental monitoring. These are driven largely by a number of legislations and overarching policies aimed at improving the domestic environment to adhere to international conventions, and multilateral approaches to global environmental problems. These policies and legislations have resulted in economic activity to: improve energy efficient buildings; improve air quality; explore energy supply alternatives; while also changing manufacturing and production processes. Regional and local government are also active drivers through implementing the Resource Management Act, while also employing a range of green jobs associated with environmental enhancement.

Markets and consumer preferences - Consumers are increasingly demanding environmental standards and accountability in the products they buy. Trends in international consumer preferences affect Auckland and New Zealand businesses, particularly in the food and beverage production sector. Individual preferences can also shape the labour market, and activities in the labour market by choosing the type of employer and activities their labour is used for. At the same time, businesses are using their sustainable and green practices as a point of difference from competitors to increase market share, for example, the growing trend in commercial or head office buildings wanting to be 'greener'.

2.3.2 Methodology used in classifying Auckland's green sector

The report used the methodology to measure green jobs developed under a joint project of the UNEP, ILO and ITUC in 2008. This particular project outlined six key areas where there has been an emergence of green jobs: energy supply; transport; buildings; basic industry and recycling; food and agriculture; and forestry.

Murray (2008) looked at each of the six key areas in light of the Auckland economy and the potential/opportunities for green jobs in these areas. Based on this analysis, the proportions of Auckland's economy that make up the green industry were then coded according to industry classification, and each Australian and New Zealand Standard Industry Classification (ANZSIC) 96 six digit code weighted to reflect the proportion of that industry assumed to be involved in the green sector. This reflected either the output of the industry or the methods employed by that industry sector deemed beneficial to the environment. It is acknowledged in the report that this approach is a first attempt and that the weighting system undertaken is subject to incomplete information.

The following provides examples of weightings allocated for the green sector in Auckland:

- Certain industries were identified as green industries and were given considerable weights such as waste disposal services, beekeeping and plant nurseries with 100% weights; industries involved with increasing public transport use were given a high weighting of 95%: long distance bus transport; short distance bus transport (including tramway) and rail transport, and services to agriculture were weighted at 80%.
- Other industries given considerable weights include libraries (40%); zoological and botanical gardens (30%); recreational parks and gardens (50%); personal and household hiring services (30%); gardening services (30%); and fruit growing (30%). Government administration was given a relatively high rating (15% for central government and 40% for local government), since environmental legislation is a considerable driver of green activities. Post-secondary education

sectors were attributed 10% weightings reflecting their role in disseminating environmental education.

- To reflect energy efficient processes in new building design, the retrofitting of older buildings and installing technologies such as solar panels and heat pumps as substitutes for open fires a weight of 5% was allocated to most of the construction industry. A uniform weight of 1% was also given to all types of manufacturing, with the exception of certain industries where it was known that significant eco-innovation is occurring (e.g. paint production or public transport equipment manufacturing) higher weights were allocated.
- For wholesale and retail trade a uniform weight of 0.5% was given to reflect changes in practices attributed to the greening of the sectors, with higher weights attributed to second hand trading. Similar to wholesale and retail, a uniform weight of 0.5% was also attributed for accommodation cafes and restaurants, more so to acknowledge some activity in the green sector rather than none.

The weighted components of the green industry were then loaded into the Auckland Economic Futures Model 2007 version as an 'additional' sector to derive the number of people employed in the sector, its value added and the occupation of its workers.

3.0 Green jobs in Auckland

This report takes the weighted components of the green sector as classified by Murray (2008) and models this into the latest Auckland Economic Futures Model 2011 version to provide an update of the number of people employed in the sector and the green sector's value added and occupations. The changes are largely attributed to further improvements to the EFM with the key difference between the 2007 EFM and 2011 EFM highlighted in the next section. This is followed by a discussion of the results for the green sector and green jobs in Auckland and areas for further work/research to expand on this.

3.1 The Economic Futures Model updated

The EFM is based on a multi-regional economic input-output table, developed for the Auckland Council by Market Economics Ltd. The EFM is based around a 48-industry categorisation using the six digit ANZSIC 96 classification system. An input-output table describes inter-industry linkages in an economy for a given period. The model is run using scenarios, and it models the growth path of each scenario, for 48 sectors along with households over 25 years (Auckland Regional Council, 2008). The EFM generates output indicators such as value added, employment and exports by industry. The employment figures are further adjusted according to an assumed labour productivity rate.

The key changes to the 2011 EFM compared to the 2007 EFM are outlined in the following table:

Table 1: Difference between 2007 and 2011 EFM

Change	Description
Base year	The base year has changed from the year ending March 2004 to the year ending March 2011.
2007 Multi-Regional Input-Output Table	The multi-regional input-output table is now based on Statistics New Zealand's (SNZ's) 2003 supply-use table. At a national level, the supply-use table has been updated to 2007 using data obtained from SNZ's National Accounts, Harmonised System, Balance of Payment, and various ad hoc datasets. It is, in turn, regionalised using the 'generating regional input-output tables' (GRIT) methodological sequence, whereby national input-output technical coefficients are translated to a sub-national or regional level. This replaces the earlier method which was based on the SNZ 1995-96 Inter-Industry study of the New Zealand economy.
Global Financial Crisis	The 2007 EFM did not incorporate this event, and so overestimated the green sector GDP and employment in 2011.
Replacement of FTEs with MECs	The employment count used in the 2007 model was full-time equivalents (FTE). This has been replaced by a modified employment count (MEC) measure which measures the number of employees plus working proprietors ¹ . This change has increased total employment in 2011 by approximately 70,000 workers, because it includes a wider group of workers.
New SNZ Industry Productivity Statistics Incorporated	Average New Zealand multi-factor productivity by economic sector has been incorporated into the model; this replaces the previously included labour force productivity of 0.64% for all sectors.

¹ Refer Statistics New Zealand website, www.statistics.govt.nz, for formal definitions of FTEs and MECs.

Export Projections	New methods have been applied in estimating the growth rate of international exports by industry. The growth rate of commodity exports is estimated based on Harmonised System data, while exports of services is estimated based on Balance of Payments data.
Domestic Consumption of Education Services	A distribution of student enrolments in educational institutions by age-sex cohort has been included to better estimate domestic consumption of educational services.
Domestic Consumptions of Health Services	A distribution of hospital bed days by age-sex cohort has been included to better estimate domestic consumption of health services.
Population	The population is projected to increase slightly faster in the 2011 model. Overall the change is approximately 20,000 between 2011-2031.
Occupational data	This has changed to the new 2006 ANZSCO classifications, which means that only limited comparisons can be made between the sectors.

3.2 The results

The green sector is then modelled as an additional sector into the 2011 EFM. The key high-level results for Auckland show that in 2011 the green sector:

- Employed 32,705 people (MEC) out of a total of 712,021 MECs. This means that 4.6% of the Auckland's total jobs are green jobs.
- This is comparable with employment in Auckland's information and communication technology sector, transport, transport services and logistics sector, and its digital content sector (noting that these categories are not mutually exclusive).
- To put this into context, the largest employers in Auckland in 2011 were business services with about 22% of the region's total jobs followed by the manufacturing and retail sectors with 12% and 11% respectively.
- The regional domestic product or value added attributed to the green sector was \$2825 million (in 2007 dollars). This equates to 5.3% of Auckland's total regional product.
- This is comparable to value added attributed to Auckland's biotechnology and information and communication technology sectors.

Using the Economic Futures Model the occupation of workers in the green sector is estimated, based on the average proportion of these occupations in each industry. Table 2 outlines the occupation of Auckland's green jobs in 2011. As shown these span across many occupations.

In 2011, the top seven green job occupations in Auckland (which are also occupations with over one thousand green jobs) were:

- specialist managers with the greatest number of green jobs (2654) or 9.6%,
- educational professionals (1769) or 6.4%,
- road and rail drivers (1552) or 5.6%,
- business, human resource and marketing professionals (1474) or 5.3%,
- chief executives, general managers and legislators (1202) or 4.4%,
- construction trades workers (1072) or 3.9% and
- design, engineering, science and transport professionals (1066) or 3.9%.

Table 2: Occupation of Auckland's Green Jobs 2011

Occupation	No.	Occupation	No.
Specialist Managers	2,654	Office Managers and Program Administrators	507
Education Professionals	1,769	Skilled Animal and Horticultural Workers	497
Road and Rail Drivers	1,552	Electrotechnology and Telecommunications Trades Workers	479
Business, Human Resource and Marketing Professionals	1,474	Protective Service Workers	460
Chief Executives, General Managers and Legislators	1,202	Cleaners and Laundry Workers	439
Construction Trades Workers	1,072	Machine and Stationary Plant Operators	434
Design, Engineering, Science and Transport Professionals	1,066	Carers and Aides	417
General Clerical Workers	972	Inquiry Clerks and Receptionists	410
Other Labourers	773	Personal Assistants and Secretaries	409
Farm, Forestry and Garden Workers	735	Sports and Personal Service Workers	383
Other Technicians and Trades Workers	716	Factory Process Workers	318
Sales Representatives and Agents	680	Arts and Media Professionals	288
Sales Assistants and Salespersons	673	Construction and Mining Labourers	284
Legal, Social and Welfare Professionals	640	Health Professionals	275
Engineering, ICT and Science Technicians	627	Mobile Plant Operators	238
Residual Categories (Operational Codes Not Elsewhere Included)	616	Clerical and Office Support Workers	229
ICT Professionals	614	Storepersons	226
Other Clerical and Administrative Workers	577	Sales Support Workers	180
Automotive and Engineering Trades Workers	565	Hospitality Workers	169
Farmers and Farm Managers	562	Health and Welfare Support Workers	115
Numerical Clerks	554	Food Trades Workers	105
Hospitality, Retail and Service Managers	548	Food Preparation Assistants	54

Source: Economic Futures Model 2011

3.3 Further work

There are areas for further work/research to expand on this which include:

Further updates to the EFM - The Economic Futures Model will be updated with the 2013 Census numbers which may have implications on the above results.

Weightings of the green sector - there may be value in revisiting the weighting of the proportions of Auckland's economy that make up the green industry as undertaken by Murray (2008). This is to reflect changes in the economy since 2008 and in particular the Global Financial Crisis and the impact of this on the potential and opportunities for green jobs in Auckland.

Further breakdown of the green sector results –the EFM only provides high-level results for the green sector in terms of employment and value added. It does not provide further breakdown of this value added that is attributed to different aspects of the green sector, e.g. from which

industries such as retail, accommodation and cafes, manufacturing etc. This could be an area for further research and/or further improvements to the model.

Projections for the green sector – similar to be above, the EFM runs projections based on past trends over a twenty five year period. Using this for the green sector would be inaccurate and too conservative given the dynamic and emergent nature of this green sector. Further work on this area could include modelling projections for the green sector as a scenario into the EFM taking into account the growth in green jobs that is likely over the coming decades given international trends, and existing conditions in Auckland.

4.0 References

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