Great Barrier Island
Sustainability Stocktake

May 2015

A report on the results of the household questionnaire and proposed initiatives

Prepared for the Great Barrier Island Local Board

ecological associates

ACKNOWLEDGEMENTS

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- the residents and ratepayers of Great Barrier Island
- the Great Barrier Local Board
- representatives from Auckland Council's Environmental Partnerships, Communications and Local Board Services teams

1 INTRODUCTION AND BACKGROUND

This report outlines the results of the Great Barrier Island Sustainability Stocktake questionnaire that was undertaken for the Great Barrier Island Local Board during January-February 2015. The aim of the questionnaire was to provide a baseline for measuring progress on the Local Board's sustainability goals and assist them to develop initiatives to support the uptake of sustainable and renewable practices and technologies. In particular, the questionnaire aimed to help develop strategies to:

- increase the uptake of solar energy and other renewable alternatives, and reduce reliance on diesel generators
- increase rainwater harvesting (collecting rainwater from roofs versus taking water from streams)
- upgrade long drops and old septic systems with a preference for systems that don't require pump-outs
- divert waste from landfill

The questionnaire was finalised with input from Local Board members and Auckland Council staff to ensure that it remained relevant to local island residents, while focusing on information that would support the development of targeted initiatives to meet the above outcomes.

The development of the questionnaire relied on a range of background information obtained from the NZ Census 2013. A summary of this can be seen in table below.

CENSUS TOPIC	COUNT
Usually resident population	939
Occupied private dwellings	501
Unoccupied dwellings (non-resident households)	453 (approx. 50% unoccupied at time of census)
One family household	52.4%
One-person dwelling	44.1%
Live in separate houses	88.2%
Median age	53.9
Employment	53.2% (c/f Auckland 61.6%)
Median income	19.2k (c/f Auckland 29.6k)
Household income	31.1k (c/f Auckland 76.5k)
Owner occupier or family trust	69.7%
Tenants / non-owners or family trust	30%

These demographics suggest that:

- A high number of homeowners and property managers are away from the Island at any one time.
- A significant proportion of the resident population are tenants (30%) and may, therefore, have limited say in household improvements.
- A number of properties are held in family trust or managed as incorporated societies potentially making access to a household representative more challenging.
- Resident homeowners have lower individual and household incomes compared to the wider Auckland making financial support or subsidies improvements a likely motivator to behaviour change.
- The high proportion of one-person dwellings makes demand for electricity and water lower than for larger residences. While this may make the cost of modifications lower than for larger households, it may also mean the outlay is more significant for single income dwellings.

1.1 Questionnaire design distribution and responses

The questionnaire was designed to provide information on the Local Board's target strategies while also determining a snapshot of residents' current use of off-grid technologies. The questionnaire was circulated at the beginning of January 2015, timed for when the island typically has the highest population of long-term and holiday residents.

A total of 1120 printed questionnaires were mailed out. Half of these went directly to on-island residents with the remainder posted to property owners who were off-island. An additional 350 copies of the questionnaire were distributed around key destinations on the island including at local stores and community buildings. Some remaining copies were provided to Local Board members for face-to-face completion at local events.

An online version of the survey was also prepared and circulated by the Local Board's e-newsletter, with additional promotion on the board's face-book page.

1.1.1 Responses

There were a total of 242 responses to the questionnaire. 164 of these were paper based with the remaining 78 collected online. This is the largest single response so far obtained for this type of engagement representing around 25% of all dwellings on the Island.

2 RESULTS

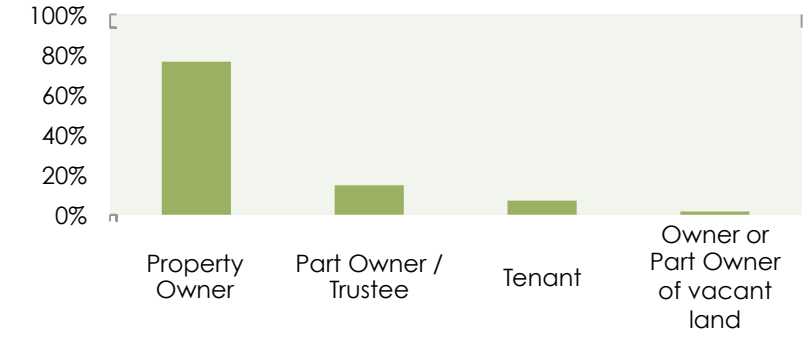
The results to the questionnaire are summarised below. This includes an overview of household demographics before a review of the following topics:

- Energy sources and use
- Water sources and use
- Waste water and sanitation
- Household waste and recycling

The questionnaire provided opportunities for residents to identify areas where they wanted further information or support, as well as ideas they had to increase the use of off-grid technologies on the Island. This information, combined with the data on each of the above topic areas, forms the basis of the final section that proposes initiatives to address the Local Board's targeted aims.

2.1 About the households

***Figure 1**: Are you a property owner or tenant on Great Barrier? (If you own more than one property or section please complete a separate questionnaire for each one).*

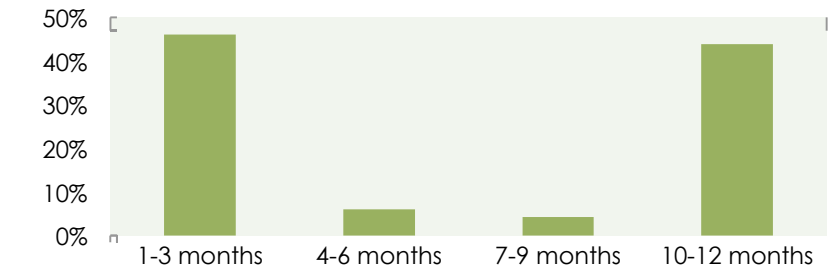


	Property Owner	Part Owner / Trustee	Tenant	Owner or Part Owner of vacant land
Percent	76.4%	14.8%	7.2%	1.7%
Count	181	35	17	4

Answered question: 237 *Skipped question: 5*

The chart shows that property owners are moderately over represented in the results with a 76.4% response rate compared to 69.7% representation in the 2013 census data.

***Figure 2**: How many months did you stay on Great Barrier over 2014?*

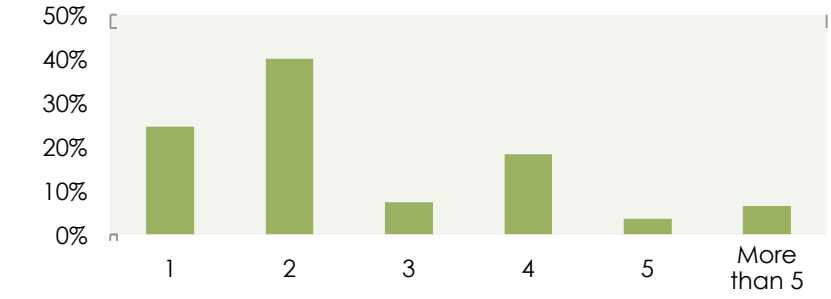


	1-3 months	4-6 months	7-9 months	10-12 months
Percent	46.0%	6.0%	4.3%	43.8%
Count	108	14	10	103

Answered question: 235 *Skipped question: 7*

The graph shows that around 56% of the questionnaire participants stay less than a full year on the Island. This coincides with a recognised influx of temporary residents over the summer months.

Figure 3: *How many people USUALLY stay in your Great Barrier household including you?*



	1	2	3	4	5	More than 5
Percent	24.5%	40.0%	7.3%	18.2%	3.6%	6.4%
Count	54	88	16	40	8	14

Answered question: 220 *Skipped question: 22*

The 103 longer-term residents (those staying 10-12 months), tend to live in households with smaller numbers of people. Of these 76% have 1-2 people, with 14% of households having 3 or more people.

Of the 108 that indicated they only stay for three months or less, 40% of households had 1-2 people and 60% had three or more.

3 ENERGY SOURCES AND USE

The questionnaire determined the range of energy sources that householders used for home heating, cooking, hot water and lighting and appliances. A method was developed to enable respondents to rank the extent to which they used any source of energy for each activity. Rankings included:

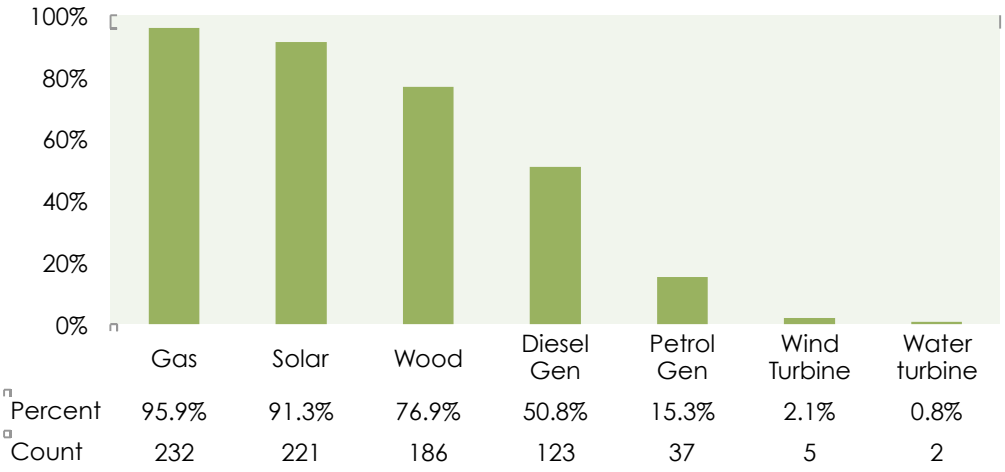
- Mainly use
- Often use
- Occasional use
- Very seldom use
- Don't use

For reporting purposes this ranking enables an analysis of the number of households that rely on a particular energy source for each activity. It also helps determine energy sources that are used for 'back-up'. Options for energy sources included solar, wood, gas, water turbines and diesel generators. Participants were also able to determine other sources of energy that they used.

3.1 Energy sources used by households

The graph below shows the total number of households that relied on each energy source *to any extent* - that is, whether it was a main source or seldom used.

Figure 4: *Energy sources used by households.*

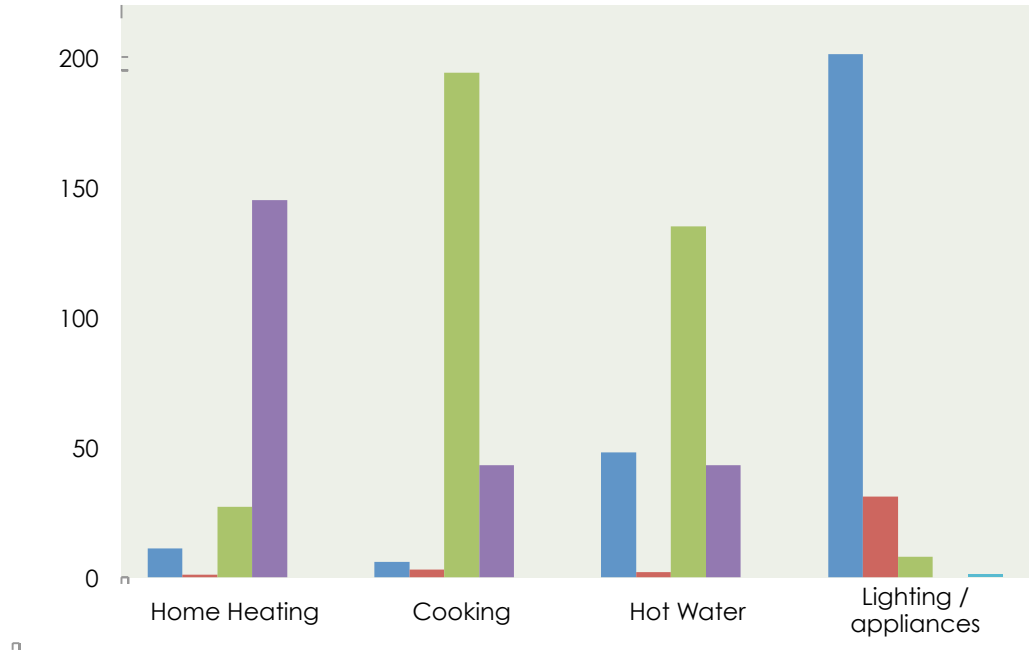


Overall the graph shows that gas is used most extensively (amongst 95.9% of responding households), followed by solar, wood and generators. Other options that were mentioned were mainly used for lighting. These included candles, kerosene lanterns and portable solar kits.

It is noted that a significant proportion of households (15%) identified the use of petrol generators. This type of generation was not included in the more detailed questions on energy use and, while this omission has little bearing on analysis of the main sources of energy that residents rely on (see section 3.2 below), it does affect the analysis of back-up energy sources. This is discussed further in section 3.3.

3.2 Main sources of energy

Figure 5: *Please tell us which ENERGY SUPPLIES you used for which purposes during 2014.*



	Home Heating	Cooking	Hot Water	Lighting / appliances
Solar	11	6	48	201
Diesel	1	3	2	31
Gas	27	194	135	8
Wood	145	43	43	0
Water	0	0	0	1

Answered question: 240 *Skipped question: 2*

The graph above shows the main sources of energy for different household uses. Overall we can see that:

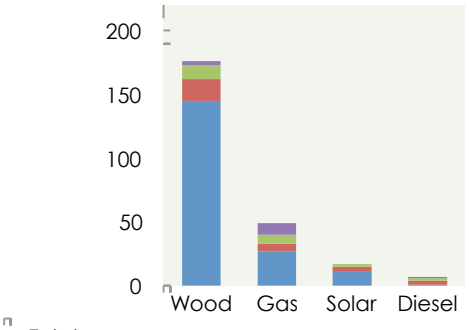
- Wood was the main source of energy for **home heating** for 145 or 60% of responding households followed by gas, solar and diesel.
- Gas was mainly used by 194 (80%) households for **cooking**, with 43 (18%) mainly using wood.
- Gas was also used by 135 (56%) households as the main means of **heating water** followed by 48 (20%)_households that used solar and 43 (18%) households that used wood.
- Solar energy was the main source of power for **lighting and appliances** for 201 or 83% of households, followed by diesel.

The above graph shows that Great Barrier Island residents rely on multiple energy sources for their daily needs and that overall energy security relies on a steady supply of wood, gas, diesel and petrol as well as access to solar technology, parts and expertise. The extent to which this supply is affected by local and external factors and the long-term security of these sources (e.g. local wood harvesting) is worthy of further consideration.

3.3 Back up sources of energy

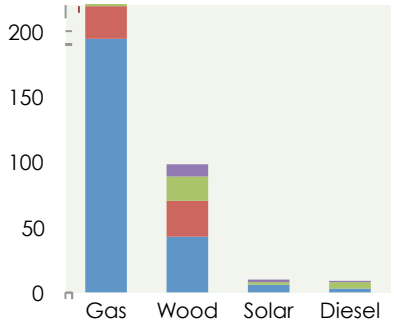
The data on energy sources for households can be broken-down further by 'activity' as shown in the graphs below.

Figure 6: *Home heating*



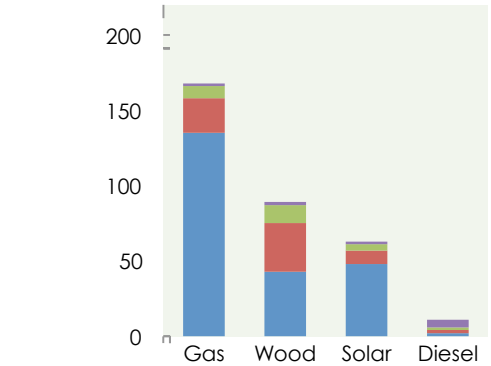
	Wood	Gas	Solar	Diesel
Total	176	49	17	7
Very seldom	3	9	0	1
Occasional	11	7	2	2
Often	17	6	4	3
Mainly	145	27	11	1

Figure 7: *Cooking*



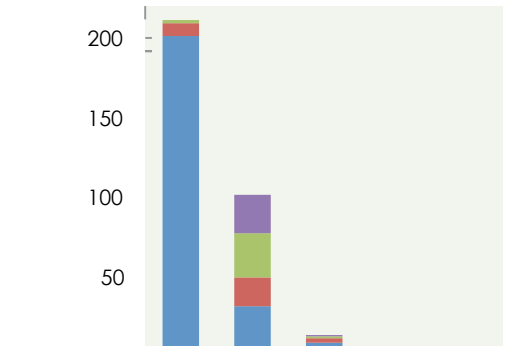
	Gas	Wood	Solar	Diesel
Total	229	98	10	9
Very seldom	2	9	2	1
Occasional	8	19	2	5
Often	25	27	0	0
Mainly	194	43	6	3

Figure 8: *Hot water*



	Gas	Wood	Solar	Diesel
Total	168	89	63	11
Very seldom	2	2	2	5
Occasional	8	12	4	2
Often	23	32	9	2
Mainly	135	43	48	2

Figure 9: *Lighting / Appliances*



	Solar	Diesel	Gas	Wood	Water
Total	211	101	13	2	2
Very seldom	0	24	1	0	0
Occasional	2	28	1	1	1
Often	8	18	3	1	0
Mainly	201	31	8	0	1

These graphs show the extent to which different energy sources were used for each household activity. For example, while it is established that wood is the main energy source used by 145 (60%) of responding households for home heating, a further 31 (13%) use it to varying degrees (often – very seldom)

When looking at the data in this way, we can see residents rely on multiple fuel options and identify that wood acts as a significant back-up source for both cooking and hot water, while diesel generation provides a level of security for lighting and appliances. As noted earlier, the additional use of petrol generators will affect the above analysis to some extent. However, if petrol generators are used in the same capacity, and for same amounts of time as diesel generators (see section 3.4), this would further highlight the reliance on liquid based fuel as a back-up power source particularly for lighting and household appliances.

3.4 Use of generators

It is calculated that a total of 123 households used diesel generators as a power source and an additional 37 respondents stated they had a petrol generator. Altogether therefore, around two thirds of participating households used generators over the past 12 months.

3.4.1 Seasonal use

Figure 10: *If you use a DIESEL GENERATOR, please estimate the AVERAGE NUMBER OF HOURS you run it for each season.*

	All households
Average hours/month during SUMMER:	39 hours
Average hours/month during WINTER	75 hours

These figures show that, for all households that reported using diesel generators:

- Average diesel generator use over winter is close to double that for the summer. This is unsurprising given that generators generally appear to stand in for lower levels of solar power during the winter months.
- Of the 108 people that responded to this question, 13% did not use their generator in the summer at all.
- Additional analysis shows that, during the summer, 61% of households with a generator use it for less than 20 hours a month (or around an average of 5 hours a week). Only 3% of households use a generator for more than 100 hours a month, the largest of these for 250 hours.
- During winter, 66% of households use their generators for 50 hours a month or less, with 13% of households clocking over 100 hours. The largest winter use for a single property was recorded at 720 hours, which is effectively 24 hours a day.

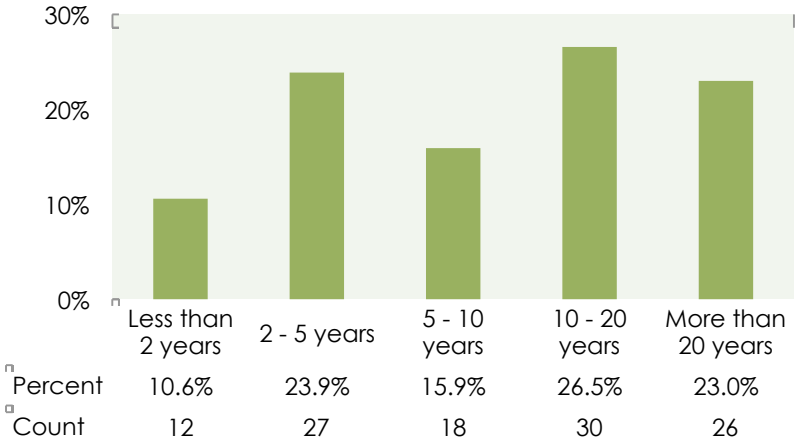
Figure 10: *Comparison of average generator use short-term vs long-term residents.*

	Short term (1-3 Months)	Long term (10-12 Months)
Average hours/month during SUMMER:	39 hours	67 hours
Average hours/month during WINTER	74 hours	102 hours

When the data is analysed with respect to short-term and long-term residents we can see that long-term residents have a higher average use during both the summer and winter months. This may be due to established residents having more appliances and if so, suggests that higher energy ratings for these appliances could help reduce the extent to which generators were needed.

3.4.2 Age of generators

Figure 11: *If you use a DIESEL GENERATOR, please tell us approximately how old it is.*



	Less than 2 years	2 - 5 years	5 - 10 years	10 - 20 years	More than 20 years
Percent	10.6%	23.9%	15.9%	26.5%	23.0%
Count	12	27	18	30	26

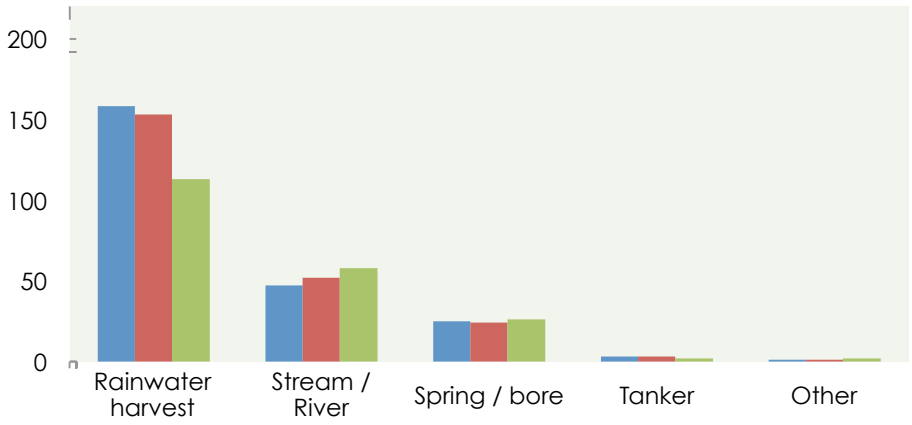
Answered question: 113 *Skipped question: 87*

The responses relating to the age of diesel generators show that just over half of households have generators aged 10 years of less. This leaves around a quarter between 10-20 years old and a further quarter at more than 20 years old. If older (or unserviced) generators are less efficient, a significant number of residents could be spending excessive amounts on diesel fuel.

4 WATER SOURCES AND USE

Respondents' main use of water sources for kitchen, ablution and garden activities are show below.

Figure 12: *WATER SUPPLIES mainly used during 2014.*



	Rainwater harvest	Stream / River	Spring / bore	Tanker	Other
Kitchen	158	47	25	3	1
Bath / Shower	153	52	24	3	1
Garden	113	58	26	2	2

Answered question 239 Skipped question 3

Rainwater harvesting is the main source of water for the largest number of houses for kitchen, ablution and gardening purposes. Close to two thirds (65%) mainly use rainwater in the kitchen, a similar amount for personal washing and around half of households collect rainwater for garden usage. Stream water is the main source of

water for between 47-58 households, around 20% of the total sample – a main concern of the Local Board. Spring or bore water was mainly used by about 10% of households.

Further analysis of this data shows that many residents use a single water source (either rainwater or streams) for all stated activities:

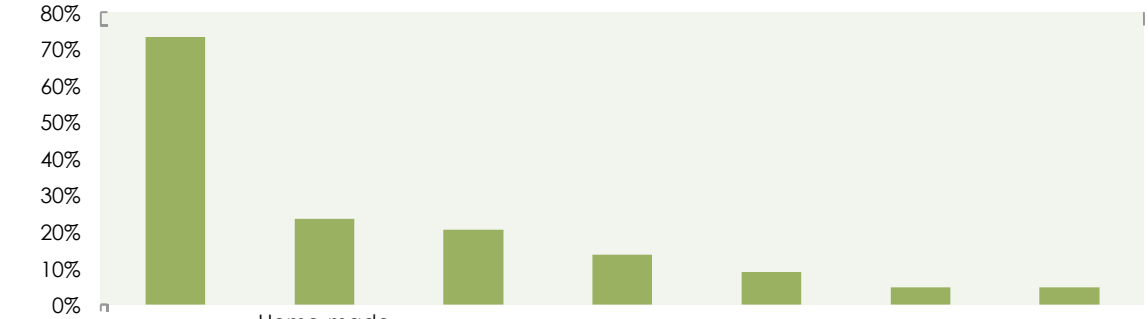
- 100 (42%) use rainwater for all stated activities.
- 41 (17%) use stream/rivers for all stated activities.
- 98 (41%) use a mixture of water sources for stated activities.

Only three households indicated they used tanker water and only one noted that they filled 30,000 litres over the previous 12 months. However another respondent stated that there was no tanker option on the Island. The availability of tanker delivery or communal water supply during droughts (or for fire protection) should be investigated further.

5 WASTE WATER AND SANITARY DISPOSAL

Households were asked the following question about their wastewater and sanitary disposal.

Figure 13: *Please TICK ANY of the options that you used for your WASTE WATER AND SANITARY DISPOSAL during 2014*



	Septic tank	Home-made grey water system	Long drop	Installed grey water system	Worm system	Composting toilet	Other
Percent	73.2%	23.4%	20.4%	13.6%	8.9%	4.7%	4.7%
Count	172	55	48	32	21	11	11

Answered question 235 Skipped question 7

The other options included:

- grey water recycled onto gardens / orchards
- Biolytic type systems (combination of composting / worm / sanitation systems generating waste into compost and water for irrigation)
- urination in the garden
- evapo-transpiration systems
- bucket and bury
- septic closed toilet systems

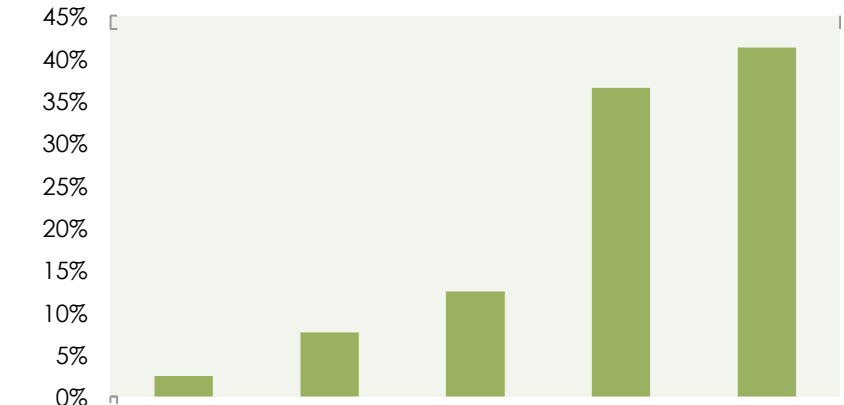
The innovation of island residents is evident in the above graph with 23.4% developing their own grey water systems. These, together with 'installed' systems account for a total of 37% of households that have either a formal of informal way of managing waste water.

Septic tanks are used by 73.2% of households and long drops are used by 20.4%. When we extract households that only use long drops we find 31 or 13% that have no other sanitation system. 13 of these are at households with long stay residents (typically with small numbers in each) providing a combined total of 19 people.

5.1.1 Age of septic tanks

Along with the use of long drop toilets, septic systems are of particular interest to the GBI Local Board.

Figure 14: *If you use a SEPTIC TANK, please tell us approximately how old it is.*



	Less than 2 years	2 - 5 years	5 - 10 years	10 - 20 years	More than 20 years
Percent	2.4%	7.6%	12.4%	36.5%	41.2%
Count	4	13	21	62	70

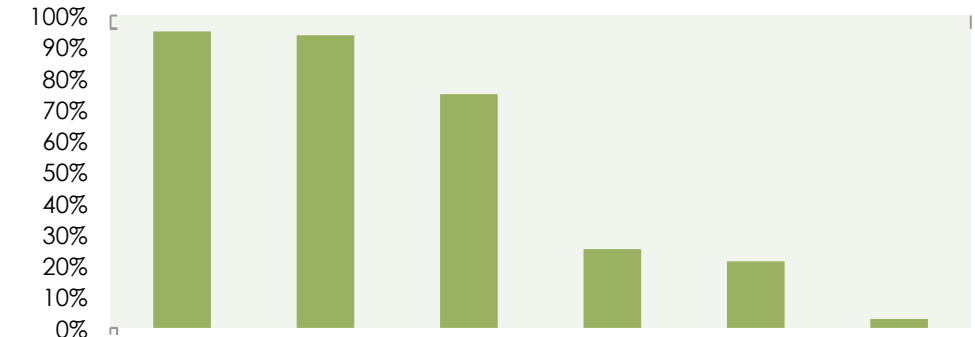
Answered question 170 Skipped question 72

The above graph shows that 41.2% of septic tanks are over 20 years old and a further 36.5% are between 10-20 years old. The extent to which these systems are maintained could directly impact the quality of the island's ground and surface water.

6 HOUSEHOLD WASTE AND RECYCLING

Householders were asked what waste options they used during 2014 and these are shown in the graph below.

Figure 13: *Please TICK ANY options you used for your HOUSEHOLD WASTE during 2014.*



	Rubbish	Recycle	Compost	Chickens/ pigs	Worm system	Other
Percent	95.0%	93.7%	74.8%	25.2%	21.4%	2.9%
Count	226	223	178	60	51	7

Answered question 238 Skipped question 4

Other waste options noted by householders included:

- feeding dogs and cats
- Bokashi system
- burning
- feeding banded rails, eels and depositing food waste in the ocean
- disposing of own waste as council facilities don't work for intermittent users

Here we can see that 95% of household respondents use the council rubbish facilities with 93.7% recycling and 74.8% composting. While food production was not included in the survey, the high proportion of waste digested by chickens and pigs suggests around a quarter of islanders are also supplying some of their own protein requirements.

Figure 14: *Waste options used by long and short stay residents*

LENGTH OF TIME ON THE ISLAND 2014	Rubbish	Recycle	Compost	Worm system	Chickens/pigs	TOTAL COUNT
1-3 months	93.52%	91.67%	63.89%	7.41%	6.48%	108
10-12 months	92.23%	93.20%	79.61%	35.92%	46.60%	103

The above table shows that there is very little difference in the uses of main waste systems between short-term and longer-term stayers on the island. However significant differences emerge in the extent to which households compost and use worms or other animals for food disposal. Here we see that at least 46.6% of longer term stayers keep chickens or pigs.

Overall, while no quantities of waste can be determined from the data, the above table may suggest that, as shorter-term stayers are less likely to use systems for diverting food scraps, more of these scraps may end up in the household rubbish for this group.

The questionnaire did not collect information on visitors to the island, i.e. those vacationing over the holiday period, but did identify that the waste habits of this group were a concern for some Island residents.

7 LOCAL INNOVATION, KNOWLEDGE AND INTEREST

The questionnaire responses have indicated a high level of innovation amongst Great Barrier Island residents as they develop and maintain their household systems. This innovation is further highlighted by residents' descriptions of technologies and activities that instil a sense of satisfaction in the off-grid lifestyle:

> *Please tell us about any alternative technology, innovation or household activity related to energy, water and waste that you are most proud of.*

There were a total of 92 responses outlining a wide range of activities that are summarised below.

7.1 Self reliance by design

A recurring theme amongst respondents was the satisfaction they achieved through self-reliance, both in terms of general independence as well as relating to particular resources. Some residents noted their overall household design to maximise solar gain and passive lighting while a number of other respondents are particularly pleased with recently installed solar technology and the associated reduction in generator time. One participant noted that their solar hot water system generates enough hot water for up to 27 people.

Users of wind turbines also indicated their satisfaction, including one household that made their own windmill from an old washing machine. Another cited their home made solar water heater and still others liked the duel purpose of a wood burning stove that heated their water.

Increased energy self-sufficiency was also recognised by one household that has installed LED lighting and others that remotely monitor their energy use and battery voltage. Other innovations include households that use small-scale solar systems linked to car batteries or to power their electronic devices.

Other more general design innovations that residents were proud of included:

- harvesting rain water
- heat exchangers
- using grey water systems
- ram pumps
- Biolytic and other sanitation systems

7.2 Actively independent

Efficient resource use behaviours are highly evident amongst users of off-grid technologies with a number of respondents stating how they are careful with their resource use in all areas - including energy, water and waste creation. Examples include:

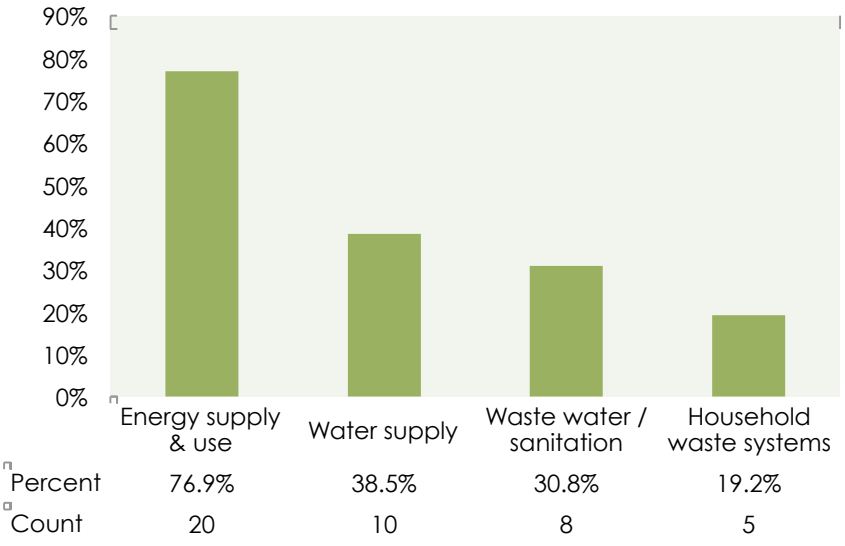
- Boiling water on the wood stove in the evening and storing it in thermos flasks for use during the day.
- Careful harvesting and efficient use of wood.
- Avoiding the purchase of packaged items where possible.
- Reusing materials and cycling waste.
- Careful capture, filtering and use of water.

These examples represent a wealth of experience and knowledge amongst Island residents. They also provide an opportunity to develop and share information with other householders as well as highlight a broader sense of satisfaction and self sufficiency associated with an off-grid lifestyle.

7.3 Knowledge and skills to share

A total of 26 respondents indicated that that they had skills and knowledge that they could share with others in the areas identified in the graph below.

Figure 15: *Do you have any specific skills and knowledge in off-grid technologies that you could share with others?*



Most respondents identified skills and knowledge in the areas of energy supply and use, followed by water supply, wastewater and sanitation and household waste systems. These people provide a core group that could potentially assist other residents with information on how to increase their independence and resilience.

7.4 Areas of interest

A total of 75 respondents identified technologies they were interested in learning more about. These have been categorised in the table below.

TECHNOLOGY	COUNT
Solar PV / Battery and maintenance	17
Wind turbine	14
Solar Water	13
Low cost energy systems and efficient behaviour	9
Water turbine	5
Water quality	5
Waste systems	5
Transport options electric cars	4
Water sanitation systems	4
Compost toilets	3
House construction	3
Grey water	2
Water heat sink	2
Bore water	1
Education of visitors on waste	1
Methane use	1
Nuclear fission	1
Solar dehydrator	1
Solar pumps	1
Wave power	1

While there are a number of areas of interest, solar power, wind turbines and solar hot water are three clear leaders. Interest in low cost energy systems and associated energy conservation behaviours provide a further indication that respondents are keen to increase their energy independence and that power generation is a priority. Other areas include the use of water turbines (again for power), water quality, waste, sanitation and transport with some additional areas of more specific interest.

8 HOW TO MAKE OUR ISLAND MORE SELF-SUFFICIENT

Respondents were asked for their ideas to encourage the uptake of sustainable technologies and practices for energy, water or waste on the island. There were a total of 113 replies and the main themes of these have been summarised below.

8.1 Financial support

- Initiatives to provide financial support for off-grid systems received the highest mention amongst islanders amounting to 38% of all received comments. This included calls for subsidies or loan schemes for all off-grid technologies and, in particular, for power generation systems (accounting for over half of all comments in this area).

- In addition residents proposed a reduction or removal of council fees related to sustainable technologies as well as rates rebates for off-grid households.

- A number of residents also considered the benefits of bulk purchasing of technologies as a means to reduce the costs for individual households. There was further suggestion that such a strategy could be coordinated through the Local Board.

- Financial support for poorer and elderly residents was also mentioned as were ideas to provide support for maintenance costs, in particular the high price of trades people.

8.2 Information, education and promotion

- Comments relating to improved information and the promotion of sustainable technologies accounted for 36% of all comments. These included a further call to encourage solar technologies, including providing residents with the means to compare the costs and efficiencies of solar with other systems (including generators).

- Suggestions for the distribution of this information included the provision of an environment centre, the delivery of an Eco-fest event as well as more personalised information and expertise provided on a case by case basis (either over the phone or through home visits).

- Additionally the provision of information on off-grid 'successes', or lessons learned by local residents, received a number of mentions. These could be presented as on-line examples with opportunities for interactive discussion. Local tours of the more exemplary households could also be arranged.

- Related comments included highlighting off-grid successes and innovations as a way of promoting Great Barrier Island more generally, both as a tourist and lifestyle destination.

- Fewer but more specific requests for information included workshops on eco-building, solar technologies and battery use, water systems and composting as well as advice on efficient wood burning.

- The circulation of instructions to all residents and visitors on what to do with waste was also suggested as was a clear explanation of items that are accepted for recycling.

8.3 Communal systems

- Residents identified the need for improved resilience through a number of communal systems. These mainly related to the investigation of micro-grid energy systems amongst more densely populated areas and included proposals for wind, solar and water technologies.

- Linkage with the national grid (across the Colville Channel) was also proposed.

- Support for other communal systems included developing a public water supply using tanks, bores and dams for use in droughts and also in case of fires.

- The development of more community gardens was also suggested as was the rotational cropping of manuka wood on council land to increase the sustainability of wood for fuel.

8.4 Regulations

- A number of residents requested relaxing council regulations relating to the installation of off-grid technologies.

- They also suggested a phasing out and eventual banning of generators identified as creating both air and noise pollution.

- Concerns over water quality lead to suggestions to create an annual licence to operate septic tanks along with regular subsidised inspections and support for improvements, particularly for households near waterways.

- One respondent suggested the banning of all motor vehicles.

8.5 Waste, recycling and water

- Islanders' remaining comments related to more specific topics including methods to reduce waste, increase recycling and improve water quality.

- A number of residents called for improved waste collection systems including the supply of household rubbish bins, providing full kerbside collection, increasing the number of drop off facilities, and generally improving and extending recycling.

- The idea of a community depot for the collection and sale of unwanted household belongings was also proposed as was a consideration to reduce packaging (particularly plastic) before it arrived on the island.

- One resident suggested the investigation of on-island waste to energy conversion.

- Additional comments were made on the need to improve water quality and encourage and support rainwater harvesting, develop home bores, and promote composting toilets.

9 DEVELOPING INITIATIVES

This section considers a range of actions that arise from the Great Barrier Island questionnaire. These are presented below in terms of activities that apply across all areas, followed by those that target each of the Local Board's objectives (including reducing reliance on diesel generators, reducing stream diversion, improving septic systems and diverting waste from landfill). These actions are then developed further (section 9.2) and summarised as three priority initiatives for the Local Board to consider.

9.1 Actions for consideration

General actions

- Communicate the results of the survey to islanders, highlighting current levels of innovation, key issues and early initiatives agreed by the Local Board.
- Develop case studies of exemplary households (innovations in specific technologies and behaviours) for local information sharing and wider promotion of GBI.
- Create an information hub of local experts (identifying individuals who have skills and knowledge to share).
- Determine mechanisms to promote improvements amongst tenanted households.
- Investigate the provision of personalised information about off-grid installations and improvements.
- Provision of information on efficient resource use behaviours – (energy, water, waste – recycling.)
- Determine potential for collective bulk purchases of off-grid technologies (initially solar).
- Determine potential for LB / AC subsidies, financing and the reduction in fees for off-grid installations.

Actions to increase uptake of solar energy and other renewable alternatives, and reduce reliance on diesel generators.

- Provision of information on solar technologies and linkages to local and off-island expertise. Include a comparison of running costs for solar and generators.
- Arrange an installers / workshop information day.
- Provide information and advice on generator maintenance and efficient use.
- Investigate the feasibility of collective grid systems in identified community/ies – solar / wind / water turbine.
- Review the long-term supply and sustainability of local wood fuel.
- Provide information on energy efficient appliances and consider a scheme for bulk purchases.

Actions to increase rainwater harvesting (collecting rainwater from roofs versus taking water from streams).

- Provide information on alternative water source systems - including effective filtering, rain harvesting and bore systems.
- Consider loans/subsidies to encourage uptake of rainwater harvesting.
- Investigate potential of communal water supplies for droughts / fires.
- Determine availability of water tanker supply.

Actions to upgrade long drops and old septic systems with a preference for systems that don't require pump-outs.

- Promote closed sanitation systems – including composting toilets.
- Provide assistance and information on septic tank maintenance.
- Consider financial support (subsidise/loans) for repair of oldest tanks particularly for those closest to waterways.

Actions to divert waste from landfill.

- Improve information on waste and recycling for islanders and visitors.
- Review waste collection systems including assessing the potential for community composting.
- Consider a local depot for drop off and sale of unwanted belongings.

9.2 Proposed initiatives for further discussion

The wide range of potential actions outlined above provides an opportunity to consider which of these, or which combination of these, will provide the greatest benefit to householders and to the wider GBI community.

Three target areas are proposed for further discussion, and investigation.

Development and provision of information

The provision of quality information on off-grid technologies was identified as a key issue for participants. This included a call for general promotion of the benefits of energy, water and waste systems as well as specific advice on installation and maintenance and examples of local success.

With this in mind it is proposed that the development of an 'off-the-grid' website provides the simplest means for collecting this information into one place while also providing a mechanism for residents' interaction through a 'members' on-line forum. Such a website could also contain local case studies highlighting exemplary household technologies and behaviours. These case studies could also be used by the Local Board to further promote the status of the island as a sustainable and resilient community. Information could also be included on local suppliers of off-grid services.

A total of 111 or 46% or participants identified that they would be happy to remain engaged. These contacts could be followed up as a means of collecting relevant examples and information. This could include a process of linking those that identified that they had skills to share in specific technologies with those that expressed interest to learn more.

Recognising that not all islanders have access to, or wish to interact online, there are further opportunities to disseminate information and connect householders with on and off-island expertise in relevant areas of interest. This could be achieved through a series of articles in local newspapers as well as consideration for educational workshops/ presentations and more personalised information services both over the phone and in person. For example, free house visits by Auckland Council's Eco-design advisor could be coordinated or one-on-one consultations with expert local advisors could be offered as part of a community 'off-the- grid' event. Above all, it is important that any information or advice on integrated solutions is of a high quality and independent, enabling residents to understand and consider their options.

Investigating financing models

Alongside quality information, questionnaire respondents identified finance as a barrier to improving the installation of off-grid systems, including solar and wind power as well as water harvesting and sanitation systems.

It is therefore proposed that a range of financing models are investigated including:

- Opportunities for gaining cost reductions through the bulk purchase of off-grid systems and energy efficient appliances.
- The provision of low interest loans for installations and upgrades to energy and water systems e.g. through Auckland Council's Retrofit-Your-Home programme.
- Subsidies for improvements in key areas e.g. septic tanks near waterways.

Developing partnerships

The potential actions described in section 9.1 provide opportunities to explore and strengthen local and national partnerships in a range of areas to further the Local Board's sustainability objectives. These partners include:

- Local GBI organisations – engagement in the development and delivery of agreed initiatives
- Commercial and government partners (e.g. EECA / off-grid energy providers) – funding for community and sustainable development
- Research / tertiary organisations – research into feasibility of communal systems including micro grids or resilient wood and water supply

9.3 Next steps

This report aims to provide a baseline for measuring progress on the Local Board's sustainability goals and assist them as they support the uptake of sustainable technologies on the island. At this stage, the above presentation of potential initiatives is intended to stimulate discussion around what actions may be achievable and best fit the Local Board's objectives. It is further noted that there are opportunities to align the findings and initiatives arising from this sustainability stocktake with work being undertaken by other agencies including Auckland Council programmes on waste minimisation and on-site waste water management.

Feedback from the Local Board will provide direction on the further development of initiatives that will have the greatest impact and benefit for island residents.