

## MAKING NEW ZEALAND POLICY, WATER CONSERVATION FRIENDLY

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### Summary

As the global shortage of water worsens, domestic water use efficiency becomes more critical. Urban dwellers need to play their part through embracing demand management and supplementary water supply. However, domestic water supply in New Zealand is a neglected aspect of sustainable development, with much of the population believing that water is a free good. In most of New Zealand there is a lack of political will to take a different message to the electorate with water pricing being a hotly contested issue.

Of the various factors that influence water use efficiency, well targeted policy and regulation appear to offer the most chance of affecting change. Technologies are already available which could reduce mains water use but incentives; cash, carrots or sticks have not been used with much degree of success.

Beacon's approach has been to explore all avenues of mains water demand management to determine what policy may be most effective and to work with water supply authorities to assist them to put demand management into practice. International and national water policy best practice has been trawled for successful approaches. In addition Beacon's research shows that the inter-relationship between local context, water efficient technologies and appropriate policy and planning is key. Solutions designed to be applied by local water supply authorities should be tailored to the specific context of each location and fine-tuned as each water use efficiency strategy unfolds. One size does not fit all.

### 1. Introduction

New Zealanders' domestic water consumption is highly variable around the country and with water metering only available in some areas, an accurate figure for domestic water usage for many regions or for the country as a whole, is not available. Reported figures range from a domestic water usage figure of 160 litres/per person/per day in Nelson at the top of the South Island and 167 litres/per person/ per day in Waitakere, a city within the Auckland region, to an average 700 litres per person per day in the Queenstown Lakes District. Table 1 shows the variability of water use reported throughout the country and demonstrates that in general those places with water metering plus volumetric charging are lower than those without. This is consistent with many UK research that shows a significant reduction in water use once metering and volumetric charging, often with well crafted tariffs, are introduced, Pezzey (1998).

**Table 1 Per capita average domestic water use in New Zealand towns**

Water supply authority	Liters per person per day
Christchurch City	333
Kawerau	214
Kaikoura	648
Kapiti	650
Manukau	189*
Metrowater	184*
Nelson	160*
North Shore	199*
Papakura	190*
Rodney	179*
South Taranaki	460
Tauranga	265*
Upper Hutt	277
Waitakere City	168*
Queenstown Lakes	700

\*Metering with volumetric charging

**Comment [db1]:** Table only has bars in it at the top.

To date the majority of interest in water management in New Zealand has been related to rural water uses which account for 78% of all the water abstracted (Lincoln Environmental, 2000). In particular rural water quality issues have been high on the agenda, especially with some of the North Island lakes showing signs of significant pollution including eutrophication with toxic algae blooms rendering them unsafe for swimming.

As such for the majority of policy makers and indeed New Zealanders domestic water supply has not been high on the agenda. On top of that the wider population appears to hold a view that water is a free good and there is a distinct lack of understanding with respect to the high costs associated with delivering water to the home. Further when water metering and volumetric user charges for water appear on a local government's political horizon, the specter of privatization raises its head and such moves are often strongly opposed. Local councils are consequently reluctant to take on the metering issue with the community particularly as there are some very strong views with regard to the right for apparently "free" water (this is so even though the Local Government Act (2002) requires a local council to maintain strategic control of water supply and that there is no demonstrable connection between privatization of supply and water metering – in Auckland for example all houses are metered but only one council in six has been privatized).

In New Zealand there is no one over-riding reason why consumers should be concerned about the amount of water they use. There is not the same level of drought as in some similarly developed countries like Australia, where the population can see first hand the severity of the lack of rainfall and its impact on domestic water supply. The rationale for demand management is based on a number of premises, which taken collectively make a strong and logical argument for water use efficiency. Those key drivers are:

- **Capital cost savings through delaying or eliminating infrastructure development** - both for more supply and increased wastewater services. The national level of estimated investment required is approximately \$5 billion over a 20 year period to upgrade water supply, wastewater and stormwater infrastructure. Ultimately that cost would be borne by the consumers.
- **Reducing infrastructure operating and consumer costs for water and energy** - consumers do not necessarily link water use efficiency with lower energy costs but energy is consumed in the supply, treatment, removal and heating of water.
- **Reducing ecological impacts** - ensuring there are sufficient residual flows in rivers that groundwater supplies are not adversely impacted and that wastewater doesn't leak from pipes into local waterways and estuaries.
- **Addressing climate change issues and the need to improve the resilience of the water supply system** - for New Zealand climate change is anticipated to mean more dry weather on the East, wet on the West and more frequent and extreme storm events overall.

Water policy in New Zealand currently focuses on education, some social marketing and little else while the range of water demand features available includes:

- Economic Tools; pricing tariffs, incentives/rebates
- Improving technology; water efficient fitments, fixtures and appliances
- Education, awareness and social marketing; promotional material and education programmes

- Regulation and Legislation; the Building Code and various Acts
- Synergies between combinations of the above approaches

There is no central water authority in New Zealand responsible for domestic water services, nor any one Act which provides overall guidance. The present regulatory responsibilities are shared between four main Acts being: the Building Act (2004), the Resource Management Act (1991), the Local Government Act (2002) and the Health Act (1956). These Acts can, through their interpretation, appear to provide conflicting requirements so that in general there is wariness about using regulatory routes to implement demand management.

Instead water supply authorities, mainly councils or council controlled operations, have implemented innovative educational approaches which include specified water advisors for indoor or outdoor use, free indoor minor pipe or water fixtures maintenance, school programmes, open days, and a suite of internet advice. Some councils also offer financial incentives, mainly rebates or special promotions in association with retailers. These approaches are useful and a necessary element of encouraging water demand management but without education as to why reducing demand is necessary, consumers may neutralise the efficiency of better technology by using water more profligately. Yet education on water use in New Zealand is rarely enough on its own, as exemplified by one of the largest local water supply authorities (WSA) that has excelled in its attempts to encourage less domestic water use but has had little impact on its ultimate water use reduction goal, with per person water consumption remaining virtually static over the last thirteen years. Clearly more than education is required to get the desired change that the WSA requires to negate the need to contribute to the costs of a major water supply upgrade in the future. In many New Zealand cities and towns with growing populations, the goal could be to keep overall water consumption static while the population rises. What policy and regulatory changes are required to bring about the desired change?

## 2. Research approach and methodology

Beacon Pathway's research is at the applied end of the spectrum. Beacon is a research consortium, established in May 2004 with the aim of encouraging and improving New Zealand's sustainability in the residential built environment. It intends to improve the sustainability of the New Zealand housing stock, both new and existing homes, primarily using existing technologies and/or building systems which are currently underutilized. It also aims to keep dwellings affordable. Reducing the level of water use in homes is part of that challenge.

The hypothesis for our research was that "barriers to water use efficiency can be overcome by well designed policy and regulatory approaches, specific to end-user requirements."

To test the hypothesis policy and regulation relating to demand management approaches both in New Zealand and overseas, were investigated for their effectiveness.

The first part of the research had a New Zealand focus with the following components:

- A nationwide survey of territorial authorities to establish the extent of water conservation programmes across the country and the key drivers for those programmes.
- Four case studies of New Zealand councils that have demonstrated results attributable to demand management approaches. This included the use of voluntary programmes, water metering and volumetric user charges, changes to district plan rules to achieve water conservation outcomes, leak reduction programmes, and other methods of demand management such as education and training.
- An international literature search then identified policy approaches in other countries that could be applied to the New Zealand context.

The findings of that work was summarised by Lawton (2008) and provided input into the next research component which was to utilise the information in workshops with water supply authorities that wished to introduce a demand management strategy. Critical to the success of these workshops was having a range of people from across the water supply service, eg engineers, policy planners, educationalists, consents officers, all in the room together to start the development of a water demand management strategy that was applicable to their specific circumstances. The workshops were in part designed to inform, encourage and develop a consensus on an agreed plan of action. The workshops also provided material for the research through a discussion on how demand management approaches may best be tailored for any given water supply authority. The interaction between context, at the global, national and local scale, demand management approaches or packages of approaches and the policy and regulations needed to support those approaches is conceptualised in Figure 1.


COUNCIL CONTEXT	DEMAND MANAGEMENT OPTIONS	POLICY & REGULATION
<p>“KEY CONSIDERATIONS”</p> <p>SUSTAINABILITY RESILIENCE LIVEABILITY</p>	<p>“WHAT TO DO?”</p> <p>Is it cost effective? Does it build resilience? Meet consumers' needs? Improve sustainability outcomes?</p>	<p>“HOW TO DO?”</p> <p>Through setting high level strategic targets Building Code - Building consent process Local Government Act processes Resource Management Act - District Plan Subdivision codes of practice Development Contributions Engineering standards Education Social Marketing</p>
<p><b>Global Trends</b></p> <p>Climate Change Rises in oil prices and other key commodities</p>	<p><b>Consists of Packages of:</b></p> <p>Improved Technologies: Rainwater tanks Wastewater recycling Water efficient appliances</p> <p>Maintenance: Fixing leaks</p> <p>Economic Instruments: Incentives, rebates and ensuring cost/benefit analyses consider the costs and benefits of all options</p>	<p>MEASURING AND MONITORING</p> 
<p><b>National/Local Trends</b></p> <p>Political direction Community attitudes and behaviours Climate and soils Governance - complexity Population, demographics and seasonal fluctuation Rating base Greenfield or brownfield development</p>		

Figure 1 Interactions between context, water demand approaches and policy instruments

The collective results of the research and workshops discussion will be collated to provide a resource for all water supply authorities, guidelines on best practice for water demand management that could be applied to the range of contexts found throughout New Zealand under our current regulatory framework.

**Comment [db2]:** Why don't we do a black and white version of the good looking matrix?

### 3. Results

The response rate to our local supply authorities was 55% of the 76 local water supply authorities in New Zealand. From the responses it was obvious that the majority were considering how to implement or increase their level of water demand management. In general they did not need to be persuaded that demand management was desirable, despite their need to balance their financial targets through water sales. The over-riding issue was that they had not managed to convince water users of the need for demand management. Additionally in some cases the local politicians had stood for council on a ticket of not implementing metering. Without metering it is difficult to manage the resource effectively, understand the leakage rate or apply incentives to reduce demand.

Primary drivers for water supply authorities are shown in figure 2.

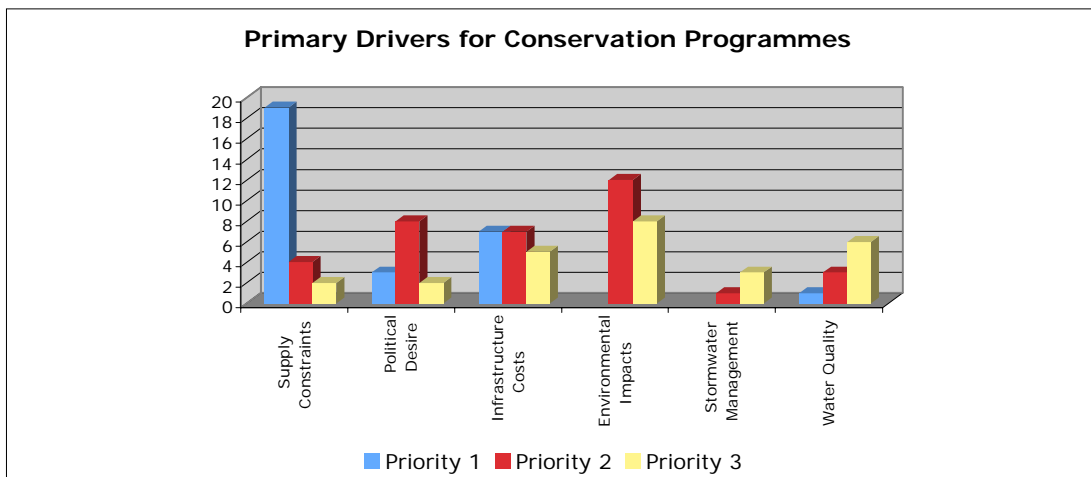


Figure 2: Drivers for Water Conservation programmes in New Zealand Councils

Many authorities are facing growing population and will have supply constraints in the near to middle future. Due to the long planning horizon needed for major infrastructure, anticipated increased supply would need to be considered 10 to 20 years or more before it is required. The case for reducing demand instead of increasing supply must be strong and ideally shown to work prior to committing to that approach. With the need for new supplies looming to match the anticipated population needs, it is critical that demand management practices are implemented swiftly to avoid the ecological consequences of large capital investments.

The four New Zealand case studies that were examined in detail provided a wealth of examples of educational approaches which were used throughout the country. It was clear from workshop feedback that a mechanism to share these stories and successes would be a useful role for an industry agency, research provider or government agency. However the educational approaches that offered the best success were hands on, with practical one on one advice sometimes supplemented with in-house water services maintenance. While internet advice may reach the masses it doesn't appear to have the same impact as the personal approach.

Those water supply authorities that had implemented water metering with volumetric pricing had an immediate drop in water use as in the case of Tauranga where it was reported as being reduced by 25%. Introducing water metering was considered to be more difficult following the introduction of the LGA which strongly promotes a public consultation process for local authorities. The process known as the Long Term Council Community Plan (LTCCP) takes a ten year horizon with three yearly refinements, and should have provided a good opportunity to discuss water management issues with the community but instead appears to be viewed by some as a barrier, perhaps an indication that the current approach to community participation could be improved.

Outdoor water use in gardens for irrigation was a key differentiator of water use between communities. In general those areas with low rainfall and/or sandy soils used significantly more water than those where rainfall was evenly spread throughout the year. While not a surprising result it did emphasise the value of addressing indoor and outdoor use separately and how the use of rainwater tanks and/or grey-water recycling came into their own, especially in high outdoor water use areas. Unfortunately the current application of both those technologies is clouded by Health requirements which, even though they can be technically addressed, can push the use of rainwater tanks and grey-water recycling into the too hard basket.

While local authorities have tended to value their independence there was a suggestion that came through Beacon's workshops that national legislation which supported water demand management would assist them, especially in considering regulatory routes. They wanted stronger signals from national levels which still provided enough flexibility to implement those requirements according to their local context. In general they would have welcomed simple requirements such as dual flush toilets and low flow shower heads to be mandatory across the country. Similarly, mandating for metering at a national level would probably be welcomed as it would have removed the decision from the local arena where it has become in many cases, a political football.

One case study authority in particular indicated a high level of commitment to demand management. Despite and maybe because they have not run the metering gauntlet with their community, they have implemented a number of other demand management approaches which are leading up to significant regulatory changes at a local level. Kapiti Coast District Council (KCDC) has used a wide range of approaches and brought them together as a model package. This includes:

- Education packages containing such things as a "green gardener" to assist with the choice of plants and irrigation

- A substantial communication process using the Long Term Council Community Plan under the LGA (2002) to discuss demand management requirements with the community
- A sub-division Code of Practice which promotes low impact urban design
- Advertising on local radio and newspapers and websites
- Modeling using PURRS developed by Coombes (2002), which indicated that for KCDC dual flush toilets can save between 20 and 31% of toilet water use. Furthermore low water use washing machines reduce water use for that purpose by 50% giving c.15% reduction in household water use.
- Unique to Kapiti is the introduction of a district plan change under the RMA (1991) which will mean that rainwater tanks become mandatory for all new homes or a mix of a rainwater tank with a grey-water recycling system for garden irrigation will be required. Again PURRS modeling was used to set the sizes of rainwater tanks for the local conditions.

While those actions may not seem revolutionary in some countries, the fact that KCDC (which is a relatively small community of 46,000) has gone where even larger councils have feared to tread makes it exceptional. Other councils' lack of willingness to push the legal boundaries is in no small part because the process required to justify the plan change can be long and painstaking, there is little case law to support a belief that the approach will be upheld in the event of a legal challenge, and the cost is significant. Judging by the level of interest in the approach KCDC is taking, it looks likely however that if successful KCDC will be but the first of many councils to undertake such a plan change. Beacon's workshops have shown that there is a high level of interest among many councils to be doing more to encourage or require on-site water management. Given that the RMA provides for a hierarchy of regulatory processes, it would be helpful if water demand management was signaled as a desirable approach in a national policy statement and/or the regional policy statements which sit over the District Plans.

Our international literature survey identified a wealth of information on demand management approaches and policy approaches. It shed light on the type of regulatory approaches that work well, again confirming the value of nationally based performance standards or requirements. The introduction of a mandatory labeling scheme, Water Efficiency Labeling System (WELS), when it comes into effect in New Zealand, will undoubtedly also assist in raising both the awareness of and availability of water efficient appliances. It is a national led intervention that will have impact.

The workshops are confirming that differing approaches are required between councils to take account of their individual contexts. Lack of discretionary income in smaller councils may in turn require more innovative use of community volunteers. Some water supply authorities will focus on retrofitting with low cost water efficient fittings while others will have greenfield opportunities and local developers willing to assist with major changes in their approach. Some councils will be the leaders and others will follow suit. It seems likely however that there needs to be a major shift in willingness to engage and our research results will provide guidelines for differing contexts that ensure we don't have to try and make one shoe to fit all.

#### 4. Discussion

Through the surveys, case study analysis, overseas literature research and workshops some key findings are emerging.

Consumer acceptance and political willingness will play a major role in how far and how fast water managers and politicians are prepared to promote water use efficiency. The issue of water metering and volumetric pricing is a point of contention in many districts. One perception within the community is that access to "free" water is a right for all people and shouldn't have a charge attached. This completely overlooks the cost of supply and the fact that people have always paid for water in their general rates. Education and awareness raising will in part help dispel the free good argument but it is unlikely that this will affect a wholesale change of attitude without other policy interventions. In addition the value case for demand management for each of its stakeholder groupings, needs to clearly articulate the benefits based on sound data.

The understanding of "water as a necessity" is undoubtedly more pronounced in those areas of the country that have experienced periods of drought in more recent years. It is yet to be tested whether those areas are more likely to offer support for mandatory water conservation approaches and volumetric pricing based on consumption. The degree of necessity relates substantially to water access and climate. Some parts of the country have low rainfall but still enjoy a plentiful supply. Other parts are more obviously short of water with most of the available supply already allocated to hydro, agriculture, industry as well as domestic use.

The degree to which current policy and regulation is helpful or provides barriers will undoubtedly impact on the route of uptake of water use efficiency. The current regulatory route can be long and often needs to be addressed on multiple fronts. Without strong national legislation promoting water use efficiency it is left to councils or water supply authorities to individually determine their policy or regulatory route. Hence there is massive replication of effort, some of which could be avoided by national level guidance or legislation.

In fact New Zealand legislation does not respond well to the need for water use efficiency. Current conflicts exist between the role of the RMA, the Building Act and Building Code, and the LGA. The RMA is intended to be responsible for the sustainable management of resources gives little consideration to domestic water supply issues, while the Building Act appears to be still coming to terms with how to translate high level sustainability principles into action. There is also something of a conflict of powers between these two acts with the Building Code making it very difficult for councils to require home owners and/or builders to do any

more than meet requirements of the Building Code – even if the measure would improve the sustainable management of resources in a district or locality. At the same time the Local Government Act - which should encourage quality governance that incorporates all aspects of sustainability and strong consultative processes - has to date failed to deliver anything innovative in terms of water conservation. Then the issues with on-site water supply and water recycling in relation to the Health Act must also be clarified and if there are real conflicts, they need to be resolved as the perception of those barriers currently provides a deterrent to using on-site supplementary water supply.

There has been some call for a national structure to oversee and promote water use efficiency initiatives. New Zealand has acknowledged the benefits of an organisation focused on energy efficiency, the Energy Efficiency Conservation Authority (EECA). Water is arguably an even more essential resource than power given that it is essential for all life. A similar organisation to EECA but focused on water should be created immediately. Australia has introduced the National Water Initiative which provides a potential model for New Zealand.

While national guidance and legislative support is important there will still need to be local solutions, specific to the variables of each WSA's context. They reflect the differences in climate, population, socio-economic groupings, local political viewpoints and development opportunities. The suite or package of interventions and the policy to implement them will have considerable site specificity.

Nobody wants a prolonged drought as we have seen in Australia. It has however galvanized that country into a major focus on preserving the irreplaceable resource that is water. Without such a crisis it is likely that New Zealand will take longer to respond to what is now recognized as a global need to carefully manage water use. The regulatory building blocks are there but they could be remodeled and their performance criteria improved. There is a willingness amongst water supply authorities to be proactive but they require support. Consumers have a way to go in understanding our water supply but financial instruments will play an increasing role as energy costs linked to water supply and heating continue to rise. Domestic water supply in New Zealand is at the beginning of a major period of change to embrace sustainability which will in turn contribute to Beacon's overall goal of "sustainable homes that don't cost the earth."

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