



Creating home and neighbourhoods
that work well into the future
and don't cost the earth

Developing the Blueprint for Urban Water Use Efficiency

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to Beacon Pathway

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Beacon Pathway Limited



World Situation

Daily per capita use of water
in residential areas:

- 350 litres in North America and Japan
- 200 litres in Europe
- 10-20 litres in sub-Saharan Africa

1.1 billion people live
without clean drinking water
2.6 billion people lack adequate
sanitation (2002, UNICEF/WHO JMP
2004)

**Quantity of water needed
to produce 1 kg of:**

- wheat: 1 000 L
- rice: 1 400 L
- beef: 13 000 L

New Zealand

Water is New Zealand's economic advantage
80% of abstracted water is used for primary production

New Zealanders are not generally aware of the value of water

Auckland's next major water supply will be over \$300m

\$5b is required over next 20 years to upgrade water supply

Catch-22: WATER vs. ENERGY

Water is needed to generate energy. Energy is needed to deliver water. Both resources are limiting the other—and both may be running short. Is there a way out?

By Michael E. Webber

IN JUNE THE STATE OF FLORIDA MADE AN unusual announcement: it would sue the U.S. Army Corps of Engineers over the corps's plan to reduce water flow from reservoirs in Georgia into the Apalachicola River, which runs through Florida from the Georgia-Alabama border. Florida was concerned that the restricted flow would threaten certain endangered species. Alabama also objected, worried about another species: nuclear power plants, which use enormous quantities of water, usually drawn from rivers and lakes, to cool their big reactors. The reduced flow raised the specter that the Farley Nuclear Plant near Dothan, Ala., would need to shut down.

Georgia wanted to keep its water for good reason: a year earlier various rivers

dropped so low that the drought-stricken state was within a few weeks of shutting down its own nuclear plants. Conditions had become so dire that by this past July one of the state's legislators suggested that Georgia move its upper border a farther north to annex freshwater reservoirs in Tennessee, pointing to an allegedly 1818 border survey. Throughout Georgia, Alabama and Florida have continued to battle; the corps, which is tasked by Congress to manage water resources, has been caught in the middle. Drought is one cause. A rapidly growing population, especially in Atlanta, as well as overdevelopment and a notorious lack of water conservation, is running the region's rivers dry. Water and energy are the two mo-

Water is essential for life



Research Components

- A nationwide survey of territorial authorities or associated water supply 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
- An international literature search then identified policy approaches in other countries that could be applied to the New Zealand context.
- Workshops with local councils representative of water supply authorities around the country.

Report: Lawton, M. et al. 2008 Best Practice Water Efficiency Policy and Regulation A report for Beacon Pathway Limited at www.beaconpathway.co.nz



Key drivers of water use efficiency

- Capital cost savings through delaying or eliminating infrastructure development, both for more supply and increased wastewater services.
- Reducing infrastructure operating and consumer costs for water and energy.
- Reducing ecological impacts.
- Addressing climate change issues and the need to improve the resilience of the water supply system.

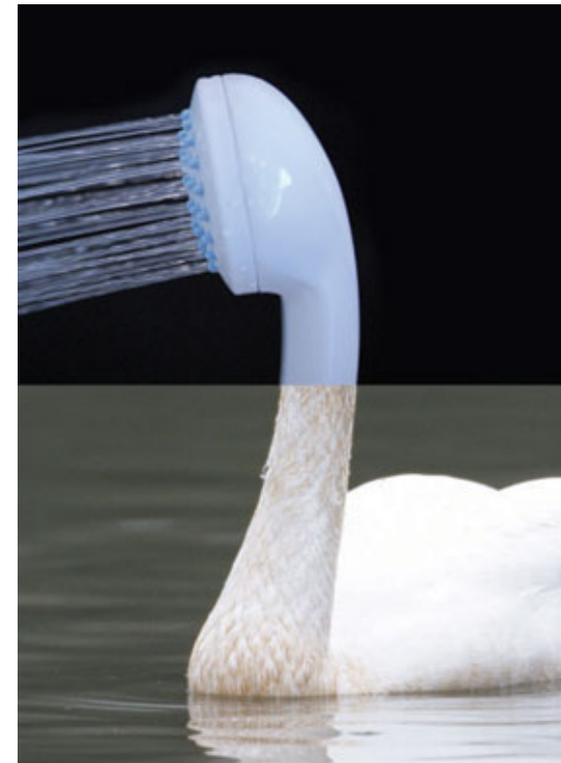


Per capita water use from around New Zealand

<u>Council</u>	<u>Daily Per Capita Water Use Figure</u>
Nelson	160*
Waitakere	167*
Rodney	179*
Metrowater (Auckland City)	184*
Manukau	189*
Papakura	190*
Tauranga	214*
Upper Hutt	227
Christchurch	333
South Taranaki	450
Kaikoura	648
Kapiti	650
Queenstown Lakes District	750

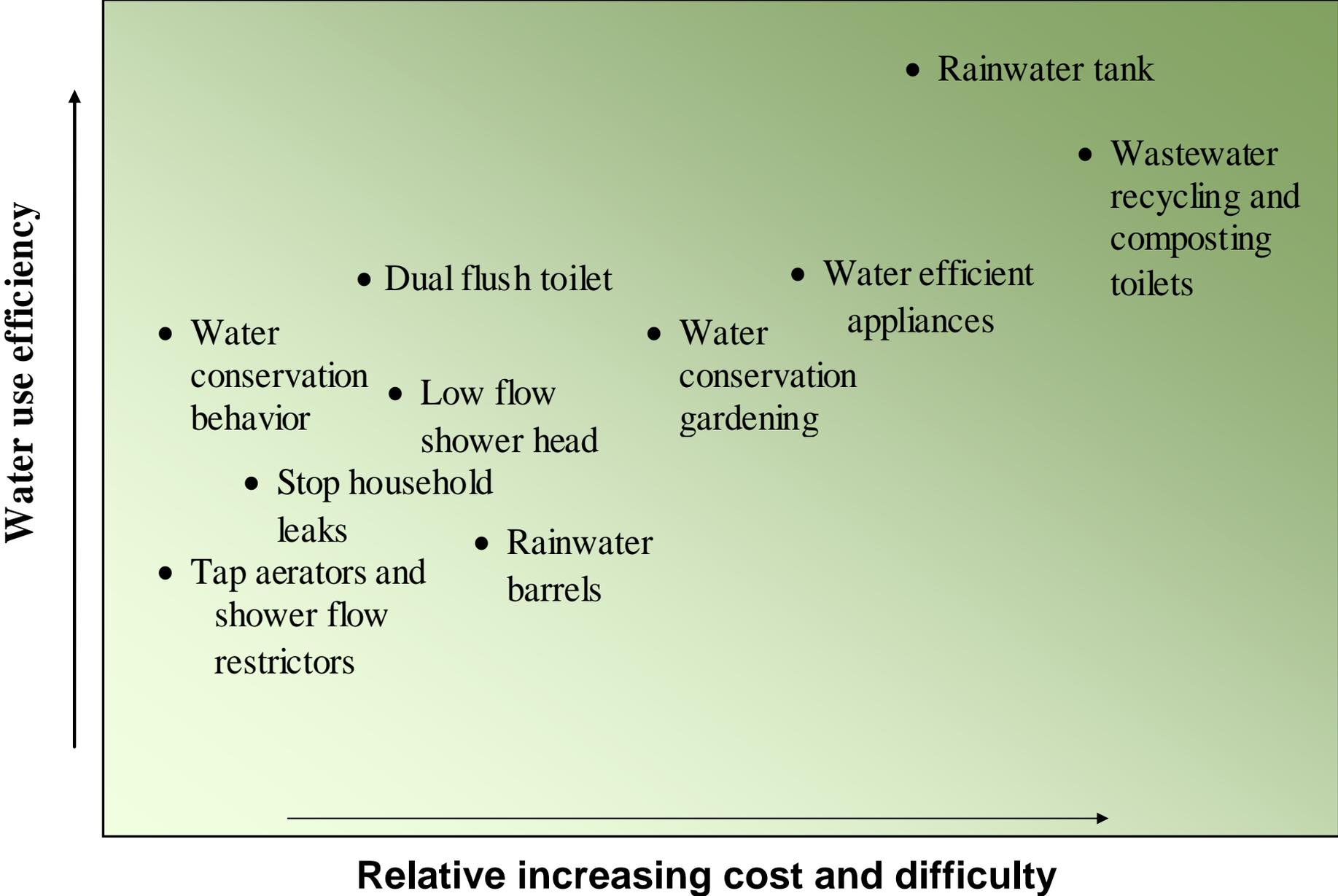
Demand Management Approaches

- Economic Tools; pricing tariffs, incentives/rebates
- Improving technology; water efficient fitments, fixtures and appliances
- Focus on maintenance and reducing waste
- 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.**



<http://www.waterwise.org.uk/>

Schematic of DM options against cost and difficulty of implementation for the domestic user



Successes in New Zealand through:

- Education: green gardeners, green plumbers, eco-days, eco-advisers, using community leaders; one on one dialogue
- Economic: Metering and wastewater charging.
- Regulatory: Currently a “rule” in the District Plan
- **But, most activities are ad-hoc, not part of a plan**



International Experiences

- UK has strong national framework
- USA; conservation accepted, state funding available for customers, automated meters, mandatory policy more effective than voluntary
- Canada; Have the Soft Path, based on modeling scenarios and backcasting, community involvement and political review
- Australia; National Water Initiative; strong multi-pronged approach, low hanging fruit taken and now more regulatory measures



CONTEXT

DEMAND MANAGEMENT OPTIONS

POLICY APPROACHES

DRIVERS/CONSTRAINTS

GLOBAL CONTEXT

Climate change
Resource depletion

NATIONAL CONTEXT

Sustainable development
Market competitiveness

REGIONAL CONTEXT

Regional development
Integrated catchment management
Water allocation
Resilience

LOCAL CONTEXT

Political direction
Community attitudes
Environmental protection
Governance
Population
Greenfield or retrofit housing
Climate and geology

POSITIVE OUTCOME

KEY CONSIDERATIONS

Is it cost effective?
Does it build resilience?
Meet end users' needs?
Improved sustainability outcomes?

WHAT TO DO?

PACKAGE OPTIONS:

Water Efficient Technologies
Rainwater tanks
Greywater reuse
Water efficient plumbing fittings
and appliances

MAINTENANCE

Fixing system leaks
Reduce system pressure
Household leaks/green plumber

OTHER TOOLS

Water metering
Xeriscaping/permaculture

ADJUSTMENTS

HOW TO IMPLEMENT

REGULATION

Building Act/Code - Building consent
RMA - District plan
LGA - LTCCP/WASSA/Bylaws
Health Act/Bylaws

NON-REGULATORY POLICY

Council Engineering Manuals
Verification methods and
Acceptable Solutions
Design Guidelines
Education/Social marketing
Council Process

ECONOMIC INSTRUMENTS

Volumetric user charges
Tariffs (stepped pricing)
Wastewater charging
Incentives and rebates
Development and Financial
Contributions

MEASURING & MONITORING



RESULTS



Relevant New Zealand Legislation



NATIONAL

**BUILDING ACT
AND CODE**

RMA

HEALTH ACT

LGA

LG (Rating)A

REGIONAL

RPS

NPS

Regional Plans

DISTRICT

District Plans

Codes

By laws

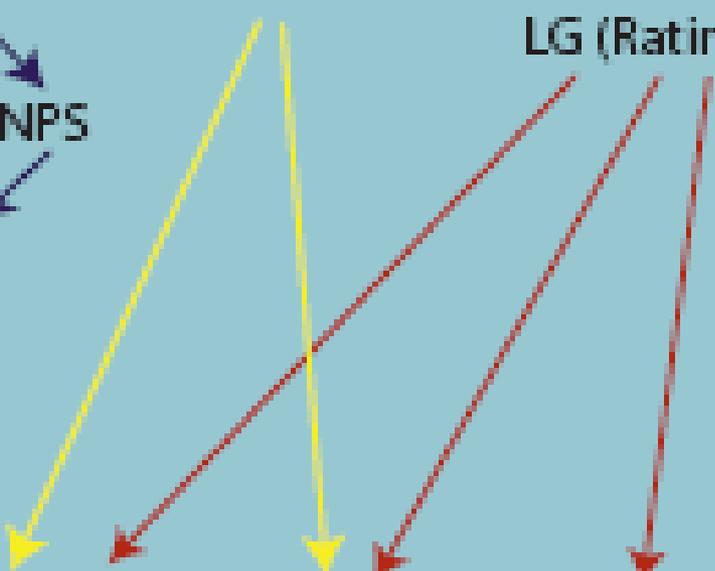
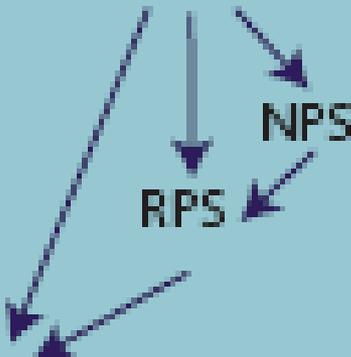
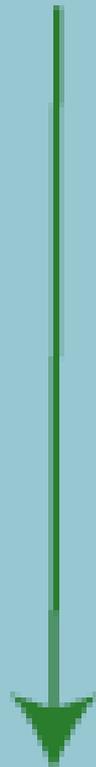
**Other policies
and plans**

**SUBDIVISION
AND SITE**

*Building
consent*

*Resource
consent*

*Development
contributions*



Kapiti Coast District Council

- **Public education & consultation**
- **Wide ranging education programmes & free services, eg. green gardener & plumber, and garden show**
- **Subdivision Code of Practice promoted low impact urban design**
- **Proposed a District Plan change- two acceptable solutions which promote water conservation**
- **But: no metering and still have 650 l/pp/pd**





Tauranga Case Study

- **Introduction of water metering on a volumetric basis reduced average daily water demand from 705 l/pp/pd to 350 l/pp/pd**
- **Information exchange with community has had a sustained effect on water demand management**
- **Positive and inclusive branding of water efficiency programme: "Water – Let's make every drop count"**
- **Schools' programme to address water efficiency and raise awareness, including how to fix leaks**
- **Dedicated water conservation officer**

Allan Dale is just a phone call away.



Key requirements for improving water use efficiency

- Improve consumer acceptance and political willingness
- Get your house in order; minimise leaks!
- Provide “green tape” not red
- Have a champion and have a plan, **start with the end in mind**
- Ensure legislation and sector structure supports the cause; if it doesn't change it
- Drive high level of uptake of water efficient appliances and fitments

Ultimately aiming for systems redesign: Taking a Cradle to Cradle Approach



- Supply only what is required
- No waste, all water and biological material is reused. (By people or other biota)
- On-site supply is integral to building design. (Water used where it falls, less pipes, less stormwater)
- Urban design and on-site supplementary supply make a major reduction to energy requirements
- Simple purification products to ensure non-mains water can be used for majority of household uses
- Residual stormwater is clean when it enters waterways
- All materials involved in water services designed to minimise toxic waste to land or water
- Designed for minimum energy and material use

