

IS IT WATER CONSERVATION OR UNIVERSAL WATER METERING – APPLYING THE KÜBLER ROSS CHANGE CURVE

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ABSTRACT

Water conservation including universal water metering makes economic and environmental sense, so why is it so hard to implement?

This paper looks at the experiences of New Plymouth District Council (NPDC) over the last five years gaining acceptance and buy-in for Universal Water Metering from councillors and communities through the lens of change management theory, centred on the Kubler Ross change curve and supported by engagement theory, as taught by the International Association for Public Participation Australasia (IAP2).

The Kubler Ross Curve in change management theory describes the four stages individuals and communities experience when confronted by a change: shock, anger, acceptance and commitment. How fast we go through these stages depends mainly on three factors: perceived degree of change, perceived degree of control and on personality.

For NPDC the shock was a report in 2016 detailing the need for a \$41M investment in the potable water network to accommodate growth. At that time, universal water metering was unpopular with the councillors, community and some staff. Over the last five years we have supported our councillors and community through the 4 stages of change, to the point where we had 60% of the community and 14 out of 15 councillors support water conservation in the 2021/2031 LTP. This journey was supported by ensuring we use different tools and methods to support each person's individual journey.

Our journey, which has seen a lot of water has pass under the bridge, has been successful so far but there is plenty of room for improvement. This paper covers practical examples derived from NPDC's experience over the last five years that reflect our learnings and suggest how other councils might deal with significant change projects in a way that is positive and constructive.

KEYWORDS

Water Conservation, Universal Water Metering, Kubler-Ross Change Curve, Engagement, Change management theory, New Plymouth

PRESENTER PROFILE

David has 15 years experience in the water sector, in consulting and with council. Since project managing the water master plan that led to the "shock" event that has led in New Plymouth adopting universal water metering he has steadily built up NPDC's three waters planning capabilities while driving the water conservation program. Over this time he has been working on how to get better project outcomes through engagement with Iwi and the community.

INTRODUCTION

In 2016 a report was prepared that concluded we either invest \$41 million in the New Plymouth Water Supply and find an additional water source, or we reduce the amount of water we consume. Immediately, the need to install water meters to drive a reduction in consumption seemed to be urgent, but neither the community nor the council were prepared for it.

The vast majority of the community was on a middle ground, not yet able to make a decision for or against water meters. Inside the council there were mixed feelings and reactions regarding them. Early adopters were trying to influence others to move ahead with the instalment of meters. The need to change was clear for this group. On the other hand there were a number of resistors who could have become very vocal opponents.

Water meters, like most major changes, have never been popular initially with the community, partly due to the many myths around them. People often think that after metering they will pay more for water or that Councils motive is additional profit through charges. Consequently, having an open conversation about water metering with the community is usually not easy.

When confronted with change there are stages we need to process. These stages involve shock, anger, acceptance and commitment. How fast we go through these stages depends mainly on three factors: perceived degree of change, perceived degree of control and on personality. The perceived degree of change and degree of control is unique to each individual, however it is also highly dependent on how the change is communicated. If communicated well the perceived degree of change decreases and the degree of control increases. This builds trust and trust generates optimism.

Acknowledging the different personalities and perceptions and that there is a process that needs to happen to deal with the change, enables the Council to embark on a more deliberate change journey with its community. This journey can be supported by ensuring we use different tools and methods to support each person's individual journey.

Our journey, which has seen a lot of water pass under the bridge, has been successful so far but there is plenty of room for improvement. The following sections provide practical examples derived from NPDC's experience over the last five years that reflect our learnings and suggest how other councils might deal with significant change projects in a way that is deliberate, positive and constructive.

CHANGE MANAGEMENT THEORY

Dr. Elisabeth Kubler-Ross (1969) based her research on the transition process associated with death, as it was the greatest crisis faced by humans. Her research laid the foundation for bereavement theory and the study of "griefwork". Since then this work has been applied to many different areas including change management.

The Kubler Ross Curve in change management theory describes the four stages individuals and communities experience when confronted by a change; shock, anger, acceptance and commitment (Figure 1).

- A shock is followed quickly by denial. When changes are first mooted, it is a natural human response to keep the status quo.
- Knowing that a change is needed can lead to anger, defence and similar feelings that make it difficult to decide how to deal with changes.
- During acceptance people begin to let go of the past and focus on building the new. People start to see the change is beneficial for the organisation (or the environment, society, vulnerable groups, etc.) and accept the potential of a new reality.
- New situations processes are tested and acceptance and trust start to arise, leading on to commitment.

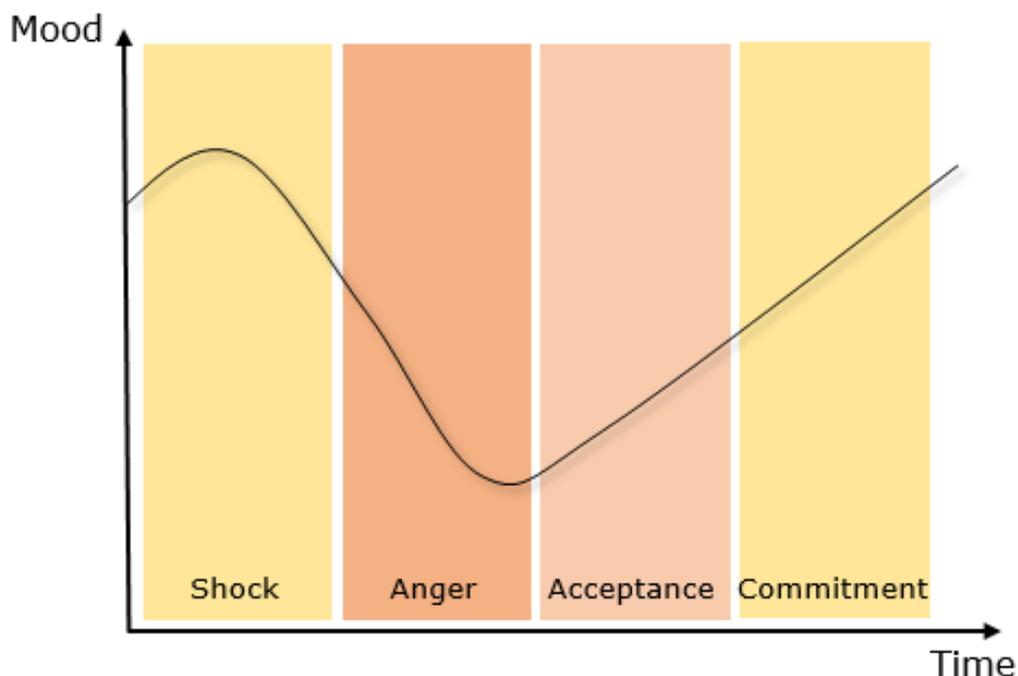


Figure 1: Kubler Ross Curve in change management

Human response to change is different for everyone. How we deal with the process of change depends mainly on three factors: perceived degree of change, perceived degree of control and personality.

The degree of change depends on how much change each individual perceives that they make. The degree of control depends on the individual's sense of how much they can change the outcome. Usually, as we perceive more change and less control of the outcome, the more reactive we tend to be to the change.

The inherent pessimism or optimism and activeness or passiveness of individuals also plays a significant role on how we deal with change. Therefore, four groups of individuals can be considered (Figure 2): Early adopters, resisters, persuadable followers and laggards (Williams and Braddock, 2019).

- Early adopters are those individuals who are predominantly optimistic and active. They have either the experience or persuasive power to be highly influential to others.
- Resisters are those who are still active, but pessimistic, therefore resistant to new opportunities and may be persuasive to those still undecided.
- Laggards are mainly passive and pessimistic and slow to adapt to new ideas or technology.
- The persuadable followers are optimistic and passive who are essential catalysts for change and are likely to be the largest group.

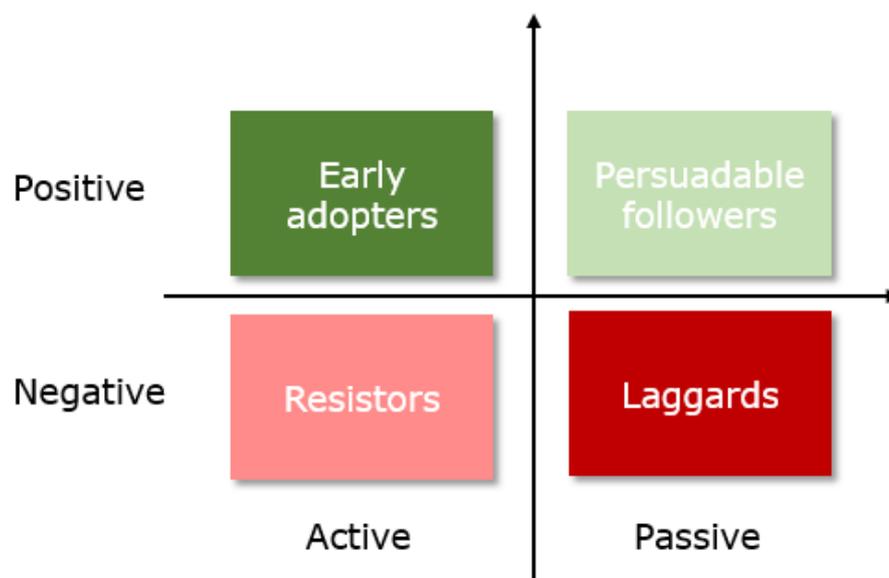


Figure 2: Different personalities

Early adopters need to be embraced during the communication and engagement process as voices and opinions to be supported. However they also need to be managed to ensure that the pace of change does not exceed the ability of the wider group to process it.

Resisters need to feel they are constantly heard and informed, and because of their activeness they may readily switch from a pessimistic stance to an optimistic one. However, if poorly managed or rushed, resisters will become your main source of problems.

Laggards are not a target as they tend to adopt only when they are forced to or because everyone else has already, but will not actively try to inhibit the change.

Finally, the persuadable followers make decisions based on utility and practical benefits. These represent the vast majority and as such represent the main target group for mass engagement efforts.

KEY STAKEHOLDERS

For any engagement, key stakeholders need to be identified. From a retrospective look at the experience, the key stakeholders are listed below, along with commentary against the above factors. These stakeholders and how they changed against each of the key factors will be evaluated for key stages of the process through the remainder of this paper.

- Elected Members: Decision makers on budget and anything controversial that can't be resolved at a project level. The majority have an active personality, where optimistic and pessimistic behaviours can be equally found. Due to the unpopularity of the topic, the implementation of water meters implied a medium change for them as they would need to explain their position in favour or not. Also, there is always a political lens on their speech as they need to represent their electorate.
- Three Waters Operational team: Decision makers on the implementation and technical constraints and future owners of the project outcomes. There are a mix of active and passive personalities, together with optimistic and pessimistic behaviours on this group. The implementation of the project would imply a significant change for their current operations.
- Iwi and Hapū: Mana whenua and provide the cultural lens of the project on specific issues. Water is taonga. Iwi, and Hapu expect that the cultural impacts of the activities around water are acknowledged and minimised. The vast majority of the representatives of this group have an active personality, where optimistic and pessimistic behaviours can be equally found.
- Community: Will experience the change and are the recipients of the solutions. The vast majority have a passive personality, where optimistic and pessimistic behaviours can be equally found.
- Marketing and Communications team: Link between the institution and the community. The majority has a passive personality with respect to this change, and both optimistic and pessimistic behaviours can be found. Even though it is an unpopular topic, the implementation of water meters did not imply a significant change for this group.

GRIEVING TIMELINE

THE SHOCK

In 2016 a report was prepared that concluded the New Plymouth supply area would grow by 19% to a population of just under 88,000 people by 2045. This anticipated population growth and the impact of this additional demand to the existing network infrastructure was significant and would require capital and operational investment.

In order to achieve Council's level of service there would be a need for capital and operational investment in several components of the network (trunk mains and reservoirs). The total estimated expenditure to resolve current and future network deficiencies until 2045 was a NPV of \$41 million.

The report also stated, that during most times of the year we could cope with demand but there were concerns with availability of source water during droughts, particularly as these tend to occur during the summer period that coincides with peak day demands. Therefore, additional investment was needed to find a new source to meet demand during droughts.

The average residential water consumption within the New Plymouth supply area in 2016 was 334 litres per person per day (LPPPD), placing New Plymouth in the top-third for water consumption among provincial councils. Also, approximately 50% of New Zealand's population were on metered supply by that time.

Therefore, universal water metering was proposed as the most effective demand management tool that could delay the capital investments. The implementation of system wide universal water metering, had at that time an estimated CAPEX cost of \$12.4 M and was anticipated to reduce peak day demand by 25%.

The urgent need for water meters was a shock for almost all the stake holders in 2016. The council communicated the problem with the wider community and immediate actions were introduced. These included compulsory annual water restrictions for all residential customers between 1 January and 31 March and the development of a range of education initiatives to raise the Community's awareness of water consumption rates and water efficiency measures. A program was also proposed for residential customers to adopt water meters voluntarily.

The Three Waters Operational team were generally accepting and supportive, however they had major concerns with the organisation's ability to manage the associated reading and billing process. The existing processes were woefully inefficient and painful. One example of this is that the bills were taken home to be folded and stuffed by a staff member and her family. The thought of expanding from 3,000 meters to 30,000 lead to some staff effectively falling into the resistor category.

Figure 3 shows where, in retrospect, we perceive the key stakeholders were shortly after the publication of the report.

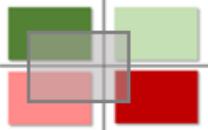
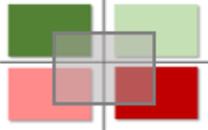
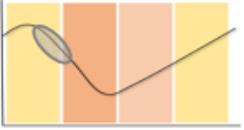
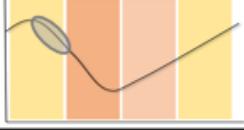
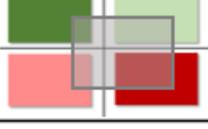
Stakeholder	Change	Control	Personality	Stage on the curve
Elected Members	Moderate	High		
Three waters ops	High	Moderate		
Iwi and hapu	Moderate	Low		
Community	High	Low		
Marketing and comms	Low	Moderate		

Figure 3: 2016 reactions

2018 LTP

With the problem revealed, a decision had to be made for the 2018 LTP. The majority of Elected Members and the Community were still in the shock stage during this period and resistant to the implementation of water metering. However, there were few early adopters that had already accepted and processed the shock and were committed to the idea of metering. This small group of proponents were pressuring to move forward with universal water metering and wanted it included in the 2018 LTP. Voices in favour and against were becoming more vocal, yet there was no clear direction.

The Marketing and Communications team was not really involved at this stage and universal water metering had not yet made it onto their radar as an issue of importance. Little information was provided to Iwi and Hapū or the Community to improve their understanding of the issues and solutions. Therefore, a significant section of the Community was still in the anger stage regarding the implementation of water meters as they were still perceived a high degree of change and low degree of control. On the other hand, some Iwi and Hapū, because of their inherent optimism and activeness, were moving towards an acceptance stage, while others considering their lack of information were still on the anger stage.

Even though there was pressure from early adopters within the Elected Members and Three Waters Operational groups to begin wide scale installation in the first 3 years of the LTP, the decision was made to delay installation to year 4. This also

deferred the official go/no go decision to the 2021 LTP. This decision was made on the basis that neither the community, nor the councillors were ready to support the change in a positive way, nor were council's systems and processes ready to deliver a positive experience for staff or the community. However funding was allocated to put together a detailed business case to provide better justification for the change and to improve the systems and processes.

In line with this, work was started with the Three Waters Operations team on the remediation of existing water meter procedures and processes. The ensuing work required a culture change approach. These changes have been successful and have helped to drive wider changes that have led to further beneficial outcomes – a virtuous circle. The perception of the degree of change started to alter as well as the team's sense of the degree of control over the outcomes. As a consequence, and also motivated by the early adopters, some of this group started to be more optimistic and move towards the acceptance stage or even commitment stage mainly motivated by the persuadable followers, although some of them were still in the anger stage.

The program for voluntary adoption of water meters by residential customers did not proceed, due to the issues with processes and procedures and internal resource constraints. This was a missed opportunity to increase confidence in the benefits of change with the Community.

Figure 4 shows where, in retrospect, we perceive the key stakeholders were on their change journey at the adoption of the 2018 LTP.

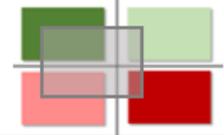
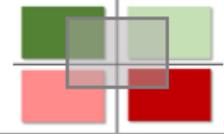
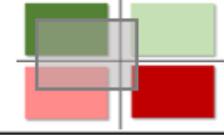
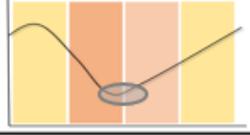
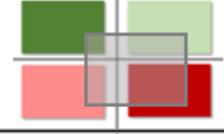
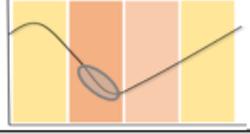
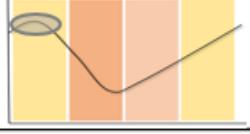
Stakeholder	Change	Control	Personality	Stage on the curve
Elected Members	Moderate	High		
Three waters ops	High	Moderate		
Iwi and hapu	Moderate	Low		
Community	High	Low		
Marketing and comms	Low	Moderate		

Figure 4: 2018 LTP reactions

ACTIONS BETWEEN 2018 AND 2021 LTP

Many questions, doubts and myths needed to be addressed during this period if we wanted to build confidence and support for the water metering project.

A voluntary internal competition was established between a group of Elected Members, Management and the Three Waters Operational group. This internal league, the Waterbowl, pitted the participants' monthly water use against each other. There was a trophy for the household with the lowest monthly per capita consumption and bragging rights for the biggest loser (e.g. reduction in usage over the previous month). This let us gather valuable insights into the motivations and methods for reducing household usage (e.g. leak detection/fixes, general mindfulness and usage changes). It was also interesting to note the natural competitive nature of some users once reduction goals were gamified. Typically participants recorded a 30% drop in their usage in the first year of the league. For Elected Members it was striking how they moved stages (eg. to acceptance) once the concept of metering became personal through seeing their own usage data and behaviour change.

The remediation process continued over this period with notable improvements for the Three Waters Operational team. Paper based and manual procedures were replaced by automatic and digital ones. Certainly there was a learning curve, but the advantages were evident once the changes were in place.

Additionally, a water metering pilot was carried out during this period to better understand the risks, benefits and costs of metering. The exercise evaluated: hardware (eg. meter type, performance and accuracy), software, usage reporting, business processes management. The objectives of the pilot were to: inform the business case more accurately about a proposed approach and to test the capabilities of possible solutions.

A related benefit of the pilot was that the Three Water Operations team gained detailed knowledge and experience of the potential solutions. This helped move, or reinforce, their acceptance and support for the solution.

The Wai Warrior campaign was launched. The focus of the campaign was to educate consumers about simple ways to save water in their homes. The campaign used radio, YouTube, social-media and events to engage and provide the community with plenty of water-saving tips. A Three Waters Education Officer visited schools and attended events to teach children and the wider community about conserving water and what they could do to cut down their usage. Kids were our 'leak detectives'.

Throughout all this period, external events were also helping us along. Events as Day Zero in Cape Town in 2018, the Auckland drought in 2020 and Wellington Waters issues have helped increase the awareness. On the other hand, the Three Waters Reform created uncertainty. Opinion pieces were written by local journals to demystify water meters and media was used to promote water restrictions, and also increase the awareness. The intention was to reach as much of the Community as possible, but not the right messages were given all the time and a closer relationship with the Marketing and Communications team would have certainly helped.

A more detailed technical understanding was needed for both the Council and community, so a Business Case was undertaken. The Business Case didn't focus just on Water Meters, but considered a comprehensive Water Conservation Program. The document included options for conserving water and estimated both the cost and the net savings from delaying the need to build additional water infrastructure. The most significant initiative among the options is the installation of water meters and a change to volumetric charging for drinking water. The Business Case found that we could save between \$62 million and \$120million (depending on the water reduction) on the next 30 years with the implementation of the program when compared to status quo.

One of the challenges with the business case was to what extent it would cover some of the harder but more detailed decisions, namely the approach to metering complicated properties (where multiple separately rateable dwellings are fed from one lateral) and tariff structure. In the end the tariff structure was deferred until after the go/no go decision as it did not have any bearing on the business case. For complicated properties, a recommendation was made for the purposes of the financial component of the business case but the final decision-making deferred until after the go/no go decision had been made. This helped keep the focus of the conversation at the right level, i.e. do you support the concept of water conservation, and helped reduce opposition to the proposal over a technicality, i.e. I don't agree with the tariff structure which can and will change in the future anyway.

The Business Case was positioned as a compelling narrative and set a presence for the storytelling. In 2020, Water Conservation became the main topic instead of Water Meters. Also, it articulated the main benefits that the program would bring, namely:

- Significantly reduce the effect on the environment.
- Protect and enhance water sources' cultural and community value.
- Use water resources efficiently in order to postpone local water infrastructure investments.

We have been hosting Three Waters Hui on a monthly basis since 2019. This working group consists of local hapū and iwi representatives together with NPDC officers. Water Conservation ideas were discussed in this forum, along with other water related relevant topics. Even though the forum started with a different focus, it helped with relationship-building and to look for ways to establish a collaborative working environment. The forum highlighted that the Business Case was too technical and needed tailoring for different audiences. To achieve this a Water Conservation Consultation Document was created to deliver a simple and consistent message. This document was followed by an interactive webpage that summarized the Water Conservation Consultation Document to those who did not want to read a full document.

The Business Case and Consultation Document coincided with the National Policy Statement (NPS) for Freshwater Management reform in 2020 which is based on the fundamental concept of Te Mana o Te Wai. Te Mana o Te Wai refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and wellbeing of the wider environment. It protects the mauri of the wai. It is about restoring and preserving the balance between the

water the wider environment and the community. This concept has helped highlight the need for integrated and holistic management that ensures the wellbeing of water and was released in time to support the Water Conservation project and benefits.

2021 LTP

The Waterbowl competition and Business Case provided the Elected Members with the right information and personal experience to allow them to buy-in to the change. They understood that with a few minor changes to their daily routine they could conserve a significant amount of water. They also had sufficient information to sell it to the community and defend their decision.

Also, financially there was no argument to be had against the implementation of the whole program. Therefore, there was unanimous support from councillors for the inclusion of water conservation in the draft LTP and only one councillor out of 15 voted against the inclusion of the water conservation program as part of the LTP.

Elected Members understood that the Three Waters Reforms do create uncertainty for this issue. There is a realistic prospect that the Council may no longer be responsible for water supply in the near future. However, they also understood that as an asset owner it is prudent to continue to plan for, and invest in, that asset until such time as the asset is taken over.

By this stage the Three Waters Operational team was firmly in the commitment stage. They understood the advantages and had personal experience of being metered through the Waterbowl. There was recognition of the value the additional data would make to their operational activities. However, most importantly, they had developed confidence that while all the issues with the processes and procedures had not been resolved, enough progress had been made and was in the pipeline to give them confidence that the end result could be managed.

The Waterbowl also revealed an interesting example of a laggard who said he would not make any change as a result of being in the Waterbowl. To date this household has spent over \$2,200 (plus lot of personal time an effort) in fixing the leaks and reduced their consumption by 90% (down from around 3m³/day to 0.3 m³/day), with no financial benefit. This illustrates how laggards can be converted to persuadable followers given the right guidance (light but sustained) and information.

A few voices against the program were raised by Iwi and Hapū. All of them supported the need of a Water Conservation Program and specifically submitted their support during the LTP consultation process. Only one iwi still thought that installing water meters or paying for water by volumetric use would not have an impact on saving water. Furthermore they thought vulnerable whanau would struggle to absorb extra costs. From the submissions received during the LTP consultation where the submitter identified as Māori, 61% submissions were in favour of introducing the Water Conservation Program.

Most of the Community had heard and understood the conservation message. 60% of the whole community submitted in favour of the Water Conservation Program during the LTP consultation process (73% from the representative

sample). The remaining 40% (27% from the representative sample), included the initial resisters and laggards, but also a portion of the persuadable followers that were not reached effectively.

One of the key challenges was the Marketing and Communications team adopting different terms and concepts during LTP consultation and many of the developed tools prepared for the wider community, as the Water Consultation Document and interactive tool, were not promoted as intended by the project team. If we were to do this again significant additional effort would be put into building this relationship and ensuring both parties were aligned.

Figure 5 shows where we perceive the key stakeholders to be when adopting the 2021 LTP.

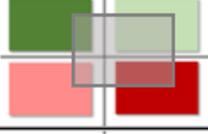
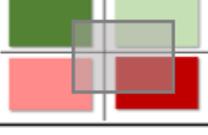
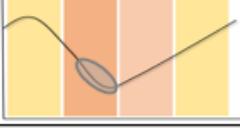
Stakeholder	Change	Control	Personality	Stage on the curve
Elected Members	Low	High		
Three waters ops	Moderate	High		
Iwi and hapu	Low	Moderate		
Community	Moderate	Low		
Marketing and comms	Low	Moderate		

Figure 5: 2021 LTP reactions

THE FUTURE

This journey was started by an infrastructure issue – lack of capacity in the water supply. Engineers then came up with an infrastructure solution – universal water metering. However, over the last 5 years, our thinking has evolved and we now understand the problem through a different lens. We would now state the problem as “we are wasting water” and the solution as “working with the community to help them use less water”.

In line with this new found understanding, moving forward we are trying to get the organisation to view this as a culture change project, not an infrastructure project. In line with this approach the Three Waters Education and Engagement resource has expanded from nobody 5 years ago, to an expected 6 people during the height of meter roll out.

To drive this culture change process we are creating an engagement plan following the tools and processes as taught by the International Association of Public Participation Australasia. Part of this involves having initiatives that target as much of the Community as possible, taking into account the key concepts discussed above; stage on the change curve, degree of change, degree of control and personality. Figure 6 below shows the key water conservation initiatives planned for the next three years and the areas each initiative targets.

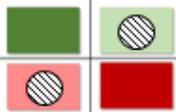
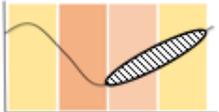
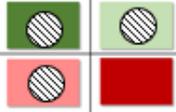
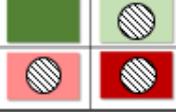
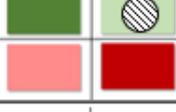
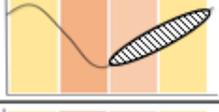
Action	Personality	Stage on the curve
- Volumetric Billing		
- Green Plumber		
- Leading by example		
- Education in schools		
- Community education - Interactive Information on use		
- Citizens Panel - Hardship support		
- Leakage management		
- Pressure reduction		

Figure 6: Planned water conservation initiatives and who they target.

CONCLUSIONS

As an industry filled with lots of engineers, scientists and other technical professionals we often focus on the technical solution to a problem and miss the human element. This human element is going to become increasingly important for initiatives like this, both to get them over the line and because their success ultimately relies not on infrastructure (e.g. the meters) but upon enough individuals changing their behaviour that we achieve a collective result.

NPDC started this change journey in an unplanned and unstructured way that improved as time went on. Ultimately we have been successful to date, but for relatively little additional effort, and a bit more deliberate thinking, we could have been significantly more successful. Key learnings for us were:

- Find a fun way to engage your key individuals. For us this was the Waterbowl.
- Think about your stakeholders and have a range of tools that will help people from different mind-sets and drivers progress through the change curve.
- Sometimes slow and steady wins the race. It takes time for people to process information and change. It is better to be successful in three years, than have it fail and off the table for 10.
- Don't wait till the last minute to get your Marketing and Communications team on board.

We encourage you to look at your projects increasingly as culture change projects, regardless of whether it's a universal water metering, a stream restoration, hydraulic modelling or even a simple water renewal. Ask how can this project help change organisational and/or community culture for the better.

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REFERENCES

Kubler-Ross E., 1969. *On Death and Dying*. Macmillan, New York.

Williams M. and Braddock M., 2019. AI Case Studies: Potential for Human Health, Space Exploration and Colonisation and a Proposed Superimposition of the Kubler-Ross Change Curve on the Hype Cycle. *Sciendō Humana*. Volume 8:1 (2019), pp 3- 18. DOI: 10.2478/sh-2019-0001.

<https://www.sciendo.com/article/10.2478/sh-2019-0001>