water

MDPI

Supplementary Material – Experts Survey Instrument

Expert opinion valuation method to quantify digital water metering benefits

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Received: date; Accepted: date; Published: date

1. Introduction

This document is provided as a supplement to the paper, Expert opinion valuation method to quantify digital water metering benefits [1]. It provides

- the survey instrument used by the study

2. Expert Survey

Digital Water Metering Benefits - Experts Survey

Summary Information:

Researchers at Griffith University are undertaking a study project titled, **Digital Water Metering: A benefits framework & modelling tool for deployment planning**.

This survey seeks the opinions of an expert panel of water industry professionals on the potential of suggested benefits from the introduction of digital water meters.

Your answers to the following questions will provide valuable insights into the benefits that could flow to water companies, Government, households and businesses. It forms part of the data collection for the project.

Firstly there are some questions about you and who you believe will benefit from digital water metering. To reduce the survey length, benefits have then been arranged into blocks of 3 to 9 questions based on areas of expertise. You can select the block or blocks that you feel you can comment on. The other blocks will be skipped. If you do not wish to comment on a particular question just enter "no opinion".

Press the **NEXT** button at the bottom of this page to start the survey.

Further Information: The purpose of the study is to gain an in depth understanding of the benefits from adopting digital water meters and how a deployment plan can deliver benefits to the business and customers earlier. This is crucial information for water authorities and policy makers who need to ensure that we, as a community, have enough water in the future and water services are provided efficiently and sustainably with sufficient information for customers to manage their water use.

The research results will be reported in an academic thesis and will be presented to participating organisations. Results may also be disseminated via journal articles and / or conference presentations.

Who should participate?

The study is aimed at supporting decision making among water authorities and, in particular, those water authorities who are developing business cases for the introduction of digital metering or who are intending to develop a business case. Water authorities who have started a rollout program may also benefit. Additionally there are a number of Government bodies and technology suppliers who will be asked to support the study. If you have been contacted for an interview and for some reason you prefer not to take part, please let us know by return email to ian.monks@griffithuni.edu.au .

What do I have to do if I participate?

Our research requires us to collect data and information over a two year period. We ask that you complete this survey with as much detail as you can provide. The survey is anonymous and confidential. Contact details of the researchers are listed below. If you would like to participate further by being interviewed and/or provide data or further information please contact the student researcher, Ian Monks.

If you are interviewed:

1. **Consent:** We will seek and require your **written consent**.
2. **Process:** We will ask you to meet with our researchers who will want to discover information about your current water supply network, social and geographic situation, customer base, your current metering practices, plans for introducing digital metering, customer concerns arising from metering and the issues that impact your decisions. The interviews will be recorded for transcription purposes.
3. **Provision of data**: We will need to request data from you to enable the project to quantify aspects of your business and the introduction of digital metering. By necessity the meter data will cover details of customer water usage and other dealings with your company. The data should be non-identifiable where appropriate before being provided to the researchers so that the privacy of your customers is maintained. Data files from companies should be named to include your company's name to identify your data and will be held in separate folders from other company data in the University's research storage facility.
4. **Provision of information**: Where possible information about your company will be sourced from the public domain. However we would like to request other commercially sensitive information such as business cases, proof of concept plans and reports, etc. These documents should be marked "Commercial in Confidence" and will be treated as such. Documents from companies should be named to include the source company's name and will be held in separate folders from other company information in the University's research storage facility.
5. **Storage, Retention and Deletion of data and information***:* All audio recordings will be erased after transcription. However, other research data (interview transcripts, de-identified data, documents and analysis) will be retained in a locked cabinet and/or a password protected electronic file at Griffith University for a period of five years before being destroyed. Griffith University provides the GU Research Storage platform for this purpose.

How long will the interview take?

The researchers anticipate that the interview will take approximately 2 hours. A second interview of 1 hour to clarify some issues may be required. Data and information collection time will be additional to these times.

Are there any risks involved in taking part in the study?

So long as data is de-identified and the data and information are clearly named as belonging to the source company we do not anticipate any risks associated with this research through customers

being identified or company data being mis-identified. If you have any concerns about any aspects of the study, please contact Mr Ian Monks (see below for contact details).

Will the privacy of participants taking part in the study be protected?

The conduct of this research involves the collection, access and/or use of your identified personal information. The information collected is confidential and will not be disclosed to third parties without your consent, except to meet government, legal or other regulatory authority requirements. A de-identified copy of this data may be used for other research purposes. However, your anonymity will at all times be safeguarded. For further information consult the University's Privacy Plan at **http://www.griffith.edu.au/about-griffith/plans-publications/griffith-university-privacy-plan** or telephone (07) 3735 4375.

Your data and information will be completely confidential and will only be used for the purposes of the research project. The data will be released as summaries in which no individual's answers can be identified.

What do I do if I decide I don't want to be part of the study?

You are free to withdraw from the study at any time without penalty or explanation. If you decide to withdraw, you can ask for any or all of your data to be removed from the study. Simply contact Mr Ian Monks (see contact details below).

Will I receive any payment for taking part in the study?

No.

(Interviewees only: How can I find out more about the study?

If you would like to receive a summary of the findings of the study, please tick the box on the consent form. In addition, please feel free to contact us at any time during the study.)

What is the best way to contact someone about the research?

Please feel free to contact Mr Ian Monks about any aspect of this project:

Phone: (number omitted); Email: ian.monks@griffithuni.edu.au ; postal address: (address omitted).

This study has been cleared in accordance with the ethical review processes of the Griffith University. If you have any questions concerning your participation in the study feel free to contact the researchers involved.

Griffith University conducts research in accordance with the National Statement on Ethical Conduct in Human Research. If you have any concerns or complaints about the ethical conduct of this

124 research project, you are encouraged to contact the Manager, Research Ethics on (07) 3735 4375 or
125 research-ethics@griffith.edu.au.

126 GU Ethics Reference # 2018/271

127 Thank you for your help with this very important research.

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129

130 Please note that this research forms a component of the student's academic program.

131 There are 94 questions in this survey

132 **Your Consent**

A question to gain your consent to proceed to this survey which is being conducted by researchers at Griffith University under GU Ethics Reference # 2018/271.

[]Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study.

Do you consent to participating and wish to proceed with this survey?

*

Please choose **only one** of the following:

- ○ Yes
- ○ No

About you

Some questions about you and your area of expertise, your role in the water industry, your time in the water industry and your experience with digital water meters.

[]

What do you consider your areas of experience and expertise?

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)

Check all that apply

Please choose **all** that apply:

- ☐ Customer Service
- ☐ Engineering Planning
- ☐ Engineering Operations
- ☐ Metering
- ☐ Finance
- ☐ Legal / Regulation / Corporate Services
- ☐ Senior Management
- ☐ Human Resources
- ☐ Information Technology
- ☐ Academic

- ☐ Other:

[]What is your current role? *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)

Please write your answer here:

[]How long have you worked in the water industry or in your area or expertise? *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)

Choose one of the following answers

Please choose **only one** of the following:

- ○ 0-2 years
- ○ 3-5 years
- ○ 6-10 years
- ○ 11-20 years
- ○ more than 20 years

[]To what extent does your experience/knowledge include digital water metering? *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)

Choose one of the following answers

Please choose **only one** of the following:

- ○ Full rollout of digital water metering
- ○ In progress rollout of digital water metering

- ○ Completed or in-progress trial(s) of digital water metering
- ○ Planning a trial(s) of digital water metering
- ○ Peripheral role in metering and/or digital metering area
- ○ Public information and presentations on digital water metering only
- ○ No current knowledge or experience/Water industry general knowledge only

Benefiting Groups

Who do you believe will benefit most from digital water metering?

[]Business Units. Which of the business units listed below do you think will benefit from digital water metering? (Select one or many) *

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)

Check all that apply

Please choose **all** that apply:

- ☐ Customer Service
- ☐ Engineering Planning
- ☐ Engineering Operations
- ☐ Metering
- ☐ Finance
- ☐ Legal / Regulation / Corporate Services
- ☐ Senior Management
- ☐ Human Resources
- ☐ Information Technology
- ☐ No significant benefiting business units
- ☐ No opinion
- ☐ Other:

[]

Stakeholders.

To what extent do you expect the following stakeholders will benefit from digital water metering?

(1 = No benefit, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high)

231 *

232 **Only answer this question if the following conditions are met:**
233 Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at
234 any time. Your participation is anonymous. By completing this survey, you are giving your consent
235 to participate in this study. Do you consent to participating and wish to proceed with this survey?)

236 Please choose the appropriate response for each item:

	1	2	3	4	5
Residential customers	○	○	○	○	○
Business customers	○	○	○	○	○
Owner of water business (often Governments in Australia)	○	○	○	○	○

237 **Where to now?**

238 Survey customisation based on your expertise.

239 **[]Which blocks of potential benefits would you like to comment on? (Only questions in selected**
240 **blocks will be presented.) ***

241 **Only answer this question if the following conditions are met:**
242 Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at
243 any time. Your participation is anonymous. By completing this survey, you are giving your consent
244 to participate in this study. Do you consent to participating and wish to proceed with this survey?)

245 Check all that apply
246
247 Please choose **all** that apply:

248 • ☐ **Meter Reading** - benefits related to the cost and issues of meter reading including cost of
249 manual reading and energy, estimated reads, special reads, OHS issues for meter readers
250 • ☐ **Metering and non-revenue water** - benefits related to metering of properties and
251 non-revenue water including data error rates, water theft, leak detection
252 • ☐ **Meter Management and Data** - benefits related to selecting and managing meters
253 including compliance, deferred replacement, meter sizing, meter failure analytics
254 • ☐ **Finances** - benefits related to the water business finances including revenue forecasting,
255 cash flow, tariffs, load shifting, value of assets, insurance claims and costs
256 • ☐ **Engineering (operations)** - benefits related to the day to day operation of the water and
257 sewer networks
258 • ☐ **Engineering (planning)** - benefits related to planning the water network, deferred
259 augmentation, uncertainty and risk margin

- ☐ **Knowledge of customer demand for planning** - benefits related to planning issues using new knowledge of property use, customer demand patterns and water use in special precincts
- ☐ **Customer water efficiency** - benefits related to customers' efficient use of water: leak alerting, awareness, bill prediction, monthly billing
- ☐ **Customer complaints and assistance** - benefits related to customer complaints, complaint resolution and assistance programs including insurance claims arising from concealed leak
- ☐ **Customer communication** - benefits related to enhanced communication to customers arising from more data and new knowledge of customers
- ☐ **New products and services** - benefits related to a range of new products and services enabled by digital water metering
- ☐ **Legal actions** - benefits related to legal action over water use and unpaid accounts

Meter Reading

This block of potential benefits relate to meter reading.

It covers meter reading costs, special and estimated reads and the physical aspects of meter reading.

[]

Do you want to proceed to enter comments on the benefits related to meter reading?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will water businesses benefit from a reduction in meter reading charges/billing costs, and to what extent?

BACKGROUND: Manually read meters require meter readers to walk or drive the reading route, stop at each meter location, find the meter, open the dial cover, read the meter and enter the reading to a handheld device. They complete the reading route by uploading the data file values into a database. Electronic reading can enable the reading to be taken across a communications network eliminating the meter reader cost (but replaced by a lower communications cost).

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '9 [D1]' (Do you want to proceed to enter comments on the benefits related to meter reading? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from a reduction in special meter reads, and to what extent?

BACKGROUND: When customers leave properties the water meter needs to be read to enable the leaving customer to be billed and the arriving customer to start from zero. By taking the electronic reading of the meter at a nominated date and time can eliminate meter readers having to visit the property.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '9 [D1]' (Do you want to proceed to enter comments on the benefits related to meter reading? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your

response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from a reduction in estimated bills, and to what extent?

BACKGROUND: Meters that cannot be read due to access issues are estimated. Often these estimates are inaccurate and cause customers to raise complaints. Collecting the data electronically could eliminate the estimated reads.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '9 [D1]' (Do you want to proceed to enter comments on the benefits related to meter reading? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from a reduction in OHS incidence costs, and to what extent?

BACKGROUND: It is possible that with meter readers no longer walking the reading routes they will avoid issues such as dogs, pits, bushes etc, or stop/start driving between reads in rural areas and so the incidence of OHS cases could be expected to drop.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '9 [D1]' (Do you want to proceed to enter comments on the benefits related to meter reading? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from a reduction in vehicle energy costs (GHG emissions), and to what extent?

BACKGROUND: It is possible that with meter readers no longer driving to their reading routes and an almost complete elimination of special reads, vehicle energy costs and their input to the Greenhouse Gas emissions could be reduced.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '9 [D1]' (Do you want to proceed to enter comments on the benefits related to meter reading? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from a reduction in billing and collection costs with monthly electronic billing and collection, and to what extent?

BACKGROUND: It has been suggested that water businesses may be able to offer monthly billing to customers using the automated reading taken at a nominated day and time within a month of readings. This would likely treble the postal charges. eBilling could significantly

reduce the extra "mailing" cost. Further coupling of eBilling with direct debit could improve the potential for on-time payment and reduction in reminders and other debt recovery expenses.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '9 [D1]' (Do you want to proceed to enter comments on the benefits related to meter reading? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Metering and non-revenue water

This block of potential benefits covers metering and non-revenue water issues.

[]

Do you want to proceed to enter comments on the benefits related to non-revenue water?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)
and Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will water businesses benefit from <u>reduced residential non-revenue water data errors/losses</u>, and to what extent?

<u>BACKGROUND</u>: Billing errors can be caused by lost, damaged and stolen meters, incorrect meter readings, poorly fitted meter installations and mismatching meter/customer, and other incorrect metering details such as units and multiplier lead to non-revenue water. Meter errors become compounded as the reads are used for calculating sewer charges. It is possible that automated reading could eliminate some of these errors or assist in quickly identifying anomalies and resolving the issues.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '16 [D2]' (Do you want to proceed to enter comments on the benefits related to non-revenue water? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from <u>reduced non-residential customers' non-revenue water data errors/losses</u>, and to what extent?

<u>BACKGROUND</u>: For non-residential customers, as well as those errors that affect residential customers, changes in property use can result in inappropriate sized meter for the changed demand and peak flows resulting in under-recording or excessive wear on mechanical parts. It is possible that automated reading could eliminate some of these errors or assist in quickly resolving the issues.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '16 [D2]' (Do you want to proceed to enter comments on the benefits related to non-revenue water? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from a reduction in water theft, and to what extent?

BACKGROUND: Hourly demand data readings from customer meters coupled with DMA water balance data could reveal anomalies through unusual patterns that might indicate meter damage or possible water theft.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '16 [D2]' (Do you want to proceed to enter comments on the benefits related to non-revenue water? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses benefit from a reduction in labour costs associated with leak detection, and to what extent?

BACKGROUND: With more data and at hourly intervals from property meters the labour effort required to detect, localise and find leaks could be reduced.

487 *

488 **Only answer this question if the following conditions are met:**
489 Answer was 'Yes' at question '16 [D2]' (Do you want to proceed to enter comments on the benefits
490 related to non-revenue water? (For each suggested benefit, if possible, please include in the text
491 boxes below an explanation for your opinion. Please try to cover some of the following aspects in
492 your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to
493 support that level of benefit - Discuss any examples where you have seen that benefit being
494 demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be
495 overcome before the benefit can be fully extracted from a smart meter system.))

496 Please write your answer here:

497

498 **Managing Meters and Data**

499 This block of potential benefits covers the selection and managing of meters for accuracy and
500 compliance.

501 **[]**

502 **Do you want to proceed to enter comments on the benefits related to meter selection and**
503 **management for accuracy and compliance (including some use of data analytics)?**

504 **(For each suggested benefit, if possible, please include in the text boxes below an explanation for**
505 **your opinion.**

506 **Please try to cover some of the following aspects in your response:**
507 **- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support**
508 **that level of benefit**
509 **- Discuss any examples where you have seen that benefit being demonstrated in smart meter**
510 **pilot trials or roll-outs**
511 **- Discuss any barriers that may need to be overcome before the benefit can be fully extracted**
512 **from a smart meter system.)**

513 *

514 **Only answer this question if the following conditions are met:**
515 Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at
516 any time. Your participation is anonymous. By completing this survey, you are giving your consent
517 to participate in this study. Do you consent to participating and wish to proceed with this survey?)
518 *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment
519 on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will water businesses benefit from deferred meter replacement (thru water conservation, targeted replacement), and to what extent?

BACKGROUND: Meter replacement has usually been based on age or nominal volume of water through the meter. The age limit used is generally between 10 and 15 years but studies have found most meters are still operating within compliance limits at these ages. Using data analytics it is suggested that compliant meters can be identified and retained while non-compliant meters can be removed.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '21 [D3]' (Do you want to proceed to enter comments on the benefits related to meter selection and management for accuracy and compliance (including some use of data analytics)? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses be able to use data from digital water meters to develop meter over-sizing identifiers, and to what extent would they benefit?

BACKGROUND Over-sized meters cause usage to be under recorded and the result is non-revenue water. Benchmarking non-residential customers could enable customers that have over-sized meters to be identified. Their meter could then be replaced with a more suitable sized meter.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '21 [D3]' (Do you want to proceed to enter comments on the benefits related to meter selection and management for accuracy and compliance (including some use of data analytics)? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses be able to use digital water meter data to improve meter sizing for non-residential customers, and to what extent would they benefit?

BACKGROUND: It is possible to log usage data at high frequency. For different customer types profiles might be developed from a sample of customers. It may then be possible to use simulated modelling based on these segment peers to work out the meters that best fit the operating characteristics of each business.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '21 [D3]' (Do you want to proceed to enter comments on the benefits related to meter selection and management for accuracy and compliance (including some use of data analytics)? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses be able to use digital water meter data for tighter meter performance/NMI compliance monitoring, and to what extent would they benefit?

BACKGROUND: Meters are required to operate within accuracy limits (+/-4%). Using data analytics it may be possible to effectively undertake in-situ testing from the desktop when data is collected frequently and at regular intervals.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '21 [D3]' (Do you want to proceed to enter comments on the benefits related to meter selection and management for accuracy and compliance (including some use of data analytics)? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses be able to use digital water meter data to undertake meter failure analytics, and to what extent would they benefit?

BACKGROUND: It is speculated that changes in usage recorded over time or a gradual shift away from a customer's peers within a segment may be an indicator of declining performance and that data analytics could identify these failing meters.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '21 [D3]' (Do you want to proceed to enter comments on the benefits related to meter selection and management for accuracy and compliance (including some use of data analytics)? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses be able to use digital water meter data for meter silting detection (large meters), and to what extent would they benefit?

BACKGROUND: It is speculated that a gradually decreasing trend in water consumption over time may provide an indicator of meter silting problem in large meters.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '21 [D3]' (Do you want to proceed to enter comments on the benefits related to meter selection and management for accuracy and compliance (including some use of data analytics)? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water businesses be able to use digital water meter data to detect revenue losses caused by declining or failed meter accuracy after break in main, and to what extent would they benefit?

BACKGROUND: Meters that are located downstream of breaks in the network may have their accuracy compromised by grit and other sediment entering the pipe at the break despite flushing and other preventative actions.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '21 [D3]' (Do you want to proceed to enter comments on the benefits related to meter selection and management for accuracy and compliance (including some use of data analytics)? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in

smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Finances

This block of potential benefits relates to water business finances, tariffs and insurance costs.

[]

Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*****

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge will water businesses benefit from digital water meters through <u>improved revenue forecasting/recovery</u>, and to what extent?

BACKGROUND: If customer usage is being tracked hourly for all customers the opportunity may exist to write periodic reports to accurately capture revenue earned and project that through to period-end amounts.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge will water businesses benefit from digital water meters through improved cash flow/reduced working capital from monthly billing, and to what extent?

BACKGROUND: It is suggested that monthly rather than quarterly billing increases cash flow and reduces the working capital requirements of water businesses.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge will water businesses benefit from digital water meters through <u>more flexible tariffs by industry</u>, and to what extent?

<u>BACKGROUND</u>: With meters being read hourly, it may be possible and worthwhile to offer tariffs that are more flexible so as to be time of day and day of week dependent. This might be used in specific industries and to residential users.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge will water businesses benefit from digital water meters through <u>load shifting (leveling)</u>, and to what extent?

<u>BACKGROUND</u>: It is suggested that digital water metering might enable tariffs to be altered for the specific purpose of levelling demand from the typical two peak diurnal curves encouraging more off-peak usage.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge will water businesses benefit from digital water meters through <u>increased value of assets (service connections)</u>, and to what extent?

<u>BACKGROUND</u>: Water companies do not normally treat as assets the main to property service connection even though they are responsible for the asset to and including the meter. The accurate location of the meter might be established as part of the digital metering rollout and enable these service connections to be recorded accurately as assets and valued.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge will water businesses benefit from digital water meters through <u>improved demand forecasting and revenue projection</u>, and to what extent?

<u>BACKGROUND</u>: Capturing hourly demand from digital water meters and using a range of statistical approaches may allow the water companies to better understand the usage patterns of water, its customer base, and to forecast future water usage and **to project revenue.**

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge will water businesses benefit from digital water meters through <u>improved customer service/satisfaction through modified tariffs</u>, and to what extent?

<u>BACKGROUND</u>: Digital water metering might allow tariffs to be modified to be based on time of day and day of week and so give customers greater choice and control over their costs.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge will water businesses benefit from digital water meters through a <u>reduction in risk premium and working capital costs</u>, and to what extent?

<u>BACKGROUND</u>: Working capital costs are required to cover near term expenses. More accurate timing of capital works based on digital metering data to eliminate non-revenue water and enable better forecasting might enable a reduction in both the risk premium employed and the working capital requirements.

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering reduce insurance claim incidents and costs from bursts and leaks, and to what extent?

BACKGROUND: Water companies may be able to reduce the insurance costs (premiums and excess payments for claims) through data from digital meters enabling earlier detection and preventative or earlier action on issues that lead to bursts and leaks and so avoid the full effects of water damage caused by main breaks.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '29 [E1]' (Do you want to proceed to comment on potential benefits related to finances, tariffs and insurance costs? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Engineering - operations

This block of potential benefits covers the day to day operation of the water and sewer networks.

[]

Do you want to proceed to comment on the possible benefits to day to day operations of the water and sewer networks?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter

pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will water business be able to gain a reduction in the wholesale cost of water, and to what extent?

BACKGROUND: Digital metering with associated data portal/communications may lead to greater customer awareness of their usage and, in turn, reduced customer demand and non-revenue water from leaks and bursts. The outcome from this water conservation could be reduced volume and cost of water from the wholesaler.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '39 [G1]' (Do you want to proceed to comment on the possible benefits to day to day operations of the water and sewer networks? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to gain a <u>reduction in water leaks and other NRW causes (eg. bursts)</u>, and to what extent?

<u>BACKGROUND</u>: With greater electronic coverage of the network and short interval data collection from bulk meters and digital water meters at properties, water companies may be able to establish District Metered Areas and calculate water balances to help identify leaks which, if undetected, might otherwise have become bursts.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '39 [G1]' (Do you want to proceed to comment on the possible benefits to day to day operations of the water and sewer networks? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to <u>better manage peak water demand</u>, and to what extent?

<u>BACKGROUND</u>: Hourly data capture could provide valuable information on diurnal and peak consumption patterns enabling better peak demand management.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '39 [G1]' (Do you want to proceed to comment on the possible benefits to day to day operations of the water and sewer networks? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

908 **[]**

909 **From your experience/knowledge, will water business be able to gain a <u>reduction in water</u>**
910 **<u>pumping cost (GHG emissions)</u>, and to what extent?**

911 **<u>BACKGROUND</u>: Digital water metering may lead to a reduction in demand and so reduce the**
912 **need for water pumping around the network.**

913 *

914 **Only answer this question if the following conditions are met:**
915 Answer was 'Yes' at question '39 [G1]' (Do you want to proceed to comment on the possible benefits
916 to day to day operations of the water and sewer networks? (For each suggested benefit, if possible,
917 please include in the text boxes below an explanation for your opinion. Please try to cover some of
918 the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any
919 evidence you may have to support that level of benefit - Discuss any examples where you have seen
920 that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that
921 may need to be overcome before the benefit can be fully extracted from a smart meter system.))

922 Please write your answer here:

923

924 **[]**

925 **From your experience/knowledge, will water business be able to gain a <u>improved forecasting of</u>**
926 **<u>sewer flows</u>, and to what extent?**

927 **<u>BACKGROUND</u>: With hourly measured water usage through digital metering at each property,**
928 **the sewer flows could be better forecast by time of day. These forecasts could be fed into waste**
929 **water modelling tools. The impact of any water tanks on the properties and internal use of the**
930 **harvested water may be able to be built into the model.**

931 *

932 **Only answer this question if the following conditions are met:**
933 Answer was 'Yes' at question '39 [G1]' (Do you want to proceed to comment on the possible benefits
934 to day to day operations of the water and sewer networks? (For each suggested benefit, if possible,
935 please include in the text boxes below an explanation for your opinion. Please try to cover some of
936 the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any
937 evidence you may have to support that level of benefit - Discuss any examples where you have seen
938 that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that
939 may need to be overcome before the benefit can be fully extracted from a smart meter system.))

940 Please write your answer here:

941

942 **[]**

943 **From your experience/knowledge, will water business be able to gain a reduction in audits**
944 **required (through targeted SWM water quality testing), and to what extent?**

945 **BACKGROUND: As part of the establishment of the AMR, separate water quality sensing**
946 **devices or multi-purpose digital meters may be established to automate some water quality**
947 **monitoring or corrective actions. For example, data analytics of complaints and actual hourly**
948 **demand readings may help establish better chlorine dosing levels by time of day and day of**
949 **week.**

950 *****

951 **Only answer this question if the following conditions are met:**
952 Answer was 'Yes' at question '39 [G1]' (Do you want to proceed to comment on the possible benefits
953 to day to day operations of the water and sewer networks? (For each suggested benefit, if possible,
954 please include in the text boxes below an explanation for your opinion. Please try to cover some of
955 the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any
956 evidence you may have to support that level of benefit - Discuss any examples where you have seen
957 that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that
958 may need to be overcome before the benefit can be fully extracted from a smart meter system.))

959 Please write your answer here:

960

961 **Engineering - planning**

962 This block of potential benefits covers planning of the water network.

963 **[]**

964 **Do you want to proceed to comment on possible benefits to planning of the water network?**

965 **(For each suggested benefit, if possible, please include in the text boxes below an explanation for**
966 **your opinion.**

967 **Please try to cover some of the following aspects in your response:**
968 **- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support**
969 **that level of benefit**
970 **- Discuss any examples where you have seen that benefit being demonstrated in smart meter**
971 **pilot trials or roll-outs**

- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will water business be able to <u>improve network planning</u>, and to what extent?

<u>BACKGROUND</u>: The increase in demand data available from digital water metering coupled with future land development plans may enable improvements to hydraulic modelling with more accurate development timing.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '46 [H1]' (Do you want to proceed to comment on possible benefits to planning of the water network? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to <u>defer network augmentation</u>, and to what extent?

BACKGROUND: Actions arising from digital metering such as reduction in demand through network non-revenue water, in-property leaks and more awareness of water use could enable the deferral of network augmentation works including pipe upgrades, pumping upgrades and waste water processing plants.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '46 [H1]' (Do you want to proceed to comment on possible benefits to planning of the water network? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will engineering planners of water business be able to reduce uncertainty and risk margin used in planning, and to what extent?

BACKGROUND: The access to vastly increased water demand data recorded by digital water meters at relatively short intervals could enable planners to more precisely know demand in different areas of the network under various circumstances and conditions. This could reduce the uncertainty in planning the operation and augmentation of the network. The risk margin might be reduced.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '46 [H1]' (Do you want to proceed to comment on possible benefits to planning of the water network? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Knowledge of customer demand for planning

This block of potential benefits covers planning issues related to new knowledge of customer demand patterns and water use.

[]

Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*****

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will water business gain new knowledge of each <u>non-residential customer's property use</u>, and to what extent?

<u>BACKGROUND</u>: Compared to residential customers there is, generally, little knowledge about demand profiles of commercial, industrial and other non-residential customers. While doing a rollout of digital meters the opportunity exists to record the property use (business type) to help facilitate the data analytics and benchmarking of non-residential customers. While normal digital metering may be set at hourly reading intervals, statistical sampling within business types of

even higher frequency readings for short durations could be undertaken to establish demand patterns and end-use studies.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business gain from new knowledge of tourism impacts for tourist regions (seasonal/event), and to what extent?

BACKGROUND: Tourist precincts have individual water use patterns that change by season and local events. It is suggested that by capturing and using hourly meter reading data, t**hese patterns might be better understood and water use planned for in the future.**

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to <u>understand time-of-day use by customer segment</u>, and to what extent?

<u>BACKGROUND</u>: Hourly readings from digital water meters could provide an opportunity to develop demand patterns for each customer segment. This could be valuable when undertaking planning, meter sizing and benchmarking studies.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to develop <u>diurnal curves for non-residential customers by customer type (micro segmentation)</u>, and to what extent?

<u>BACKGROUND</u>: Based on the ANZSIC (Australian and New Zealand Standard Industrial Classification) and AVPCC (Australian Valuation Property Classification Code**) code there is an extensive range of business types. Some could be grouped into common demand patterns (eg. Commercial office based businesses). Digital metering could provide an opportunity to establish diurnal curves for different business types and for sub-business types (eg supermarkets with limited hours and those open 24x7).**

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss

any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to develop <u>diurnal curves for high-rise buildings and multi-unit properties</u>, and to what extent?

<u>BACKGROUND</u>: High-rise and multi-unit developments are special customer groupings and may have different demand profiles based on the numbers of residential units and the commercial businesses within the complex and the common areas that are not sub-metered. Data from digital water metering of properties within the complexes may be able to be used to develop curves for high-rise and multi-unit properties.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to develop <u>reverse modelling of household characteristics via the demand pattern</u>, and to what extent?

<u>BACKGROUND</u>: It is suggested that household size, irrigation use, presence of water tank and evaporative cooler use might be able to be modelled using demand patterns gained from hourly usage data across seasons using reverse modelling from previous end-use studies.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to gain new knowledge of the <u>impact of appliance efficiency on total demand</u>, and to what extent?

<u>BACKGROUND</u>: Historical disaggregated end-use models might be able to be employed with digital metered properties to provide sufficient data to enable the efficiency of appliances to be measured. Long term trending of appliance efficiency and its impact on total demand might be able to be modelled from this data.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business be able to develop <u>benchmarks for customer segments</u>, and to what extent?

BACKGROUND: Customers within segments may have similar usage patterns. Using data from simultaneous hourly digital metering there is a possibility that they could be benchmarked. The individual customers within segments could then be compared to the benchmarks.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '50 [J1]' (Do you want to proceed to comment on possible benefits relating to new knowledge of customers' water demand patterns and use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Customer water efficiency

This block of potential benefits covers customers' water efficiency.

[]

Do you want to proceed to comment on possible benefits to customers' water efficiency?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)

and Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will customers be able to reduce costs by being alerted to leaks at their property, and to what extent?

BACKGROUND: Early detection of leaks at properties and alerting the customer may be enabled by digital water metering and might significantly reduce the time that leaks run before repair and therefore reduce the cost impact on customers.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '59 [K1]' (Do you want to proceed to comment on possible benefits to customers' water efficiency? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will customers be able to reduce their water use through awareness and education, and to what extent?

BACKGROUND: Providing customers ready access to their water usage through an online portal could provide them with opportunities to modify their water demand.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '59 [K1]' (Do you want to proceed to comment on possible benefits to customers' water efficiency? (For each suggested benefit, if possible, please include in the text boxes

below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will customers be able to be more water efficient and reduce their bill through bill prediction, and to what extent?

BACKGROUND: Systems and processes that use forecasting techniques could be set up to provide customers to a portal that could include a bill prediction based on previous usage patterns and billing period-to-date from digital water metering.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '59 [K1]' (Do you want to proceed to comment on possible benefits to customers' water efficiency? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will customers be able to be more water efficient and reduce costs through monthly billing, and to what extent?

BACKGROUND: Monthly billing would provide earlier feedback to customers on their recent usage to which they could react to control their use.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '59 [K1]' (Do you want to proceed to comment on possible benefits to customers' water efficiency? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Customer complaints and assistance

This block of potential benefits relate to customer complaints, complaint resolution, assistance programs and insurance claims from concealed leaks.

[]

Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*****

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will digital water metering lead to <u>reduced customer billing complaints</u>, and to what extent?

<u>BACKGROUND</u>: Billing complaints such as high-bills, estimated reads and mis-reads could be reduced if customers are provided with access to greater information about their water usage. In particular, if they are alerted to leaks early and if they could access an online portal for hourly or daily usage records from digital water meters.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to <u>reduced external costs of Ombudsman (eg. EWOV) referred complaints</u>, and to what extent?

<u>BACKGROUND</u>: Water Ombudsman (for example, the Victorian Ombudsman) charges water companies a fixed annual fee based on the companies number of customers and a processing fee per complaint based on the effort to resolve the issue. Digital water metering may reduce the number of complaints referred to the Ombudsman and so could in turn reduce the costs to the water company.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of

the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to reduced internal costs of Ombudsman (eg. EWOV) referred complaints, and to what extent?

BACKGROUND: Considerable water company staff time and therefore costs may be incurred when complaints are referred to the Ombudsman. Many billing complaints centre around billing issues are unresolved and referred to the Ombudsman. Billing complaints may be reduced through digital metering eliminating such issues as reading errors, estimated reads and concealed leak high-bills and could be expected to reduce the billing complaints presented to the Ombudsman and therefore internal costs.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to improved outcomes from billing disputes, and to what extent?

BACKGROUND: With more data to draw on from digital water metering and customer self service through a portal it is suggested that billing disputes could be avoided and if they do occur they could be resolved more quickly and amicably.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to reduced HULA (High Usage Leak Allowance) costs from concealed leaks, and to what extent?

BACKGROUND: Quarterly billing means that concealed leaks at properties can run for long periods before the customer becomes aware of the issue through a high usage and bill. Water companies' customer assistance programs for concealed leaks may be limited to the time when the customer contacts the water company about their high usage/bill. Earlier alerting of customers to possible leaks at their property (based on data from digital water metering) could significantly reduce the water company's assistance cost (through their HULA program) .

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to <u>reduced plumbing assistance costs</u>, and to what extent?

<u>BACKGROUND</u>: Some water companies run plumbing assistance programs to provide disadvantaged customers with access to funds to repair and replace water appliances. Early detection of issues based on digital water metering data may reduce the extent of the problem and therefore the assistance expense per customer allowing more customers to be assisted within program budgets.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to <u>reduced contact centre calls</u>, and to what extent?

<u>BACKGROUND</u>: Customers with an online account portal in which they can see their water usage are more likely to visit that site to resolve their billing enquiry as they have 24x7 access to the portal to avoid having to wait until business hours to call and then getting caught in telephone wait queues and telephone IVR systems.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to a reduction in insurance claims by customers, and to what extent?

BACKGROUND: Customers' insurance claims involving water use include water theft from behind the meter and damage to properties caused by concealed leaks. Digital metering could help to reduce these claims through early detection of anomalous water use patterns, access to data through a portal, bill prediction and customer set alerting rules.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '64 [L1]' (Do you want to comment on possible benefits from digital water metering on issues of complaints and assistance? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to fewer visits to the property and therefore to increased security for home and business owners, and to what extent?

BACKGROUND: Automated meter reading could, as well as eliminating safety issues for water company employees, mean that home and business owners are safer as they do not have to enable ready access to their private property (ie. through key safes, unlocked premises, key-codes, etc) for meter readers to read the meter.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question ' [M1]' (Do you want to comment on the possible benefits of customer communications from digital water metering? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following

aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Customer communication

This block of potential benefits covers enhanced communication to customers.

[]

Do you want to comment on the possible benefits of customer communications from digital water metering?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will digital water metering lead to <u>enhanced communications</u>, and to what extent?

<u>BACKGROUND</u>: With more data of a customer's usage available, water companies might be able to provide more detailed information on bills and through an account portal.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '74 [M1]' (Do you want to comment on the possible benefits of customer communications from digital water metering? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering enable water companies to provide a service to non-residential and residential customers for <u>disaggregated/appliance end use</u>, and to what extent?

<u>BACKGROUND</u>: High frequency digital metering studies has led to tools for disaggregating water usage into end-use even when multiple appliances are applied. Based on these studies the algorithms provide an opportunity for customer portals to also provide a disaggregated end-use analysis from hourly interval metered use data. This might be particularly useful to some non-residential users who would otherwise need to sub-meter their business to monitor the water efficiency of particular processes.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '74 [M1]' (Do you want to comment on the possible benefits of customer communications from digital water metering? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to integration of smart meters with "smart" appliances, and to what extent?

BACKGROUND: It is speculated that the integration of smart water meters with other household appliances could be possible and assist water conservation by controlling use to optimal levels.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '74 [M1]' (Do you want to comment on the possible benefits of customer communications from digital water metering? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

New products and services

This block of potential benefits covers a range of new products and services enabled by digital water metering.

[]

Do you want to comment on possible new products and services?

(For each suggested new product or service, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs

- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will digital water metering enable customer selection of their billing day, and to what extent would customers and water businesses benefit?

BACKGROUND: If digital water meters provide a reading each hour of each day it is suggested that customers could be provided with the opportunity to nominate the day of the month that their meter is read for billing purposes. This could help customers with their household/business budgeting and cash flow and offer the water company more certainty of payment.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '78 [N1]' (Do you want to comment on possible new products and services? (For each suggested new product or service, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering enable information to be provided to customers on their evaporative cooler water use, and to what extent would customers benefit?

BACKGROUND: In southern states of Australia, evaporative coolers are used to cool homes as they are considered more cost effective. They are more energy efficient but have the additional cost of water used to cool the filters. Hourly meter readings could provide customers with an opportunity to monitor the water use efficiency of their evaporative coolers during hot periods, especially overnight when other appliances are not being used. High readings might signal parts failure or the need for servicing or the replacing of the appliance.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '78 [N1]' (Do you want to comment on possible new products and services? (For each suggested new product or service, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering enable non-residential customer end-use data logging and analytics, and to what extent would customers benefit?

BACKGROUND: Considerable effort has been put into residential end-use analysis. Non-residential customers in high-water use industries may benefit from water companies offering a service involving similar data logging at high frequency. This could enable individual customer end-use analytics and ongoing tracking of water use for machinery and process performance analysis.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '78 [N1]' (Do you want to comment on possible new products and services? (For each suggested new product or service, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being

demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering enable customised product offers to be made to customers, and to what extent would they benefit?

BACKGROUND: With digital water metering generating so much more information about customer water use patterns and potential profiling, water companies may have opportunities to customise product offers to individual customers and customer segments. These might include plumbing services, rain water tanks, appliance servicing and appliance upgrades. Such targeted marketing programs based on water use patterns could be used to reduce marketing cost and boost sales outcomes.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '78 [N1]' (Do you want to comment on possible new products and services? (For each suggested new product or service, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering enable water businesses to offer customers vacant property water use monitoring and alerting, and to what extent would they benefit?

BACKGROUND: Using data from digital water metering and with a leak alerting system in place, the functionality could be extended to allow the customer to set the trigger flows at zero so that any flow will send an alert to the customer. This service could also be charged for to defray costs. Controlled through a portal, such a service might be useful to customers on extended holidays away from home, holiday home owners and untenanted property owners. The

frequency of the alert (eg. Maximum 1 alert per day) and the alert method could be limited to control costs of the service.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '78 [N1]' (Do you want to comment on possible new products and services? (For each suggested new product or service, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering enable water businesses to offer benchmarking of water demand of evaporative coolers, and to what extent would they benefit?

BACKGROUND: In southern states of Australian evaporative coolers are used as energy efficient appliances during hot weather. Digital water meters being read hourly could provide data so that the water use of these appliances could be checked. Benchmarks for coolers of similar age, make and model might be able to be developed so that the efficiency of an individual customer's appliance could be compared to benchmarks of similar appliances.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '78 [N1]' (Do you want to comment on possible new products and services? (For each suggested new product or service, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Legal actions

This block of potential benefits covers legal action over water use and unpaid accounts.

[]

Do you want to comment on possible benefits for legal action and illegal water use?

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*****

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?) *and* Answer was at question '8 [D0]' (Which blocks of potential benefits would you like to comment on? (Only questions in selected blocks will be presented.))

Please choose **only one** of the following:

- ○ Yes
- ○ No

[]

From your experience/knowledge, will digital water metering lead to <u>reduced supply restriction case costs</u>, and to what extent?

<u>BACKGROUND</u>: When payment is withheld by a customer the water company may eventually restrict the flow into the property in order to reduce their potential ongoing losses. This requires a crew to attend the property to effect the restriction and then again once the non-payment issue is resolved. Digital metering with leak alerting, online access to usage data and bill prediction may reduce the issues that lead to disputes and to the restriction of service cases and, therefore, costs.

*****

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '85 [P1]' (Do you want to comment on possible benefits for legal action and illegal water use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering lead to reduced debt recovery/legal action case costs, and to what extent?

BACKGROUND: When payment is withheld by a customer the water company may undertake debt recovery processes including taking legal action in order to recover their losses. Digital metering with leak alerting, online access to usage data and bill prediction may reduce the issues that lead to disputes and to the cost recovery and legal action cases and, therefore, costs.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '85 [P1]' (Do you want to comment on possible benefits for legal action and illegal water use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will digital water metering enable automated regulation compliance monitoring, and to what extent would water companies benefit?

BACKGROUND: Water companies are sometimes required to impose water restrictions or implement bans on some water uses. These restrictions and bans are a water conservation

measure and are intended to be equitable for all citizens - eg. Odds/Evens garden irrigation, winter ban on irrigation. Using the hourly data from digital water meters, data analytics may identify breaches which could then be investigated.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '85 [P1]' (Do you want to comment on possible benefits for legal action and illegal water use? (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

Business value - goodwill

This block of potential benefits covers increased business value through changes to customers' attitude towards the water business resulting from the other benefits from digital water metering.

[]

Do you want to proceed to comment on changes to the value of water businesses (goodwill) from the other benefits of digital water metering?

In considering any benefit to a water company in the form of goodwill from digital water metering, respondees are invited to consider their attitude as customers of water companies as well as any professional knowledge they may have in the area.

(For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion.

Please try to cover some of the following aspects in your response:
- Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit
- Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs
- Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.)

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '1 [A2]' (Completion of this survey is voluntary and you may quit at any time. Your participation is anonymous. By completing this survey, you are giving your consent to participate in this study. Do you consent to participating and wish to proceed with this survey?)

Please choose **only one** of the following:

- ○ Yes
- ○ No

Goodwill can be considered at two levels, either, a strict accounting definition, or simply customers' attitude towards the company.

An improved attitude might be witnessed though a less confrontational, more relaxed relationship resulting in more understanding response when customer services are impacted. It may show up in customer satisfaction surveys.

The Australian Tax Office provides the following statement on goodwill (refer qc21245 ATO Market valuation for tax purposes, issued 18 Aug 2017, p40)

"**Goodwill**
Tax law does not define 'goodwill'. However, the term is defined in a range of industry applications. AASB 3 Business combinations defines goodwill as:
Future economic benefits arising from assets that are not capable of being individually identified and separately recognised.
AASB 3 also describes how goodwill is measured (paragraph 51(b)):
…the excess of the cost of the business combination over the acquirer's interest in the net fair value of the identifiable assets, liabilities and contingent liabilities…"

[]

From your experience/knowledge, will water business gain an <u>improvement of value of goodwill from information sharing</u> with their customers, and to what extent?

<u>BACKGROUND</u>: Customers may appreciate being alerted to possible leaks and to have access to more detailed water usage information from their water company on which they can make better decisions.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '89 [F1]' (Do you want to proceed to comment on changes to the value of water businesses (goodwill) from the other benefits of digital water metering? In considering any benefit to a water company in the form of goodwill from digital water metering, respondees are

invited to consider their attitude as customers of water companies as well as any professional knowledge they may have in the area. (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business gain an improvement of value of goodwill from new products and services, and to what extent?

BACKGROUND: Customers may appreciate a range of quality and flexible products and services and gain some economic value from them.

*

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '89 [F1]' (Do you want to proceed to comment on changes to the value of water businesses (goodwill) from the other benefits of digital water metering? In considering any benefit to a water company in the form of goodwill from digital water metering, respondees are invited to consider their attitude as customers of water companies as well as any professional knowledge they may have in the area. (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business gain an improvement of value of goodwill from customer recognition of operational efficiency and capital management, and to what extent?

BACKGROUND: Customers may appreciate that their water company is improving its efficiency, investing prudently and utilising contemporary technologies.

*****

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '89 [F1]' (Do you want to proceed to comment on changes to the value of water businesses (goodwill) from the other benefits of digital water metering? In considering any benefit to a water company in the form of goodwill from digital water metering, respondees are invited to consider their attitude as customers of water companies as well as any professional knowledge they may have in the area. (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

[]

From your experience/knowledge, will water business gain an <u>improvement of value of goodwill from more flexible tariffs</u>, and to what extent?

<u>BACKGROUND</u>: New tariff options offered by water companies may increase customer choice which customers will appreciate and possibly gain benefit from.

*****

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '89 [F1]' (Do you want to proceed to comment on changes to the value of water businesses (goodwill) from the other benefits of digital water metering? In considering any benefit to a water company in the form of goodwill from digital water metering, respondees are invited to consider their attitude as customers of water companies as well as any professional knowledge they may have in the area. (For each suggested benefit, if possible, please include in the text boxes below an explanation for your opinion. Please try to cover some of the following aspects in your response: - Discuss the extent of the benefit (eg % reduction),and any evidence you may have to support that level of benefit - Discuss any examples where you have seen that benefit being demonstrated in smart meter pilot trials or roll-outs - Discuss any barriers that may need to be overcome before the benefit can be fully extracted from a smart meter system.))

Please write your answer here:

End of Survey

Thank you for completing this survey.

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Thank you for your comments on the list of potential benefits.

This is the last question in the survey.

Do you have any suggestions of other benefits not covered in the previous questions? Or any comments on the survey? Or would you like to participate further by being interviewed and/or supply data or information into the study - if so, please discuss your interest with your company's liaison for this study or contact the research candidate, Ian Monks, ian.monks@griffithuni.edu.au ?

*****

Please write your answer here:

Submit your survey.
Thank you for completing this survey.

1937 **References**

1938 1. Monks, I., et al., *Expert opinion valuation method to quantify digital water metering benefits (in press).* 2020.
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