



Pricing for digital water metering

April 2019



The challenge

In August 2018, KPMG released a paper titled “[Digital water metering – the time is now](#)”. In this paper we discussed the drivers for change towards digital metering, the technology on offer, lessons learned from the Victorian electricity industry’s rollout, and provided insights into the journey that a water business should undertake to prepare for a rollout. This paper is an extension to “the time is now” paper and considers the impact of digital metering on a business’s pricing and billing.

Digital water meters are coming. In the [2018 Victorian water price review](#), seven urban authorities committed to trials to test the potential benefits of digital meters, or to a broader rollout across their region. The Melbourne metropolitan water businesses are also developing a [Digital Metering Joint Program](#), aimed at ensuring the best outcome across all of Melbourne based on maximising scale efficiencies.

To support digital metering, businesses will need to determine the necessary arrangements to realise the benefits. Tariffs, prices and billing are an essential component of this process. Effective use of digital meters in this space will require:

- Customer education and empowerment – giving customers the tools to effectively utilise the information provided by digital meters.
- Tariffs that balance customer needs and the delivery of outcomes, while providing appropriate signals regarding the costs imposed on the network.
- Fit-for-purpose access to, and the dissemination of, real time information regarding consumption, network issues and billing.
- More flexibility regarding the frequency, form and payment of customer bills.

A changing customer experience

The roll-out of digital meters for water has the benefit of being able to draw on the experiences of utilities in other sectors such as energy, telecommunications and transport (discussed in this report).

Business also have the benefit of being able to draw on customer feedback provided through recent and ongoing customer engagement programs. This engagement shows a strong desire by customers to avoid time of use tariffs (such as those imposed by energy retailers).

Customer feedback has made it clear that for digital metering to be successful, it will need to be rolled-out in a manner that is both relevant to the water sector and supports the delivery of improved customer value.

Shareholder expectations

In addition to customer expectations, businesses also need to meet the expectations of their shareholder, who has increasing expectations regarding improvements in performance and productivity, and in getting commitments from businesses to do more with less.

Navigating these expectations is complicated by the typically long lead times for offsetting the upfront capital costs of installing digital meters, with avoided operational costs and deferred augmentations resulting from improved demand responses.

Water prices play a pivotal role in the relationship between a business, its customer and its shareholder. This paper considers the current environment regarding customer expectations and regulatory requirements, and the role that digital metering and pricing can play in:

- reducing customer bills;
- driving more efficient water consumption decisions; and
- optimising the costs of operating and investing in the water network.

Changing customer expectations

The most recent snapshot of customer expectations comes from the considerable engagement with customers on digital metering and pricing that occurred during the 2018 water price review in Victoria. This engagement outlined a number of common themes or areas where customers want to see change. These include a desire by customers for businesses to:

- improve the timeliness and quality of communication with customers and diversifying the reasons for customers to receive information;
- increase the choice of tariffs and prices available to customers;
- address affordability and fairness issues, including the manner in which businesses respond to or support customers in hardship;
- allow customers a greater opportunity to take control of their bills; and
- allow customers to manage the environmental consequences of their water use.

A growing number of water customers want to be rewarded for reduced consumption, to be notified when consumption is high and to have more frequent and smaller bills.

These themes are reinforced by a shift in customer experience expectations. No longer happy with a 'black box' of service provision, digitally savvy customers are seeking an ability to view and interrogate data, manage it on a mobile device, and to feel empowered in how they consume water.

All of these themes are consistent with customers wanting their water business to incorporate an advisory function in their relationship with customers. Digital meters provide the technological foundation for undertaking this function and pricing is a fundamental mechanism through which businesses can engage with customers to deliver these outcomes.



The customer relationship



The relationship between a customer and their utility has changed over time. Digital metering impacts on all aspects this relationship, through:

- **Increased information:** digital metering allows for the collection and dissemination of customer information at a much more granular level.
- **Increased interaction:** more information will lead to more regular interactions, which will impact on value and trust.

Digital metering not only offers businesses the opportunity to learn about their customers, but also for customers to learn about how their decisions impact on the utility and the environment. From the perspective of the business-customer relationship, digital meters expand a water business's role from being a service provider to also being an advisor to its customers.

Improving consumption decisions

An increase in the level of information also provides for a greater level of insight into customer behaviour and water use, which allows businesses to anticipate their customer's behaviour in both the setting of their prices and in renewing and investing in the network.

The pricing related benefits of digital metering are largely realised as a result of consumption decisions.

Consumption decisions relate to the value a customer ascribes to the activity they are consuming. Customers will consume up to the point where the benefit they receive from the product no longer outweighs the cost. This benefit is impacted by the cost of the product and the value of the experience the customer receives.

Businesses will have better opportunities to reveal these values and to influence consumption decisions through the prices and products that they offer. The more meaningful the price signal is, and the better it allows the customer to maximise value, the more likely it is to influence consumption decisions.

Technology such as in-house displays and applications for smart devices have the potential to provide customers with a real-time interaction between consumption, billing and water businesses. They can also provide for more practical outcomes such as informing customers when there are issues behind the meter (e.g. leaks), or to send notifications during service interruptions.

The benefits to billing

There are also clear benefits to both businesses and their customers in billing. Remote reading will almost eliminate the need for physical access to a customer's property, reducing the potential for billing

errors and significantly improving the ability of businesses to address customer inquiries in a timely manner. More accurate billing will also reduce call centre contact, and utility costs.

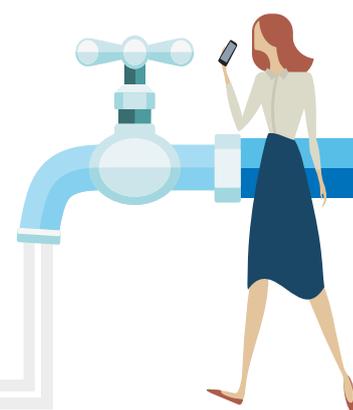
More flexible billing arrangements will allow for better cost management by customers, reducing payments owed to utilities, and subsequent debt management costs.

Digital meters also offer more convenient access for customers to pay bills and to take some control over the management of their own accounts (e.g. by facilitating choice in terms of frequency of payment).

For businesses, digital meters offer an ability to have great control over the input costs of running their business. They can use the digital meter data to optimise water use such that they minimise those costs. It may also allow them to optimise (for example) production processes where water is used as an input.

The increase in interaction and information facilitated by digital meters offers an opportunity for businesses to adopt more flexible pricing and billing arrangements that can be tailored to deliver better customer value.

The charging framework and pricing objectives



The water charging framework is stipulated in legislation and regulation. This typically includes the:

- principles by which tariffs must be underpinned;
- prices by which a water business can charge, and how those prices change annually;
- process by which a utility can charge prices and recover costs from a customer; and
- information contained within a bill.

Pricing objectives underpin the charging framework. These objectives dictate the price-setting strategy, tariff structure and ultimately the actual price of a service. The primary drivers impacting on pricing objectives for businesses can be broadly grouped as: commercial and regulatory, customer, and resource management.

Commercial and regulatory pricing objectives

Commercial drivers include full cost recovery, operational productivity, corporate reputation and compliance with regulatory pricing oversight. These drivers are typically articulated in the objectives of the business itself and the economic regulator.

From a commercial perspective, businesses need to ensure that prices recover the costs associated with service provision and provide customers with the appropriate

signals supporting the optimisation of asset use and the minimisation of costs. Businesses need to ensure prices and tariff structures (and the process used to derive them) are readily understandable, provide signals about the efficient costs of service and consider customers interest (in particular those that are vulnerable or in hardship).

Customer centric pricing objectives

It is also in the commercial interests of businesses to ensure that pricing objectives reflect customer driven outcomes and customer preferences. Customer drivers for pricing include affordability, bill control, convenience and flexibility, facilitating tailored service level outcomes and transparency.

The pursuit of customer centric pricing is a central theme of recent regulatory reform in water (i.e. [PR19](#) in the UK and [PREMO](#) in Victoria). Under these frameworks, businesses are encouraged to engage deeply with customers to understand needs and preferences, and where appropriate, reflect these preferences in their proposals (e.g. consideration of the reweighting of the fixed and variable component of a bill to provide a customer greater control over the costs they face).

Resource management based pricing objectives

The final set of drivers reflected in pricing objectives are those that relate to environment and resource management. Resource management objectives capture those drivers aimed at delivering environmental outcomes and management of water itself as a resource (e.g. scarcity pricing).

These drivers are both internal to businesses through their desire to achieve sustainable outcomes and external, relating to the objectives of technical regulators (e.g. environmental health, water quality and dam safety) and their customers. Using the above example, scarcity based pricing allows for the rationing of water use in times of scarcity, by incentivising customers to adopt sustainable or more efficient behaviours through price.

Resource based objectives are the most underdeveloped of the three categories. Historically, the ability to use price to affect behaviour has been constrained by traditional technologies and the price setting arrangements that have evolved in response to these technologies. Digital meters represent an opportunity for resource managers and businesses to harness the power of price to affect behaviour.

Charging options – some examples

Digital metering allows for pricing options that:

- offer customers direct control of their water use (water conservations plans, in door/outdoor tariffs and voluntary restrictions); and
- provide for more explicit incentivisation of sustainable behaviours (off-peak rewards, scarcity pricing and leakage repair credit).

These options are explored further overleaf.

Tariff choice

In a data rich environment, it will be possible to allow customers to choose a tariff option or bill plan that best suits them from a menu of tariffs. Successful implementation will depend on:

- the trade-off between choice and additional complexity;
- a more flexible pricing environment that can facilitate customer driven price changes and provide appropriate protections such as the establishment of default pricing options; and
- the impacts on a utility’s financial sustainability to ensure prices allow for cost recovery.

Tariffs and hardship

Digital meters can allow for more tailored hardship responses.

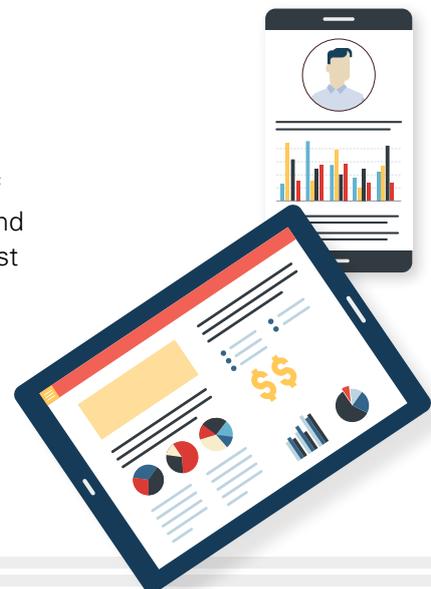
By differentiating prices for uses, they may provide a mechanism that allows businesses to target and maintain essential water use more effectively while supporting customers in hardship.

They will also facilitate a more preventative approach by providing a detailed level of monitoring that helps businesses pre-empt and seek to avoid hardship situations.

Tariffs and billing

Successful implementation of tariff reform supported by billing and the adoption of digital metering allows for:

- a breakdown of daily consumption (average, maximum, minimum, year-on-year);
- periodic billing history;
- detail of how a customer’s bill would look under different tariff arrangements (both quarterly and annual), with comparison against current bill and best option;
- discounts for direct debit and paying on time; and
- greater billing frequency.



1

Off-peak reward

- Lower unit rate when threshold consumption during off-peak times is breached (i.e. 10% of total consumption)
- Incentivises overnight water use (e.g. dishwasher/clothes washer)
- Designed such that reduced revenue matches future avoided costs
- Aids affordability issues and allows customers greater control over bill

2

Water conservation plan

- Pricing based on different allocations, with higher charges for increments above plan (analogous to a mobile phone plan)
- Potential to carryover unused allocations, trade with other customers or sell back to water business
- Assists customers in managing the environmental consequences of their use

3

Indoor/outdoor

- Charge a lower price for non-discretionary (indoors) use and a higher price for discretionary (outdoors) use
- Quantum of difference linked to state of water restrictions and security of supply
- Aids affordability issues and allows customers greater control over bill

4

Scarcity pricing

- Set volumetric prices to reflect the opportunity costs of using water storages as dam levels change. Would need to balance revenue risk and signals for appropriate investment
- Assists customers in managing the environmental consequences of their use.

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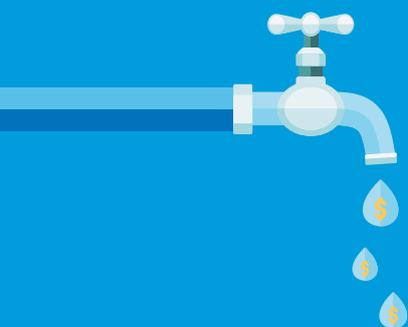
Leakage repair credit

- Credit the customer for repairing an on-property leak
- Effectively replace the current rebate when a customer can demonstrate on-property leak resulting in a high bill
- Rebate linked to difference between pre/post repair change in consumption
- Aids affordability issues and allows customers greater control over bill

6

Voluntary restriction

- If consumption is constrained to [x]KL over a period of time, receive reward linked to deferred augmentation (or value of reduced desal order)
- Could be used during water restrictions
- Restricted volume linked to average winter consumption by household
- Assists customers in managing the environmental consequences of their use and allows customers to manage affordability



Comparable pricing arrangements using real time data

Digital meters are a relatively new technology and their application to the utility space is still in its early stages of diffusion. There are relatively few examples in the public domain of mature integration of digital meters, and the most obvious examples can be found in the energy and telecommunications sectors.

Budget based rates

This approach adopted in California is similar to inclining block tariffs, but is negotiated at a customer level and tailored to each customer's preferences. Tiers are set based on personalised quantities of water for residential indoor use, residential outdoor use, and specific plans for commercial, industrial, and institutional users.

While this approach currently relies on estimated uses, a digital meter would facilitate a much more reliable quantitative base for the application of the tariff. Under budget-based rates, each residential household customer is assigned a specific indoor water budget plus a specific outdoor water budget. This tariff system discriminates between indoor and outdoor use and allow customers a vehicle through tariff tiers to affect or manage their behaviours.

Electricity time of use tariffs

In electricity in Victoria, the mandatory roll-out of smart meters has resulted in the adoption of time of use (TOU) tariffs which are aimed at providing customers with direct signals regarding the cost impact of their usage (specifically peak usage).

They have a fixed charge and different consumption charges depending on the time of day that a customer uses electricity. Each of the TOU consumption charges have a defined time period. Consumption during the peak period has a higher consumption charge than consumption during the shoulder or off-peak periods. This tariff provides an opportunity and an incentive for consumers to respond to price signals at different times of the day, which reflect the costs they impose on the network.

The application of TOU to water is challenging, as customers have clearly communicated their dissatisfaction with the potential application of these arrangements.

Telecommunications plans

Telecommunications service providers typically offer customers a menu of tariff options reflecting different price and service offerings. These include key product features such as varying levels of data capacity for broadband services and call minutes for voice services. Other options include contract length, download speed, service quality, customisation, and network coverage (for mobile services). Wholesale data service providers have also made available tariffs that vary based on distance, geographical location, capacity and security arrangements. The tariff options offered by telecommunications and data utilities allow customers to tailor the service and prices they face to best meet their own requirements.

Roads toll charges

Another sector that is beginning to explore the tariff potential of digital platforms is transport. The transport sector has experienced similar technological disruptions with the introduction of GPS monitoring technology in vehicles. For example, in 2005, Germany introduced a Global Navigation Satellite System (GNSS) based road user charging system for heavy vehicles. The roll-out facilitated the introduction of 'user pays' principle in charges and addresses congestion and environmental problems by reducing emissions and promoting a modal shift towards rail and waterways. The toll requirement applies to all German motorways. The German system utilises GPS technology and an On-Board Unit installed in trucks to automatically track vehicle position. The total toll amount is based on distance travelled on the toll route and a toll rate based on vehicle class and toll rate information entered into the unit (e.g. emissions class).

In a cross between transport and energy, energy business are also integrating digital metering in the growing electric vehicle section. The UK provides an example where energy utilities have made a 100% green energy tariff (a fixed rate 12-month plan that gives you 100% renewable energy, the cost of which is included in the plan's unit rates) available to electric vehicle users. Digital meters match price to demand signals from the grid, which combined with half-hourly settlement allows customers to be rewarded for off-peak usage.

The process of tariff reform

Developing and implementing tariffs

The process of designing and implementing tariffs is one that needs to be conducted in an open, transparent and inclusive manner. Successful tariff reform requires a clear understanding and articulation of pricing objectives and outcomes being sought by businesses.

The process involves four clear stages:

- development of tariff principles and features through engagement of internal stakeholders, customers and shareholders;
- anticipating customers responses to tariffs and modelling both the revenue impacts and customer impacts;
- development of customer support and decision tools, and planning for tariff migration and meter transitions; and
- developing and implementing frameworks to monitor pricing outcomes, including ongoing engagement of customers to ensure that the momentum of price reform is carried forward and tariffs remain relevant.

Changing the charging framework

The current charging and regulatory framework also presents a number of potential risks for the adoption of digital metering and more flexible pricing and billing:

- **Revenue risk due to uncertainty:** Introducing new tariffs or providing for greater levels of choice in tariff options will increase uncertainty regarding customer uptake and use. Without the appropriate level of flexibility to adjust prices in response to unanticipated changes in demand, businesses will face the risk of over or under recovery of revenue.
- **Trade-off between customer understanding and complexity:** Offering tariff choice or reforming tariffs to provide for customer preferences may result in tariff menus or options that are overly complicated and impact ease of understanding. This can be negated by ensuring alignment with feedback provided through engagement and focusing on the customer outcomes that those prices support.

- **Regulatory risk:** Digital meters have the potential to provide for more flexible pricing and billing arrangements, however there may need to be explicit allowance in the regulatory framework for this flexibility. In the absence of this allowance, businesses will be limited to the outcomes approved in a price review, and the billing and information provision arrangements stipulated in regulation.

It will be important for both businesses and their regulators to consider how the current charging framework is managed through the form of price control and annual price adjustments, in order to facilitate tariff changes.



Design

Tariff design principles and features



Analyse

Forecasting customer response and impact to tariffs and the revenue implications of change



Implement

Providing customer support and decision tools and developing path ways for tariff transitions



Engage

Ongoing engagement of customers and the monitoring of pricing and tariff outcomes

Digital meters and tariffs

By increasing the quality and flow of information, the rollout of digital meters changes the relationship between water businesses and their customers. Digital meters introduce a data rich environment that operates in real time, and in doing so, fundamentally changes the environment that prices operate within. Businesses will no longer be in a position of using prices that send signals to customers about the costs of usage that occurred three months prior to their bills. Instead, they can use digital meters and prices to communicate to customers the costs of their usage now.

Digital meters represent an opportunity for businesses to harness the power of prices to:

- **Drive efficient behaviour:** by strengthening the nexus between price, usage and bills, customers will be able to adjust their behaviour in real time.
- **Improve investment decisions:** increasing the data on consumer behaviour will facilitate better forecasting of demand and better decisions regarding investment in future capacity to meet that demand.
- **Better resource management:** digital meters and more sophisticated tariffs offer an opportunity to harness price more effectively as a tool for resource allocation.

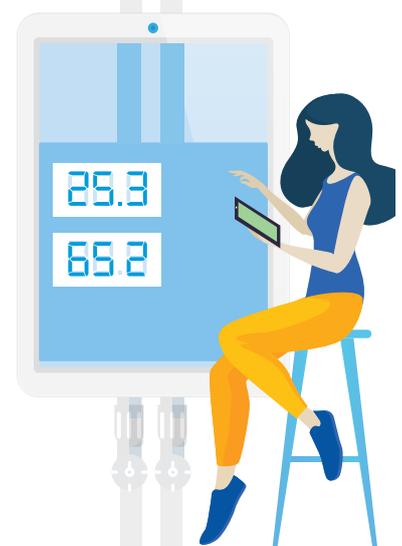
This paper highlights a number of potential tariff options that could be facilitated through the rollout of digital metering. These options are aimed at balancing cost recovery, efficient usage decisions and providing better customer value through addressing recently provided customer feedback.

With opportunity also comes risks. Utilities must be aware of the risks such changes create, and develop strategies to best manage these risks. Experience indicates that existing regulatory mechanisms and good practice risk management can mitigate the likelihood and consequence of these risks occurring.

Understanding which pricing option is appropriate or what level of tariff choice businesses should pursue will depend on the individual pricing objectives of businesses, their customers and regulators.

The implications for each of these options will also need to be considered in terms of revenue and financial sustainability.

There is a significant opportunity for utilities to consider how tariffs and pricing arrangements can support the delivery of benefits from the rollout of digital meters. It also provides an opportunity to provide better customer value through alignment with customer expectations.



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