

Water Sector Macro Trends

Analysis Report for the Victorian water industry

September 2020



A JOINT PRESENTATION OF



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Executive Summary

Megatrends have been defined by the CSIRO Futures Team as 'significant shift in environmental, economic and social conditions that will play out over the coming decade(s)'. Megatrends prescribe a possible future that could have impacts across societies, industries and economies. Within this arrangement, Macro Trends are those that specifically have an impact on our industry. This paper investigates the impacts of COVID-19 on historic megatrends as a thought starter for discussion of the New Utility.

Significant trends (STEEP Assessment)

Social

Australia was experiencing some of our highest population growth levels, with the majority of growth driven by immigration. COVID-19 has reduced immigration to almost zero and this may continue for some time. Impacts may include:

- Delays to large infrastructure projects e.g. Sydney Aerotropolis
- Potentially lower revenue base for utilities reliant on growth
- Significant impact on towns reliant on tourism

Urbanisation

A significant in infrastructure boom and densification of cities was occurring pre-COVID-19 affecting affordability, asset management and waste disposal costs and exacerbating flooding and runoff impacts. COVID-19 has led to a greater appreciation of urban space, presenting opportunity for urban renewal and green infrastructure approaches. There is greater opportunity to repurpose or multipurpose strategic land assets to enhance liveability and the quality of urban space. There is also a potential opportunity influence customer behaviour and engagement in this area.

Integrated planning

Driven by recent drought conditions, Industry and government had a growing interest in the use of alternative water solutions. There is a consensus, made clear in the recent Productivity Commission inquiry into integrated water management, that the integrated planning of water supply and infrastructure can reduce long term costs and support the liveability of communities. However, upward pressure on cost to serve the customer without any ability to pass this on to communities, coupled with a decrease in new developments is likely to mean that the opportunities to undertake integrated planning are severely constrained.

Beyond the pandemic, it is critical that integrated planning can account for expected changes in growth and development and ensure that implemented solutions deliver the best value outcomes for the community and optimising funding for long term capital expenditure. This is driven by lower growth and hardship impacts on affordability and revenue, coupled with the medium to long term need for government to repay stimulus borrowings and likely higher dividends that may be requested from water utilities.

Changing workplace

An aging workforce, gig economy and rise of the Millennial cohort resulted in a greater focus on personal development and work/life balance over financial reward and other traditional incentives. After the pandemic, a significant proportion of the workforce would prefer to work from home a portion of the week, have more flexible work times, and wear more comfortable clothes to work. The wholesale adoption of technology options to augment or replace face-to-face interaction is expected to prevail.

Service-oriented employees will be more available, driving a further shift toward tertiary production and the related automation of low-skill tasks. The water industry is viewed as highly stable employer because it is an essential service. Thus, higher competition for industry roles is expected.

Technology

We are witnessing rapidly evolving technology which automates the way routine tasks are undertaken, and enhanced connectivity and data analytics to develop integrated solutions with deep insights that enhance personal and business outcomes. There is also a greater personalisation of the interaction and tailoring of products and experiences. The combined effect of technology has been to deliver better agility, efficiency, and productivity for business.

The maintenance of current trends will see an ongoing move to rapidly automate aspects of asset management and operational activities to the most practical extent. Ongoing use of remote technology will promote a more agile and diverse workforce. Remote technology also improves safety with reduced travel and the automation of hazardous sites.

Utilities are experiencing a higher degree of resilience, empowerment and connection across their teams during this time. However, the adoption of virtual environments limits some and causes audio-visual fatigue. People need new tools and coping strategies to optimise the new environment.

Economy

Less certain forecasts for economic growth across 70% of the worlds' economies relate to the reduced availability of capital and expected increases in the costs of living. Decreasing stamp duty as property sales decrease and reducing GST collection from a depressed national retail sector could see governments relying on dividends and levies from water utilities.

Post COVID-19, we expect upward pressure on water prices. Increasing numbers of customers are entering hardship, coupled with defaults on water bill payments over the next 12 to 18 months. This is translating to an increase in hardship allowances provided to retail customers.

Together, these effects could increase tensions between expanding customer services and growing costs.

Water Affordability

Increasing water prices trigger concerns for most states, particularly South Australia and Queensland. We expect further increases related to supply diversification and augmentation designed to accommodate population growth and provide greater assurance against the impacts of climate change. Moreover, water prices are artificially suppressed and would need to significantly rise to truly reflect costs.

Populations based on mining are relatively stable, with minor demand reduction predicted from major mineral and gas users. Towns supported by agriculture face particular hardship, with a number of smaller towns becoming unviable due to the drought of 2016-2020.

Adding in the impacts from recent bushfires which have affected town water supplies, reduced tourism and business due to COVID-19, it is likely that many towns will see further losses in revenues and populations. This may be partially offset by remote working and the related regionalisation of labour.

Supply chain resilience

There is growth in the sourcing of ethical producers and localisation of supplies on a global scale. And this is partly attributed to concerns with the resilience of supply chains.

The sector needs to evaluate the options for diversifying the supply of some chemicals, either through local production or the diversification of sources. To further secure supply chains, manufacturers appear to be investing more in automation technology (i.e. robotics) to reduce the risks of pandemics to production and transport.

Environment

The world is getting warmer and extreme climatic events are becoming more frequent, most evident in 2019 with a spate of historical record-breaking meteorological extremes. These changes have significant impact on water supply resilience. Lower and flashier precipitation patterns as a manifestation of climate change have decreased streamflow and overall water supply across the country. Higher temperatures have increased water demand, especially for the greening of neighbourhoods and bushfire management.

Therefore, alternative sources will be a necessity to meet future demands, including recycled water and stormwater, despite limitations with public health perceptions, mass storage and diffuse management.

Beyond COVID-19, financial constraints may negatively affect the ability of utilities to put in place measures to increase water supply resilience. This is potentially of greatest concern in regional areas, particularly those experiencing the combined effects of drought, flood, fire and COVID-19.

Political

Changes to global powers and reduced trust in democracy have changed our political and regulatory environment. Populism was on the rise, but new forms of community activism have given rise to deliberative governance and initiatives to improve social equality. This is resulting in a greater need for new forms of customer information and greater engagement in the development of service strategies and offerings.

Increased de-globalisation may impact the ability to reliably source materials and personnel internationally. Within Australia's global geographic context, more costly local production of previously imported goods and services will be passed on to customers.

The combination of these factors may cause governments to consider privatisation and the sale of assets.

Introduction

Megatrends have been defined by the CSIRO Futures Team as ‘significant shift in environmental, economic and social conditions that will play out over the coming decade(s)’. Megatrends prescribe a possible future that could have impacts across societies, industries and economies. Within this arrangement, Macro Trends are those that specifically have an impact on our industry. This paper investigates the impacts of the Coronavirus Pandemic.

The purpose of this document is to present key trends observed in early 2020, prior to COVID-19, and develop a view of how the COVID-19 pandemic is expected to impact these trends, followed by the potential impact for the water industry. Where appropriate the impacts are looked at over three horizons¹:

- Horizon 1 (0-3 months);
- Horizon 2 (3-12 months);
- Horizon 3 (12+ months).

Significant trends (STEEP Assessment)

Social

Population growth

Status pre 2020

Australia was experiencing a level of population growth of approximately 1.8% per annum, a level of growth unprecedented since the 3% growth observed post World War 2. This high rate of growth comprised of approximately 0.8% within country reproduction, with the additional 1% from immigration.

Effect of COVID-19

As of the 19 March 2020, Australia officially closed its borders to all foreign entrants. This situation is likely to continue to at least early 2021. Closing of borders caused the immediate effect of curtailing immigration-related population growth. The current rate of reproduction within Australia is insufficient to increase the population without immigration.

Within the first horizon, COVID-19 will likely cause Australian population growth to slow to the lowest rate since at least the Second World War and possibly the Great Depression. The decline in immigration will be the key driver of the decline in population growth.

Within the second horizon, net overseas migration of 50,000–110,000 and population growth of 0.75-1% in 2020 are anticipated.

Looking at the third horizon, the outlook for migration in 2021 and beyond is uncertain. Net migration could rebound rapidly and return to numbers before the coronavirus outbreak or it could remain sluggish.

¹ based on a [framework from the McKinsey Institute](#)

Potential effect on the water industry

At present there are several large water-related projects across Australia where the timing for implementation will be delayed by a reduction in population numbers. These range from city-scale augmentations such as the Sydney Aerropolis, through to supply augmentations such as desalination plants down to the development of new estates. For example, Melbourne Water is anticipating that these changes may impact the likelihood of desalination water orders or push back the timing of the desalination plant augmentation.

It is likely that tourism-dependent areas will see a decline in population numbers as will areas heavily affected by fire, drought and flood. In addition, inner-city areas are seeing lower rents due to the changed market, particularly the absence of international students requiring accommodation and the lack of foreign visitors using apartments for temporary accommodation. The lower rental and property prices may result in an increase in people moving to the city. Note also that this may be countered to some degree by people seizing the opportunity to work from home full time in a more regional setting. While this has not yet been proven, recent property data indicate a growth in demand for regional property from city-based residents since the onset of the pandemic.

Although a number of these projects may be shovel-ready, they need to be demand-driven to avoid stranded assets or overcapitalisation. The consequence of constructing these assets in the current climate is likely to be greater upward pressure on water bills for customers over the near term, with a lag in population growth against asset need and without an associated positive community benefit. This is resulting in pushing back of Capex with a growth driver and lower Opex forecasts where the increase is associated with the need to serve more people.

Note that lower population growth would most likely translate to fewer new developments. There are also significant infrastructure implications in regional and peri-urban areas due to occurrences of COVID-19 hot spots. A reduction in new developments means less developer contributions, which are a significant source of revenue for a number of water businesses. These circumstances will provide additional upward pressure on customer bills.

It should also be noted that supply augmentations to enhance resilience against bushfires, drought and flooding are more likely to proceed and those associated with growth are less likely to proceed. Such projects may increase overall water supply costs over the medium term but would provide a net positive community benefit. There would be benefits in showcasing how the industry has responded and developing a framework for how others can follow suit.



Urbanisation

Status pre 2020

An infrastructure boom and densification of cities was causing rapid reductions in biodiversity, housing affordability, while commute times, asset management costs and waste disposal were on the rise. For the water sector, increased densification created deleterious impacts associated with urban flooding and stormwater runoff, thereby increasing risks to people and property while reducing the environmental quality and amenity of waterways.

Effect of COVID-19

As a result of isolation measures there has been a significant and sudden increase in the number of people working from home. This has flattened morning flow peaks as people prepare to leave for or start work later. Initial information suggests evening peaks associated with preparation of dinner etc. appear to be unchanged (according to anecdotal evidence from Europe). And indications are that elevated numbers of workers will continue to work from home associated with lower business overheads and the government advisories relating to limited capacity of public transport in taking into account social distancing provisions. Taken together, the early trends indicate a long-term decrease in the number of people commuting to the inner city to work along with decreased occupancy rates in inner-city offices over the short to medium term.

The government edict for isolation within the private domain has caused a new-found appreciation for the role and comfort of homes and gardens. Commensurate with the edict, public access to local green space and waterways for recreation and restorative benefits has been permitted. This has stimulated greater investment in home and garden improvements and prospecting of high-quality public spaces. Some media reports also identify a growing community opposition to urban intensification.

Potential effect on the water industry

Currently, reduced water demand in the inner-city during office hours may lead to potential deferral of inner-city infrastructure upgrades and consequently lower developer contributions. An approach to assessing the impact is to review the potential downturn based on scenarios for industry activity levels driven through changes in lot-sales demand and supply.

There is an opportunity to enhance urban drainage and aspects of inner-city infrastructure due to reduced traffic in the inner city and the increased likelihood of being able to request building occupants to work from home for short periods while works are undertaken. There is also an opportunity for investment in infrastructure in regional areas of growing residential interest as a result of changing lifestyles linked to the pandemic.

Water corporations holding strategic land assets can contribute to alternative transport and recreational uses, which are growing in urban centres because of COVID-19. Investment in these spaces, including irrigation and drainage, will likely receive stronger community support. With increased community uses, there may be greater resistance to any perceived reduction in the quality or quantity of green spaces.

The disruption of usual behaviours and the focus on private homes and gardens means that there is an opportunity in the immediate future to drive positive changes in behaviour for water usage and sustainability, particularly where they also save customers' money in the anticipated economic downturn. Communication campaigns which land this message are likely to be more successful in this period. However, there is also the potential that some people lapse into more undesirable behaviours as economic concerns take priority over sustainability and their water use subsequently increases.

Integrated planning

Status pre 2020

Industry and government have taken more interest in the use of alternative water solutions, most obvious during and immediately after the Millennium Drought. Effective integrated planning is required to address water issues such as water security and affordability, which in Victoria has led to a series of Integrated Water Management forums across the state. Integrated planning and use of alternative water sources can also assist in delivering sustainable solutions to infill development and increased densification of urban areas, avoiding or deferring expensive infrastructure upgrades.

There is a consensus, made clear in the recent Productivity Commission inquiry into integrated water management, that the integrated planning of water supply and infrastructure can reduce long term costs and support the liveability of communities. However, upward pressure on cost to serve the customer without any ability to pass this on to communities, coupled with a decrease in new developments is likely to mean that the opportunities to undertake integrated planning are severely constrained.

Separately, there is a growing understanding of the impact of finite resources on costs for waste disposal (landfill availability) and the need to reduce carbon impacts on climate variability. These factors are causing several water businesses to investigate options around resource recovery and the circular economy. This is evidenced by how well the UK water industry has addressed urban issues such as high waste levels and the need for renewable energy. In Australia, a growing number of examples of residential communities are proving the benefits of integrated planning impacting positively on the triple bottom line.

However, progress with integrated planning is slow, acknowledging some water businesses are seeking to address issues through their state agencies. For example, members have highlighted the potential to use stormwater as an alternative water resource, but the legal rights to stormwater and its occurrence across various institutional domains has limited effective action. Unlocking the potential for integrated planning relies on a networked form of governance, reliant on partnerships and mutual support between public and private sectors.

Effect of COVID-19

It is possible due to public concerns regarding the transmission of the virus, there may be less acceptance and implementation of recycled water. Further limitations to the integrated planning and adoption of alternative water sources relate to the likely expectations from both government and the community to focus water businesses on maintaining affordability and the reduced ability of other partners (such as local government) to support them.

Potential polarisation and partisan conflict within government could also stall action on integrated planning, which is dependent on collaboration. Similarly, co-funded projects with partners could be slowed and limit the ability of water businesses to fully achieve their strategies.

Potential effect on the water industry

As we move into a post-pandemic state, there is an increased need for better integrated planning to account for expected changes in growth and development and ensure that implemented solutions deliver the best value outcomes for the community given that funding for long term capital expenditure will need to be optimised. This is driven by the lower growth and hardship impacts on affordability and revenue, coupled with the medium to long term need for government to repay stimulus borrowings and likely higher dividends that may be requested from water utilities.

The pandemic opens a window of opportunity for integrated solutions to be driven by our sector that extend to other services. Examples include integrated utilities services (partly exemplified at Aquarevo), customer billing and support. In doing this, there is an opportunity to partner with other sectors, particularly transport, land use planning, health and environment – working to promote a whole of government opportunity in relation to wellbeing and liveability as a result of COVID-19. In addition, there are likely to be localised opportunities for promoting and enhancing efforts to deliver circular economy outcomes, particularly in the areas of resource recovery. Part of this effort could include localised generation of energy for sewage treatment, wind and solar.

Changing workplace

Status pre 2020

A key change in demographics which has ramifications for the cultural and ethnic makeup of the workforce is the ageing population. The growth of the labour force is slowing as more people are exiting the workforce than entering. Generally, this gap is being filled by immigration, which increases the cultural and ethnic diversity of the workforce of the future. Additionally, as the population ages, people are beginning to work longer to fund their retirement, a phenomenon known as “the 100-year life”, and as more millennials enter the workforce, the diversity of the workforce will continue to grow. It also presents challenges for some organisations to manage the uncertainty around the end of employees’ working lives.

There has been a rise in flexible work arrangements and self-employment associated with the gig economy. There are more small-to-medium enterprises, reliant on a mix of larger businesses for continued workflow. This arrangement works well when there is relatively stable employment and healthy turnover for medium to large enterprises.

Millennials will make up 50% of the global workforce this year, and this will play a key role in shaping the workforce of the future. Typical characteristics of millennials include a greater emphasis on personal autonomy and extensive use of electronic communication. They tend to support personal development and work/life balance over financial reward and other traditional incentives. As a result, they expect that companies will adhere to their development and diversity promises, provide rapid progression pathways, and have a quality brand as an employer of choice rather than promoting their Corporate Social Responsibility status.

Effect of COVID-19

Large scale unemployment of people engaged in service industries, including restaurants, tourism, office management and reception, retail and travel, has been attributed to the pandemic.

Potential effect on the water industry

According to recent surveys of members, a significant proportion of the workforce is not looking to return to standard week face-to-face working arrangements. Many would prefer to work from home a portion of the week, have more flexible work times, and be able to wear more comfortable clothes to work. These changes are producing a need for more flexible and agile work arrangements, including effective work from home, consideration of co-working environments, sub-offices and satellite offices, and potentially permanent work from home options. It is suggested that this 'new way of working' is likely to become the accepted method across most sectors, and potentially necessary to attract the best talent. According to recent recruitment data, there is a growing interest in relocation to regional areas for employment. This is also supported by the increasing engagement of workers remote from regional centres, where home-based working has been facilitated and permitted for many roles.

There has also been extensive acceptance and adoption of technology options to augment or replace face-to-face interaction. This produces time savings and efficiency for people avoiding or significantly reducing travel across town, interstate and overseas. The secondary impact is that online meetings are more tiring for staff, with consistent short breaks often being needed to maintain productivity. However, online meetings are tending to be more focused and targeted, resulting in outcomes that are no less and sometimes more efficient and effective than physical meetings.

There will be a greater availability of service-oriented employees. As a result, there is an opportunity to automate low-skill tasks and change the composition of the workforce to become more service-oriented. While some possibilities exist to fulfil customer service roles addressing hardship, the changing employment composition may be at the expense of employment tasks requiring a high level of technical expertise. However, this could be largely outsourced provided a core set of internal competence was retained. Such outsourcing could interface the gig economy, including the potential to re-engage retirees and expand the part time workforce. There are also indications of the emotional and mental health impacts of hardship cases on customer service staff, which will need to be managed for the long term.

Conversely, the water industry is viewed as highly stable employer because it is an essential service. Whilst this increases the employee value proposition, it could lead to people maintaining current positions and potentially delaying retirement. In addition, the available talent pool for technical experts relevant to the water industry could diminish as people remain in their current roles for job security and the available migrant talent pool is encumbered by above-mentioned global factors.

Technology

Technological innovation

Status pre 2020

We have been witnessing a rapidly changing and evolving technology which automates the way routine tasks are undertaken, and enhanced connectivity and data analytics to develop integrated solutions with deep insights that enhance personal and business outcomes. There is also a greater personalisation of the interaction and tailoring of products and experiences. The combined effect of technology for business is to deliver better agility, efficiency, and productivity.

Effect of COVID-19

Since the pandemic arose, there has been a dramatic adoption of remote connection technology to allow people to continue to work from their homes and other locations. For certain business functions, we are seeing an increasing automation of their processes. As a result, there is an improved understanding of network and system vulnerabilities associated with the need for an on-site human operator. De-risking these vulnerabilities is likely to be a high priority given the virus may recur in waves.

Potential effect on the water industry

The maintenance of current trends will see an ongoing move to rapidly automate aspects of asset management and operational activities to the most practical extent. We also expect the ongoing use of remote technology to promote the ability for staff to work from home, allowing a more agile and diverse workforce than previous. Senior staff situated in regional utilities have significantly curbed their travel times by converting their diaries to virtual meetings with industry colleagues.

Assuming the majority of domestic environments are conducive for working, there will be a greater flexibility to employ people for shorter time periods because they do not need to spend time commuting to the office. The online environment should also allow greater opportunities to use off-site 'gig economy' workers or other specialists for tasks.

A number of utilities have also noticed a higher degree of resilience, empowerment and connection across teams during this time. However, the benefits from remote working are not universal, people who rely on face to face meetings can find things difficult and online meetings can become all-consuming if not carefully managed. This constantly accessible environment is different, and people need tools to help structure this environment.

Internet of Things

Status pre 2020

Technology and 'Internet of Things' (IoT) - dubbed the Fourth Industrial Revolution – are rapidly disrupting businesses across all sectors. These technologies include messaging and chat bots, autonomous vehicles, augmented or virtual reality, blockchain, quantum computing, artificial intelligence, internet of things, 3D printing, platform economies, and true global connectivity.

For the water sector, the IoT is particularly focused on Intelligent Water Metering (e.g. automatic meter reading, meter data management, sensor device management, networks and transmission); Intelligent Asset Management and Operations (e.g. SCADA, remote condition monitoring condition based maintenance automated water quality and control) and Data Acquisition and Insights (e.g. availability of more data points, real time data, and predictive data). With these advances, the global water metering market is forecast to be \$6.6bn annually by 2025.

Key considerations for water utilities in an IoT world include devices (i.e. when and how to rollout smart network); connectivity (i.e. management of connections); data & analytics (i.e. creating insights from overwhelming volumes of data); interoperability; and ownership and control (i.e. control points and who owns the "network"). Skills sets synonymous with digitalisation and this new IoT world are in high demand, and include data specialists (i.e. data scientists, architects, visualisation), cyber security specialists (i.e. to protect not only consumer information but also the network infrastructure), and software and application programmers (i.e. user experience and back end).

Effect of COVID-19

The onset of the pandemic has quickly enhanced the consideration of automation, IoT devices to reduce human-dependent tasks and enhance business resilience. It has also escalated activity to prove automation and remote operations technologies for rapid adoption into business as usual.

Potential effect on the water industry

In Horizon 1 and 2 there are likely to be gains not only in productivity but also in safety. Less travel means less driving risk. In addition, digitalisation and automation of work over Horizons 2 and 3 should reduce human exposure and risk. On the negative side, in Horizon 1 and 2 there are increased human health risks from isolation and loss of connectivity. There are also increased risks from cybersecurity breaches.

In Horizon 3, there is likely to be an ongoing move to automate water business operations. This will need to allow for the development of an enterprise approach to digitalisation of the organisation. Augmentations will be aimed at providing a rapid return on investment to assist in improving efficiency and reducing operational expenditure. It would be expected that there would be strong regulatory and senior management support for implementation of such initiatives.

Economy

Economic pressures

Status pre 2020

In 2019 the International Monetary Fund downgraded forecasts for economic growth across 70% of the world's economies. This has implications for the water sector: as capital becomes less available and costs of living increase, we are seeing increased scrutiny of water industry expenditure. Decreasing stamp duty as property sales decrease and reducing GST collection from a depressed national retail sector could see State governments putting pressure to increase dividends from water utilities. Ultimately, this places upward pressure on costs to the customer.

Public debt is expected to operate as a significant constraint on fiscal and policy options through to 2030 and beyond. Increasing public debt increases exposure to global markets. Potential tax increases from the government to raise funds would have an impact on the profitability of asset owners.

Effect of COVID-19

An economic depression is likely as national GDP is expected to decline 10-12% in June 2020 quarter alone. It is suggested to be the most severe since the Great Depression. The retail sector has been decimated as stores cease to remain financially viable due to social isolation restrictions. Property sales and rentals have also slowed as a result of isolation measures and the economic downturn. With increasing signs of household mortgage stress, property prices are expected to decline.

Potential effect on the water industry

We expect there will be upward pressure on water prices. Increasing numbers of customers are entering hardship, coupled with defaults on water bill payments potentially by a significant portion of the population over the next 12 to 18 months. Already, this is translating to an increase in hardship allowances provided to retail customers.

The existing financial hardship measures in place in the water industry may prove insufficient to provide the assistance required to alleviate the financial and mental pressures of those who are hardest hit. New, substantive financial packages with proactive measures and communications may need to be developed and directed to reach those customers.

In addition, debt recovery processes and procedures will need to be sensitive to the mental health pressures of the customer and take into consideration public opinion on the appropriate handling of debts incurred as a result of the pandemic with an empathetic and supportive approach. Customer service staff will need specialist training to identify customers under severe pressures and mental health strain and clear processes to deal with each situation in the most appropriate manner.

We have already seen increased government scrutiny of water utility operations with a likelihood of ongoing pressure to reduce water bills through efficiencies and the provision of minimum service levels. In addition, the State government could look to the larger water businesses for additional dividends. All of these effects could impact service to customers and mean that, although there are significant upward pressures on cost to serve the customer, there is virtually no willingness or ability for the customer base to pay increased costs.

The expectations of water business customers are likely to have shifted significantly because of COVID-19 and also recent fire, drought and floods. It should be noted that this shift is different based on the geographic location of the customer and the extent to which they have been impacted by these events. A key question is whether the expectations of government and regulators have also shifted to match community expectations. It will be a challenge for water businesses to understand and balance the competing needs of the customer base with the expectations of regulators and owners.

There is an opportunity to gain government stimulus funding to subsidise infrastructure investment and help kickstart the economy. A 'shovel-ready' pipeline of projects for water businesses can support significant government spending requirement and offer employment opportunities. However, Australian Government stimulus support is unlikely to be directed to water utilities. Initial indications are that funding would most likely be from the State Government, if at all. Should this be the case, it will most likely create additional pressure on water utilities to augment government revenue through dividends. Depending on the economic headwinds, asset sales and asset recycling may come back onto the table, with implications not only for the asset owners but others such as councils where their assets adjoin those of the water utility.

Water Affordability

Status pre 2020

Increasing water prices are a major concern for most states, particularly South Australia and Queensland. Water prices are expected to further increase because of augmented and diversified water supply sources that are designed to accommodate population growth and provide greater assurance against the impacts of climate change. The replacement of ageing infrastructure is another factor affecting price increases.

Contributing to this issue is that water prices are artificially suppressed and will need to rise significantly to truly reflect costs. Given supply-related infrastructure needs to be provided before projected population capacity is reached, the timing for customers to pay for its investment creates additional pressure on current customers. Adding to this is the concern of predicting infrastructure needs beyond the 10-year horizon, which could in the longer-term result in higher capex and prices than those currently predicted.

Effect of COVID-19

Immediately there has been no impact on water prices. However, cases of customer hardship are increasing across residential and commercial sectors in most regions.

Potential effect on the water industry

Increased hardship and affordability concerns over the medium term, if realised are likely to put additional pressure on water utilities to reduce prices in real terms. The impact on regional population dynamics depends on the region. Several forces are involved. Areas that have a strong tourism basis are likely to see significant population decline due to travel restrictions. Populations based on mining are relatively stable, with minor demand reduction predicted from major mineral and gas users. Agriculture based towns face particular hardship, with a number of smaller towns becoming unviable due to the recent drought from 2016-2020. Revenue impacts tied to commercial hardship and insolvency are yet to be realised but are expected to be measurable for some water businesses.

Couple this with impacts from recent bushfires which have affected town water supplies, reduced tourism and business due to COVID-19 and it is likely that a number of towns will see a significant reduction in revenue and potentially population. This may be offset to a small degree due to the ability of more people to work remotely and hence live in regional areas. However, current indications are that this will be only a small portion of the working population.

Consequently, there is no one-size-fits-all for regional areas. Noting that for many the next 6-18 months are likely to be a time of recovery with little additional funding. Whilst some may come from Federal Government the allocation is uncertain, as is the requirement for repayment of any funds provided.

Supply chain resilience

Status pre 2020

There has been an emerging trend for sourcing of ethical producers and a move towards localisation of supplies on a global scale, associated with international political regimes. In Australia, concerns have been developing around the diversity of our supply chains for chemicals. In particular, supplies of some critical chemicals within Australia are limited to a single source supplier, e.g. chlorine gas, while a number of other chemicals are sourced entirely from overseas. Taken together, the diversity of supply chain is limited and potentially poses a major risk for water supply and treatment operations across Australia. Initial indications have been that stockpiles of some chemicals are as low as two weeks.

The supply chain for buried infrastructure appears to be robust, with a diversity of suppliers (albeit most from overseas). The major constraint in this area appears to be local supply of sand and aggregate, particularly in Victoria due to the amount of construction occurring. There is limited knowledge of the resilience of supply chain for non-essential materials (e.g. pumps and electrical goods) and services. Work is currently being done to understand this aspect of the supply chain.

Recent geopolitical tensions are affecting supply-side capex mainly in the form of steel, which may produce measurable impacts on project timing and costs.

Effect of COVID-19

This has exposed weak links in the supply chain, particularly if overseas supply lines are cut or restricted for an extended period. Detailed understanding has developed of the supply chain for chemicals and essential materials.

Potential effect on the water industry

The sector needs to evaluate the options for diversifying the supply of some chemicals. One option is to stimulate SMEs within Australia to locally produce some types of essential chemicals; another is to diversify the source of materials. Recent analysis indicates the supply chain for essential materials has a higher degree of diversity and resilience. Manufacturers for these products suggest they can provide an undisrupted supply and can rapidly increase supply as needed. To further secure supply chains manufacturers appear to be investing more in automation technology (i.e. robotics) to reduce the risks of pandemics to production and transport.

Environment

Climate change

Status pre 2020

The world is getting warmer and extreme climatic events are becoming more frequent, most evident in 2019 with a spate of historical record-breaking meteorological extremes. These changes are associated with an increased food security risk and biodiversity loss (noting that Australia has the highest recorded biodiversity loss of any continent over the past 50 years due to climate change and environmental management approaches). In addition, catchments are revealing atypical fluctuations of water volumes, flows and water quality with increasing frequencies and magnitudes of extreme events, including droughts, floods, and bushfires.

Difficulties to secure consistent policy and intervention persist with public opinions across the nation varying from support to resistance to expert opinions.

Effect of COVID-19

During the pandemic, the level of human pollution has significantly altered and has most likely decreased because of self-isolation measures reducing vehicular travel, abolishing peak travel periods, ceasing nearly all air travel and the operation of many manufacturing plants.

At the same time, there has been a redistribution of power and water usage from central business districts to the suburbs of cities. The cumulative effect of these changes is not fully known. However, it is likely that a proportion of these changes will remain for the short to medium term as businesses see benefits of allowing workers to work from home. It is too early to determine the full effect, but it is possible that there will be a significant decrease in traffic to the inner city, along with reduced inner-city occupancy rates for business real estate.

While positive effects are already seen with monitored reductions in smog-producing air pollutants, these changes to the pattern of urbanism may also positively influence the temperature profiles associated with the urban heat island effect. There is also the opportunity to use data to change people's perceptions of human activity's large impact on the environment. Such data could be gathered through peak bodies such as VicWater and WSAA.

Yet, in Horizon 1, the pandemic has resulted in almost complete loss of focus on environmental issues such as climate change because people are more worried about the immediate economic and health threats. It is likely that this will continue to a large degree into Horizon 2. The overall effect of these impacts on climate change and actions for mitigation are highly uncertain at this point.

Potential effect on the water industry

The climate-specific effects on our industry are not yet determined. However, the change in occupancy rates may have implications on the timing for upgrading inner-city infrastructure such as urban drainage, along with buried water and sewerage infrastructure. Changes to usage patterns may also reduce peak demand, thereby limiting the need for augmentation in some districts.

The advent of the majority of the population working from home has led to a greater appreciation of open space through walking and cycling. If this continues post COVID-19 then it presents an opportunity for greater community activation through increased use and value of waterways and other easements (e.g. pop up cycleways in a number of cities). This may open opportunities for innovation in government policy to support these initiatives. In addition, the reduction in travel and greater home working may reduce human pollution impacts. The water industry has the opportunity to influence government policy around improving liveability into Horizons 2 and 3.

Water Security

Status pre 2020

Climate change and rapid population growth are threatening Australia's water supply

There is much data revealing that climate change is decreasing Australia's water supply while increasing demand. Lower and flashier precipitation patterns as a manifestation of climate change have decreased streamflows and overall water supply across the country. Higher temperatures have increased water demand, especially for the greening of neighbourhoods and bushfire management. For example, higher temperatures in Western Sydney compared to other areas of Sydney have resulted in 1.8 times greater water usage, predominately driven by neighbourhood greening.

In addition, rapid population growth is increasing water demand. Australia's population is projected to grow at a rate of 1.4% p.a. from 2018 to 2066. This will particularly increase demand in capital cities where population growth is concentrated.

In peri-urban and regional areas, changing public sentiments and values associated with catchment areas, such as interests in recreation and other uses, exacerbate these challenges. However, a greater support for self-reliance in growing home economies has potential benefits in forms of reducing reticulated water use, energy consumption, and carbon and fugitive emissions.

Australia needs to consider a diversified water supply

Acknowledging the climate and population dynamics affecting our water supply, alternative sources will be a necessity to meet future demands. To this end, recycled water and stormwater are important parts of the solution.

Recycled water needs to be genuinely considered as a way to diversify Australia's water supply, despite its negative perceptions in some communities. Because of perceptions, it is expected that a pilot scheme would be required to change the discourse and support purified recycled water as a credible alternative supply source. However, there is evidence the government can change public opinion of recycled water. For example, in Western Australia there are 74 water recycling schemes and over 90% public support for aquifer recharge. And recent community surveys, such as one conducted by Western Water of the Sunbury community, reveal support for potable recycled water.

Stormwater can be used to diversify Australia's water supply, although the diffuse management of stormwater and the cost-effective mass storage of it in urban areas has made this difficult. Regulatory change would be required to warrant all water utilities to use stormwater as an alternative water source.

In the longer term, stormwater and recycled water supply augmentations would benefit from clearer guidance on government in intentions regarding agriculture growth areas to better ensure schemes are located close to intended users where possible to avoid underutilisation. However, both stormwater and recycled water harvesting often require significant storage to allow year-long use given there is often an excess of water in the wetter and cooler months. Construction of such storages and associated transfer systems could be a useful investment of government stimulus funding. Desalination is another option to further Australia's diversify water supply. With a relatively large carbon footprint and the potential to disenfranchise local communities for which treatment plants are located, this should not be the only solution.

Demand management strategies have been extensively used across Australia with largely an enduring effect since the Millennium Drought. According to research, there are limited gains to be made from further implementation, suggesting a preferred focus on maintaining water conservation behaviours. In addition, there is an observed growing fatigue to the application of water restrictions as a response to drought in some areas. This supports consideration of alternative sources and the search for more innovative ways to manage water that provide living infrastructure, including greener spaces, urban heat sinks and other elements, as a form of future investment in addressing the impacts of climate change. With community and government expectations growing for water corporations to improve the environmental state of broader systems – such as water quality further upstream of their catchments through education, urban planning and rehabilitation investment – there will be a tendency toward water security programs offering multiple and integrated outcomes.

Effect of COVID-19

No immediate effect on water supply has been recorded since the onset of the pandemic. While increased water use has been suggested in the media due to required sanitation measures, this has been more than offset by a reduction in commercial and industrial uses.

Potential effect on the water industry

Financial constraints negatively affect the ability of utilities to put in place measures to increase water supply resilience. This is potentially of greatest concern in regional areas, some of which have seen significant impacts on the revenue and viability of local towns associated with the combined factors of drought, flood, fire and COVID-19. Recovery from these combined factors is likely to take many years.

Political

Polarisation in democracy and de-globalisation

Status pre 2020

Changes to global powers and a growing dissatisfaction with and lack of trust in democracy have changed our political and regulatory environment. Populism was on the rise, but new forms of community activism have arisen seeking deliberative governance and social equality. This is resulting in a greater need for timely, personal, transparent information for customers and greater engagement in the development of service strategies and offerings.

Effect of COVID-19

COVID-19 is exacerbating de-globalisation and centred public attention on responsive international government leadership and cooperation. Many countries have shut their borders to movement of people. There is expected to be a global decline in trade internationally by around 11% (Home Affairs *pers com*).

Potential effect on the water industry

There has been an increase in trust in government during this time. It is unclear to what extent this flows through to water businesses, and could benefit from a better understanding as it may assist in implementing new initiatives.

Increased de-globalisation may impact the ability to reliably source materials and personnel internationally. Whilst it is possible to gear up local production to supply materials and upskill personnel, this is at a cost. In addition, the volume of materials and services used within Australia is often low compared to international markets. Consequently, local production of previously imported goods and services will come at a cost, which must be passed on to customers.

Also, with a constrained international labour market, there is a likelihood of competition across construction and other skilled industries, with potential knock-on effects on our industry for procurement (some water businesses have reported up to 30% increase in costs for contractors).

Additionally, there is likely to be an increased cost of goods and services due to a higher cost for transport. For example, there is currently an unofficial COVID-19 related increase in the cost of transporting goods by an estimated 10-15%. Any upward pressure on costs is likely to occur in Horizon 2 and 3.

The combination of these factors may cause governments to consider privatisation or selling assets through capital recycling or similar. WSAA has produced a position paper on privatisation which has been circulated to all economic regulators. The key focus of that position is that privatisation is only one option to increase efficiency and that it should be considered against the current context. For any privatisation or asset sale discussion it will be important for the water business to be fully involved with government during the process, as each outcome will need to be decided on the net economic and community benefit.

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