CRC for
Water Sensitive Cities

Policy influence:

tactics and strategies for researchers

CRC for Water Sensitive Cities, Project A3.3
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Policy influence: tactics and strategies for researchers

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Executive summary

The CRCWSC project A3.3 *Strategies for influencing the political dynamics of decision making* examined strategies and tactics for influencing opinion formation and policy making, to facilitate progress towards water sensitive cities. This report is intended to function as a manual to help scientists understand both the 'rules of the game' and tips on how to play it, informed by our research into the science–policy nexus in the urban water sector in Australia. It aims to give insight into the nature of opportunities for influence, and how to exploit them, while being frank about the obstacles. This report is about the policy impact that scientists can potentially have, but also why scientists so frequently lack the policy influence to which they aspire. No singular method or approach is guaranteed success, and many of the most relevant factors to science making an impact on policy are outside the control of universities and research institutes. However, scientists can do many useful things, both strategic and tactical, that help facilitate influence over policy.

Strategic issues in influence and advocacy. The research revealed a wide range of ways in which scientists and researchers can improve their effectiveness in influencing policy. Strategic or high level considerations and planning for how research might ultimately have greater impact include:

- **Expectations**: Scientists need to approach the concept of influencing policy, whether it be in the public or private sphere, as a process rather than an outcome. They need to manage expectations and understand that a good outcome in a policy context looks radically different from a good outcome in a research context.
- **Context**: Scientists need to understand the context in which policy is made in their area, and particularly understand who the stakeholders and veto players are. Science-based arguments that are shaped with even some consideration of those elements are likely to carry further.
- **Timing**: Scientists and researchers who to wish influence government deliberations need to understand the policy development cycle and its relevant timeframes. Scientists must be abreast of what is happening in policy—they need to be mindful of when windows are opening and policies are being reviewed (hence the greatest chance for influence), and when the chance for influence is disappearing. Scientists and research organisations also need to develop ideas and be ready with proposals. This is a challenge for research organisations particularly, which need to be able to adapt flexibly and to provide ideas (even if partial or tentative ones) when opportunities appear.
- **Networks**: Building networks between scientists and other actors in the policy sphere is an essential strategic aim for achieving influence. Networks are key aspects of science influence: they consolidate intelligence and facilitate access; they promote the relationships on which trust depends; and they are channels for dissemination and communication.
- **Communication**: A key aspect of developing science influence is how research is communicated and disseminated, and how scientists and researchers promote and package their work. Traditional academic dissemination is often not effective at communicating ideas and research to policy makers and practitioners. Accordingly, research communities need to use different communication strategies when wanting to influence policy.
- **Tactical issues in influence and advocacy**. Scientists need to develop the skills and insight into the most effective ways to use opportunities for influence when they occur. Key tactics that scientists can use to 'make the pitch' for their research include:
- **Knowing what you want to achieve**: For their research to best effect change, scientists need to clearly identify what a better alternative to the status quo would look like—that is, what is the grand vision, and what does it look like in specific cases? They also need to identify the means and instruments for changing the status quo—that is, what is within the jurisdiction and capacity of the body that is responsible for change? Decision takers and policy makers must work in specifics, so scientists seeking to influence need to be able to provide concrete and specific recommendations.

- **Bringing solutions, not problems:** While a researcher generally looks to investigate problems, government and industry generally engage in applying solutions. So, when approaching government or industry, scientists seeking to be influential should try to: (1) understand a known and difficult problem, then provide a workable solution; and (2) align research with a government or industry focus.
- **Understanding the decision makers**: Would-be influencers need to understand the key decision makers, what they need, and what they will be receptive to when making their decisions. Networks that connect policy makers and researchers become a critical asset in this tactical task. It is usually through such networks that scientists and researchers can gain insight, either directly or indirectly, into the decision making structures that will determine whether good research becomes good policy, or just another idea that is discussed but not actioned.
- **Working with certainty and risk**: Certainty and risk are handled by scientists and researchers against very different standards than those that apply in the policy domain. Scientists need to achieve a balance between the imperative for research integrity, and what can be asserted with reasonable probability given what is currently known. Researchers and scientists who are willing and able to provide concrete recommendations, even if tentative or evolving, are more likely to be of interest to policy makers than are those who are not willing/able. Proposals rooted in research but that have parallels or confirmation in other areas are much more likely to be of interest to policy makers, and they are less risky than those that have neither.
- **Translating the research**: Translation is about converting research into terms that make sense to, and are useful to, other users (such as policy makers). The most powerful impact is when research fits into a bigger picture that key decision makers appreciate and understand.
- **Finding the business case**: A business case is a subset of translation—namely, how a research proposal translates into economic and financial realities. Considerations for scientists crafting a business case for industry or government include: (a) the ability to quantify benefits in some way; (b) knowing who benefits from the proposal, and who will own the benefits; and (c) tailoring the value proposition from the perspective of a range of potential adoptees.
- **Making the political case**: The political case acknowledges that even if an idea or proposal stacks up technically and financially, political factors usually come into play. When seeking to create a persuasive political case, scientists should: (a) understand the relevant stakeholders in an outcome and anticipate their likely reactions; (b) reach out to allies and identify potential detractors, including their arguments and how these could be countered; (c) investigate the likely community response to a proposal; and (d) understand who is charged with making the final call.
- **Communicating clearly**: How researchers and scientists communicate their ideas and package them for different audiences is crucial to their success or failure in influencing policy. When time and information search are constrained in a policy making context, information that is clear and easy to understand (and doesn't rely on expertise) is most valuable and most likely to be used. To communicate more effectively, researchers need to: (a) convey expertise with a degree of humility; (b) get to the point succinctly and quickly; (c) find formats that connect (concise reports and briefings, lunchtime seminars, and other short format communication are preferred); and (d) avoid sector-specific terminology and waffle.

Introduction

Most universities and research organisations have a goal of making a difference to public and policy debates. Particularly in the environmental sciences, research and scientific evidence are a critical component in making a case for change in policy and practice. However, a common complaint from scientists and experts alike is that their research seemingly has little impact on policy, and that politicians and policy makers routinely 'ignore' or 'misunderstand' science, and subsequently make misinformed, compromised or otherwise poor policy decisions. The mission, then, of many scientists and research institutions is to try to make science and research more influential in the policy process, to have a greater impact on the decisions made.

This mission was at the centre of the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) project A3.3 *Strategies for influencing the dynamics of political decision making*. This project team spent three years (January 2014 to January 2017) finding those strategies via three principal means:

1. an extensive review of the literature on science and policy making interactions (Laing, 2015)
2. development and trial of two experimental workshops on interactions between political decision makers and CRCWSC researchers (Laing & Wallis, 2016)
3. interviews with 60 water industry figures, principally senior bureaucrats, utility managers and political decision makers working in the urban water policy sphere (the results are largely captured in this report).

Although this milestone report works largely from the significant body of interviews, it also distils the insights from the other three sources (especially the feedback from CRCWSC stakeholders in the workshops).

A common problem

Scientists and members of the academic community often ask why politicians don't listen to them. This question is often underpinned by the assumption that the decision takers and policy makers need to listen more to the experts, and that it is incumbent on them to improve their evidence collection and develop more robust, evidence-based policies that strive to incorporate a broader range of research recommendations. In other words, any necessary improvement or change is assumed to be in how the government and policy makers engage with and listen to experts and scientists.

Yet, throughout the many dozens of interviews with politicians, bureaucrats, policy makers and industry leaders that we conducted, there was no shortage of enthusiasm for, or interest in, science and evidence that can help them do their job. Although science can be contentious and controversial, we found no evidence that it is routinely ignored. Policy makers at all levels expressed highly positive and encouraging opinions of scientists, and a desire to use and incorporate scientific work into their own. However, in the words of one interviewee, 'we often get excited by what scientists tell us they have … but often we are disappointed by what we get' (Interviewee 21). This sentiment was expressed across numerous interviews (Interviewees 6, 11, 46, 51). Cases and scenarios explored in this report show why—from the perspective of policy makers— science all too often answers the wrong questions, takes the wrong approach, is delivered in the wrong format or for the wrong conditions, is delivered at the wrong time or the wrong place, and/or is subject to restrictions, limitations or caveats that render it unusable. To overcome these barriers, we must understand the institutional constraints that shape policy makers' perceptions .

The story is much more complicated than wilful ignorance on the part of policy makers. Policy making is a complex, difficult process undertaken under severe limitations. Without understanding this process and its limitations, scientists and experts will struggle to make clear and compelling cases to policy makers and politicians about the need for change. Scientists and experts represent just one of many groups trying to influence government policy and have their voices heard. To gain a hearing, scientists and researchers need to think strategically and tactically about how they can make compelling *policy* cases (rather than simply *scientific* cases), and how they can ensure their research meets the needs of policy makers. This report, by distilling what we've learned from the urban water sector, aims to assist scientists to do just that.

Two different worlds

As Peter Cullen, one of the most influential scientific voices in water policy in recent decades, once wrote: 'When scientists do enter the political arena, they must understand they are playing to different rules from those used in science and need to learn the rules of politics and the media. Unless they understand the rules and tactics of policy debate it is like them walking on to a tennis court equipped only with golf sticks' (Cullen, 2006: 10).

Much of the research conducted by CRCWSC project A3.3 confirmed Cullen's view. There was a wide gulf between the perceptions and understandings of policy makers and scientists. When looking at the science–policy nexus, the difficulty comes not just in translating science into policy terms, but even in developing shared understandings and approaches to key concepts and ideas. Policy makers and experts, while often having the same passions and objectives, follow different rules, have different incentives, and can even be said to speak different languages. In conducting interviews, case studies and workshops, the project team did not find the urban water sector to be unique in this regard—the problems of the science—policy nexus reflect those experienced in natural resource management, forestry and wildlife conservation, and in other areas such as education or community services. Generally, scientists and researchers in all disciplines have philosophies and approaches that significantly vary from the philosophies and approaches of decision takers and policy makers.

A key divergence comes with the concept of evidence. Evidence is integral to the contemporary policy process. But the research community and the policy community—as we will see—may have extremely different ways of understanding and defining common terms such as 'evidence', 'risk', 'stakeholders', 'cost' and 'proof', or agreeing on what evidence is persuasive, and what constitutes certainty in evidence. Further, the policy process is not the same as the process of research. Policy processes can be chaotic and unpredictable, following non-linear timelines and resembling more of a scramble to find solutions than an orderly progression to find truth. As a result, not only may the players on the court be using different equipment (Cullen, 2006), they may not even have the same understanding of the rules of the game.

What this report does

This report is intended as a manual to help scientists understand the 'rules of the game' and tips on how to play it, informed by our research into the science–policy nexus in the urban water sector in Australia. Although our research focused on this sector, many of the principles apply broadly to any science–policy interface. This manual covers key themes that consistently emerged in our research; for each theme, it offers some analysis and guidelines on possible remedies. These observations and recommendations lean heavily on the interviews and workshops conducted by the A3.3 project team, and they come with two important caveats:

Scientists need to be the change. The overwhelming sentiment emerging from the project's research is that the focus for improving the science-policy interface should be on scientists and researchers, contrary to many popular beliefs. There are two important reasons for this focus.

First, it is easier to change what scientists and researchers do than to change the nature of politics and policy making. Policy making processes are large, complex and amorphous, involving massive bureaucracies and multiple potential points of failure and blockage across the government, stakeholders and community. By comparison, research teams and centres are simpler and, ideally, more agile. So, when examining barriers to an effective science–policy nexus, it is easier to find pathways by which a research team can be more successful in influencing a policy process that adapts to political realities, than to create a reform project for the policy–political system. Scientists too have more capacity and professional leeway to improve their influence over the policy process, compared with policy makers, who are often constrained by legal, political or budgetary structures that are extremely difficult to change. In other words, scientists and researchers have greater agency than most other actors in the policy sphere to adapt to the complex and unpredictable structures of policy making.

Second, the scientific community may sometimes feel ignored or sidelined in policy processes, but this sentiment is not shared by policy makers to whom we spoke. As a senior bureaucrat in the water industry noted, 'we don't feel like there is a lack of science in our policy making' (Interviewee 14). This might surprise scientists who lament a government's lack of action on emerging research. But, although government is interested in science, it does not necessarily feel the need to change the way it interacts with the scientific community (for reasons we cover in other sections), and does it not perceive the issues at stake in the same way that scientists and researchers in the water sector do. This difference partly arises because scientists, universities and research institutes compete for influence in urban water. Numerous other providers of 'evidence' for government policy indirectly compete with traditional scientists and research centres. Engineering consultancies are increasingly used by government and utilities to provide policy evidence. This growing trend will further marginalise traditional researchers. If scientists and researchers fail to adapt to this rising competition in influence and the provision of evidence, then they risk dwindling impact and increasing irrelevance.

The researchers in A3.3, concluded that it is easier—and a more pressing imperative—for the scientific community to improve its approach and learn from other cases in which scientists have successfully pitched to government than to wait for government and policy making to better incorporate traditional scientific outputs. Although science and policy struggle to meet for structural reasons that cannot easily be changed, many barriers and impediments can be changed relatively easily, and via unilateral action by researchers.

Policy influence is hard won and easily lost. Even the most sophisticated and well-funded lobbying outfits can fail when trying to influence policy and practitioner outcomes. One well-known study of hundreds of legislative outcomes in the US Congress found even the largest and best funded lobbying campaigns influenced legislator behaviour in only half of the cases studied; further, in many of those cases, the effect was relatively small (Baumgartner & Leech, 1998). Similarly, even the most effective and well-known advocates of science in the water policy sphere (such as Peter Cullen) have lost as many battles as they have won over long careers. Influencing the policy process and getting policy or practice outcomes are usually long, complex and difficult processes, and they may daunt even those scientists and researchers with experience of those processes.

However, as several government ministers noted in interviews (Interviewees 15, 34), excellent science driven policy outcomes have been achieved from even relatively modest efforts by engaged and well-prepared scientific advocates. There are numerous cases (with several highlighted in this manual) where specific strategies and tactics succeeded in garnering greater influence for science than might have been predicted. Although there is no guaranteed way to influence processes that can have unforeseen outcomes (given the nature of politics), there are known techniques for greatly improving the *potential* for influence. Individuals who have certain skills and outlook are greatly valued and sought after by senior decision makers in the water policy sphere (Interviewees 6, 16, 20, 40). As noted by a scientist whom others identify as an individual voice in urban water policy:

> ***As for science influencers, there are a handful of people that I know of and we find ourselves in the same room often. Where we start by signing a confidentiality agreement and then you have senior bureaucrats—the highest level—who say "We've got to do this. What would you recommend?". And no-one's allowed to talk about it. You're very lucky to be in the room. And often the questions are "What's best practice? How do they do it elsewhere?" "Is there somewhere else that this has been done that you can tell us about?". And that's very much the speaking of a language that everybody can understand. You're not pushing a barrel and you're not going to use academic language that no-one in his right mind is going to understand. You're in that room because you can understand their problem and their constraints, and respond to that. And there's very few people who can do that. And how do you make those people?***
> **(Interviewee 33)**

This manual seeks to provide some answers to this question. It aims to give insight into the nature of opportunities for influence, and how to exploit them, while being frank about the obstacles. This report is about the policy impact that scientists can potentially have, but also why scientists so frequently lack the policy influence to which they aspire. There is no singular method or approach that guarantees success, and many of the most relevant factors to science making an impact on policy are outside the control of universities and research institutes. However, scientists can do many useful things, both strategic and tactical, that can help facilitate influence over policy.

Part 1. How scientists can be influencers

Why should scientists play the role of influencers, advocates or even lobbyists? A frequent refrain in the academic literature—see the CRCWSC report *Science and policy influence: a literature review* (Laing, 2015)—is that the scientific 'role' is not that of an advocate or a persuader. Rather, scientists are called on to be independent researchers, free from political inference, who provide facts, not interpretations or opinions. Although the academic literature commonly takes this position, our field research and interviews revealed reasons why it may be problematic, and indicated compelling ways in which scientists and researchers can be effective advocates for their research and seekers of policy influence, while remaining independent, credible and apolitical.

Scientists and advocacy

Many of the bureaucratic decision makers whom we interviewed in the urban water sector were highly encouraging of scientists to take on greater roles as advocates, and to seek influence more actively within the policy process. As one government minister noted:

> ***Yes, they should. Of course they should. I've got no qualms about that. I mean scientists are the way forward. Throughout history, science has driven mankind forward. And if scientists ever take a backward step, they lose the ethos in which they operate. Only through science pushing the boundaries do we get not all change but major change ... So, science should always be advocating for change.*** **(Interviewee 40)**

Most interviewees, particularly in government, felt they heard too little from scientists and researchers, and wanted to hear more. In an environment in which managers, bureaucrats and politicians are unlikely to have the time, training or inclination to search the ocean of academic journals and published volumes for ideas or answers, scientists must be able to quickly and effectively communicate to policy makers, and to provide clear and compelling answers to the problems faced. Scientists must be active (at least in part), rather than passive, in providing those answers.

In the view of one senior water bureaucrat, there are few downsides to scientist advocates who approach his department, even when they advocate on issues that were not particularly pressing or immediate:

> ***... you need to keep a few balls in the air because you'll always get an opportunity to progress something if you have enough things you think would be worth doing. You'll always get something that's worth doing and you can get ... political interest one way or another.*** **(Interviewee 5)**

However, policy makers perceive scientific advocacy very differently from the way in which scientists perceive it. Several interviewees who were, or had worked, in senior bureaucratic positions in urban water noted the significant potential variances between how particular scientists are viewed by policy makers versus peers in the research community (Interviewees 5, 19, 22). Scientists philosophically place a very high value on the perception of credibility and apolitical integrity (for examples, see Rykiel, 2001; Doremus 2008; Ruggiero 2010). Policy makers and politicians are keen to ensure their advisers and evidence makers have these traits as well, but judge 'credibility' and 'independence' in different ways. There is more tolerance and acceptance among policy makers and political decision makers of scientific activities and histories that the scientific and research community would judge more harshly. The high standards that scientists observe within their own community, in terms of scientific independence and apolitical credibility, do not readily translate into the policy sphere, where some degree of politics and advocacy is considered par for the course. One minister noted all would-be influence seekers, including scientists, have an agenda (Interviewee 34), and this is accepted and normal rather than a basis for disqualification.

Political and bureaucratic decision makers are receptive to, and generally want, scientists to be advocates for their research. There is a general need for scientists to be active in seeking influence, rather than using the more traditional passive methods such as journal publication. While active advocacy seemingly conflicts with some of the philosophy of the scientific community, policy makers and decision takers often perceive credibility and apolitical integrity very differently (and usually far more liberally) than scientists do.

Scientists at the policy interface

Scientists and experts can perform a range of roles in relation to policy. These roles can range from evidence provider to advocate, policy entrepreneur, and even policy maker, although each has opportunities and pitfalls. So, despite barriers and shortcomings in the process of converting good science into good policy, scientists and experts have opportunities and methods of influence that are not normally available to most other would-be influencers.

Often, a strategic choice is involved when scientists arrive at the science–policy–politics nexus. Scientists and experts may legitimately be *insiders* within the formal policy process, sometimes working as bureaucrats themselves, and other times working as secondments or consultants for a more limited period. Yet, they may also be *outsiders* to the formal process, providing insight and critique that influence the policy outcomes through informal pressure (perhaps by raising public and political awareness of certain issues, or by making effective public arguments). Scientists often under-appreciate the uniqueness of this position. Bureaucrats, for example, may have significant power and influence over the formal policy process as *insiders*, but their role requires fidelity to the government's program, and they cannot credibly assume positions as *outsiders*. Similarly, lobbyists may wield significant influence informally as *outsiders*, and garner access and persuasiveness on behalf of external parties. But they cannot credibly (or legally in most states) become policy *insiders*. Scientists, however, can be both insiders and outsiders over their career; very occasionally, they may even alternate roles within a single policy domain and still maintain credibility (although perhaps not without making enemies).

Very few scientists take advantage of such opportunities. In 60 interviews in the urban water policy sector across three states, interviewees named less than a dozen scientists who had been influential in policy making in their state. There are two apparent reasons for this finding. First, our interviews and workshops indicated scientists and researchers usually lack the skills needed to be effective as either insiders or outsiders. Some skills, such as communication, are common to both roles, while others are more specific. Translation and trust building tend to be associated with influential insiders, while networking and timing tend to be associated more with influential outsiders. Second, scientists appear reluctant to embrace influence seeking roles, or to invest the time and effort to become effective in such roles. Moreover, there is evidence that those who do look for influence may be viewed with suspicion by colleagues, or lose their status in the academic community—a challenging choice. One of the few named scientist-cum-influencers noted:

> ***I was a researcher for 20 years but I got out of it 10 or 12 years ago, and I made an active decision to get into management and into the science-to-policy space. I chose to do so, but it's not easy. Once you move into this other space you lose your credibility in your home team. I'm a researcher but I haven't published a decent paper in 10 years. I've done other things to create influence and I had to have the motivation I guess and confidence, to some extent, to do that. It's very tricky to do both. Very few people can keep their scientific credibility through publishing high quality papers and still be out there in the industry.*** **(Interviewee 31)**

As a result, there are few influencers (either insiders or outsiders) extant in the urban water policy sphere who are also members of the urban water research community. Many of the top scientific advisers that ministers or senior bureaucrats identified as being influential over urban water policy initiatives in recent decades were water scientists from other areas, such as catchment hydrology (Interviewees 14, 16, 29, 34, 40, 58). Often, those individuals identified were linked by specific backgrounds, skills or projects that had been successful. A prominent example was the CRC for Freshwater Ecology, which Peter Cullen once chaired: it was remarkably successful in producing several high profile science 'influencers' who went on to other projects and states, but whom governments still call on for advice in the water space.

CRC for Freshwater Ecology

Of the 'trusted scientific advisers' identified in our interviews with political and bureaucratic decision makers in the urban water sector, a high proportion (in both Queensland and Victoria) had a connection to the CRC for Freshwater Ecology (despite many of that project's alumni not being experts in urban water issues). Many of these trusted advisers had been established voices for quite some time, and they had some influence in key water decisions made in both states in recent decades.

Why? The 'trusted advisers' that we interviewed gave insight into their experiences with the CRC that seem to serve them well for future influence brokering. These experiences including training in communications and using research results to inform broader influence efforts with policy makers. Some interviewees described long communications retreats; others spoke of intensive sessions focused on engagement and the transformation of pure research into a product that governments and industry could use. They emphasised the structural and capacity building aspects of the CRC that helped create alumni who are more engaged with impact and policy, but also noted a degree of luck and timing (Interviewees 1, 26, 31, 44). As one of the CRC's alumni commented:

> ***It's extremely difficult to maintain influence across governments and very few people can do it ... I think what you do institutionally is make sure you do align yourself with the industry, get your relationships right at the top of organisations, at the middle management and at the technical level, and just build and work off those, and keep listening, keep engaging, keep listening, keep responding as positively as you can all the time. And coming back to what I said originally, don't just keep delivering knowledge as a raw commodity product; it needs to be something more than that.*** **(Interviewee 31)**

Scientists as trusted advisers

A common feature of the science–policy interface found at senior levels (namely, in our interviews with government ministers and senior bureaucrats) is the concept of the 'trusted scientific adviser.' These advisers might be the consummate influential 'insider', insofar as their role and influence are often unseen yet they are consulted frequently to comment on science and to provide a scientific perspective on policy problems. Unofficial and often difficult to identify (no sitting politician or bureaucrat interviewed would confirm these influencers specifically), these individuals were repeatedly mentioned in our interviews with former politicians and bureaucrats. Further, their existence was triangulated through multiple testimonies. One minister described how these individuals arise:

> ***Well, from my point of view, over time, you build up a database of who you can go to for referrals. And I've built that up over time. It might be with the department. It might be people I know outside the government as well. It might be people in CSIRO who will say, "Well talk to so-and so" or it might well be an article in the paper that strikes me as being something of value, and then I'll read the paper behind the article, and then talk to that person one-on-one.*** **(Interviewee 40)**

Such individuals are perceived as crucial bridges between the scientific and political realms, and often have significant influence over government ministers. Their utility to ministers is summed up by one interviewed scientist who is a known trusted adviser in Queensland:

> ***None of them are reading scientific papers, and very few even read reports. If you prepare a one-pager or a two-pager, a few of them might look at that but, by and large, they're getting their advice from a trusted individual. And it may not even be in the field that they're seeking advice in; it's just that's a person they know they can phone up, ask a stupid question, not feel embarrassed and know that it's not going to come out in the media.*** **(Interviewee 44)**

This description broadly fits the reality. Ministers and political decision makers generally do not have the time, inclination, or depth of knowledge to read and absorb scientific reports and papers. They usually look to individuals who can explain and advise on critical decisions. Although much advice comes from ministerial advisers or senior bureaucrats, it is also relatively routine for ministers to consult beyond these circles for alternative viewpoints, greater depth of insight, or simply a bypass established agendas within their office or the bureaucracy. From numerous interviews with decision makers and policy makers, we found the role of trusted advisers on water science appears to be growing because it is perceived as less susceptible to political and agenda machinations and therefore more trusted (Interviewees 2, 9).

Trusted advisers, insofar as they can be identified, share the following properties:

- **Reliability:** Numerous bureaucratic interviewees noted the scientists who are most likely to become trusted advisers are those who can be relied on to work constructively with the department or agency, and who will not create tension or be dogmatic. Although this requirement sounds simple, numerous interviewees identified occasions when scientists were indiscreet, inflexibly wedded to their own agenda, or obtuse about political challenges (Interviewees 14, 21, 26).
- **Translators:** Trusted advisers are skilled at translating science into policy and political terms. That is, when they are consulted by ministers or bureaucrats, they can synthesise related findings from the science and develop cogent policy arguments that are relevant to the government's needs.
- **Longevity:** Trusted advisers are relatively senior and long standing members of the urban water science community, and they have established their value over long periods and often over multiple governments. They largely avoid being associated with particular political parties or movements; in this sense, they fit the character of Pielke's (1997) 'Honest Broker' most closely.
- **Forthrightness:** Trusted advisers do not fear giving honest opinions or interpretation of the science in terms that make sense to policy makers. They can give recommendations and advice on courses of action. Indeed, they provide 'advice' first and foremost. Ministers and policy makers are not seeking for scientists to restate the evidence that is already published; rather, they are often seeking validation of courses of action, ideas on alternatives, or interpretations of the scientific evidence and the policy courses that it might support (Interviewees 33, 35, 43).
- **Broadness:** Trusted advisers have the capacity to make recommendations on science across a broad area, often the whole of the water portfolio. From our interviews, some identified advisers on urban water processes had no scientific background in urban water specifically (although this finding varied from state to state). Their skills in translation and their forthright recommendations were the reasons that they were called to interpret other areas of water policy, particularly in smaller states (Interviewees 55, 60). This fact speaks to the rarity of scientists who have the desired properties of trusted advisers, such that a minister may refer to just a handful of scientists who speak to a broad range of areas. However, this approach seems to vary greatly from minister to minister.

Scientists as champions

In contrast to the trusted insider, the influential outsider might be better called the 'champion'—someone who has a passion and an influential place in promoting science and science informed policy outcomes, yet who usually does so externally to policy processes and through public channels. Champions, particularly in the water and environmental management sectors, are a topic of frequent discussion. Many of their characteristics and properties are described elsewhere, including in some findings of this project (for example, Taylor, Arriëns & Laing, 2015). Champions are usually more visible, given they often play a prominent role in policy outcomes and garner significant public attention. However, our interviews and case studies in the urban water sector uncovered prominent themes that link champions and provide insight to their utility.

First, champions provide momentum. Several interviewed policy makers noted many urban water projects and ideas that were propelled over long periods because champions existed both within and outside the bureaucracy. Although many policy makers might see the benefits of water sensitive urban design (WSUD) theoretically, champions within the policy space are needed to push initiatives in practice. One policy maker surmised:

> ***... you get people together for common interests. Like a bit of a talk-fest. Everyone thinks how great it is but unless you have a leader or a champion, or someone vested with or given the permission to actually lead a major initiative, not much happens, you know, until the next crisis ...*** **(Interviewee 8)**

Beyond providing initial momentum, champions within organisations (particularly the bureaucracy and water utilities) are also needed to keep initiatives alive when limited activity or progress might be expected. When there is little political or financial attention, for example, interviewees noted champions are essential for keeping networks and ideas alive, and for maintaining readiness for future opportunities (Interviewees 24, 29). This need is particularly essential in large organisations (such as water utilities and government departments), where personnel turnover can mean institutional memory is quickly lost when individuals depart (Interviewees 8, 17).

Second, champions tend to be most successful when they operate in networks over different institutions. Clusters of champions in specific areas—such as the public service or the research community—have value but often lack the network to facilitate significant impact. These findings echo the ideas of Sabatier and Jenkins-Smith (1999), particularly the concept of the *advocacy coalition*. Interviewees offered examples of effective advocacy coalitions that they had observed in the policy process, between utility managers and public servants (Interviewee 5); between scientists and public servants (Interviewee 14); and between scientists and utility managers (Interviewee 18). The networked, cross-institutional aspect of champions was identified as critical for several reasons:

- First, as one water science champion noted, champions have a mutual need for knowledge and skills that they lack as individuals, and 'political champions' and 'science champions' are a particularly powerful coupling when done properly (Interviewee 44).
- Second, in the words of one senior water bureaucrat with a long history of working with local government:

> ***People leave. You might have a great champion but if there's no support for them ... they go somewhere else where they can be a bit more fulfilled, essentially. They're not getting any traction or support so it's a bit of a vicious circle. So, I think [champions] are crucial.*** **(Interviewee 10)**

In other words, champions may exist in organisations across the water policy sphere but, if they lack support or networks to back them up, they may become isolated and move on. Organisations such as Clearwater in Melbourne have garnered most success through their capacity to interconnect the network of WSUD champions across local government areas in Victoria. That is, the collective efforts of many champions who can share resources and experiences is far more powerful than individual champions working alone (Interviewees 10, 11).

Even if scientists do not choose to play the role of direct champions for policy change, they can serve as powerful allies to other champions, and help facilitate champion networks. Several interviewees involved in campaigns for major change in urban water policy noted scientists and researchers often played a crucial role in creating the forums and networks through which information and relationships could diffuse (Interviewees 16, 20). As neutral parties and providers of potentially essential policy evidence, scientists can be uniquely successful in assuming these support roles.

However, the number of scientists and research organisations pursuing 'champion' roles is small. The concept of scientists as trusted advisers (insiders) and champions (outsiders) is not new, but scientists taking on such roles remain the exception.

The Wentworth Group of Concerned Scientists

The Wentworth Group of Concerned Scientists is a prime example of how successful scientists can very effectively be champions for water science, but also facilitate broader champion networks that reach into government, business, and the community. Born out a meeting at Sydney's Wentworth Hotel in 2002, a group of prominent scientists from a range of disciplines sought to influence the public debate and put pressure on policy by finding a common set of simple principles for protecting Australia's fragile water, soil and vegetation:

The group's scientific credentials were key to their trustworthy and objective image, but equally important was the fact that they had nothing personal to gain—the opposite in fact. This gave them a credibility with the media and public in particular which many policy bodies, lobby groups, NGOs and paid think-tanks lack. Many of the group were also nearing the end of their careers, and so were more bullet-proof than their junior peers. (Cribb, 2006)

The group's *Blueprint for a living continent* was straightforward and simple in its message, but it gained significant traction with Australian policy makers and helped facilitate the growth of a network of champions at all levels who agitated for major policy change, not least the landmark National Water Plan and Murray–Darling agreements.

The success of the Wentworth Group in shifting the public debate and creating an impetus for policy change rested on more than just the group's capacity to publicly champion change and create an advocacy coalition: timing, communication, and a political strategy were other key ingredients. However, the fact that the group endures and has a lasting legacy speaks to the power of scientist led champion networks.

Structural barriers to scientists as influencers

The capacity for scientists to be trusted advisers or champions depends on skills and techniques that interested individuals can develop, which we discuss in the following chapters. However, it is important to be aware of the structural barriers that scientists and researchers inevitably face when trying to act as influencers. These barriers are not easily ameliorated by individuals, and it is incumbent on institutional leadership to try to lower them.

Incentives. The greatest structural impediment is the fact that scientists and academics are poorly incentivised to engage in influence and impact activities: 'University reward systems rarely recognise inter-disciplinary work, outreach efforts, and publications outside of academic journals, which limits the incentives for academics to participate in real-world problem solving and collaborative efforts' (Jacobs, 2002, p. 14). As one scientist-cum-influencer put it:

> ***It's really interesting to me coming in from outside and to see this fixation on category one research and high quality publications. There's lip-service paid [to impact]. "We have to connect to industry" and so on. But, in reality, research publications are the driver ... So, we've got these mismatches with keen individuals and the institutions of research that talk about impact but on the other side the university as an institute has promotional reward systems that doesn't match that.*** **(Interviewee 12)**

This sentiment was evident in our workshop exercises. A majority of participants in the science translation exercises noted insufficient incentive or capacity to invest large amounts of time in influence projects, despite acknowledging the importance of such projects, and aspiring to influence policy.

Increasing academic workloads and a tight academic job market have increased the pressure on scientists' time. In this context, a preference to invest time in career yield activities (such as high quality publications and grant applications) over activities that help influence the policy process is understandable. This leads to a situation whereby only academics in senior positions with high career security can afford to invest heavily in influence activities (Interviewee 26). This barrier is significant and cannot be ignored by scientists. In practice, many scientists and academics avoid the time and energy needed to become influencers, there is little institutional support for such activities, and those who do seek to be influencers have to balance activities that are career rewarded and activities that are less obviously so.

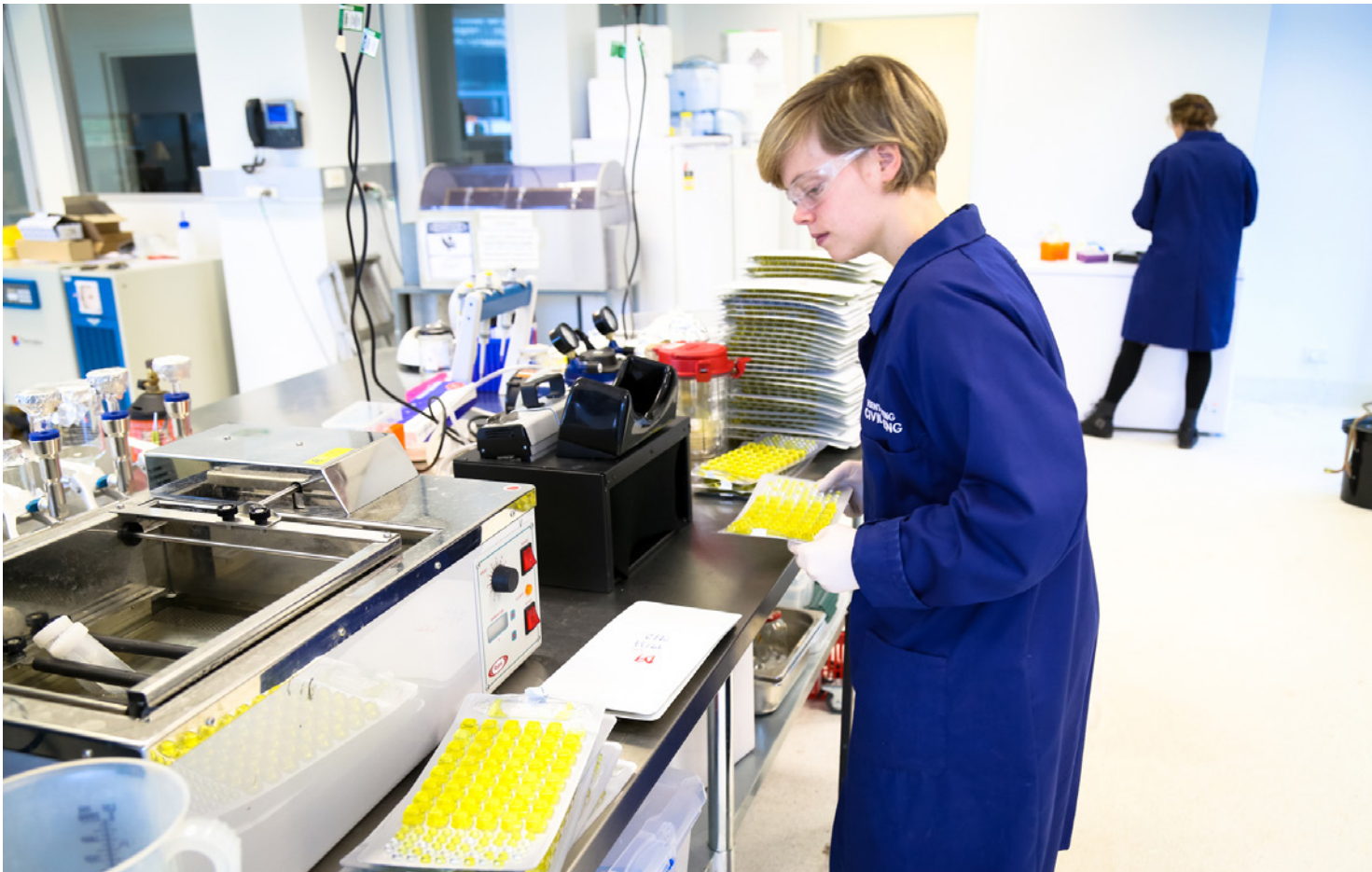
Partner attraction. Numerous interviewees noted a genuine desire to work closely with universities and research institutes, but that many of universities' rules and managerial constraints make partnerships unattractive. A utility manager gave this example:

> ***[Partnering with the university] caused a lot of issues though because they had very tight rules around intellectual property. So often we spent proportionately a lot of time talking with the partner groups and the legal areas about issues which were pretty low probability happening but [universities were] in fairly entrenched positions.*** **(Interviewee 8)**

Another utility manager offered two key reasons for being disinclined to engage with universities or research institutes:

> ***(a) You don't get what you want. What you get is the researchers are driven by self-interest. They just want to promote their favourite research project and get funding. You're really not going to get any answers, and history tells us we won't really get what we want. Or, (b) we get what we want but we don't like what we get. What you're giving us is disruptive. It's disruptive to management. It's disruptive to policy. All you've told us is what we're doing wrong all the time. So, there is this kind of fear, anxiety about engaging. These are sweeping generalisations I'm making here. There are good examples where that isn't the case, where people in industry have the confidence to engage with research organisations. But it's the exception, not the rule.*** (Interviewee 59)

Although these examples cover a range of possible concerns, many interviewees from all states and sectors felt universities and research centres are not ideal as partners in the development of policy or practice. They also noted significant problems and poor past experiences in science–policy or science–business partnerships that diminished the incentive to partner again (Interviewees 3, 6, 11, 12, 17, 25, 27, 33, 37, 38, 47, 51).



Part 2. Strategic issues in influence and advocacy

Assuming a scientist or researcher is interested in taking on advocacy and influence seeking roles for policy, political or practice outcomes, an array of case studies and insider interviews reveal a wide range of ways in which scientists and researchers can improve their effectiveness. Some ways are strategic, in that they involve high level considerations and planning for how research might ultimately have greater impact. Others are tactical, and refer to approaches, techniques and skills that are desirable in scientists-cum-influencers. Both are essential.

Expectations

A recurring theme in studying the policy–science nexus in urban water (and probably common wherever those two worlds connect) is a mismatch of philosophies, plus poor expectation management by scientists. One senior policy maker in Victoria summarised her experiences of this aspect of working with scientists:

> ***Well I've worked on it for years as well and I've frequently given talks to scientists as to how do they get their research into policy. But usually it'll be 20 years of their research boiled down to two lines which I've used in a policy, which I think is terrific. But you've got to be able to see it. There's one example in drought management that I think is perfect in terms of that translation of science into policy, but it's possibly very unsatisfying for the scientists involved. But you go, "See that policy? It takes account of you. Drought refuges. Everything you've ever told us. That's the policy." But for them it's 20 years of science and a whole lot of freshwater ecology. It's not just your little piece of work; it's everything.*** **(Interviewee 14)**

Scientists and researchers are trained to invest time in work that is individually credited to and focused on their expertise. Most research projects work intensively on details and look at depth, rather than breadth. It can be difficult for scientists to appreciate that the opposite is true of policy—policy is broad, and those who develop it go largely uncredited as individuals. Government or industry policies synthesise a range of perspectives and try to find useful compromises to produce an outcome. By contrast, scientific research tends to capture the work and perspective of a relatively small group (sometimes just one researcher) working intensively on a highly specific issue. For this reason, working at the policy–science interface is radically different from doing pure research, and scientists may have high and sometimes unrealistic expectations of how their interests or research can contribute to the outcome. Scientists need to be able to balance their individual accomplishment (which is critical to the structure of research institutions) with the trade-offs needed in policy engagement to foster policy development (Interviewee 26). Further, as one interviewee noted:

> ***Scientists judge it by the outcome so, if they don't like the policy outcome, they think they haven't been listened to. But [policy is] a trade-off and they're only seriously one part of a trade-off. So that's often why they think they haven't been listened to: they don't like the outcome ... But they generally don't know enough about the full problem to actually judge the outcome anyway. They know enough about their bit.*** **(Interviewee 14)**

Many interviewees commented that scientists tend to overemphasise the importance of their work, and to greatly believe in its value, which is sometimes out of proportion with its role in a policy development process (Interviewee 5). Scientists are also liable to misinterpret policy outcomes that don't emphasise their interests, research or desired outcomes. In one workshop session, several CRCWSC scientists considered instances when their research did not heavily or obviously impact a policy outcome were due to 'hidden agendas' and 'political malfeasance' that thwarted the public good for political or economic gain. Although such cases do exist, more often this opinion is rooted in the expectation that science or research should be the *only* consideration in arriving at policy outcomes. But this expectation is unrealistic in a complex, diverse policy environment in which many interests are competing.

Also important in expectation management is understanding what constitutes 'evidence' in a policy context. Given the nature of their work, researchers place a very high premium on exactitude and a stepwise, calculated method for reaching truth and knowledge. Policy, by contrast, is not a search for what's right or perfect, but often for simply for what works. Evidence is important but other considerations (costs, conflicting objectives in other policy domains, government targets, stakeholder demands, sheer capacity etc.) must also be taken into account.

This mismatch is at the heart of many disagreements and complex relationships between policy makers and scientists, and their fundamentally different missions and philosophies can lead scientists to have unrealistic expectations of what a good outcome will look like. Here's a good summation of the problem from a senior public servant:

> ***It's really important to help the scientists think about how they pitch and actually hear what's important to people and policy makers. Because, I think I've always gone for the 80 per cent solution really. Whether it's economic theory or the science, it's about how you can sort of jiggle that into a bunch of expectations that community and stakeholders have for you. In principle you have to have the evidence behind you, but I think it's also got to be something which people feel is fair and reasonable and practical. You know, whether it's a water business they'll be saying, "Oh heck, I've got to run a business here. How can I make this work?" And they love rules of thumb coming from the scientific work. And for a lot of them, often that's enough. Often that's enough.*** (Interviewee 5)

Such a description is antithetical to the world of research, in which the 80 per cent solution is certainly not good enough. However, for time pressured, outcomes focused policy development, in which many stakeholders and interests agitate for particular outcomes, an 80 per cent solution is perhaps the very best we can get. Thus, the first strategic principle of science influence is having realistic expectations of what a good policy solution would look like. Scientific input represents just one aspect of the numerous inputs that a policy process will need to synthesise. A good result is not always one in which a scientist's or researcher's view prevails and radically shapes the policy; more likely, it is one in which science and research provide the primary evidence base for the decisions taken.

Scientists need to approach the concept of influencing policy, whether in the public or private sphere, as a process rather than an outcome. They need to manage their expectations and understand that a good resolution in a policy context looks radically different from a good outcome in a research context.

Context

Decision making in any policy area, as we have demonstrated, is a complex process that considers and balances many different stakeholders and positions. Science represents a critical but relatively small aspect of the totality of a decision making process from conception to outcome. As one senior water utility manager noted:

> ***Well I can, having run these businesses for 18 years, I can tell you that, at the end of the day, science makes up about 10 per cent of the decision making. I probably haven't quite got that percentage quite right but the rest of it is politics, personalities, people and, and basically the role of the CEO is to try and determine the right thing to do. You try and base that on some science and then the rest of your role is running the gauntlet of the personalities and the politics ... it's a huge part of the role and it's naive to think that it's otherwise.*** **(Interviewee 27)**

So, scientists wanting to influence the policy process need to be able to contextualise their research and the scientific viewpoint in a way that speaks to the personalities, interests and stakeholders that may dominate the other '90 per cent' of decision making. This task may seem daunting for the average researcher, but even a moderate insight here can yield significant results. In terms of understanding the policy context and how scientists might better navigate it, a few recurring concepts from the project's research can be useful:

Understanding the policy process

Various case studies, theories and models of policy cycles (summarised in our project's literature review: Laing, 2015) are instructive for thinking about how policy is made, and the rough process that is followed. All such cases indicate that scientists wishing to influence policy must consider the stages at which they are most likely to have impact.

Stakeholder mapping

As essential as understanding the policy process, identifying the stakeholder interests in a policy outcome is also vital for influencers. A variety of stakeholder exercises (for example, Mitchell, Agle & Wood, 1997; Savage et al., 1991) can inform how scientists might understand the relevant stakeholders in a policy process. When we conducted stakeholder mapping exercises in project A3.3's capacity building projects, relatively few scientists had explicitly engaged in these exercises. Nor did they have a clear idea of the most relevant players.

Understanding stakeholders, particularly those with whom scientists do not regularly interface (and there are many), has many benefits. Building effective advocacy coalitions for a policy outcome often involves creating alliances across broad interests from different areas. To take an example, the introduction of rain gardens as a component of WSUD and storm water management must take account not only of research, but also, as the CRCWSC has demonstrated, of community interests and perceptions (see Dobbie, 2016). But their introduction must also engage with different levels of government, and consider economic and political factors particular to different agencies, departments and jurisdictions (municipal and state, for instance). Advocacy coalitions tend to be more powerful, at least in the experience of key players in the urban water industry, when they are broad rather than deep (Interviewees 5, 9, 30). Most lobbying handbooks note that a key element of a successful influence campaign is building large and often heterogeneous alliances of stakeholders who are in favour of a change, even if those stakeholders do not usually share interests or connections. A keen understanding of stakeholders in the urban water sector also helps scientists better appreciate to whom they must ultimately make their arguments.

Veto players

A concept made famous by Tsebelis (2002), the idea of veto players, can help us think about arguing for science in a policy sphere. Veto players are stakeholders and decision makers who have the power to 'veto' initiatives if they do not agree with them. They are more powerful than regular stakeholders, because they may stop an idea from progressing. Knowing the veto players is essential for would-be influencers, because an influencer's arguments eventually come before veto players who could sink them. For this reason, science-informed policy ideas need to be translated into terms to which veto players will respond. Veto players do not need to register an enthusiastic 'yes', but they have to be stopped from saying 'no'.

In most areas of government policy, and water is no exception, the Department of Treasury is the key bureaucratic veto player in state government. One state water minister commented:

> ***Treasury is always an issue. There's no question about that. Treasury control the purse strings. At the end of the day, the government's priorities can depend on which state you're in and what timeline you're in as well. So, Treasury's a pivotal point in regard to what can be achieved. Therefore, you've got to turn to economic ways for achieving the same outcome. There's no question about. Now, whether you do that to a better or equivalent standard is open to some debate. Treasury's role is pivotal. It can force you to look for not shortcuts but a more economical approach to what you want to achieve.*** **(Interviewee 40)**

Other veto players in government policy processes include the political 'superpowers' of state government, such as the Premier's department (Interviewee 16); for urban water, interviewees also identified the planning department (Interviewees 21, 23). Policy ideas need to run the gauntlet of these veto players and address their interests and standards. The science behind a policy idea will not always be relevant to this challenge, but it is enormously helpful if science and research can provide some of the answers. Frequently in interviews, policy makers expressed frustration that good ideas from the urban water research community often are not backed by evidence of economic, fiscal or community viability—the very arguments needed for key veto players in government to approve those good ideas (Interviewees 6, 11).

Stakeholders outside government can also have an unofficial veto due to their influence in policy implementation. Land developers are an example frequently cited by policy makers in the urban water space. Without watertight regulatory schemes (something challenging to achieve), developers may weaken, bypass or ignore policy, and prevent good water policy ideas from being implemented (Interviewees 3, 25, 36). Policy outcomes in urban water are decentralised and mostly implemented by the commercial sector (developers and water utilities), because government does not directly manage or implement much of the water infrastructure. So, cooperation and interest are needed at the implementation level. Again, science does not have to provide all the solutions, but research and scientific evidence can provide incentives for the private sector to implement WSUD, for instance by demonstrating its capacity to deliver long term savings, or adding aesthetic value that appeals to potential customers or communities (see Dobbie, 2016).

Scientists need to understand the context in which policy is made in their area. They must understand who the stakeholders and likely veto players are. Science-based arguments that are shaped by such understanding are likely to carry further.

Timing

Timing is one of the biggest strategic issues in the science–policy nexus. Research and politics occur over different timelines, and the mismatch is a major issue when thinking about how science and research can influence policy processes and decision making. A simple analogy is the contrast between a lighthouse and a buoy. Political attention is like a lighthouse: it tends to focus intensely but briefly on a given area. By contrast, academic attention is like a buoy: it shines dimly but evenly in all directions. Reflecting these different styles of operation, good scientific evidence for policy is often produced out of sync with the policy development cycle. Interviewees frequently raised issues of timing when explaining why science did or did not play an influential role in a given policy outcome. Here, we examine a number of salient issues that scientists need to consider if they want to be more effective influencers.

The long tail of research

Research is a lengthy exercise, with most research projects at universities and research institutions having timelines measured in years. However, government and business alike are typically presented with problems that need to be solved in months, weeks or even days. When researchers and scientists begin to study a problem, private sector or public organisations are often interested only because it affects them, and they want solutions. They will look elsewhere if researchers cannot produce useful solutions quickly. As one Melbourne water utility director commented:

> ***With the academic process of peer review, publication is looking at very long timeframes. We can't afford to wait. By that time, you're going to tell us in two or three years what we should be doing today, you know. So, the contrast for us is that we go to [other institutions] who've got the same sort of horsepower, intellectual horsepower but are more focused on implementation, on real, everyday problems. So, we've used those extensively.*** **(Interviewee 29)**

This sentiment is far from unique—dozens of interviewees, particularly in the private sector but also in government, noted traditional university research programs are too slow to produce useful or influential results over policy or practice development timelines. By the time answers are produced, solutions have already been found through other means, most frequently through recourse to engineering consultancies or specialised research centres (Interviewees 1, 5, 6, 7, 8, 11, 15, 27, 29, 39, 46, 47, 53, 59).

One director from an urban water utility spoke of three horizons for research and development. Horizon I, with a one-year timeframe, is typically industry driven, addressing known problems that need immediate solutions—the call is for a quick mitigation of risk, or a quick reduction in cost, for example. Horizon II is also often industry driven but refers to medium-term projects that are more ambitious—these are known problems that don't need immediate solutions. A lot of water sensitive urban design (WSUD) and urban water research falls into this category; that is, when projects are announced on this scale, utilities and industry usually need research and evidence to support what is happening in two or three years' time. Horizon III is more the world of fundamental research—problems and timelines are unknown, projects are academically driven, and the research horizon stretches into the future (Interviewee 27). Academic research operates largely in the Horizon III space, pursuing projects that are driven by curiosity and with expected delivery dates far into the future; it struggles to deliver in the Horizon I and Horizon II spaces. But water utilities battle to justify investment in and use of Horizon III work, when there are more pressing needs for work in the Horizon I and Horizon II spaces (Interviewee 27).

Such horizons are relevant to not only the water industry. Government policy also has fairly tight timeframes for development, and usually has a clear need to quickly find effective solutions for immediate problems. Yet, as issues come up and the government has windows to act, researchers are often not ready to provide input. So, how can science help inform policy and practice if it is not ready when it is needed? If research lags the pace of policy and practice change, how can it be influential in those spaces?

Part of the answer is for researchers and scientists to be able to deliver on issues across the three different 'horizons'. Research projects should be better geared to finding some quick answers to immediate problems. Rather than persisting with only traditional modes of data collection, analysis and reporting, researchers need to provide regular outputs that offer useful insight into pressing current issues. Given the certainty required in policy or for business is often very different from the standard applied in academic research, adapting to multiple time horizons is not a question of simply producing more academic outputs faster. Rather, it is about taking a multifaceted approach to research in which different types of output can be produced on different timelines.

Opportunity windows

In the interviews, a water utility director in Queensland alluded to a common problem in trying to mesh science with policy:

> ***... lots of research organisations have tried these brokering arrangements and pushing major changes to policy and in my observations that has largely failed ... usually because you've got a solution looking for a problem and the problem doesn't, doesn't exist at that point in time.*** **(Interviewee 38)**

Because it operates on timeframes independent of the policy cycle, new research is often released when there is little political interest in the subject. In the experience of those interviewed, it was rare for new research in urban water to be sufficiently ground-breaking or newsworthy that it created momentum for new policy or practices (Interviewees 29, 38), even if it did have clear policy or business implications (Interviewee 21). There is a lot of work on the theory of policy windows—that is, occasions when some event or disruption demands a new policy direction (see Laing, 2015). The millennium drought in Australia, for instance, was such an occasion: it was an incentive for policy makers to concentrate on better water management and hence an opportunity for scientists working in that domain to achieve maximum influence. In a practical sense, for scientists in the urban water sector, the most successful influence strategies will be ones that are ready to be implemented when such windows open.

With respect to timing, some windows are better opportunities than others. At the most basic, non-sector-specific level, looking to influence the policy agenda is more likely to be effective in certain periods—for example, outside the government's budget season (annually, after the end of the financial year), in the lead-up to elections (when party platforms are being developed), or in the immediate aftermath of government changeovers (when new ministers and government members are looking for ideas). However, for water policy, much depends too on climatic conditions and the news cycle. Some of the greatest changes in water policy (particularly urban water policy) have come in recent decades as a result of droughts or floods. These high profile incidents generate public concern and refocus government attention on water policies and the search for policy solutions. High profile media events in water have also come about from concerns about water quality, river health, and other environmental events. Although policy can and does change outside these instances, reform then is often far more incremental and hard won. By contrast, at some regular times (such as budget cycles) and some random times (such as weather events), there can be an opportunity and political will for far greater change—a window has opened.

Right evidence, wrong time

One of the most challenging issues that policy practitioners raised is the prospect of good science being delivered at precisely the wrong moment. Although rare, it can be a devastating result for all concerned. One senior public servant in water in Victoria gave this example:

> ***If you've got a really good idea as a scientist and we've just written the Victorian River Health Strategy and gone through a year of consultation, three times through cabinet, and it's out in public and everybody's implementing it, don't come near us unless it's a dire emergency.....But, in five years' time, when it's ready for review, that's a really good time. We're ready to actually go, "All right, it's open now. Are there some new ideas we need to think about?".*** **(Interviewee 14)**

Two interviewees noted this lesson was learned the hard way by scientists who had research findings that could undermine a policy with a completed development cycle that was now being implemented (Interviewees 14, 21). This situation is the obverse of an opportunity window: it is a dangerous contingency in which decision makers, to protect a fundamentally good policy (even if new research indicates some change might be necessary), may be compelled to discredit scientists presenting new views that will undermine hard won gains. Such situations reveal the need for scientists who want to engage in public and policy debate to understand timing and context.

Scientists and researchers who wish to influence government deliberations need to understand the policy development cycle and the relevant timeframes. They need to keep abreast of what is happening in policy, much as they would in academic publishing: they need to be mindful of when windows are opening and policies are being reviewed (hence the greatest chance for influence), and when windows are shutting and the opportunity for influence is disappearing.

Scientists and research organisations also need to develop ideas and be ready with proposals when opportunity windows open. A research project may have a running time of three years, but what if the opportunity to influence unexpectedly opens after one year? This is a challenge for research organisations particularly, which need to be able to adapt and to provide ideas (even partial or tentative ones) when opportunities appear.

The Office of Living Victoria

The Office of Living Victoria (OLV) is a prime example of how timing and opportunity affect how and when science becomes influential in policy outcomes. This major government department was dedicated to the transformation of the urban water systems of Melbourne, focusing on Integrated Water Cycle Management (including the WSUD paradigm). It came about due to several unique confluences. First, the Millennium Drought in Victoria precipitated a water policy crisis in 2007–10, with significant action needed to forestall major possible water shortages in metropolitan Melbourne. However, as some of those subsequent policies became politically unpopular, the then Liberal Opposition capitalised by proposing a major new policy initiative for the 2010 election—an initiative that would provide an alternative to the unpopular policies of the government. A unique window of opportunity opened up in 2008–10, when both the government and the opposition intensively explored alternative urban water policy options. Water became a major political and campaign issue in those years.

In this period, scientists and researchers best able to provide new ideas for government also saw a rise in their ability to influence policy outcomes. Those who sought to provide policy ideas to the government were best placed to affect outcomes for research that had been ongoing for decades. The result was an unusually high focus on water issues in the 2010 party platforms in Victoria, and the subsequent development of the Office of Living Victoria by the new Liberal government.

However, windows for influencing outcomes are fleeting. The Office of Living Victoria did not outlast the government that created it. Ultimately, with the end of the drought and the decline of water as a major political issue, the opportunities for the policy uptake of innovative water research diminished too.

Networks

Building networks between scientists and other actors in the policy sphere is an essential strategic aim for achieving influence. One of the most influential people identified by both government and business figures for water policy and practice in Queensland was distinguished as such chiefly because he could build networks and work across them. In his words:

> ***I'm just inclusively there. And, to be honest, I think back to the reason for that, and it's because I've been able to enter into the different arenas from probably my early Murray-Darling days. Because I got to sit at the table with the ministers, with the senior bureaucrats, with the key stakeholders and I got an inside education about how the system works. Getting an outcome is all about how the system works and what relationships you can build, and seeing possibilities for bringing people and knowledge together. That was invaluable for me, so even if I don't know people now, you know, I can probably make the calls and get people to the table.*** **(Interviewee 38)**

Similar individuals were identified in three states (Victoria, Queensland and Western Australia), of whom some are from a scientific background and some are not. But all of them were noted as having the contacts and relationships to advance initiatives and connect influential people. Scientists often have distinct advantages in fulfilling these roles because they are perceived to have a less political agenda and often sit outside the political sensitivities that exist in government and politics (Interviewees 23, 38, 43). Networks are key aspects of science influence: they consolidate intelligence and facilitate access; they promote the relationships on which trust depends; and they are channels for dissemination and communication.

Intelligence and access

Networks that span a policy domain allow for shared knowledge and information on where opportunities are emerging, and what others need. Scientists and research institutions often lack situational awareness of the agendas of government and industry, because they are sometimes inadequately connected to those networks. Knowing what the government or a business wants to achieve at a given time is information of critical importance; it allows the research community to address those agendas and identify opportunities for advancing its research.

As revealed in project A3.3's workshop program, most scientists and researchers do not clearly know who to approach when they want to influence a policy or agenda. Identifying the relevant decision makers allows would-be influencers to much more accurately and effectively to direct their efforts. Even a limited knowledge of the policy network in urban water provides an awareness of options for advancing good ideas or sharing relevant science. As one policy maker commented:

> ***You must know the people. Because if someone writes a question to the minister, then it comes down to a lower officer level, it bounces down, goes down to that officer to answer. If someone asked to meet with the minister, bang! It comes down to a lower officer to write the briefing note about the meeting, you know. So, if you know people at that level, you've got access there, and I don't think many people know how it works.*** **(Interviewee 46)**

Trust

Trust is a pivotal precursor to influence. Because there are many sources of potential advice, interests and ideas in a policy space such as urban water, credibility and trust are essential to whether a source is listened to or not. Scientists and universities start with a degree of both. But, in many cases that we observed, it was a pre-existing relationship with, and trust in, a particular scientist or research organisation that led to real influence in policy or practice (Interviewees 22, 25, 26, 30). Trust is significant given the different risk profiles facing decision makers compared with scientists and researchers. Decision makers, whether in politics or business, are accountable for their decisions and the impacts that follow. Modern decision making processes are thus usually designed to minimise risk and maximise the evidentiary basis for making a decision. However, time and resource constraints usually lead to a system of 'bounded rationality' in policy making (Simon, 1947), in which the search for solutions cannot be exhaustive. Under such conditions, decision makers must often rely on advice from others, but ultimately have to take responsibility for the decisions made and, indirectly, for the advice on which they acted. It is critical then that decision makers, particularly political ones, trust that advice given to them will lead to good decisions. As one manager in the water industry in Melbourne commented:

> ***... probably [my organisation] is not as bad as the bureaucracy in Canberra but like all organisations it's kind of risk-averse so what's the incentive for me to take on this risk? What are the likelihoods of success? How could it go wrong? So, I think that's an issue ... I think often the research will give sort of part of an answer or a component of a bigger picture. So, I find that often people are happy to come and listen but it doesn't always lead to a change of practice immediately. But I feel, and this is what someone said about having the partnership, it's kind of the zeitgeist. It's having this mental connection with people who do the research and to build trust and think about what the application of that knowledge could be. That I think, eventually, leads to change.*** **(Interviewee 18)**

Establishing rapport and a track record with decision makers greatly enhances their trust in scientists and researchers (Interviewees 34, 40). So, would-be influencers must establish this trust over a period. Ideally, scientists-cum-influencers are established within a policy network long before they wish to promote a particular aspect of science or research. While the ability to engage with politicians (ministers) is important, enduring relationship with more or less permanent members of such networks (such as public servants) can cushion researchers against changes of government. This is why a relatively small set of 'trusted voices' in science tend to prevail over a long period, not least in the urban water sector. As one of those identified 'trusted voices' surmised, without getting 'plugged into the network you're doomed to being fairly marginal' (Interviewee 30).

One way of getting 'plugged into' the policy network is to engage with the formal processes in which the water bureaucracy engages. Examples that emerged in our interviews with public servants are the submissions and inquiries processes. Scientists are often underrepresented in such processes, yet submissions and inquiries can allow good ideas from the research community to gain the attention of policy makers.

Preparing submissions and participating in inquiries are arduous tasks, but several policy makers in Western Australia noted a long-term relationship between a department and a research organisation had developed out of the organisation's presence in submissions. As a result, the organisation gained such trust and recognition within the network that it is routinely asked to consult on policy questions (Interviewees 46, 47, 53).

Communication

Also key to science's influence is how research is communicated and disseminated, and how scientists and researchers promote and package their work. This issue came up repeatedly in interviews with policy makers and decision takers: good research and good ideas from the research sector are often difficult to find, and they do not come to the attention of the people who could use them (Interviewees 11, 12, 18, 29, 33, 38, 39, 48, 57).

One prominent influencer in the water sector from a science background commented:

> ***There's using existing processes and being aware, and also recognising that it's not just about putting the submission in; it's about knowing who's writing the reports and having coffee with them, and saying, "You know, maybe you need to look at this". So, there's an awful lot of behind-the-scenes work that goes on and I think there's a lot of academics who think all they have to do is publish.*** **(Interviewee 63)**

This last sentiment was common to many interviewees from policy making and decision making circles in urban water—namely, that academic publications are an ineffective means of communicating ideas and research to policy makers and practitioners.

Two common reasons were given:

- **High volume:** The extraordinary quantity of peer-reviewed journal articles means it is generally impossible for policy makers to stay on top of research developments, and attempting to do so is not practical. Moreover, academic publications in most areas (including urban water research) are poorly indexed. For those outside the research sphere who are trying to find answers to policy or practice questions, academic publishing is time consuming and difficult to navigate and understand.
- **Intelligibility:** Academic publishing is not done with policy makers or decision makers in mind. Several interviewees, including a government minister, admitted they found most academic pieces that passed in front of them to be either irrelevant or unintelligible (Interviewees 34, 53).

In addition, accessibility and availability—which universities and research organisations have developed significantly in recent years through web presences and knowledge portals—do not sufficiently ameliorate these two problems. One senior Western Australian water bureaucrat pointed out:

> ***It's easy to say, "Oh the scientists don't communicate their stuff very well", but, if you go into their area, onto their websites etc. there are streams of publications and they're well packaged. And if you had the time to read them ... you'd probably see there's a lot out there and it would be helpful. But there's so much of it and you have so little time to find answers. So how do you fix that?*** **(Interviewee 60)**

Thus, policy makers often rely heavily on their networks and trusted sources to provide input on and guidance to relevant science. Or they engage consultancies and other external bodies to navigate and produce answers based on existing science. Much of this behaviour points to a need for different communication strategies from research communities that want policy influence: traditional academic dissemination is often not effective for this purpose.

This issue again calls for researchers to participate in networks, generate trust, and embrace roles as science influencers to create conduits between the research and policy/practitioner communities. It also highlights the importance of science champions who can bring research into the public and political domains effectively.

Part 3. Tactical issues in influence and advocacy

As we have established, scientists and research organisations need to understand the policy context and the political environment to position themselves for influence when opportunities arise. But they also need to develop the skills for, and insight into, the most effective ways to use those opportunities. This section looks at how scientists can 'make the pitch' for their research, drawing on the insights from experts and decision makers in the urban water sector, and the outcomes of the two capacity building workshops that we conducted in 2015 and 2016. Naturally, not all scientists can possess all the skills relevant here. One interviewee commented on their experience in working to achieve influence in Melbourne's water policy environment:

> ***There's a range of skills and that's where it becomes important if you're going to have some sort of cohesive approach is that it's not about one type of person. You need a whole range of different types of skills within there and they're not always going to be within the one person.*** **(Interviewee 11)**

Science influence, then, is very much a collective effort. Although individual champions and trusted advisers may be identified as individuals with unique influence within a given policy sphere, they too rely on their own networks of research colleagues to back them up. As noted in a later section, unity and collective purpose are much more powerful than lone individuals attempting to influence the agenda in isolation. Thus, when examining the tactical elements of pitching for research influence, we assume individuals are not making the pitch, but that teams and organisations who can bring together the many skills and approaches needed for success will do so.

Know what you want to achieve

What do you want to happen as a result of your research or ideas? This question seems incredibly simple, yet answering it succinctly and directly often proved the first stumbling block for scientists participating in our influence workshops. Being able to answer this question means being able to articulate the desired outcome of your influence. That is, in the best case scenario, to what outcome (government policy, industry practice or otherwise) do you envisage your research leading?

Answering this question often requires understanding other interrelated issues. Three issues recurred across the eight groups involved in our workshops, and were mentioned frequently by expert panellists in reviewing the group's work:

- **Knowing a persuasive alternative to the status quo:** Many scientists in workshop sessions gravitated towards discussing problems identified in research, yet could less clearly identify a better alternative to the status quo. Although a grand vision is often attached to the notion of 'liveable city', what that looks like in specific cases was often a challenge for our scientists and researchers to articulate.

- **Understanding instruments:** Although several groups could identify a clear alternative to the status quo that they wished the government or industry to work towards, another stumbling block came with articulating the means for achieving it. Workshop participants often had a limited understanding of what government or industry would realistically be able to do. Several groups in the two workshops made policy proposals, for example, that involved changing government legislation and regulation. In practice, however, legislative and regulatory changes are complex processes that are often avoided if the same outcome can be achieved by other means. Moreover, when examined by expert panellists, such changes were often found to have potentially harmful (though unintended) consequences, and to reduce the political chances of the proposal's success significantly. To articulate what you want to achieve effectively, you need to understand what is within the jurisdiction and realistic capacity of the body to which you are presenting.

- **Being specific:** Panellists reviewing the work of workshop participants commented on groups not being able to provide concrete and specific recommendations. Scientific researchers are often be guarded and cautious when reaching conclusions, and avoid taking controversial positions or ironclad recommendations. However, decision takers and policy makers generally must work in specifics—generalities and hedged conclusions are much less useful. Several interviewees noted this issue (Interviewees 8, 25). The scientists most influential within any policy process are those willing and able to clarify issues and provide specific recommendations.

Would-be influencers from science backgrounds, therefore, must learn about the tools and instruments that are available to those they are seeking to influence. They must then use their research to justify available courses of action to achieve specific outcomes.

Bring solutions, not problems

In most cases, academic research is structured around the *investigation of problems*. Yet, government and industry are generally engaged in the *application of solutions*. One senior utility manager in Victoria noted his experience with scientists approaching his organisation:

> ***I'd love a hot dinner for every time I've seen somebody say to me, "I'm doing a piece of research into the water industry. I want to find out what's wrong with X or what are the barriers to Y or … There'd be a gazillion papers that have got the word 'barrier' written into them. There wouldn't be too many that have got the word 'opportunity' written in them.*** **(Interviewee 31)**

Such statements were common among the interviewed policy makers and industry figures, who were often frustrated or irritated with research that focuses on problems but has little to say about solutions. Another interviewee in the public service reframed this frustration: for decision makers, who face a constant stream of problems through the course of everyday business and politics, there is little incentive to engage intensively with any researcher who simply brings more problems without solutions (unless the risk of ignoring the problem is very high) (Interviewee 15). Here's another perspective from an experienced water policy officer in state and local government:

> ***Policy officers [in state government are] busy trying to get through, wade through all this research and data, but if scientists rang them and said, "Hey, I've got something that's going to help you and here's how and here's why", they would sit up and listen because they've got a problem to solve and they've got a lot of barriers. If someone comes to them and says "we've got the answer or part of the answer", of course they're going to listen.*** **(Interviewee 3)**

So, when approaching government or industry, scientists and researchers seeking to be influential should try to package their research and themselves as problem *solving*, not problem *bringing*. From the interviews and workshops, two rules of thumb were immediately apparent for the water sector (but generally apply to any area):

1. Understand your target's problems

From the cases we analysed, the most powerful combination is when a government or business faces a known and difficult problem, and research provides a workable and practical solution. The task is to understand what a government or business wants to achieve, then provide a way to do it by deploying your research. Identifying the problem or agenda is sometimes not straightforward, which is when strategic placement such as networking can provide opportunities to understand it. On the other hand, many problems are relatively straightforward and readily identifiable. Political parties generate policy platforms and agendas before every election that clearly explain what they hope to achieve over a government term. Similarly, most businesses and industry partners were straightforward and forthcoming when we asked about their problems in need of solutions (Interviewees 16, 19, 33, 39). Moreover, several overarching aims (such as greater efficiencies and cost-effectiveness) are constant across the board, and any research that has insight on how to achieve either will demand attention.

One senior executive at a water utility in Queensland noted:

> ***At the end of the day [you need] to really think about who the customer is … Who is the customer for the work that's being generated? Because that then starts to … define who might get value out of it, who might be prepared to pay for it or implement it. A better alignment of expectations to outcomes.*** **(Interviewee 39)**

Although researchers may seldom think of their research is terms of its 'customers', it is a useful heuristic when thinking about the influence process. The customer may not be immediately apparent when research is being conducted; then, when the research is complete, the consumers may not be who you imagined when the research began. Further, researchers can make the mistake of focusing too heavily on influencing a certain level of government or a certain major player in the water industry, not realising that other players in the sector may have more use for the research produced (Interviewee 39).

2. Align research with problems

Critical to bringing solutions, rather than problems, to the table is avoiding the common mismatch between the agendas of the research community and the agendas of the rest of the water sector. A long-time research manager and science-influencer noted:

> ***The problem with researchers is they're not prepared to cede any autonomy in a research project a lot of the time …. I struggled with this a lot. People saw me as being micro-managing and manipulative of their research … There's all lip-service paid, "Yes, I will listen to industry", but what that really means is they're doing what they normally do, maybe marginally differently … So, the question is posed—why doesn't research influence policy better? That's something that must be considered that there isn't a true engagement, true openness at the point of project conceptualisation and development. You're really just re-badging …*** **(Interviewee 61)**

The lack of synchronisation between research agendas and government or industry agendas is hardly a new observation, but it bears reviewing for the influence question. Put simply, it is much harder to make an influential pitch or proposal if you are working to a schedule or agenda that your influence target does not share. Across the interviews conducted in three states, few interviewees could identify cases in which a scientist or research institution had successfully changed the agenda or driven major outcomes in areas not under review. The exceptions were when research uncovered problems with serious public or political risk (such as water quality) (Interviewee 43), or when major unrealised cost savings could be found (Interviewee 44).

However, most successful cases of research sector influence occurred when the science aligned with a government or industry focus, rather than trying to wrest the focus of government or industry onto problems identified in research.

This does not mean research projects must always start with industry identified problems. However, it does mean influential research (whatever its initial spark) is that which can be translated and applied to problems that government or industry currently faces, or which is ready to be applied to problems or opportunities that arise in the future.

Understand the decision makers

A seasoned influencer in water across government and industry captured some key principles:

> ***If you're trying to get a political decision made around it, you have to sit back and say, "Well what decision are they going to be asked to make? What knowledge will they need in order to be able to form that decision?". And that knowledge falls across a spectrum of "Do we understand what the punters think? Do we know what the punters know? What do we need to feed into that process to build sufficient consensus so that we can then take a decision?"*** **(Interviewee 38)**

That is, would-be influencers need to understand the key decision makers, what they need, and what they will be receptive to when making their decisions. What decision makers debate the topic, which arguments are likely to be critical, and which are likely to be peripheral?

Networks that connect policy makers and researchers become a critical asset in this tactical task. It is usually through such networks that scientists and researchers can gain insight, either directly or indirectly, into the nature of the decision making structures that will determine whether good research becomes good policy or remains just an idea that was discussed but not actioned.

It is also important to understand who the real decision makers are, and who might be detractors in a given process. And it's necessary to accept, even with the best pitch to key decision makers, that policy processes are complex and require persistence. One senior public servant in Victoria's water sector noted:

> ***Even if it's what the minister wants or what the minister thinks he wants and what the senior policy people are trying to do, if you haven't got the intermediaries on-side and it's possibly going to conflict with their agendas then you're going to struggle to get anywhere. I think that part of it does come back to the fact that the government is, and each department is, incredibly complex. There's so many things happening that whether something's important or not might not, might not have anything to do with its own particular merits; it's just what else is going on at the time.*** **(Interviewee 26)**

Work with certainty and risk

The policy makers interviewed found it frustrating that scientists and researchers apply very different standards to certainty and risk from those that apply in the policy domain. As we've noted, researchers often apply stricter standards for establishing certainty and providing recommendations than policy makers do. This difference occurs because policy makers and decision takers usually have far more imperative timelines and limited resources that constrain an exhaustive search for solutions to a policy problem. They must come up with the best fit possible within given limitations. This mismatch can lead policy makers to become frustrated with scientific research, which is cautious about definitive conclusions. One senior policy maker in the Victorian water sector described this experience:

> ***We went to [experts on environmental flows] … Could be this, it could be that they said. So, we got them in a bloody bus. Fed them and showed them a river. Gave them a whole lot of red wine and said, "All right, we're going to make some rules here. Tomorrow you tell us what you think". So, it was sort of an expert panel process and we finally managed to pin them down on some specifics. We really had a particular management need for information because riding up bulk entitlements you had to have some view about what the environmental flow regime was … We really pushed for rapid assessment type methodologies, given the amount of information available. The science in that area can be incredibly reductionist and the finer you look at it the more difficult it becomes and more uncertain it is. But you can come up with rules of thumb and those types of things which, from a management point of view, was all we really wanted. We were saying "Give us some rules of thumb and we'll have a crack. And we'll see how it goes."*** **(Interviewee 5)**

We don't suggest this is the standard procedure by which policy makers secure concrete recommendations from researchers and experts. But the account reflects the difficulty that policy makers can have in getting scientists to recommend ways forward on policy problems. Researchers are not generally in the business of the 'rule of thumb', but policies often proceed on this basis and then are fine-tuned or improved through successive iterations and greater experience. While research integrity must not be compromised, the tactical issue is how to balance that imperative with assertions of reasonable probability (given what is known). Researchers and scientists who are willing and able to provide concrete recommendations, even if tentative or evolving, are more likely to be of interest to policy makers than those who are not willing/able.

It is important to remain aware that researchers and policy makers face fundamentally different risk profiles. A researcher will certainly risk their career if they advance foolish suggestions or recommendations that are not sensibly rooted in an evidentiary base. At the same time, when a researcher or scientist asks government or industry to make changes or implement an idea, the decision makers ultimately bear the responsibility for policy outcomes. For this reason, there is significantly more inertia on the part of government or industry when new ideas arise, given potential uncertainty. One water industry insider from Queensland commented:

> ***Though my observation the way departments are working here now is that they don't want to take decisions or make recommendations in the political process without multiple points of confirmation that what they're taking forward stacks up. And even for my local management project, even though I'm the independent chair, I've got an independent team and I'm outsourcing all over the place, bringing in independent advice, and they're still checking and double checking, and we've just put in place another independent assessment process so that there's multiple points to be able to fall back on in the advice to cabinet. The bureaucracy's become extremely risk-averse.*** **(Interviewee 42)**

The idea of multiple points of confirmation is relevant to the researcher-cum-influencer. Proposals that have evidence from research but also parallels or confirmation in other areas are much more attractive and less risky than proposals that have neither. The interviews and the policy workshops revealed two common ways of providing confirmation:

- **Policy transfer**: Several more successful groups in the workshops convinced their expert panels because they had examples of similar ideas being successfully implemented in other jurisdictions. This approach echoes the idea of 'policy transfer' (Stone, 2012), and it is a particularly powerful confirmation for decision makers. It reinforces the perception of certainty.
- **Outside confirmation**: Ideas and research that can be verified by others within the industry are considered to be most influential (Interviewees 30, 31, 45). Although some researchers might think of themselves as the most definitive source of evidence for a policy, numerous interviewees confirmed scientists and researchers can be perceived, whatever their reputation, as having an agenda like any other influence seeker (Interviewees 10, 20, 38). A government minister shared this view (Interviewee 34). For this reason, researchers and scientists who can root their ideas in not just research but also other authorities in the water sector are providing the multiple points of confirmation that a decision maker looks for.

Maintain unity

Related to certainty and confirmation, but deserving particular attention, is the subject of unity among scientists. Numerous interviewees raised the issue of conflicting reports and conclusions from research, even giving examples when a lack of agreement among research centres and scientists ultimately undermined decision maker confidence in their proposals, sometimes fatally (Interviewees 24, 35, 43, 44). Although the research community works and thrives on robust debate and critique, such contestation is not always useful when the research community tries to influence the government or industry agendas. A long-time water policy insider with a background in the research community commented on why some efforts from scientists are more successful than others:

> ***Part of it is [with our organisation] we used to keep a fairly tight ship in terms of communication with the public. Any major science controversy or dispute, we would have that behind closed doors. We'd reach an agreement as to what the message was and people would stay on message, because the moment you start debating science issues in public then people think you don't know anything about it. And they'll say "the scientists can't make up their minds so we'll just go ahead and do what we want". So, we would run a very tight ship as to who was allowed to speak publicly. And we would sometimes run whole day workshops that were quite volatile between groups of scientists. And, at the end of it, a lot of the time scientists are trying to answer questions they haven't been asked.*** **(Interviewee 44)**

A united front within the research community is something that is rarely coordinated in policy or practice initiatives. Scientific conferences on water, for example, rarely assemble for the sake of establishing a unified or public position on matters. The few organisations in the water sector that do, however, have been uniquely successful in turning good science into good policy. There are both strategic and tactical benefits from researchers collaborating more closely to establish clear ideas and positions on important issues, and settling key debates before advancing an agenda with government or industry. But this approach is rare, even at a small scale. Various research institutes and units in water across all states that we visited have unclear or even inconsistent positions on key water policy issues, even though most researchers broadly agree on values and outcomes, and disagree on only smaller scale issues.

For policy makers and decision takers seeking clarity and certainty, there is enormous benefit from seeing unity among the research community. Would-be influencers from the research sector should thus seek to build broader coalitions and consensus as a means to greater persuasiveness.

Translate the knowledge

Translation and communication should be treated as separate concepts in the management of science influence. *Translation* is the conversion of research into terms that make sense to and are useful to other users (such as policy makers), while *communication* can be broadly understood as how researchers convey that information. Translation generally was considered to be a weak point for most researchers and scientists by those we interviewed in government or industry (Interviewees 4,6, 21, 22, 29, 38, 39, 46, 47, 49, 51, 53).

One of the principal issues identified is that even when knowledge effectively passes from a research organisation to an external body, there is no guarantee that such knowledge can or will be used. Translation is different from communication or diffusion in that it enables research and data to be transformed into policy or practice. This process is extremely important. Scientists don't traditionally consider translation, but it represents one of the most problematic bottlenecks in the science–policy–practice nexus, because many organisations lack the capacity, time or expertise to translate their knowledge.

Moreover, some interviewees noticed water research organisations overemphasise ideas such as 'knowledge brokering'—this concept may be an effective means of transferring knowledge from one organisation to another, but it is often so broad and so high level that the transferred knowledge may not be translated or diffused widely enough to impact practice. As one boundary spanner from Queensland commented:

> ***Knowledge brokering is only so good. All it means is that there is an understanding or the knowledge is actually sitting there in both organisations. Does it mean it's being used in policy, practice or planning? Not necessarily. So how do we move from knowledge brokers to knowledge adoption?*** **(Interviewee 41)**

The interviews and workshops identified some common areas of weakness and potential means of improvement.

Follow-through

Follow-through was a common issue posed by industry and government insiders in the water sector. As one interviewee from Western Australia in the water bureaucracy noted:

> ***I guess the research project sort of ends when you've published the results, whereas the client and the stakeholders want the actual on-the-ground implementation. That's where it starts for them and there's that disconnect. It's being somehow [able to] go from creating that research project to actually report on outcomes from on the ground.*** **(Interviewee 47)**

Although scientists may consider others are responsible for implementing their recommendations, the capacity for appropriate adoption may be inadequate when there is no ongoing research engagement. Usually when researchers complete a project, they move onto other projects, and do not provide ongoing consultation or support relevant to their earlier findings. Any potential adopters are left on their own. One executive in the Queensland water industry commented on their experience with a research project that they commissioned:

> ***One of the guys that we've got that's doing the work out with the university just said to me, "Oh it's really funny. They've actually got to do some real engineering" because they sort of backed it up to the door and went "Here's the science!" And our guys have ... have said "Well what do you want us to do with it? We've got to build pipes. We've got to construct infrastructure. You can't just drop the bags up at the door and leave the heavy work to us". So, you've got to think about what is the whole value chain that's going to take this idea to implementation. And who's going to be carrying it along the way? Because utilities have a certain amount of capacity to do things but there's a very strong push for day-to-day operations. So, if you just sort of back it up at the door and go, "There we are. There's a great idea. How about you run off and implement it?", you'll get people who are passionate about a particular philosophy who might want to take it up but most others will go "It's too much work, it's not on the list".*** **(Interviewee 39)**

This is an incredibly important part of the translation gap between science and industry. **With many research projects simply 'leaving the bags at the door' by publishing in peer-reviewed journals, but going no further in ideas for implementing or translating the research into real-life applications, the prospects for adoption are much poorer. Ultimately, researchers have to consider the entire life cycle of their research to cover this gap.** Of the water sector's research organisations that interviewees identified as most successful at influence, several were ones that provide a more holistic perspective and ongoing support during implementation (Interviewees 31, 44).

The big picture

Translation is also about contextualising research and ideas in a broader narrative of competing interests and pressures. Although scientists usually specialise in particular areas, the decision makers who ultimately use their research, even if scientifically trained, must develop the transferable skills of generalists. And the political decision makers are unlikely to be experts in the area at all. Often, a major challenge for water sensitive urban design (WSUD) research is to demonstrate how an issue or area fits into not just the water picture but the broader overall agenda that government and industry must consider. As one Victorian senior bureaucrat noted:

> ***The whole concept of water sensitive urban design or water sensitive cities is, is one that makes intuitive sense for a lot of people but there's so many practical barriers on the ground to getting it done, whether it's the roles and responsibilities side of things, who's going to maintain these assets, how do you get them across the line from a cost–benefit analysis point of view, how do you get communities to understand what these are out on the ground and to not go park their cars in them, or get their kids to play in stormwater harvesting basins, or whatever. I think the roles and responsibilities, who pays, and keeping the community engaged in that more sort of decentralised approach to water management are probably some of the big picture questions that need answering.*** **(Interviewee 7)**

This comment came in response to a question about why some WSUD research failed to have an impact at a certain juncture. The policy maker immediately noted problems at the bigger picture level that the research could not address. This is not to say that researchers must be able to answer all such questions. But some translation of research to suggest even rough ideas related to such issues will significantly ease a policy maker's burden and perception of uncertainty. As another interviewee from Western Australia's water bureaucracy commented, using traditional academic outputs to develop policy is like 'putting together a puzzle where you've been given the pieces but not the picture on the box of what the finished result should look like' (Interviewee 60). The piecemeal nature of research addressing different aspects of a common problem requires translation to draw the end picture and show how the pieces fit together, if the research is to be a realistic resource on which policy makers can draw.

At the political level, translation may seem an even higher level and more challenging task, incorporating considerations far removed from the water sector. At our policy development workshops, participating groups were frequently challenged by the expert panellists to contextualise their policy ideas within a much broader basket of government concerns. What is the value, for example, of government investment in a liveable city compared with much more tangible demands, such as funding for additional hospital beds or schools? How does a WSUD agenda stack up in terms of costs and benefits against the whole of a government's responsibilities? This is a daunting question for any researcher to answer, yet the most effective policy teams at workshops were those able to translate their research and ideas into a bigger picture that held its own when compared with the benefits of attention to other areas. Again, this translation task is not as difficult as it seems, because the threshold is often lowered when researchers show themselves willing to engage. **Evidence of a sensible attempt to translate a research-based idea into a proposal with implications and benefits that can be evaluated against competing priorities can go a long way in securing influence.**

Tailoring

One size often does not fit all, and good research needs to be tailored to speak to different potential adopters and stakeholders. Research findings must be adapted to meet the interests and needs of different groups. As one successful science translator remarked:

> ***We used to tailor presentations. We'd literally drive out there and someone would be revising a PowerPoint so that when you got there it would be the Ipswich PowerPoint. And so, you could actually deal a lot with, even though you're sort of selling a regional approach, you could really pick up what's going to be of interest to that group.*** **(Interviewee 44)**

Again, this idea comes back to understanding the needs and interests of potential targets for influence, and being able to shape research and scientific understanding according to those targets' frames of reference. Another interviewee with long experience in local government water management in Victoria noted that often it was a case of paring back research findings to the terms most relevant and most useful to the stakeholder:

> ***We were saying, "So how will this be applied in the industry? What can we learn?", so we went and interviewed and had a chat to several of the researchers. They had really varied responses in terms of seeing the connection of what they did with practice. So, I think it's sometimes that the translation is straightforward and easy but it really depends on the researcher and the person and the content, because some of that content is not directly transferable. For example, climate modelling is incredibly technical. Is it appropriate? How much of that information really does a local government need to understand?*** **(Interviewee 11)**

Establish the business case

A subset of translation, the business case might be the general term applied to how a proposal translates into economic and financial realities. Interviewees from the government and private sectors argued the business case is critical in the minds of decision makers at all levels, particularly given the increasing financial constraints on the water sector in recent years (Interviewees 3, 4, 5, 9, 14, 16, 22, 25, 31, 33, 49, 50, 54, 56). Water research is rarely translated into terms related to its economic or financial consequences, but they are so critical that their absence can make the difference between an influential pitch and one that fails. One senior water executive gave his impression of the importance of the business case to the decisions made by water utilities:

> ***In the business world, whenever you put a business case up, it doesn't matter if it's to management or a board, you've got to have a raft of options from 'do nothing' through to the most expensive options. And there is no option in the world that's all positives and no negatives. They all have pros and cons, and that's one of the things you've got to do as a business manager and leader—to make those decisions and trade-offs. If scientists aren't mirroring some of that decision making process in the research world, to me it just articulates another disconnect. Because the business world is not going to go their way which is to say, "It's just the science and that's what we've got to do", because every decision has compromise associated with it. For example, we go to great pains to innovate and avoid capital spend ... And, to be honest, I think a lot of the reason a lot of partners would be in on the CRC at the moment is because they're looking for non-capital solutions to problems. What are the cost-effective ways of solving some of these big problems that we're facing in the water industry?*** **(Interviewee 31)**

Another interviewee with extensive experience working with water officers in local government noted the absence of businesses cases attached to many WSUD ideas is one of the biggest problems in persuading councils to change practice (Interviewee 11). The story is little different in state government: one senior policy officer in the water sector in Victoria summarised the sentiments shared by many others in similar positions:

> ***I think it's because it's very difficult to quantify the type of benefits that will result. And you can shoot holes through it. There's been a lot of work done around avoided costs and all that kind of thing which you ... start to see that it's actually based on some sort of reality. But, again, you could just tweak a few things—do a sensitivity analysis and come out with a completely different outcome. I think it's mostly because it's very hard to quantify things like peoples' enjoyment of waterways and the view that they have, or just having those animals in the creeks. How do you value that? What would people be willing to pay for it? It's just really difficult to value it beyond saying, "Well you'll like it so it's valuable". And so it needs to be quantifiable, and we just can't find enough evidence or enough real data that gives it that strength.*** **(Interviewee 3)**

While the business case is pivotal to decision makers, research institutions and projects may have little to no capacity to translate research into economic or financial terms that make sense to industry or government. Participant groups at workshops found putting a business case together the most challenging aspect of the exercise of turning research into a persuasive policy proposal. In many large research organisations, a comparatively small number of people are working on economic or fiscal issues, if any at all. Yet, several of the organisations identified by our interviewees as being influential translators of research into adoption were also noteworthy for their relatively high number of economists and financial analysts working side-by-side with water experts and scientists (Interviewee 44).

Our policy workshops generated considerations that scientists should take into account when crafting a business case for industry or government:

- **Quantifiability**: As noted, the ability to quantify benefits in some way is important in delivering a persuasive value proposition. Broad, generic statements are common in WSUD but difficult for policy makers or industry to accept at face value. Indeed, several policy makers commented that WSUD researchers often made significant promises of benefits but were unable to back up their statements with evidence (Interviewees 10, 12, 35). Researchers need to think strategically about research partners who can provide these missing skills. An investment of time and resources in translating research into quantifiable value terms is likely to yield big dividends in persuasiveness (Interviewees 7, 11, 12).
- **Knowing who benefits**: During the workshops, several groups that presented a proposal to expert panellists (acting as a state cabinet) referred to economic research showing values rose for properties close to WSUD assets, to justify state government spending on WSUD infrastructure. However, the state government panel pointed out that rising property prices do not benefit the state government directly, but rather local councils and property owners. The rising values might even constitute a negative, given the housing affordability problems that have arisen in capital cities. This example shows the importance of considering who actually benefits from what is proposed, and who will own the benefits.
- **Tailoring**: Like the message, the business case needs to change from target to target—that is, considering the value proposition from the perspective of a range of potential adoptees is critical. Usually, WSUD implementation requires partnerships across multiple levels of government and industry, and a general business case should recognise benefits for all the potential partners.

Make the political case

Inevitably in urban water, there is a political case to be made alongside a business case or a technical case. Whether the pitch is to industry or government, the role of politics will be significant. One senior officer of a Melbourne water utility observed:

> ***My experience was the higher up you went, the more focus there was on the political end of that spectrum and less the technical information. It was all read through the prism of "What's this mean for the minister, for the government? What will this decision look like? Who would this annoy?". So, it was the social end of the spectrum rather than a kind of "this is what the science is telling us. So, regardless of what that means, that's, that's the outcome we're going to put forward".*** **(Interviewee 18)**

The political case acknowledges political factors usually come into play, even if an idea or proposal stacks up technically and financially. These political factors can take a number of forms, from the likely reaction of communities and the public, to the agendas of specific governments and ministers. Researchers and scientists cannot easily influence these political currents, but they have to adapt and work with them. Sometimes, even an excellent technical and business case is not sufficient to secure an outcome. Numerous interviews pointed out this scenario as a fact of life; often, not much can be done about it except to be as aware of it as possible, and to time your run well (Interviewees 25, 26, 29, 38, 42, 51). However, our interviews and workshops highlighted some preparation that researchers and scientists can undertake to deal with the potential political ramifications:

- **Anticipate stakeholders**: Understanding the relevant stakeholders in an outcome and anticipating their likely reactions in light of their values and interests, is highly useful. Will your idea accord with the stated values of decision makers? Will it negatively or positively impact others in the water sphere, especially those whose support is needed by government? What is the likely reaction of the community, private parties, or public entities that may influence public opinion? An example was illuminated in one of our capacity building workshops. An expert panellist challenged the researchers (who were making a case for potable re-use of recycled water) to anticipate how commercial users of water would be impacted—for example, how would the state's multi-million dollar brewing industries (which rely on high quality water for their product) react to the introduction of recycled water? Although researchers may focus on a specific range of stakeholders, political and commercial decision makers often have to account for the broadest possible range.

- **Consider allies and detractors**: A basic principle of effective lobbying and advocacy is to join forces with those who want the same things. Effective research advocates are those who can reach out to others who want the same outcomes, even if they are not natural allies of the scientific community. At the same time, who is likely to strongly oppose what is being proposed? How pivotal are they to the outcome? Are they potential veto players or merely difficult stakeholders? What kinds of argument might they use against the science? How can these arguments be countered?

- **Account for the community**: What is likely to be the response in the community to a proposal? Often in urban water, there is a very tangible outcome that will affect neighbourhoods or broader communities, and researchers need to consider this impact. However, particularly in the business case, this consideration needs to be more nuanced than simply 'the community likes X'. It may need to capture complex trade-offs in policy or implementation. We spoke with one research institution that identified research indicating residents positively view WSUD assets in neighbourhoods and healthy waterways (Interviewee 57). Yet, in another interview, a water utility noted the community is heavily price oriented on water and prefers the lowest possible cost on their water bills (Interviewee 39). The question, then, is whether the community would accept higher costs on their water bills (or on their house price in a new development) in exchange for improved water assets and WSUD infrastructure. Or would it prefer the lowest cost options?

- **Understand decision makers**: As highlighted, understanding decision makers is critical background research that will help mould an effective political case for those who ultimately have to make the call.

Creating a persuasive political case is one of the more difficult elements of making a successful pitch. As noted, scientists and research institutions have some advantage from their perceived credibility and relatively apolitical stance. However, many interviewees in government pointed out that scientists are not considered wholly value neutral (Interviewees 34, 38, 40, 57). At the same time, the arguments and perceptions of government figures are manifestly influenced by their own values and commitments. One government minister in Queensland gave an example of his perceptions of politics and science:

So, if I can talk on the reef, one of my biggest frustrations is that the argument around the reef at the moment is not scientifically based. The science all says the biggest threat to the reef are cyclones and storms. They've happened for millennia. They'll continue to happen. And it's the crown of thorns starfish, which is fed by the nutrients coming down the catchments from cane and grazing. That makes up 90 per cent of the longitudinal decline in the reef over the last three decades. So, what can we focus our attention on? We can focus our attention on the sediment and the nutrients coming down out of the catchments. And yet, all of a sudden, we're having a debate around ports and dredging, and sediment related to ports. And it's got little to do with the real cause of decline in the reef: it's about a campaign, a political activism campaign against the coal industry in the state but using the reef as, as the icon. One academic wrote a very good paper that actually pointed out if the environmental activists aren't careful, governments will actually take their eye off the real cause of decline on the reef and start focusing around ports because that's what they've created as the issue. And then we lose the battle altogether about the reef because we've been driven down that path as politicians to address. **(Interviewee 34)**

Whether this comment accurately captures the debate over the Great Barrier Reef's decline is relatively immaterial. The point is that a key decision maker on the reef at the time felt strongly that many (but by no means all) scientists had become attached to a political campaign and, as a result, somewhat distanced from the factual reality.

The would-be influencer needs to be attentive to how research is packaged or communicated, and how it fits with existing political agendas and fault lines. One utility manager commented on the subtle differences in how an idea is communicated, using the term 'green wall' as an example. They noted how a different term, such as 'heat barrier', could be used to describe the same concept while avoiding the political connotations of the term 'green' (Interviewee 19). This example may seem flippant, but it indicates the multiple levels of interpretation to which research ideas may be subjected (not all of which bear much relation to the underlying technical and scientific data).

Communicate clearly

Finally, how researchers and scientists communicate their ideas and package them for other audiences is crucial to their success or failure in a broader context. Interviewees from across the board had many suggestions and ideas for how researchers could communicate more successfully. One minister gave his view of science communication:

> ***I've found that scientists are dreadful at putting their work in a sense that we or the community at large can use. One of the positions that I'm actively trying to recruit in my agency is a science communicator. Someone who can take the scientific paper and turn it into something that I can understand easier. I mean I've got a science degree so I can read a scientific paper and get to [the point] but I'd love to get to it a lot easier than that. But, more importantly, get it into a form that can be put out to the broader public and say, "Look, you can have confidence this is what the scientists are saying but in a way that you understand it".*** **(Interviewee 34)**

The first principle is being able to communicate research in simple and straightforward terms that are accessible to non-specialists. Jargon and overly technical language are highly problematic for outsiders, and they increase the chances that the prospective decision maker will misunderstand what is being communicated. Many interviewees in policy making or industry positions found academic papers to be difficult to read, often unclear in their practical implications, and loaded with language and terminology that make them hard for outsiders to interpret (Interviewees 11, 12, 21, 31, 51, 52). In time constrained policy processes, sources of information that are clear and easy to understand will be most valuable and likely to be used. Researchers cannot rely on policy makers or decision takers to have sufficient expertise to understand traditional academic papers. Moreover, academic papers follow conventions that make sense to other researchers and those interested in their methodology, but not to those primarily interested in the findings and conclusions that can be implemented.

Scientists and researchers can encounter similar communication barriers even when just talking to policy makers and decision takers, by adopting methods and styles that are familiar to professional peers but unfamiliar and often opaque to others. One policy maker in Victoria described an experience:

> ***For example, this plumbing enthusiast, he knew his stuff. And I kept saying, "Can you show me where what you're proposing has saved water and money in a simple document?". And he couldn't, he couldn't give me any concise information. He just gave me bucket loads of detail that I couldn't understand because it was incredibly technical and there was just way too much detail for a policy maker to be able to go through it. So, in the end, I lost patience because there was nothing I could get my teeth into, and so I couldn't work with it. And it was sad because he got my attention by being so passionate but he just couldn't sort of provide me with concise information that summed up what he was trying to say.*** **(Interviewee 12)**

The critical challenge for researchers is to communicate effectively and concisely the key concepts behind research and ideas, to pare back a great deal of complex detail and deliver a well crafted message that can be communicated quickly. This is not the usual style for researchers, who communicate in long form and take time to a build a case. One interviewee in state government described the influence process in politics as being like 'speed dating' (Interviewee 5): you have a very limited window of time to establish rapport and understanding with the other person before you are moved on. Long presentations, detailed reports, and dense arguments merely increase the chance of disengagement. Another utility manager put it this way:

> ***If I'm passionate about something, I, at best, might have a couple of 20-minute windows during a given week when I was working to absorb that passion. So, whoever was communicating to me, they had to get it down to a couple of bite-sized messages. At tops, it would be six PowerPoint slides, which I'm sure would be absolute heresy to some of these people. You know, "I've spent three years studying this. You want me to get it down to six PowerPoint slides? That is bloody outrageous!". Well I'm sorry, that means that we will never talk because that's the only language I talk in.*** **(Interviewee 31)**

In terms of communicating in the most effective way, and finding methods to deliver research ideas in succinct and manageable forms, several suggestions emerged from the interviews and workshops:

- **Convey expertise with a degree of humility**: One interviewee suggested, paradoxically, the more of an expert that a person appears (often through language or style), the more intimidating and difficult it is for decision makers and policy makers to interact with them effectively and successfully (Interviewee 63). That is, the social and communicative distance between a researcher and an outsider can create relatability problems. Although researchers must ensure they convey competence and knowledge, they also need to establish rapport with outsiders and create spaces in which it is okay to 'ask dumb questions' (Interviewee 63).
- **Get to the point**: In capacity building sessions, many of the workshop groups were taken to task by expert panellists for not getting to their point succinctly and quickly. Often, researchers make points guardedly, couched in extensive side commentary or long justifications that dilute the power of the message and make key points difficult to discern.
- **Find formats that connect**: Often, the primary means by which academics communicate with each other do not appeal to, or work for, outsiders. Inviting practitioner attendance at conferences and workshops may be of limited benefit. One interviewee, for example, referred to the difficulty of being able to spare two or three days in a distant city to attend a vaguely described session that might be of use, as far from an ideal way of finding out useful research for policy (Interviewee 12). As stated, peer-reviewed papers and other traditional academic outputs are also problematic and often not of great use to policy makers. Concise reports and briefings, lunchtime seminars, and other short-format communications have far more appeal to those outside the academic community (Interviewees 12, 24).
- **Avoid sector-specific terminology and waffle**: Several interviewees, particularly those in the utility sector, took issue with the terminology of WSUD researchers. Terms such as 'liveability' and 'water sensitive', although extremely common, are often not well defined in the context in which researchers use them (Interviewees 38, 50). There was a preference for using a common language that is unambiguous and sticks to realities as far as possible, and for avoiding terminological and conceptual debates.
- **Train in media and communications**: Several scientists identified as 'influencers' had done media and communications training (Interviewees 42, 44). Training was also a key element of our capacity building workshops, and participants indicated it is both useful and important. Persuasive communication in public and policy forums is a matter of practice.

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Appendix 1: Interview list

Victoria

Interview 1	Policy Officer, State Government
Interview 2	Academic, University
Interview 3	Senior Policy Officer, Statutory Agency
Interview 4	Manager, Water Utility
Interview 5	Senior Manager, State Government
Interview 6	Senior Executive, Water Utility
Interview 7	Senior Manager, State Government
Interview 8	Manager, Water Utility
Interview 9	Senior Officer, Water Utility
Interview 10	Director, State Government
Interview 11	Manager, Local Government
Interview 12	Senior Policy Officer, State Government
Interview 13	Senior Manager, Research Institution
Interview 14	Senior Officer, Water Utility
Interview 15	Senior Manager, State and Federal Government
Interview 16	Chief Executive, Water Utility
Interview 17	Minister, State Government
Interview 18	Officer, Water Utility
Interview 19	Chief Executive, Water Utility
Interview 20	Scientist, Statutory Agency
Interview 21	Senior Manager, Local Government
Interview 22	Chief Executive, Statutory Agency
Interview 24	Senior Manager, State Government
Interview 25	Scientist, Statutory Agency
Interview 26	Senior Policy Officer, State Government
Interview 27	Chief Executive, Water Utility
Interview 29	Senior Officer, Consultancy
Interview 30	Academic, University
Interview 31	Chief Executive, Water Utility
Interview 32	Scientist, Research Institution
Interview 33	Chief Executive, Water Utility

Queensland

Interview 34	Minister, State Government
Interview 35	Manager, Research Institution
Interview 36	Senior Officer, Research Institution
Interview 37	Senior Policy Officer, State Government
Interview 38	Senior Executive, Water Utility
Interview 39	Chief Executive, Water Utility
Interview 40	Minister, State Government
Interview 41	Manager, Research Institution
Interview 42	Manager, Research Institution
Interview 43	Senior Scientist, State and Federal Government
Interview 44	Manager, Research Institution

Western Australia

Interview 45	Academic, University
Interview 46	Manager, State Government
Interview 47	Policy Officer, State Government
Interview 48	Academic, University
Interview 49	Manager, Local Government
Interview 50	Senior Officer, Local Government
Interview 51	Senior Policy Officer, State Government
Interview 52	Director, State Government
Interview 53	Policy Officer, State Government
Interview 54	Manager, Local Government
Interview 55	Academic, University
Interview 56	Manager, Local Government
Interview 57	Executive, Statutory Agency
Interview 58	Manager, Consultancy
Interview 59	Director, State Government
Interview 60	Senior Manager, State Government

Other

Interview 61	Senior Manager, Research Institution (ACT)
Interview 62	Manager, Consultancy (NSW)
Interview 63	Academic, University (ACT)

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