

the

WATER

group

Final Report

to the Peter Cullen Trust

November 2011

Prepared by the 2011 PCT Fellows

*A diverse group of water practitioners
who seek to make a meaningful
contribution to public policy issues in
water management in Australia.*

Acknowledgements

Peter Cullen was an amazing and unique person who made a substantial contribution to the management of rivers and catchments across Australia. Unperturbed by a challenge, Peter took river management out of the research institutes and brought it to the forefront of public policy making. He had a rare gift for communicating complex scientific concepts in a way that politicians, policy makers and practitioners could understand. For this, the 2011 Peter Cullen Science to Policy Fellows wish to thank Peter for being the person he was, and for his inspirational leadership in river and catchment management. The 2011 Fellows will endeavor to continue to build upon Peter's legacy.

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Optimising the long-term benefits of CSG for Australia

Coal Seam Gas (CSG) is a resource of increasing importance in a carbon-constrained future. It provides substantial benefits to the national economy.

CSG is also a significant community issue at the local level. There is conflict over access to land and to water resources. There is conflict within and between communities and between sectors. There is contention over potential long-term environmental issues.

CSG development is moving at different rates in different regions. Communities, government and industry don't always have clearly defined roles. The issue is a classic resource conflict.

An opportunity exists now to strengthen policy frameworks to investigate and ensure the long-term benefits of CSG for Australia. A collaborative approach between all tiers of government is required. Getting this right will provide a legacy for effective resource management both now and into the future.

What should be done?

1. Strengthen regional governance to empower communities.

Many communities in regional and remote Australia are championing their rights to have a say in how regional Australians need to be an important part of the research, planning and decision-making around CSG on their lands and waters. Regional governance is advocated as a serious investment required to empower communities to promote sustainable development and livelihoods in regional Australia.

This addresses community conflicts by strengthening the capacity at a local level to contribute to decisions on CSG. The process of stakeholder collaboration will build regional resilience and importantly link into other levels of Government – providing a feedback loop for critical regional input.

This feedback loop will be formalised through ongoing monitoring and evaluation of the processes, impacts and outcomes of CSG research, planning and investment into both soft infrastructure (e.g. human, social, cultural and environmental values and assets), and hard infrastructure (e.g. roads, schools, health services) and other essential services in relevant regions.

2. Enhance the understanding of water-related impacts and benefits.

Public debate around CSG is being readily played out and influenced by various forms of modern media communication. To be able to inform this debate requires a reassessment of the evidence base, the values base and the opinion base that contribute to decision making around CSG. An example is the inclusion of Indigenous knowledge with the analysis of quantitative and qualitative scientific views. An open honest dialogue will contribute to a rich debate and enable all parties to have confidence in the evidence base upon which consensus is reached, allow more than just science to inform policy. This recommendation could include a risk-based framework applied to CSG development at a range of spatial scales. It would also increase our understanding of the cumulative impacts of CSG development on the environment and on communities. Active independent monitoring, coupled with improved availability

of data, would further develop the knowledge required for evidence-based decisions to be made. Increased confidence in these decisions would facilitate collaborative response, aimed at minimising cumulative impacts now and into the future.

3. The infrastructure needs of regional communities must be met.

This option needs to consider both soft infrastructure (e.g. human, social, cultural and environmental values and assets) not already included by the previous points, and hard infrastructure (e.g. roads, schools, health services) which contribute to livability, diversity and other essential services for the region. Intergenerational investment is required to manage the pressures on regional communities and the impacts and outcomes of the growing CSG industry. Infrastructure needs beyond the boom-bust cycles of resource development must be considered. This will invest in the resilience of healthy regional communities, building intergenerational equity of land and water rights and interests, sustainable livelihoods, food and job security and the investment to build co-management and co-existence for all stakeholder groups living and working for the collective public good.

Each of these steps is interlinked and should be underpinned by the establishment of a perpetual fund, which could be obtained from CSG levies and rents, or partially supported by a Carbon tax.

Implementation of these recommendations will achieve clarity, confidence and a path to consensus.



Contents

Acknowledgements	i
Optimising the long-term benefits of CSG for Australia	ii
Contents.....	iv
1. Introduction	1
1.1 The Peter Cullen Trust <i>Science to Policy Leadership Program</i>	1
1.2 The Narnu Group	2
1.3 The Group Project	2
1.4 Purpose and Structure of this Report.....	3
2. The Science-Policy Interface	4
2.1 Introduction.....	4
2.2 The Literature	4
The Linear Model	4
What is needed?	5
The alternative approach.....	5
2.3 Narnu Group Musings	7
2.4 Recommendations for Achieving Policy Consensus	9
1. Consider the time-frame, context and why – Policy doesn’t occur in a vacuum!	11
2. Set-up policy a development team and identify player roles – Policy for people!.....	11
3. Identify the vision or objectives – Don’t frame to blame!.....	12
4. Workshop solutions – Address the source, not the symptoms!.....	12
5. Discuss chosen solution/s with stakeholders – Don’t put the end in users!	12
6. Implement, review, improve – Own the solution – Keep conversing!	13
3. Achieving Policy Consensus in Coal Seam Gas.....	14
3.1 The Emergence of Coal Seam Gas as a National Public Policy Issue.....	14
3.2 Understanding the Issues	15
3.3 The Policy Context- Existing State and National Frameworks.....	16
Existing State and National Legislation – An Overview	17
Consideration of the Issues Identified and Key Findings	19
3.4 CSG and the Community	20

3.5 Environmental Issues.....	22
Impacts on groundwater and surface water.....	23
Disposal of waste water.....	24
If fracking is used	24
Other environmental issues.....	25
3.6 Economic Issues.....	25
3.7 Sifting through the Evidence Base.....	27
4.Narnu Learning Reflections.....	30
5.References	32
Appendix A – Narnu Group Charter.....	34
Appendix B – Group Project Plan.....	36

1. Introduction

1.1 The Peter Cullen Trust *Science to Policy Leadership Program*

The Peter Cullen Water and Environment Trust was formed in 2009 in memory of Peter Cullen and as an enduring legacy for his significant contribution to water management in Australia.

The Trust aims to strengthen the bridges between science, policy and stakeholders in water-system management. Its goals are to enable scientists to work effectively with policy makers, and policy makers to understand scientists' thinking, by facilitating action learning, communication and connections between these groups.

“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”.

Peter Cullen

In line with its objectives, one of the Trust's main activities is the *Science to Policy Leadership Program*. The *Science to Policy Leadership Program* focuses on building leadership and communication skills specifically geared to bringing about positive change in water and catchment management in Australia. The program selects attendees who are highly motivated, knowledgeable and skilled people who can continue the work of Peter Cullen.

Following the highly successful inaugural 2010 leadership program, a group of diverse water practitioners from across Australia were selected to participate in the 2011 program. The 2011 *Science to Policy Leadership Program* comprised two hands-on sessions, the first in South Australia and the second in Canberra, and the completion of a course project. The sessions and course project focused on developing leadership and communication skills to assist the group to effectively participate in, and influence, policy and political agendas in relation to river and catchment management.

1.2 The Narnu Group

The participants of the second Peter Cullen Trust *Science to Policy Leadership Program* formed the Narnu Group – *a diverse group of water practitioners who seek to make a meaningful contribution to public policy issues in integrated water management in Australia.*

The Narnu Group operates according to a Group Charter, which outlines our Mission, Goals and Code of Conduct. A copy of the Charter, including a list of the fourteen participants, is provided as Appendix A.

The Narnu Group seeks to collaborate on projects that help fulfill their Mission and Goals.

Shared identity and purpose...

Creating a strong identity is important to drive shared purpose; branding the Narnu Group provided a strong shared ethic and objective through which to develop a consensus policy position. The branding provided an instant camaraderie that helped to develop and strengthen a shared purpose.

1.3 The Group Project

Participants in the second Peter Cullen Trust *Science to Leadership Program* were required to complete a course project that was aimed to help the group think across science, policy, politics, media, values, ethics and constitutional matters.

The project was to enable the group to practice what Peter Cullen is best remembered for – *his superb capacity to synthesise and communicate complex ideas, simply and clearly, to local communities, policy makers and politicians in a way that supported them to make decisions and take actions.*

Specifically, the course project required the group to:

- Review the current literature in relation to the ‘science – policy’ interface and develop a consensus position on the role of science in the policy development process;
- Select a significant emerging or current national public policy issue directly related to water management (urban and/or rural) in Australia, and design a policy development process that would achieve sufficient consensus for political action;
- Design an ‘event’ or ‘activity’ that could be hosted by the Peter Cullen Trust to promote public debate about the issue and the role of science in informing decisions; and
- Reflect on and synthesise individual and collective leadership learnings from this project.

The Narnu Group used a consensus approach to select the ‘significant emerging or current national public policy issue directly related to water management (urban and/or rural) in Australia’.

Settling on the issue of Coal Seam Gas (CSG), the Group was particularly interested in the following sub-themes:

- Implications for both surface and groundwater management;
- Existing legislative frameworks – State and Federal; and
- Local issues, including the human, social, cultural environmental and economic context.

1.4 Purpose and Structure of this Report

This report outlines our learnings and policy recommendations formed through completion of the two hands-on sessions and the course project.

The report has been prepared for the Peter Cullen Trust and is structured to provide:

- A review of the role of science in the policy development process and our recommendations for achieving policy consensus in issues related to water and catchment management;
- Recommendations for the application of a more inclusive policy development process in managing the expansion of the CSG industry in Australia; and
- A summary of our key learnings from the course and the project, and the implications for achieving clarity and consensus on difficult policy issues.

Throughout the report a series of boxes are used to highlight key Narnu Group learnings from our participation in the *Science to Policy Leadership Program*.

This report is accompanied by a proposal for an event that could be hosted by the Peter Cullen Trust to promote further discussion and debate on the issue of CSG and the role of science and various other forms of evidence in informing policy decisions on this issue.

“Peter Cullen is best remembered for his superb capacity to synthesise and communicate complex ideas, simply and clearly, to local communities, policy makers and politicians in a way that supported them to make decisions and take actions.”

The Peter Cullen Trust

2. The Science-Policy Interface

2.1 Introduction

The Narnu Group considered the role of science in the policy development process. This was based on a review of the literature and our own understanding and experience from our diverse backgrounds. The review led to a set of recommendations for achieving policy consensus in issues related to water and catchment management.

2.2 The Literature

The Linear Model

The idea that ‘science compels action’ derives from the linear model of expertise, in which the interaction between science and politics is conceived as unidirectional (Beck 2011). The model is also referred to as the transfer model, the deficit model, or ‘truth speaks to power’ (Cullen 2006).

The influence of science on policy is assumed to be strong. It is scientific consensus that determines and drives political decision making. The assumption of linearity is supported by three propositions (Beck 2011):

- More research will necessarily lead to more certainty;
- More and better science will help to solve political disagreements; and
- By keeping problems away from the political ‘whirl’, science makes policies evidence based and thus more rational.

In many cases, however, more science generates more uncertainty. Also, science does not automatically resolve value conflicts and disagreements but may instead contribute to fuelling public debate. The linear model suggests science is value free and autonomous from politics, with science a neutral arbiter or harmonizing force in politics. By following this model, parties can become embroiled in controversy over the scientific foundations on which their views are based.

Scientific uncertainties can become a ‘political resource’ if they are cherry-picked or taken out of context in order to support or delay a particular political action. Disagreements that present as disputes over scientific evidence are in fact rooted in more fundamental differences regarding values or the role of science in policy making (Jasanoff, 2010).

Linear model solutions often follow the path of seeking a technological fix for a technologically created problem. Furthermore, the policy measure is frequently static. This model serves to detach expertise from its political and cultural context and decouple it from systems of experience and understanding. The linear model also tends to stifle discussion of alternative policy approaches, results in inaction and fosters political gridlock (Pielke, 2007).

What is needed?

Decision-makers need to know how 'issues' will affect specific political jurisdictions, what types of interventions will make a difference, over what time scales, at what costs, and to whose benefit (Beck, 2011).

The scientific information that policy-makers need derives from policy and political processes, not from scientists' perceptions. The science-policy interface can be bridged only when scientists understand this policy process and work with policy-makers to reduce political and policy risk, rather than simply providing scientific facts (Briggs & Knight, 2011).

Lawton (2007) states policy formulation is actually a messy, iterative, untidy process. Different individuals have different legitimate interests and perspectives that they will naturally attempt to protect and promote (Sarewitz, 2000). It also involves not only science, but economics, cultural values, tensions between institutions, different interpretations of what the science actually tells us, and of course, the need to score political points and win political battles.

According to Meffe & Viederman (1995) much of what scientists do is essentially worthless if it is not translated into effective policy. They argue scientists must decide that they should and can influence policy; scientists must also better understand how the policy process works and thus more effectively exercise their influence. Policy-makers, on the other hand, should help create and maintain good working relationships about practical matters without neglecting the wider social issues at stake; they will only have impact if they show real interest in local problems and perspectives (Keulartz, 2009).

Effective policy is often a crisis in timing: a decision must be made now, but useful information is non-existent, insufficient, contradictory, or of poor quality. Regardless, policy decisions await nobody. There is often no time for proper, controlled studies to be done, so scientists must anticipate, to some degree, the needs of policy-makers, be willing to listen and learn, to deal with uncertainty, and to have the relevant information available before policy-makers know it is needed (Keulartz, 2009). Scientists must develop issue-driven rather than discipline-driven science; incorporate broader sources of information, including information from non-scientists; and understand and work within the policy process.

The alternative approach

Several authors suggest scientists should make transparent the limits of their expertise and the extent of their uncertainty; that wise policy does not necessarily depend on debating the science (Jasanoff, 2008; Sarewitz, 2010).

There is a role for scientists to present 'policy-relevant' alternatives and expand the array of technically feasible options without prescribing decisions.

Some believe there is a need to shift from problem to policy orientation in scientific assessments. The emphasis would switch to research that seeks to understand the interaction between the issue at hand and society in ways that identify short-term vulnerabilities, as well as opportunities, in regional contexts (Beck, 2011). Research would focus more on providing information that is useful for addressing regional and short-term problems with a better understanding of the socio-economic, political, cultural and environmental processes (O'Brien et al., 2004).

An emphasis on policy-focused research would help decision-makers explore the implications of different scenarios. Rather than forming a consensus about policy options, science would place itself in the role of being a tool for policy action instead of a tool for political advocacy (Dessai et al., 2009).

This also implies a shift from abstract, top-down to place-based, bottom-up approaches, with the involvement of local and regional stakeholders and decision-makers; a more flexible approach to defining problems in order to acknowledge how people experience risk. This task requires a more distributed and participatory approach - one that engages scientists, governments and the public in a shared enterprise of responsible knowledge making (Jasanoff, 2010).

Increasingly there is divergence in the literature regarding the definition of 'evidence'. Some authors consider 'evidence' to include only science or research, while a growing number believe it includes various sources of knowledge in addition to science, such as Indigenous knowledge, expert knowledge and public opinion (Godfrey, 2010).

The role that science can constructively play in policy making is to provide a robust consensus that allows for continued scrutiny, re-examination, and revision (Oreskes, 2004). Such an approach feeds informed opinion about the performance of strategies over a wide range of plausible futures and their possible consequences.

Although participatory processes have the potential to improve governance, various authors identify problems. For example, the inclusion of a wide range of stakeholders in the policy-making process is usually costly and time-consuming. It may therefore delay the urgently needed adoption of policy measures. In France, for instance, increased participation of stakeholders has gone hand in hand with a strong decline in scientific participation, because scientific expertise lost credibility in the early stages of the policy process (Rauschmayer et al., 2009).

Beck (2011) suggests one of the main problems to implementing this alternate approach will be the question of quality control. Policy relevant knowledge typically grows from interdisciplinary collaborations in which methods and criteria for quality control are not well established in advance.

Keulartz (2009) states the way forward is through the establishment and preservation of stakeholder platforms and user associations that function as "boundary organisations", that is, as organisations operating at the interface between groups and communities with different interests and ideas. Knowledge brokers may provide a similar function (Cullen, 1990). Keulartz (2009) further suggests the following practices:

- Go beyond rhetoric and put participatory processes to work;
- Close the gap between top-down and bottom-up governance;
- Involve stakeholders as early as possible in the policy process;
- Map out the different interests and ideas, visions, and values at stake to improve communication and cooperation;
- Try to balance different types of knowledge; and
- Establish long-term working relationships between stakeholders.

Ideas about ‘evidence-based’ policy may, in fact, change when we move from a technical approach towards a more relational approach. There are multiple forms of policy-relevant knowledge that are vital to understanding the issues and the prospects for the success of policy interventions – there is not one evidence-base but several (Head, 2008).

"Scientists commonly hold strong values about desirable outcomes, and should be welcome in the political debates as society grapples with the various issues. However, they should not expect their scientific standing gives them any special right to decide value questions for society.

Their science needs to inform the debate, not replace the debate."

Peter Cullen

2.3 Narnu Group Musings

The Narnu Group considered their own experiences in policy development, particularly in relation to water and catchment management. Typically, resource management issues are steeped in conflict and if these conflicts are not well understood and considered, a range of undesirable policy characteristics and consequences can result. Through identification of some of the more common “undesirable” policy characteristics and consequences, we began to develop a list of preferred policy characteristics.

Understanding conflict...

Conflict and debate should be encouraged and well-mediated as a valuable way to crystallise issues and bring them to the fore.

Undesirable Policy Characteristic	Consequences	Preferred Policy Characteristic
Short sighted	Policies tend to treat symptoms not the source.	Consider timeframe and context. Policy development and review cycle should continue as long as the solution has impact.
Reactive	There is a waste of resources and no long term cohesion.	Alternative economic system, funding long-term policy continuation and knowledge transfer. Policy PROCESS funded separately from individual policies and projects.
No continuation of policy development teams	Lost knowledge. Difficulty in reviewing the process.	Accumulate knowledge across projects, treat knowledge sources (evidence base as well as values base) as a long term investment – aim to enhance policy making over time.
Problems are identified in isolation of policy development (i.e. not keeping end users in mind). No identification of up-front GOAL or underlying objectives.	The source of the problem may be misunderstood. Less ownership by policy developers and end-users.	Enable communities to help define the ‘vision’ rather than framing as a problem, which can be felt as blame. Identify goals together so all parties can own the solutions.
Consultation is prescriptive: this is the situation, you are the problem, you must do this.	You lose the stakeholders early, little engagement, potential hostility or disappointment.	Community consultation should be viewed as more than just a tick-box. Stakeholders are a source of information too and should be treated with the same respect as technical experts.
Consultation that doesn’t provide feedback (i.e. ‘we took your comment X and did/did not act on it because).	Unmanaged expectations and failure to empower users to implement.	Provide iterative feedback to stakeholders on inclusion of their feedback.
Policy ‘advertising’ is poor. People don’t know about the process, and think policy is boring.	Users can’t take action or ownership.	Be clear on who is doing what and why. People who want input on the policy need information on the policy development process. Create a specific job for this, such as a “policy liaison” or “engagement” officer.

2.4 Recommendations for Achieving Policy Consensus

It is clear that the policy cycle stands still for no-one.

Traditional models or 'linear' approaches to policy development – where the influence of science is assumed to be strongly engaged in a one-way knowledge transfer – is becoming increasingly redundant. The consensus of scientists is not the same as unarguable science which, by the very nature of science, cannot exist. Due to its ever increasing nature, scientific information often generates further questions, increasing uncertainty and fuelling public debate.

Public debate must be informed by social, economic and environmental considerations, cultural values and beliefs, vested interests and political tensions inclusive of the views of wide stakeholder groups. Public debate is frequently played out and influenced by various forms of modern media communication styles of electronic petitions and internet advocacy, film, photography, alternative press and social networking.

Science-based policy alone cannot ensure political action. This new policy environment requires a new approach to policy development.

Current national political environments are demonstrating that when ordinary people become conscious of the political realities of their situation they are likely to take collective action to address issues of equity and social justice.

Our view is that key stakeholders directly involved in the issues around water leadership and integrated water management require a process of engagement where they can express their views as people to inform policy and decision making, and to contribute their understanding of the impacts of policies on them. This new approach offers policy development the opportunity to have those directly involved in the issues under consideration own the process.

Imagine a Policy Wheel where our politicians and key decision makers become informed as wise water leaders leading the way to integrated land and water management around CSG.

Through a review of the literature and our own experiences, the Narnu Group has formed a set of recommendations for achieving policy consensus in issues of resource conflict. The recommendations are based on six elements, and are illustrated by the Policy Wheel at Figure 1.

This Policy Wheel differs from the more traditional policy processes in several ways. Importantly, it is intended to operate outside political cycles. To facilitate this, an overarching funding program surrounds the Policy Wheel. Funding is for the process itself, not for any individual project for which this Wheel might be used. This allows for a proactive basis to decision making while also allowing better informed reactive decisions when necessary. Further, it encourages a high level of engagement within a framework that has very clear distinction of roles throughout the process, and recommends that roles be 'permanent' across decisions. This facilitates ownership of the decisions that come out of the process.

Creating ownership...

To be totally engaged, all members need to have full ownership of development and delivery of the process. Through our tasks in the Coorong we discovered that to have engagement of all participants in any given task we had to ensure everyone was involved in the process development. This became clear by a lack of engagement of the whole group and was perhaps the result of decision making processes that had been dominated by individual group leaders. This was an important learning outcome that could then be applied to our group project and drove us to have full group involvement in all stages of project development.



Figure 1: The Policy Wheel. This wheel has six major elements underpinned by a resourcing process that is designed to allow policy development to occur across political cycles, and to invest in voice more effectively.

The six principles in Figure 1 form the foundation of the consensus approach used by the Narnu Group, and are discussed in more detail below.

1. Consider the time-frame, context and why – Policy doesn't occur in a vacuum!

This point speaks to the longer term nature of this process which cuts across individual policy development, and includes all stages of research and implementation. At any one time, many policies are being developed and are going through this cycle at their own pace. There is no clear start point and no decisive end so long as the impacts of the policy are still being felt. This first point calls to understanding of the socio-economic, political and cultural context, and how this evolves over time. This knowledge represents the environment in which the policy will unfold. This involves an understanding of previous and potential future policy and a continuation of input of information on context. We are also reminded to look at parallel and international policy which may seem irrelevant on the surface, but which might provide insight and understanding of the broader context in which each individual policy occurs.

2. Set-up policy a development team and identify player roles – Policy for people!

This point is the beginning for engagement. It arises from an understanding of the environment in which policies may unfold. It is about identifying players. This will include a policy development team who will be responsible for the development of one or more specific policy documents in the pre-described context. This policy development team should have a broad network of advisors, within and outside the Policy Wheel who provide evidence, advice, values and opinions. Stakeholders are the people present within the policy environment who will be directly or indirectly impacted. Stakeholders can contribute values and opinions, but they can also provide evidence. The roles must be clearly defined for the gathering of an evidence base. Stakeholders can have several roles in the policy process and these must be clearly understood and defined. Currently, stakeholders providing evidence can have their credibility threatened by 'bias'. The evidence base can also be gathered by people who are not stakeholders. This evidence is also gathered by people, however as they are less involved in the outcomes of the process, this evidence can seem more impartial and be valued for this. Relationships with stakeholders, whether providing an opinion and values base or an evidence base, should be tended like current relationships with scientists who work across different projects.

An important requirement of this policy process is the continuation of human resources and knowledge. The policy development team should, where possible, be continuous along the life-time of a policy and its implementation. This may not be possible for 10-50 year policies, particularly where the policy development team is part a Government Department. Options for getting around this include the creation of a dedicated policy engagement officer role, which could help to ensure continuity of process. However with this Policy Wheel, there is also opportunity for on-ground engagement and relationships which can last well into the decades. This process encourages policy developers to draw on pre-existing consultation relationships, and make new ones for the long-term.

Having identified the players, and clearly identified the roles, the policy development team should also be prepared to change these as the policy develops and the context changes. Roles must be clearly defined, but not fixed.

3. Identify the vision or objectives – Don't frame to blame!

This is about identifying the purpose for the policy out of the policy context. Frequently, a 'problem' is identified and a solution is 'offered'. In the ideal Policy Wheel it's about identifying the desired outcome. An important omission from the Wheel when compared to more traditional policy development is 'framing to blame'. In addition to the science evidence base, the policy development team can also draw on multiple lines of evidence and diverse values to help identify the goals and objectives so that those directly involved can own the issue. Traditionally, this step is typically not as consultative. This is a critical step, and is also likely to be one of the most difficult and time consuming parts of the process, although it is also likely to be one of the most rewarding in the long term. The engagement encourages pro-active action and helps avoid mal-adaptation and perverse outcomes. In the long-term overarching Policy Wheel that the Narnu Group recommends, it should be easier to address the source of issues, not just the symptoms. Remember: don't frame to blame, start with stakeholders in mind and get the goal right!!

4. Workshop solutions – Address the source, not the symptoms!

When you have a goal, and not before then, workshop solutions with a pre-defined group, which should include stakeholder representatives, scientists, advisors, and the policy development team. In keeping with clear roles, identify the evidence base, and identify the values/opinion base. Be aware that some people can be both, but that the different types of information should be clearly delineated. Have a clear communication strategy for ongoing engagement, even across projects in the same space. Re-label 'problem' to 'vision', don't be prescriptive with solutions, and have fierce conversations. Realise that for this to work, you will need the relationships (and associated trust) developed in the previous steps when identifying a common goal. Where in the past this step might have caused trouble, in this Policy Wheel, it should be a relatively easy part given the significant groundwork that has already been undertaken.

5. Discuss chosen solution/s with stakeholders – Don't put the end in users!

This step is different from the previous step in that it involves decision making. This is the step where the possible solutions identified in step 4 are discussed with all stakeholders, with the intention of selecting and implementing. This is where engagement sometimes starts in less effective approaches to policy making: with ready-made solutions presented to stakeholders for a problem they haven't been involved in identifying. Don't put the users at the end. Draw on the relationships developed over time and take consultation seriously. Be very clear on the role and scope of consultation at this stage. Provide feedback to stakeholders on how their input is used, or not used, and why. Explain the policy process and everyone's roles to all involved. Be clear about accountabilities. Make sure the strong communicators in the team have key roles in this part, as policy is often perceived as 'boring'. Engage!

6. Implement, review, improve – Own the solution – Keep conversing!

Implementation, review and reflection and constant dialogue is informed by a cycle of continuous action, observation, reflection and feedback learning.. Gather the evidence base for the impact of the policy, and also gather the values/opinion base for the impact of the policy. This is an ongoing process. Revise and re-engage the policy development team and expand their network of advisors across government and other silos to provide feedback for improvement. The key to implementation was the previous steps which enabled those involved to own the solution. Previous issues with implementation should be minimised so long as the conversation continues and ongoing review occurs. Remember to review the policy context, the goals, the solutions, the evidence base and the decision making process.

Consensus building...

For the process of building consensus there are parallels between our own team work and the approach to developing policy. Researching multiple lines of evidence is a critical foundation for discussion, debate, and building consensus. We all require an evidence base to make an assessment and critically analyse the information we receive. Our evidence base varies depending on our values, culture, education and style of thinking.

The critical moment for us as a group came during week one when we were preparing for our presentation at the end of that week. We established good boundaries for group discussion, encouraged robust debate and for all members to speak and make a contribution. This activity helped us to form strong links and subsequently build trust between group members as it was safe to speak your mind, essentially because the clear outcome was consensus rather than conflict.

The group set to work researching different evidence, information, propaganda, and government policy to try and understand the actual issues. We all had a different style of evidence gathering, from different sources and with slightly different ideas about what mattered and where, and how to focus the group task. We came to conclusions as individuals about how we felt and perceived the CSG issues and how this would fit into the project we'd been asked to do. Bringing these views together while keeping everyone engaged was challenging, but ultimately achievable as we had already gained experience in working through difficult discussions and challenges as a group, and had established good trust amongst each other as a result.

The Narnu Group communicated through different media: teleconference, written materials, links to websites, audio-recordings of meetings, shared literature, individual conversations, small group work, email banter. These activities helped to maintain group cohesion and facilitated the development of ideas and solutions to problems.

Building consensus requires the consideration of multiple lines of evidence, different input from diverse stakeholders, and focused participation within an environment of trust.

E-Fatigue™...

Working remotely in a group on a complex topic has a finite life span. As the group progressed through to the final stages of the project it became clear that members were becoming burned out with the remote communication and that face to face communication was required to re-motivate, check in with each other and re-connect in a different way. Face to face communication was critical in moving the group project to the next level.

3. Achieving Policy Consensus in Coal Seam Gas

3.1 The Emergence of Coal Seam Gas as a National Public Policy Issue

Coal seam gas (CSG), or coal bed methane, is a form of natural gas extracted from underground coal reservoirs. The gas is bound onto the surface of the coal, which can be extracted by reducing the water pressure in the aquifer containing the coal seam. This method of extraction means that a network of wells dispersed across the landscape are needed to extract the gas, a process unlike most forms of traditional, large-scale mining. The development of a CSG project is consequently much more closely intertwined into local communities than other forms of mining.

The first CSG well in Australia began commercial production in 1996 and the industry grew slowly until 2003, at which time only 20 peta-joules (PJ) of CSG was produced annually. Thereafter, growth was rapid and by 2009, 195 PJ of gas was produced. The majority of gas production occurs in Queensland, with the remainder (<4%) from New South Wales.

Nationally, over 40,000 CSG wells are scheduled for drilling during the next decade, with each well bringing groundwater to the surface that must be dealt with. Communities are increasingly coming into conflict with CSG production as it affects the availability and viability of agricultural land, threatens to deplete or pollute groundwater resources, and highlights divisions within a community over how they should respond to these changes. The recent, rapid expansion of the CSG industry has raised legitimate questions and concerns over whether existing state and national policy frameworks adequately protect the interests of current and future generations of Australians as well as Australia's natural resource base and unique and rare ecosystems.

These issues have come to a head in 2011, with large-scale protests, increased media interest, and calls by some Parliamentarians for a moratorium on any further development of the industry. Public concern is focused on the rights of landholders to limit access to mining companies. Nationally, there is also

concern about the cumulative impacts of many thousands of wells on agricultural land, and on the availability and quality of groundwater, in particular, the sustainability of the Great Artesian Basin.

Our aim is to develop a framework that would enable the incorporation of the broader evidence base toward a better understanding of the social, economic, cultural and environmental considerations in any future expansion of the CSG industry.

3.2 Understanding the Issues

Like most public policy issues, the management of Australia's natural resources is steeped in a complex array of views – these include (but are not necessarily limited to) views on existing policies and legislation, scientific evidence or gaps, community or cultural traditions and beliefs, and expected social and economic implications. These views may be formed by an individual's values, knowledge base and experiences, but are increasingly influenced by politics and various forms of modern media.

The recent expansion of and the resulting public reaction to the CSG industry across Australia is no exception.

The challenge for policy makers is to sift through the often overwhelming amounts of information, be it belief or evidence based, to gain a better understanding of these various points of view so that the need for government intervention (i.e. public policy), can be identified and appropriately addressed.

While an often complex and time consuming effort up-front, increased understanding of the political, social, cultural, economic and environmental context will not only help identify the policy need, it will help clarify at what level (e.g. state, national) and what policy tools (e.g. regulatory, incentives) need to be implemented.

Further, this contextual information is an imperative for guiding the stakeholder conversation by allowing issues to be identified and matched against existing policy frameworks, available information and knowledge gaps.

To gain a better understanding of the issues as they relate to CSG, including sources of conflict, policy and knowledge availability/gaps, the Narnu Group undertook research across the following sub-themes:

- The Policy Context- Existing State and National Frameworks;
- CSG and the Community;
- Environmental Issues; and
- Economic Implications.

Silos...

You can't prevent silos developing in any detailed work area, and in fact silos are valuable for focused and detailed work. However it is important to recognise when they are required and when they are inhibiting the progress of a project and employ some tools or approaches to manage it.

3.3 The Policy Context- Existing State and National Frameworks

Overall, whilst there is some good coverage within existing policy and legislative frameworks for CSG, they don't completely fulfill the current and likely future needs arising from this industry. In part, this can be attributed to previous mining activities, that generally consist of one large asset with few small neighbours, while CSG industry has many small assets impacting many stakeholders. The industry is moving into new geographical areas and expanding rapidly, causing concern within the community. Some critical gaps in content and approach within existing frameworks that need to be addressed will be considered here:

- current frameworks do not provide sufficiently comprehensive arrangements to allow for extensive community involvement in decision-making;
- CSG sites tend to be considered and managed in isolation, with little capacity to allow for consideration of cumulative impacts, or coordinated use of resources across sites;
- management of groundwater that is released from aquifers during CSG operations is a key issue for both companies and governments, and there needs to be long term and strategic consideration of how to treat this water appropriately;
- while there are many possible condition impositions both at the State and Federal level, at present there is limited scope in the obligations placed upon CSG companies, beyond requirements to manage the first order impacts that their activities cause; and
- there is no sustainability framework in place to assess the most appropriate use of land and resources in areas of high resource conflict, and there is a demonstrated need within this industry for strategic land assessments that have strong engagement with community, government and industry (e.g. a process through which to assess broader sustainability and industry suitability criteria).

The discussion provided in this sub-section makes the case for institutional reform by exploring in more detail the key gaps that need to be addressed.

Existing State and National Legislation – An Overview

Predominantly, the governance of CSG activities is driven primarily by relevant mining (or mineral resources) legislation of the State or Territory where the activity is located. To illustrate, by far the greatest amount of CSG activity currently taking place in Australia is occurring in Queensland, where mining is governed by the *Petroleum and Gas (Production and Safety) Act 2004*. New South Wales is second to Queensland in terms of predominance of CSG activities, where they must take place in accordance with requirements under the *Petroleum (Onshore) Act 1991*.

Using these two Acts as examples, this type of legislation generally sets out the requirements for companies in terms of:

- obtaining authorisation for undertaking exploration and production activities;
- approvals processes for undertaking these activities (development; environmental); and
- arrangements for consultation, agreement and compensation, which is typically required when activities take place on private land

In situations where CSG activities have been given the approval to go ahead, these types of projects will typically have environmental impacts, many of which may not be significantly well known or understood at the outset of the project. For this reason, virtually all CSG activities will fall under environmental legislation at both the State/Territory and Federal level.

EIS and other environmental requirements that companies must comply with as they undertake CSG activities will be governed by environmental impact legislation operating in each State or Territory. To continue the example initiated above, this means CSG projects are in part managed under the *Environmental Protection Act 1994* in Queensland, and the *Environmental Planning and Assessment Act 1979* in New South Wales.

Given the nature of many CSG projects, in particular with regards to their location within Australia, most also require approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act; Commonwealth). This is especially true if projects are located within or very near to sites of national environmental significance such as the Great Barrier Reef, or within the Great Artesian Basin. The Commonwealth Environment Minister must also consider economic and social matters in deciding whether or not to approve an activity.

A relatively unique emergent issue for most CSG projects, which sets them apart from many more traditional mining activities, is their potential impact on groundwater resources, which can occur through a range of activities, including:

- the use of water for fracking activity, and possible contamination from chemicals used in this process;
- releases of large volumes of water (commonly referred to as produced water), from aquifers and challenges with its subsequent disposal; and
- the potential for adjacent aquifer penetration and contamination.

Whilst companies are typically required to obtain licences for the water they use in the initial CSG extraction (for example under the *Water Act 2000* in Queensland; or the *Water Management Act 2000* in New South Wales), there are currently no comprehensive legislative arrangements for produced water, beyond its management as a waste by-product of the mining process itself.

Many farmers see this as an inequity of rights given they are required to obtain a licence under the relevant jurisdictional water legislation and have a volume they are entitled to extract, that reflects the full volume of water that they are entitled to use. Some argue that the head of power that governs CSG mining should place similar volumetric restrictions on the full volume of water that companies use, including the amount of produced water that is generated.

Also potentially relevant, the *Water Act 2007* (Commonwealth) may have some future jurisdiction in relation to this issue. Although this Act does not consider ground water that forms part of the Great Artesian Basin to be part of the water resource of the Murray-Darling Basin, groundwater aquifers and surface water resources within the Basin will, from 2019, be subject to legally enforceable limits on extraction and use. The role of this Act in regulating CSG activities as they relate to Basin water resources has not yet been formally tested.

Sitting in and around the legislative framework described above are a number of policies and related material that both informs the implementation of existing legislation, and provides advice on future directions and policy needs for this industry. For example:

- Expert reports, such as the *Assessment of Impacts of the Proposed Coal Seam Gas Operations on Surface and Groundwater Systems in the Murray-Darling Basin* (Moran and Vink, 2010), have been commissioned by the Commonwealth to better understand the impacts of CSG that may have a bearing on the operation of relevant Commonwealth legislation such as the *Water Act 2007*.
- Policy documents that complement implementation of the legislative framework such as the *Coal Seam Gas Water Management Policy* (DERM, 2010), which was developed by the Queensland Government to help manage environmental impacts arising from salt produced through CSG, and encourage the beneficial use of treated CSG water.
- Other types of policy advice or guidelines that address issues that aren't currently covered specifically by legislation, such as the joint report *Cumulative Impacts – A Good Practice Guide for the Australian Coal Mining Industry* (Franks et. al., 2010), which provides advice on the management of cumulative impacts arising from coal mining activities (including CSG), which is currently not comprehensively covered within legislation that governs this industry.
- Strategic and risk-based assessment of land use is currently undertaken for a number of industries, and could form a critical and highly beneficial input for the future development of CSG, particularly as it moves into more productive land use types in agricultural areas of Queensland and New South Wales. This issue has been a central driver for many CSG conflicts and the adoption of more risk-based assessments for this industry would provide both a useful input to resolving issues, and a highly informative part of any future

sustainability framework. For example, Queensland has recently developed a policy framework for Strategic Cropping Land, with a view to identifying land that should be left as prime agricultural land and hence undeveloped by mining.

Consideration of the Issues Identified and Key Findings

Overall, the key conclusion of the legislative review is that while many issues are addressed relatively well within existing legislative frameworks, a number of critical gaps exist that can limit the effective management of CSG activities. In addition, the current legislative approach could impose barriers that may further limit the effective regulation and governance of this industry. Three key findings support this:

Firstly, much of the existing policy and legislation that makes up the current framework takes a relatively traditional approach to community involvement in decision-making, where for example:

- Members of the general public can make submissions as a part of Government deliberations and approvals related to the potential environmental impacts of projects (e.g. the EPBC Act includes provision for a 10-business-day public comment period on the Commonwealth's draft recommendations as part of its approval process).
- Mining legislation can require companies to consult with, and reach agreement with landholders before entering private land to undertake certain types of activities.

While this approach provides a formal avenue for public submission on very specific aspects of a development application, it is not that accessible to a large part of the general community early enough. Submissions require very specialised knowledge of regulatory processes and on the whole require a high level of technical and environmental expertise for legitimacy. This formal approach is necessary but does not foster the enhancement of regional governance where decision-making is shared and communities are empowered to actively participate in processes for which they are accountable. Additionally, formal public consultation usually occurs well into the development of the project.

Secondly, CSG activities are for the most part treated in isolation from one another under existing legislation, with sites typically considered and managed individually, as are most contemporary mining or industrial developments. This makes it very difficult to effectively consider cumulative impacts within decision-making.

The Queensland Government has responded to the increase in CSG activity and the need to consider cumulative impacts. In December 2010 it introduced changes to existing State legislation to tighten the management around groundwater extraction by CSG companies.

Changes to the *Water Act 2000* (Queensland), mean that cumulative management areas will be established to cover areas where impacts are likely to overlap. Currently, the Surat cumulative

management area has been established and the Queensland Water Commission (QWC) is responsible for setting out predicted impacts and management strategies for this area. The QWC will act as a central holding for baseline and monitoring data and will provide advice to cumulative management areas in the future.

Related to this, each natural resource associated with a CSG site is generally treated in isolation. For example, sites are typically managed as an energy resource, despite many of them also being a water resource. Mining and water regulations have not been adequately integrated to allow for coherent assessment, and most existing frameworks aren't sophisticated enough or flexible enough to allow for the coordinated and optimal use of resources at each site.

The principal risk in relation to these matters is that existing frameworks don't require a fulsome understanding (and treatment) of water-related impacts and benefits emerging from this industry, or regulation that recognises the whole water cycle (i.e. produced water is regulated under one Act, while water used in CSG mining is regulated under a separate Act). This means that opportunities for achieving multiple-benefits from resource use at each site cannot currently be properly explored.

Finally, the activities of CSG companies are really only regulated, or governed, to the extent of the first order impacts that their activities cause on the environment or on private land, which is generally dealt with through direct compensation to landholders. There are no broader stewardship requirements for companies in relation to the areas where they are operating, such as strategic land planning, greater community engagement and acknowledgement of CSG impact at a regional scale.

Existing legislation typically does not require CSG companies to address any of the second order impacts that their activities can also generate, for example through placing additional pressure on regional infrastructure such as roads and housing. There are also no formal requirements in relation to the 'boom and bust' cycles that can characterise these types of industries.

Where matters of this type are being addressed, it is generally because companies are choosing to do it themselves, not because it is a part of any formal regional governance arrangements that they are required to participate in.

3.4 CSG and the Community

Overview

With State Government (and where required Federal) approval, mining companies have the legal right to explore and access underground mineral resources, regardless of the tenure of the land from which they are accessing those resources. Landholders have a legal right to the surface land and water, but have no legal right to prevent a mining company from entering their property without reasonable grounds. Whilst the mining companies have statutory obligations to minimise their impacts and avoid

unreasonable interference with landholders' existing activities, this situation is often a source of great conflict between the mining company and the landholder. It is also a concern for landholders that mining rights lie with the land and bind all future owners.

There is also concern from different interest groups that landholders may be at a disadvantage when negotiating with mining companies for access conditions and compensation, or the requirement 'to make good'. In 2010, the Queensland Government introduced new land access laws to involve landholder consultation in agreement negotiations. However, there are often time and expertise constraints that can be problematic for landholders and the process does not effectively facilitate good consultation.

Landholder concerns

Once an agreement is negotiated, many landholders may feel that they need to adjust their way of life. Many feel they have lost their privacy and autonomous control of their property and lifestyle. Some families fear their children's activities will be restricted due to safety concerns around pumps and pipes. Landholders may also have to adjust to disturbances such as traffic, lights, noise and dust. It is possible many landholders did not foresee these small, but cumulative changes to lifestyle.

There is concern around the effect of CSG mines on property values. This also translates to a loss of confidence for landholders to develop and expand agricultural businesses. Concern for water quality, water supply and ownership of water is often at the heart of many landholder – mining conflicts.

A potential increase in the incidence of mental illness associated with land-use conflict is considered to be a real issue for regional communities. Everingham (2010) has found an impact on some landholders by the changes on their property and within the community.

Community concerns

There are indications that some regional businesses are struggling with the potential impacts of staff resources, social capital and boom and bust cycles. Regional communities are also concerned with the potential for increased crime, violence and social disorder and changes to the social fabric of their communities associated with the dynamic nature of transient populations of mine and construction workers, an often male dominant transient population.

Whilst mining can create more jobs and a stronger economy, there is increased pressure on local infrastructure and services, such as housing, hospitals, schools and roads. To help with this, the Queensland Government has released the *Sustainable Resource Communities Policy*, addressing:

- The government's coordination role.
- Improving linkages between social impact and regional planning.
- Fostering partnerships with local government and stakeholders.

- Enhancing the regulatory framework for social impact assessment.

Incorporating diverse stakeholder views and expectations into policy, requires meaningful participation and collaboration. Governance is central to effective participation through both formal and informal processes (Eversole and Martin, 2005).

There is a knowledge base specific to a region that needs to be captured by more bottom-up approaches to policy development. Outsiders lack the knowledge of local conditions, constraints and priorities, all which are vital to successful policy adoption and implementation. There is also a need to balance expert knowledge (capacity) with popular concern (legitimacy) and other lines of local evidence (Eversole and Martin, 2005). This can be done more effectively with strong governance structures and processes in place.

Governance is a combination of institutions, processes and relationships that exist at a range of scales (National, regional, local etc). Governance incorporates a complex web of networks, partnerships and services (Swan, 2009) which drives collective decision-making. Partnerships and productive relationships are important in underpinning effective governance, and provide the vehicle for participation.

Another element of strong regional governance is well coordinated and a 'joined-up' approach within formal government structures, with an aim to better integrate services and processes. This provides the stability, capacity and leadership to foster an environment of collaboration.

Regional Governance is the process by which people pursue their collective goals. It is a combination of institutions, processes and relationships that support shared decision-making. It is characterised by a complex web of networks and partnerships, both formal and informal. It seeks to empower regional communities through participation, accountability, leadership, coherence and coordination.

3.5 Environmental Issues

Proposed CSG developments must consider potential environmental impacts and develop a risk management plan. As outlined above, specific requirements and governing legislation vary from state to state and according to the timing and size of the proposed development.

The typical form of the current process is described in the steps below:

- *Step One – Identify Potential Problems:* Proposals must first consider potential threats to environmental assets.
- *Step Two – Consider Options:* Risk mitigation options are then considered.
- *Step Three – Propose Preferred Solutions:* A risk management plan is developed.

Only after steps one to three are the community consulted. For example, in Queensland companies must seek public comment for 1 month after finalising a draft Environmental Impact Statement. The project will usually be approved if the risk management plan is deemed by the responsible state government department to be acceptable

- *Step Four – Implement:* Activities will start at this point, for example the commencement of drilling.
- *Step Five – Review:* CSG operators are required to monitor environmental impacts; however there is currently no requirement on individual CSG companies to consider cumulative impacts of a large number of CSG wells.

Environmental issues associated with CSG include impacts on groundwater and surface water, treatment and disposal of groundwater pumped from the coal seams, and impacts on natural ecosystems of works and waste products.

Gathering of required evidence and proposals for solutions is often contracted to consulting firms with technical expertise. These firms usually rely on existing information on local and regional water resources and other environmental assets, generated over many years by government departments for other purposes (for example for management of groundwater resources such as the Great Artesian Basin). In the case of groundwater, this pre-existing information is used to generate a groundwater model which is used to predict the effect of aquifer depressurisation on groundwater levels, particularly connectivity between aquifers. In some cases this only includes the area proposed for development, but some companies have attempted to model entire groundwater basins.

Typically, EISs are lengthy, technical reports that are difficult to understand by non-experts (see for example Golder Associates 2009). For development of new gas fields, there is usually great urgency to be the first company to have their EIS approved, as later applications often get given more stringent conditions attached to them, in an attempt to consider cumulative impacts.

Some evidence, particularly hydro-geological, is sometimes also collected by the CSG companies themselves. For example, Origin Energy currently has the longest existing core cross-section from the GAB touring around Australia for information displays.

Impacts on groundwater and surface water

In Australia, CSG production has ramped up in the past 5 years. Today, there are a few thousand wells are operating (mostly in Queensland), with tens of thousands more planned. This is expected to result in approximately 300 GL per year of produced water to treat and dispose of, and millions of tons per year of salt (NWC 2010).

The National Water Commission (NWC; 2010) has described a number of potential risks to sustainable water management from CSG, including:

- impacts on connected surface and groundwater systems, some of which may already be fully or over-allocated;
- impacts on other water users and the environment due to depressurisation of coal seams;
- changes in pressure of adjacent aquifers, consequential changes in water availability, and potential reductions in surface water flows in connected systems; land subsidence over large areas;
- large volumes of treated waste water, which if released to surface water systems, could alter natural flow patterns and impact on water quality;
- fracking, to increase gas output, has the potential to cross-contaminate aquifers, with impacts on groundwater quality; and
- the reinjection of treated waste water into other aquifers has the potential to change the beneficial use characteristics of those, and surrounding aquifers.

The NWC (2010) also considers that CSG development could cause significant social impacts by disrupting current land-use practices and the local environment. CSG development could represent a substantial risk to sustainable water management due to uncertainty about water impacts, and the time periods over which they may emerge and continue to have repercussions. The NWC (2010) advocates for an adaptive and precautionary management approach, which is seen as essential to allow for the understanding of impacts, including cumulative effects, and to support timely implementation of effective management and compensation processes.

Disposal of waste water

Often CSG in Australia is extracted from coal aquifers. Groundwater is pumped out of the coal seam to release the gas. This produces large volumes of water which is often saline. Questions associated with treatment facilities (e.g. desalination plants) include where to dispose of treated water, which is required to be of high quality, and how to dispose of the brine. There are concerns over the potential to contaminate local fresh water aquifers in some areas. There is also concern over cumulative and long-term effects on regional groundwater (e.g. the GAB) of thousands of wells .

If fracking is used

The term fracking (hydraulic fracturing) refers to a process used to create and enlarge cracks in geological formations (including coal seams and shale) that contain the methane gas, to enable the gas to be extracted. In coal seams, the gas is attached to the surface of the coal on fractures known as cleats. In many coal seams targeted for CSG in Australia (for example 60% of the coal seams in the Surat Basin in Queensland), the fractures in the coal are already sufficiently open to enable the gas to flow without fracking, once the coal seam has been depressurised by pumping out groundwater.

Some coal seams in Australia, however, do require fracking. This is an expensive process and is therefore only used when necessary. Fracking is only targeted at well-defined coal seams and is designed to cause horizontal rather than vertical fracturing. Horizontal fracking is less likely to create connections between aquifers that are otherwise separated by an impervious aquatard. Even where the permeability of the

aquifer is not in question, buffers of 15-30m are put in place to deal with unintended vertical fracturing.

Fracking chemicals may be toxic (e.g. BTEX) and therefore the potential for contamination of other aquifers, surface waters and soil needs to be addressed, as does the volume and source of water used in fracking and the treatment and disposal of water and chemicals after fracking/pumping. Due to depressurisation, it is unlikely for chemicals to travel away from the core during the process, however the initial drilling and preparation (several days) poses a slightly greater risk, which has not been clearly defined.

Other environmental issues

Other environmental issues potentially include the impacts of access roads, drill sites, and waste water treatment plants on native vegetation and habitat, and the impacts of development of large gas processing and export facilities on marine environments (e.g. potential impacts of developments along the Queensland coast on the Great Barrier Reef).

3.6 Economic Issues

A number of large energy companies, including SANTOS, Origin Energy, BG Group and Arrow Energy, have invested many billions of dollars in the exploration and development of the CSG industry. Up to eight new liquefied natural gas port facilities (some still pending regulatory approval) are being constructed along the northeastern coast of Australia to accommodate the surge in gas exports. One distributed CSG project, by the BG Group, is expected to contribute \$32 billion in gross state product in Queensland over an 11-year period, demonstrating the significant economic benefits of CSG to the country. The employment prospects are also highlighted as a major advantage of CSG to the Australian economy, with the BG Group forecasting 1000 permanent positions, and an additional 5000 jobs during the project construction phase.

CSG reserves are generally considered to be the property of the Crown, allowing free passage over the land to access areas where exploration and mining licenses have been granted. Compensation to landholders under these circumstances differs between state jurisdictions. For example in New South Wales, landholder compensation is limited to the degradation of the land surface under the *Petroleum (On-shore) Act 1991*. The New South Wales *Water Management Act 2000* also allows for compensation to a water license holder for reduced allocations if this arises from changes to water access. There is no provision for compensation arising from deteriorating water quality to either surface or groundwater entitlements.

In Queensland, compensation to landholders is defined more broadly as an activity for which “the eligible claimant suffers that is caused by relevant authorised activities”, according to the *Petroleum and Gas (Production and Safety) Act 2004*. Compensation is claimable for activities that reduce access to

land, the value of land, a decline in land-use options, reduced land connectivity, any cost, damage or loss arising from the activities undertaken, and any reasonable costs in legal fees, accounting and valuations arising from a claim or land-use agreement. However, the entity exploring or extracting minerals according to the Act have the right to take or interfere with water as necessitated by the mining activity, with no limits imposed. In a similar way to New South Wales, the Queensland *Water Act 2000* requires that compensation only be paid to landholders for a change in water allocation upon a change to the water resource plan. This offers no avenue for compensation for deterioration to water quality or for local changes to groundwater availability (which wouldn't affect the water resource plan).

Managing Scope Creep...

Keeping a complex, highly integrated and wide-reaching topic contained within a policy process or a project brief is hard.

By week 5 of the project the Narnu Group had amassed a huge amount of information and research as foundation for developing the policy process. Small teams were formed to further develop the different elements of the project. This served to further open up the level of detail investigated. With each group generating new thinking on a more detailed element of the topic, the project was suffering from what has been termed 'Scope Creep'. The Narnu Group managed this by communicating early across the groups to check progress and scope. The project was continually checked back against the original objectives and deliverables.

3.7 Sifting through the Evidence Base

In order to identify potential avenues for improving the current CSG policy framework, the Narnu group applied their Policy Wheel process to the CSG issue.

Policy Wheel Phase	Application to CSG
<p>Policy doesn't occur in a vacuum – Context and integration must be clearly defined at the beginning. This requires understanding and consideration of the broader political, social, environmental and economic interactions. Ideally, policy development needs to be funded outside the political cycle to allow for long-term knowledge transfer and ongoing refinement.</p>	<ul style="list-style-type: none"> ● Existing state and/or national frameworks for management of water resources in the CSG industry are inconsistent. There is a need for a more consistent approach for management of water resources (including effects on water quantity and quality), paving the way for institutional reform. ● Strategic land assessment is recommended in order to understand where CSG is best positioned in the landscape for best value and minimum impact (such as that being developed in Queensland). ● A holistic and integrated approach is required in order to consider land and water issues appropriately and for stakeholders to engage with the conversation.
<p>Policy for people – The identification of, and conversations with, all stakeholders must be framed in the context of these broader considerations. This means clear boundaries can be set on what is up for discussion, leading to appropriate and considered responses around what is not.</p>	<ul style="list-style-type: none"> ● The policy process is failing in the case of CSG because many stakeholders feel they have not been adequately consulted and that few or no avenues for formal consultation are available. This leads to a lack of confidence in the process. ● The policy process should invest in the voice of a range of stakeholders to inform the process – the policy team should include stakeholders. Inclusiveness leads to better solutions.
<p>Don't Frame the blame – A shared vision/goal enables stakeholders to jointly take ownership of the policy process.</p>	<ul style="list-style-type: none"> ● An improved and publicly-available knowledge base about the diverse costs and benefits of the CSG industry, and resultant informed debate, will enable the policy team to identify visions and goals that all stakeholders will feel some ownership of. ● Management of water resources must include the whole water cycle including water use, production, disposal, treatment and beneficial use. This needs to also clarify water rights, definitions and entitlements so that the groundwater extracted as a “by-product” is accounted for in an appropriate way and consistent with other extractive uses.
<p>Address the source not the symptom – Workshop solutions.</p>	<ul style="list-style-type: none"> ● Improve the knowledge base of the social, cultural, environmental and economic costs and benefits of CSG mining, through targeted investment in critical

	<p>research.</p> <ul style="list-style-type: none"> ● Clear and effective communication of this improved knowledge base to all stakeholders, such that informed debate can build consensus over time. ● Building an evidence base should incorporate a diverse range of knowledge inputs including science, traditional and Indigenous knowledge, local understanding, economic data, and values of different sectors and stakeholders.
<p>Don't put the end in users – Discuss chosen solutions with stakeholders.</p>	<ul style="list-style-type: none"> ● The conversation with all stakeholders must be framed in the context of the broader political, social, environmental and economic considerations, but essentially be bound to the issue at hand. ● The current widespread public concern over CSG is demonstrative of a policy process that has failed to permit stakeholders to take ownership. A more inclusive policy development process such as that promoted by the Narnu Group should be used to develop more effective policy responses to CSG.
<p>Own the solution – keep conversing – Implement-review-improve.</p>	<ul style="list-style-type: none"> ● Cumulative impacts of the CSG industry (social, cultural, environmental, economic) need to be better understood and regulated through better strategic planning and integrated management. ● Policy development should facilitate rapid/reflexive decision-making within an overarching structure by making policy decision-making widely known as an experiment: monitored and modified constantly, and revised periodically. This shifts accountability in case of poor decisions, allows rectification and doesn't make a policy decision an end point: it's a means to an end which could be some time away.

Different levels of communication yield different results...

The whole Narnu Group discussing the project via phone hook-up provides the big picture and builds the collective vision; smaller group discussion then drills down into more detail and can be more descriptive (because there are less voices and more space); mixing up those small groups changes the blend of skills and thinking and the dynamic of communication – which yields a different result again; then having individual conversations amongst members digs deeper and more personally into the thinking, concerns, and ideas people have. Each layer of conversation has less and less structure (the fewer people you have to manage) setting the stage for the conversation. When combined, these levels and layers of communication provide a strong network of collaboration (and confusion sometimes).

Taking things to the next level by building upon the previous iteration...

Getting from the initial idea to the outcome seems to involve a process of alternating between working and thinking at the broad scale and then dropping into detail. This process of zooming in and out seems in part to be due to confidence and clarity. The big ideas at the outset feel daunting and overwhelming and so there is great comfort in sinking down into something smaller and more manageable to get across. Then panic sets in with the feeling that too much focus on detail will miss the bigger picture, and so on. At first, it seems like an inefficient way of working through an issue, but I realised that each change in focus is informed by the previous work and so the prior information is not wasted, but is built upon. This helps to develop clarity around the issue at multiple levels and provide a very sound understanding. I also learnt to expect this pattern, have confidence in the process and accept it as a valid way of progressing an issue with a group. Not everyone in the group feels the need to shift their gaze at the same time, and some people may feel more comfortable at a particular level, so members of the group may be out of sync. It's worthwhile suggesting to the group that a shift might be in order rather than silently panicking when everyone else seems to be working at a different scale to you!

4. Narnu Learning Reflections

To reflect is to learn and improve on what came before.

Scientific research is exciting, necessary and a useful resource that we believe should be incorporated more readily into the management of Australia's water systems, rivers and catchments. Researching multiple lines of evidence is a critical foundation for discussion, debate and building consensus. Silos are inevitable when investigating specific areas and are valuable for focused and detailed work. However it is important to recognise when they are required and how to bring these silos back together to work towards a common goal. Multiple lines of evidence need to align with agreed policy processes to pave a way forward for this land of "drought and flooding rains".

This report has essentially focused on wicked policy problems, drawing on the example of CSG. Wicked problems are described as such because they are rarely completely solvable. Rather, the processes you implement can make them better or worse. Making things better requires a broader, collaborative and integrated approach.

The recommendations and policy process described herein are applicable to other policy issues, not just CSG. Achieving clarity, confidence and consensus is about having a process that clearly articulates what you want to achieve and how you will get there. We recognise that there is a need to bring people on the journey with you. Engaging them in your vision is critical to success. We have learnt throughout this program that a shared journey will lead to strengthened bonds and therefore greater productivity. Incorporating communities, policy makers and those in the science world early on in the policy process will serve to strengthen the confidence and ownership we all have in the resultant policy.

Effective linkages between tiers of government as well as the intellectual capital that exists within academia and in other sectors of the community, particularly Indigenous, need to be established in order to generate and integrate knowledge to accurately inform our policy processes. Formal incorporation of local knowledge and community voice also lends legitimacy to any policy discussion and this must be balanced with expert knowledge. Participation in the generation of knowledge and the pathway for uptake is important for successful policy implementation. Strong regional governance, with healthy interconnected relationships between organisations, individuals, industry and layers of government underpins this.

Community engagement is paramount to the success of any policy. The increased pace of technology has meant that the community can be engaged on issues more rapidly than ever before, but also

presents challenges in the packaging of information into three second sound-bytes. Social media is the new reality for many community members, with stories and information being communicated in cyberspace within moments of their occurrence. The media hysteria surrounding CSG has doubtlessly muddied the waters, with public confidence being damaged. The issue has definitely been driven by emotive and less-informed media sources, which has polarised the discussion. Bringing people back to the table will be difficult. Although we acknowledge that conflict and debate can crystallise issues and bring them to the fore, in the case of CSG the lack of strong mediation of this conflict has led to a vacant space that is easily filled by emotion and opinion, unless moderated by a more objective adjudicator.

Technology however has its benefits and allows people to remain in contact from across the globe. Throughout our learning experience with the Peter Cullen Trust Program we relied heavily on the ability to correspond via phone and over the internet. But it was clear that working remotely in a group on a complex topic has a finite life span. Face to face communication is critical. This is true of any policy process. It is important to engage in face to face contact with all stakeholders to ensure they are on the same journey.

We all require an evidence base to make an assessment and critically analyse the information we receive on an almost constant basis. Our evidence base varies depending on our values, culture, education and style of thinking. What was made clear to us through this experience is that we cannot disassociate people from the knowledge they bear or how they accept and interpret information. It is not how much information we have but how that information is generated, communicated and adopted. It is time that we realise that it isn't Science to Policy that solves wicked problems ... it's **Scientists** to Policy **Makers** working together to achieve multiple benefit outcomes for the stakeholders they represent.

We are only as good as the people we have around us...

Leadership is not only about having the courage to stand at the front and speak with a strong articulate voice. This is but one facet of leadership. Leadership is more about finding and enabling the strengths in those around you that in turn find the strength in you.

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Appendix A – Narnu Group Charter

Mission Statement: A diverse group of water practitioners who seek to make a meaningful contribution to public policy issues in water management in Australia.

Background: The Narnu Group comprises 14 water practitioners who first came together during August 2011 in South Australia to participate in the second Peter Cullen Trust *Science to Policy Leadership Program*. The diverse group of individuals were selected from across Australia based on their broad range of skills and knowledge in rural and urban water management. In particular, each of these individuals demonstrated a commitment and capacity to bringing about positive change in water management in Australia.

Goals: In working together the Narnu Group has set the following overarching goals:

- To ensure individual ownership of group projects and activities - i.e. to maximise individual commitment and contribution.
- To build on the understanding of ourselves and others to improve our individual and group capacity to effect change.
- To practice speaking independently and clearly on complex issues.
- To optimise our learning from the broader Peter Cullen Trust network.
- To engage a wider audience on significant water management issues.

Code of Conduct: The Narnu Group seeks to collaborate on projects and activities that it feels will help fulfil its mission and goals. The Narnu Group's collaboration is guided by:

- Consensus on all projects and activities.
- Values of trust, respect, and honesty.
- Development of a clear and agreed plan for each project and activity.
- Chatham House Rules.

It is recognised that the individuals within the Group each bring a broad range of knowledge and experience in water management. While their current employers support their involvement in the Narnu Group, the projects and activities undertaken by the Narnu Group are independent of the respective current employer organisations.

Logo Concept: The Narnu Group's logo is representative of their collaboration. The background line represents a horizon as a future vision and a balanced viewpoint. You can see through the text which represents transparency.

The Narnu Group

Members: Richard Benyon – Principal Research Fellow, University of Melbourne

Tamara Boyd – Statewide Ecological Water Manager, Parks Victoria

Carolina Casaril – Climate-Water Scientist, CSIRO; Senior Policy Officer, QLD
Department of Environment and Resource Management

Kaye Cavanagh – Principal Officer, Natural Environment Planning, Ipswich City
Council

Linda Christesen – Senior Policy Analyst, Victorian Department of Sustainability
and Environment

Michael Douglas – Director, TRaCK, Charles Darwin University

Suzanne Long – Senior Scientist, Reef & Rainforest Research Centre

Susan Madden – Executive Officer, Macquarie River Food & Fibre

Anne Poelina – Managing Director, Madjulla Inc

Kirsten Shelly – Project Manager, eWater CRC

Dominic Skinner – Research Fellow, University of Melbourne

Simon Treadwell – Practice Leader Aquatic Ecology, Sinclair Knight Mertz

Andy Westcott – Catchment Coordinator, Molonglo Catchment Group

Susan Williams – Senior Water Planner, WA Department of Water

Acknowledgement: The Narnu Group is grateful for the opportunity provided to them by the Peter Cullen Trust and the *Science to Policy Leadership Program* from which their collaboration stems. In particular, the Narnu Group acknowledges the guidance and support of their program facilitators Leith Bouilly, Rob Patrick and Colin Hendrie.

Appendix B – Group Project Plan

Project Title: Narnu Group ‘Course Project’

Background and Purpose: Participation in the Peter Cullen Trust *Science to Leadership Program* requires the group to complete a course project that is aimed to help the group think across science, policy, politics, media, values, ethics and constitutional matters to be able to practice what Peter Cullen is best remembered for – his superb capacity to synthesise and communicate complex ideas, simply and clearly, to local communities, policy makers and politicians in a way that supported them to make decisions and take actions.

Specifically, the course project requires the group to:

- Review the current literature in relation to the ‘science – policy’ interface and develop a consensus position on the role of science in the policy development process.
- Select a significant emerging or current national public policy issue that is directly related to water management (urban and/or rural) in Australia, and design a policy development process that you believe will achieve sufficient consensus for political action.
- Design an ‘event’ or ‘activity’ that could be hosted by the Peter Cullen Trust to promote public debate about the issue and the role of science in informing decisions (please be realistic in your choice of ‘event’ or ‘activity’).
- Reflect on and synthesise your individual and collective leadership learnings from this project.

Project Sponsor: The Peter Cullen Trust, represented by facilitators Leith Bouilly and Rob Patrick

Project Context: The participants of the second Peter Cullen Trust *Science to Leadership Program* have formed the Narnu Group – a diverse group of water practitioners who seek to make a meaningful contribution to public

policy issues in water management in Australia.

The Narnu Group operates according to a Team Charter, which outlines their Mission, Group Goals and Code of Conduct. A copy of the Charter is attached to this Project Plan.

The Narnu Group seeks to collaborate on projects that help fulfill their mission and group goals. This Project Plan has been developed in line with this Charter.

Project Goals: To successfully deliver on the 'Course Project' by:

- selecting a topic that is 'owned' by each of the individuals within the group
- consolidating group learning from Session 1 of the PCT Science to Leadership Program
- working together to maximise the benefits from the groups diverse range of skills, knowledge and experience
- optimising learning from identified experts
- engaging with a broader audience

Project Event: This part of the project is still in the planning process. Events under considerations include: a CSG board game, a Q&A type forum or an information page on ScienceAlert.
