

# Communicating the science of climate change

## HOT AIR SYMPOSIA TIPS AND HIGHLIGHTS

*Compiled by Jenni Metcalfe for the Australian Science Communicators*

*Supported by*



Environment,  
Climate Change  
& Water

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*Draft 6 August, 2010*

## ACKNOWLEDGEMENTS

This document could not have been produced without the significant contributions of all the chairs, speakers and participants at the three Hot Air symposia held in 2009 and 2010. I would like to thank these people for their time, especially those who contributed to the small group discussions. These people are listed at the back of this guide.

I would like to give especial thanks to Karen Pearce from Bloom Communication for volunteering her help in reviewing the initial draft of this document and including the outcomes of the Canberra Hot Air small group discussions into the draft document. Will Rifkin from the University of New South Wales also provided critical input and feedback to the most recent draft.

The symposia could not have run as successfully without the support of volunteer facilitators and recorders in Perth, Brisbane and Canberra. Will Rifkin from the University of New South Wales was instrumental in guiding, training and supporting these volunteers. He also provided critical and very useful feedback to the development of this document.

The symposia were hosted and organised by the Australian Science Communicators (ASC). ASC members generously gave voluntarily of their time to assist me in organising these symposia and drafting up this guide. ASC Membership Officer, Kali Madden, was particularly helpful in organising registrations and venues for the symposia. Immediate past president, Tim Thwaites was involved in all three symposia and provided me with much needed support and mentorship.

In Perth, Nancy Longnecker from the University of Western Australia was of enormous help organising volunteers and providing support for the symposium. In Brisbane, Joan Leach from the University of Queensland was also very supportive. Both Universities provided financial and in-kind support for their local symposia.

In Perth, the Hot Air symposium was held in conjunction with Greenhouse 2009. In Brisbane the symposium was held as part of the 10<sup>th</sup> International Ecology Congress. I would like to thank the organisers of both these meetings for their support and encouragement. Both provided venues and local support for the symposia.

I would like to thank my team at Econnect Communication. Over the past couple of years they have not only helped me organise the symposia and identify relevant issues, but they have shown great patience as I took time out from 'proper work' for the symposia and this publication. Sarah Cole, in particular, was a huge help in helping to review, add to and put this document together.

The New South Wales Department of Environment, Climate Change and Water provided financial support to assist in developing and drafting this document and I would like to thank them for their generous support.

This is a living document and we would welcome your feedback to its evolution.



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## SUMMARY OF TOP TIPS

Below is a summary of the top tips from the Hot Air symposia for communicating with the public, the media, governments or businesses. All these tips are based on having a good understanding of the specific target groups that you wish to communicate with.

### The public

1. Work with social scientists to better understand the specific groups you wish to communicate with, including current perceptions, attitudes and concerns
2. Use positive messages and examples to inspire and motivate and to establish positive social norms about both mitigation and adaptation (and avoid messages of fear and guilt)
3. Use vivid language and images to communicate the concrete nature of climate change
4. Communicate local / regional examples of changes and actions that are relevant to specific groups
5. Collaborate with trusted messengers and 'champions of change' to engage people in conversations in places where they feel safe
6. Provide a range of simple and cheap options for behaviour change
7. Foster two-way communication by involving people by using their knowledge

### The media

1. Provide pithy accurate facts and quotes about climate change science
2. Update about new scientific information as it becomes available
3. Use new media (e.g. blogs, social network sites, twitter) as well as traditional media (e.g. editorial pieces in newspapers)
4. Stress that 'balance' in the climate change debate means that 90% of climate scientists agree that climate change is occurring and that this has been exacerbated by human activities; they disagree about the details but not the main message
5. Work with specialist science and environmental journalists as well as general journalists
6. Recognise the deadlines and constraints that journalists work under
7. Get the best-available science out there as soon as possible; don't wait to correct media misinformation or inaccuracies

### Governments

1. Distil and translate the complexity of climate change science into a series of short sharp messages
2. Acknowledge and explain any uncertainties in the scientific details
3. Provide relevant synthesised information that is not prescriptive of policy
4. Use examples and case studies to explain the science and possible solutions
5. Provide specific details on the costs and benefits of mitigation and adaptation actions
6. Identify priority areas for action based on risk assessments
7. Support and promote government leaders to make change by being open to questions and scepticism and thereby building a relationship of mutual trust

## Business

1. Engage through personal dialogue to find out what information they need and then deliver that information
2. Describe the actual or possible effects of climate change on their business
3. Explain the differences between adaptation and mitigation actions and provide skills and knowledge about how to implement appropriate actions
4. Support collaborations between business, governments and NGOs to take climate change action
5. Provide certainty about the environment and rules affecting business
6. Foster and promote business leadership
7. Showcase successful actions by business to mitigate their greenhouse gas emissions or adapt to climate change

## INTRODUCTION

### The Hot Air symposia

Human-induced climate change is now accepted as fact by the vast majority of climate change scientists. The Australian public also mostly accepts this view, although scepticism is an ongoing issue. The current Australian Government is moving to minimise carbon use by industry and individuals and has taken an active stance internationally on this issue.

The next step will be a difficult one. Reductions in carbon use will require changes to the way Australians live, affecting jobs, energy prices and transport. They will increase the cost of living at a time of economic fragility. The arguments on climate change will be tested again and again as policies are proposed.

The Hot Air symposia were organised on the premise agreed by more than 90 per cent of the world's climate scientists that human induced climate change is occurring. **Given that climate change is occurring, how can science communicators work with governments, industry, business and communities to help generate solutions to the problems it raises?** To answer this question, three Hot Air symposia were organised by the Australian Science Communicators in 2009 and 2010:

- Communicating the science of climate change in a sceptical world  
Greenhouse 2009 conference, Perth (March 2009)
- Communicating the science of climate change with government, business and industry  
10<sup>th</sup> International Ecology Congress, Brisbane (August 2009)
- Communicating the science of climate change with the people  
Australian Science Communicators' conference, Canberra (February 2010).

The symposia looked at the role of science communication within the multi-disciplinary context of working with governments, industry, business and communities to provide solutions to climate change. Climate change is now a social issue not just a scientific issue.

The objectives of the symposia were to:

- increase awareness and understanding of the issues and opportunities associated with communicating climate change to assist in the generation and adoption of useful mitigation and adaptation strategies
- discuss factors influencing ethical and clear communication of and engagement with climate change science
- identify 'best practice' in communicating about climate change science to assist in the generation and adoption of useful mitigation and adaptation strategies

Each symposium followed the same format – a morning of presentations and panel discussions followed by an afternoon workshop where participants worked in small groups to develop ways of addressing the issues raised in the morning session.

Symposia programs, along with the questions that each symposium was seeking to address, are included in Appendix 1. Symposia participants, who all contributed to the development of the content of this publication, are included in Appendix 2.

## This document

The material in this publication was collected at three Hot Air symposia to provide tips and insights for the effective communication of climate change science based on the broad body of evidence and experience in the Australian science communication community.

This document is envisaged as being a resource for those who need to rely on climate change science in formulating, influencing, or enforcing policy, stimulating businesses, organisations, and families to change behaviours, and generally developing beliefs that something has to be done to avert and adapt to climate change.

## Audience

This document was developed by and is intended for:

- science communication professionals, including science journalists, writers, editors, institution-based communicators and consultants
- scientists involved in communicating climate change science
- others involved in communicating about climate change, e.g. policy makers, industry leaders, business leaders, community leaders

## Format

The tips and insights are presented in the seven steps of a communication strategy used by Econnect Communication and typical of steps in most effective communication strategies:

1. Objectives – what do you want to achieve with your communication?
2. Target groups – who do you want to communicate with?
3. Understanding – what do you understand about your target groups?
4. Messages – what do you want to convey to your target groups?
5. Tactics – how are you best going to communicate with your target groups?
6. Evaluation – how do you know when your communication is effective?
7. Action plan – who is going to do what to implement the communication?

The document focuses on the public, media, governments and business as target groups for communication about the science of climate change.

This document does not include specific information about evaluating your communication of the science of climate change (step 6), and focuses on the communication roles of the various players under step 7, Action Plan. We also provide a list of useful references for exploring this topic in more detail, although this list is certainly not exhaustive.

**One of the objectives of the symposia was to develop ‘best practices’ in communicating about climate change. However, this document provides more ‘rules of thumb’ or heuristics rather than tested and peer-reviewed ‘best practices’ that provide specific rules for communication.**



## STEP 1: OBJECTIVES

### What do we hope to achieve from communicating climate change science?

*“We have the dubious privilege of living through two big meltdowns: one liquidating the financial markets, the other the Arctic sea ice. And they are not unrelated.*

*With exception of a few recalcitrant deniers, most people now agree that climate change is one of the greatest challenges facing the human race, although they may not care about it as much as we might expect, given all the attention it has had. Despite the fact that numerous reports indicate that failure to act will actually cost substantially more than prevention, many politicians, and the voters who elect them, continue to prevaricate or make largely token gestures to solve the problem.*

*In fact, there is increasing evidence that, if anything, there is a ‘tendency for the public to distance themselves from the causes, impacts and responsibility for tackling the problem.’<sup>1</sup> And most of the solutions contemplated are focused on ways to allocate a given level of carbon emissions rather than on sharply reducing the extraction and consumption of fossil fuels. We continue to act and think as if resources are unlimited and the planet is infinitely capable of absorbing our wastes.”*

*- Dr Carmen Lawrence, Perth Hot Air Symposium*

Irrespective of the success of efforts to reduce greenhouse gas emissions, some climate change will occur. Events have already set us along a path of inevitable change and associated impacts. This means communities, governments and businesses will also need to adapt to the changes that occur.

There is unlikely to be any lasting reduction of greenhouse gases without action on numerous fronts, all of which are underpinned by human attitudes and behaviours, government policies and controls, new technologies and economic willingness to change.

In this setting, what do we hope to achieve from communicating climate change science?

#### **To inform**

One of the objectives of communication about climate change is to increase knowledge about the scientifically proven impacts of climate change and the available solutions for mitigating or adapting to climate change.

Having sufficient confidence in the science is a prerequisite to developing informed opinions of the problem and then acting. Instilling sufficient confidence starts with the scientists.

#### **To change attitudes and behaviours**

A second objective for communicating about climate change is to change people’s attitudes and behaviours to:

- (a) mitigate climate change by reducing greenhouse gas emissions
- (b) adapt to inevitable climate change

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<sup>1</sup> Whitmarsh, L. (2009) What’s in a name? Commonalities and differences in public understanding of “climate change” and “global warming” *Public Understanding of Science Online* First published on September 16, 2008 as doi: 10.1177/0963662506073088.,

Any significant effort to reduce greenhouse gas emissions and change behaviours will also require significant economic change. Business and industry will need to operate differently and support community and government actions with new technologies and services.

There are five essential facets to bring about changes in attitude and behaviour:

- The need for change
- A vision for change: what will it look like when we get there?
- Willingness to change
- Knowing how to change
- Resources and support to change

### **To influence government policies**

A third objective of communication is to influence government policies and regulations to help people to mitigate and adapt to climate change.

“Policy makers need to reinforce accurate beliefs and correct inaccurate ones while linking effective solutions to the explicitly stated causes,” said Dr Carmen Lawrence at the Perth Hot Air Symposium.

### **A checklist of possible objectives**

The following objectives are those most commonly applied to communicating about science, which is perceived to be ‘risky’, such as climate change. The objectives focus on a two-way communication process.

#### **Relationship and networks objectives**

- To find out the perceptions, concerns and communication needs of target groups
- To build and maintain the credibility of the organisation/project in the minds of target groups
- To build a relationship (personal *and* bureaucratic) incorporating both feelings and data
- To identify and maintain informal and formal networks for communication

#### **Information exchange objectives**

- To give target groups the data they need to increase their understanding
- To keep target groups informed throughout the project
- To tell target groups what the organisation/project has done, is doing, and plans to do
- To tell target groups what the organisation/project cannot do, and why
- To answer questions that have arisen and respond to any concerns
- To gain information from target groups

#### **Involvement and evaluation objectives**

- To provide maximum opportunities for productive input from the target group including, where appropriate, a chance to help make and carry out key decisions
- To coordinate actions within the organisation/project and with collaborators so communication is consistent and effective
- To involve target groups in the research

### Action objectives

- To tailor new practices and policies to suit target groups
- To increase adoption of new practices
- To influence policy development
- To precipitate change in specific behaviours or practices
- To shift specific attitudes

## STEPS 2 AND 3: IDENTIFYING TARGET GROUPS AND UNDERSTANDING THEM

Scientifically, the climate is a complex system, and we are still working to understand what all the elements of the system are and how they fit in with and react to each other. The science of climate change is about uncertainty and about natural variability. Hot Air speaker, Jess Tyler communicator with the Antarctic Climate and Ecosystems CRC, said: “The science is on the run. The planet is definitely on the run, and policy is being made on the run.”

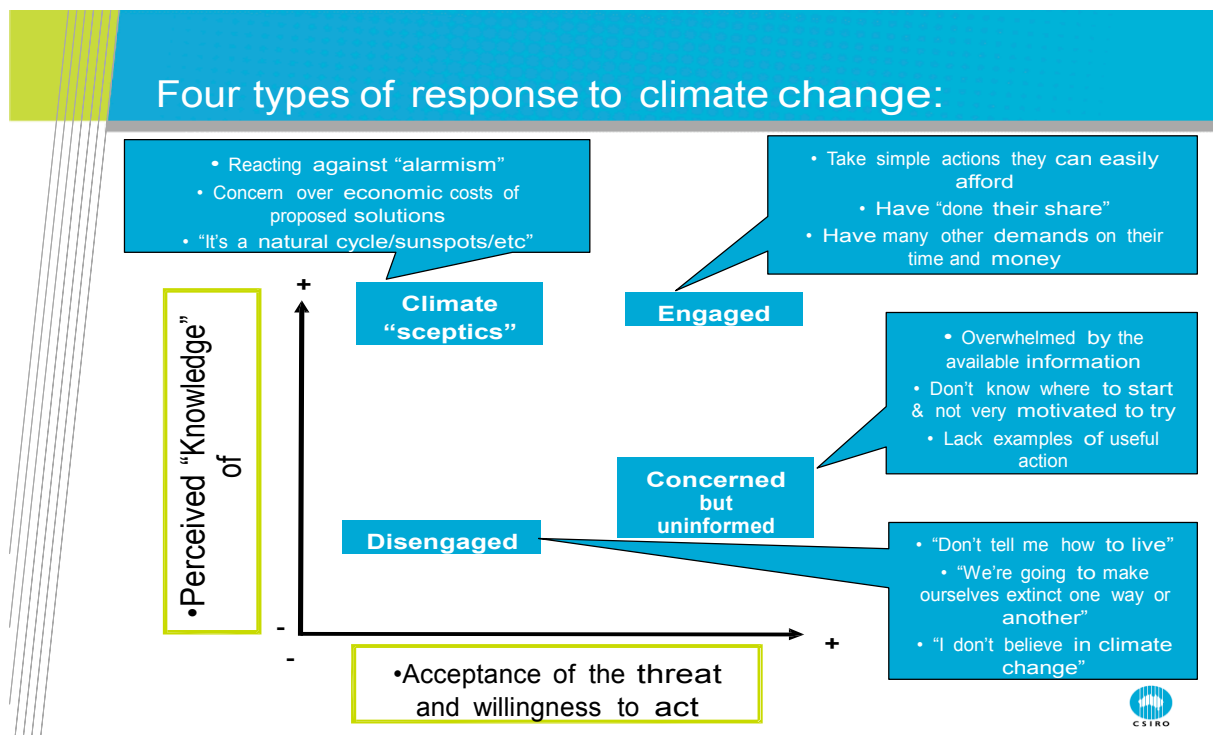
Even though the weight of scientific evidence is that climate change is a reality, climate is such a complex system and possible mitigation and adaptation measures depend on so many socio-economic factors, there is intrinsic scientific uncertainty about the details of climate change and how to address the issues. This gives rise to many discussions, not only in the scientific literature but also in the government, business and public arenas.

The target groups for communication covered by this document include the public, the media, and governments (including politicians).

### The public

There are a lot of voices out there now talking about climate change, not just those from the scientific community. Dr Susannah Elliot of the Australian Science Media Centre observes, “Climate change is a now a social issue, and it is a very broad issue.”

Perth Hot Air speaker Anne-Maree Dowd, a CSIRO social scientist, talked about the four different reactions people have to climate change, as shown in the diagram below. She recommends that our communication with people should be guided by these responses.



To mitigate or adapt to climate change requires social change and, according to Dr Carmen Lawrence from the University of Western Australia, “the public’s willingness to accept the seriousness of the situation, to support the necessary government intervention and to change their own behaviour as well.” Such behaviour change may need to be extensive given that electricity use in Australia is predicted to double in the next 20 years.

### ***Understanding people’s psychology***

In May 2010, **Dr Carmen Lawrence** spoke to ABC’s *Bush Telegraph* program about the psychology of people’s behaviour around climate change. Dr Lawrence is the director of the Centre for the Study of Social Change, at the School of Psychology, in the University of Western Australia.

She used the example of the ‘bystander effect’ to describe behaviour around climate change – where the more people who can help, the less action each person takes.

Dr Lawrence said that we don’t actually experience climate change directly – average Australians spend only an hour per day outside – so we first have to notice what’s going on.

“We aren’t close observers of nature,” she says, “so we have to rely on others to tell us what’s going on.”

Our motivation to act is tied to factors like personal responsibility, and a sense of belonging, she says.

“If you think that it’s up to you, you’ll act. Having more people around who could possibly act diffuses responsibility. Or if you have a strong sense of identity or belonging, that can help too,” Dr Lawrence says. “It doesn’t help that climate change effects usually happen somewhere like Bangladesh. We have to change people’s perception of connection. We have to present climate change as relevant to humans, not ice sheets. People think, ‘well, that’s not me’.”

She says that to inspire action, climate change has to be presented as affecting people’s health, their communities, themselves. Unfortunately we’re very optimistic as a species, and think “that’ll never happen to me.”

When questioned on how to convince and motivate people about climate change, Dr Lawrence was quick to explain that “fear doesn’t really work. It drives people away too much and can sometimes force people into ideas that are the opposite.”

“Some of the most powerful motivators are comparisons,” she says. She gave the example of publishing neighbourhood statistics on water and electricity use – the highest users will tend, when they see their usage compared to others’, move toward the average. “People will change on the basis of only information, in fact,” she says.

Dr Lawrence says that a vital step in communicating climate change is to convey that there is no panacea. “All the steps to fix this require humans, not just governments, to change. All require a change in perceptions and behaviour.”

Canberra Hot Air speaker Professor Will Steffen said that climate change is an issue of societal transformation, not a science or communication issue: “It’s a pervasive, profound, emotional issue that challenges our concept of progress. We are affecting the fundamental life support system of the planet, and this generates a legitimate fear of what’s going on.”

Dealing with the complex problem of climate change calls for an understanding of human behaviour and thought patterns and how these are shaped. For example, US psychologist Dan Gilbert<sup>2</sup> argues that “Global warming is a deadly threat precisely because it fails to trip the brain's alarm [like terrorism would], leaving us soundly asleep in a burning bed.”

The first step in effective communication with people is to better understand their perceptions, concerns and needs. This is particularly true for achieving behaviour changes. Hot Air speaker, Dr Carmen Lawrence, suggests that we need to examine what we already know about human psychology with regard to:

- Values - what values people bring to their assessment of the environment and to their consumption of resources
- Risk perception - how people judge the seriousness of the risks they confront and how they respond to such threats
- Attitudes - how attitudes toward environmental issues are formed and changed
- Methods - what methods of persuasive communication are most likely to facilitate changes to attitudes and behaviour, and which could backfire (e.g. using messages that incite fear)
- Techniques - what are the most effective techniques for producing rapid and widespread behaviour change
- Barriers - what barriers and habitual modes of thinking prevent the adoption of climate friendly patterns of behaviour, and what incentives and social forces facilitate such behaviours

Canberra Hot Air speaker Giselle Wilkinson said that we need to remember to avoid lumping all audiences together: “The word ‘people’ gives the wrong message – people need to know this, people need to do this... But it’s never all people. It’s some people, most people. We need to identify each audience.”

Founding member of the Wentworth Group of Concerned Scientists, Leith Bouilly, agrees: “Labelling can be a source of conflict. One size doesn’t fit all. Farmers and rural communities are all different.” She said that farmers can have very different ideas about risk-taking approaches on their farms.

People don’t always behave rationally. Their attitudes and beliefs may be shaped more by their own personal experiences or others that they know. These in turn determine their behaviours. We live

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<sup>2</sup> Gilbert, D (2006) if only gay sex caused global warming. Why we’re more scared of gay marriage and terrorism than a much deadlier threat. *Los Angeles Times*, July 2.

very much with a lifestyle that is about consumption. Asking people to change this consumption can lead to people feeling you are attacking their values and culture.

We need to better understand what people know and understand about climate change. Gaining this understanding may require the expertise of the social scientist. That is extra efforts and expense; however, unless we begin with this understanding, we are likely to have communication programs that create reluctance or resistance rather than acceptance to what we are trying to achieve.

“There has been a steady flow of studies on how people perceive and experience climate change, how their perceptions have changed, whether they understand the causes of and solutions to climate change, and how they judge the importance of climate change against other areas of public interest. Because of its complexity, we know that climate change is difficult for people to conceptualise.

“For almost 15 years, studies from the developed world have shown that people view climate change as a serious problem. In Australia, 75% of voters believe that climate change is a major problem and support government action to introduce energy efficiency, clean electricity generation and motor vehicle emissions reductions.

“Generally speaking, however, in most of the world climate change is rated as a lesser priority than other, more personally relevant issues. The Lowy Institute poll of 2007 found that Australians rated tackling climate change after improving education and health as the most important goals for Australia. In some parts of the world, climate change still ranks below other, more tangible, environmental risks, such as nuclear power and radioactive waste, industrial pollution and ozone depletion.”<sup>3</sup>

Investigations have also shown that most people still have a fairly limited understanding of the causes of climate change, and they typically do not have an accurate picture of what and how human behaviour is responsible. Their understanding of key concepts is far from complete, and the terminology used may produce further confusion... Misunderstandings are evident even in countries with relatively strong environmental values.

While there has been some recent improvement in the knowledge base, many respondents, including in Australia, continue to confuse the greenhouse effect with ozone depletion, and a majority probably still do not appreciate that burning fossil fuels is the main anthropogenic contributor to global warming or that global warming is the result of increasing CO<sub>2</sub> emissions. When respondents to such surveys are not provided with a list of possible causes, their understanding is even poorer.

Many of the behaviours that people were less likely to link to climate change are those that they are also least prepared to address in their own lifestyles... A recent study found that although 61% of those surveyed said they felt a moral obligation to do something about climate change, most had

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<sup>3</sup> Lorenzoni, I & Pidgeon, N (2006) Public views on climate change: European and USA perspectives. *Climatic Change*, 77:77-95.

little faith that other people would act to tackle climate change and believed that ‘action should be equitably enforced, rather than left up to individuals.’<sup>4,5</sup>

Social research conducted by CSIRO and presented at the Brisbane Hot Air symposium backs up Dr Lawrence’s comments above. CSIRO’s Dr Peta Ashworth reported that a recent survey of 2,000 Australians showed that people did not link their own behaviours to their energy consumption and greenhouse gas emissions.

Many people believe that climate change is someone else’s future problem, and they also tend to overestimate their ability to survive adversity. Climate change does not tend to loom large in people’s minds, especially if they don’t have direct experience of it. However, people generally like to do the right thing. As Dr Lawrence said in her Perth Hot Air address, “We are in many respects, altruistic and cooperative”.

Dr Craig Cormick, Manager of Public Awareness and Community Engagement at the Department of Innovation, Industry, Science and Research (DIISR), observes that people’s attitudes are actually not often about the science of climate change. “Attitudes are not necessarily formed by logic; so they are not influenced by logical arguments,” he says. “When information is complex, they make decisions based on attitudes and beliefs rather than facts, and seek out affirmations of their current ideas.”

### Sceptics and deniers

Sceptics exploit the nature of scientific uncertainty. Perth Hot Air speaker, Dr Kevin Hennessey describes three types of sceptics: “There are trend sceptics who deny that there is any global warming, or for example, that there has been cooling since 1998 or 2001. There are attribution sceptics. These are those who believe that there is global warming, but only see natural causes for it. And finally there are impact sceptics who accept that there is warming and that maybe humans have some contribution to it, but that future warming and climate change will be harmless or even beneficial.”<sup>6</sup>

Canberra Hot Air speaker Sarah Clarke, ABC science correspondent, said that the sceptics’ “campaign is well orchestrated, with scientists and journalists copping the flak. The recent IPCC errors are unfortunate, and are giving sceptics a voice. They are trying to discredit the scientists by shooting the messenger.”

US risk communication expert, Peter Sandman<sup>7</sup>, likes to talk about climate change deniers rather than sceptics and classifies three different types of deniers:

1. Strategic - those who deny climate change to protect their job, business, position, relationship

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<sup>4</sup> Whitmarsh (2009), op cit, p 11.

<sup>5</sup> Excerpt from Dr Carmen Lawrence’s speech at the Perth Hot Air: Communicating the science of climate change in a sceptical world, 24 March 2009

<sup>6</sup> Excerpt from Dr Kevin Hennessey’s speech at the Perth Hot Air: Communicating the science of climate change in a sceptical world, 24 March 2009

<sup>7</sup> Source: [www.psandman.com/col/climate.htm](http://www.psandman.com/col/climate.htm) Feb, 2009



2. Intellectual – those with a genuine disagreement with climate change based on their own scientific understanding
3. Psychological – those who deny climate change because it challenges their beliefs and /or behaviours or because they emotionally can't cope with the thought of climate change and its impacts

Peter Sandman<sup>8</sup> suggests that psychological deniers of climate change are increasing in our society, and says that quite often they may appear to be people who are apathetic about climate change, but in fact they're deniers. They're deniers because they have what he calls 'cognitive dissonance', which is where climate change challenges some behaviour or belief they have, so they try and justify that behaviour or belief by denying climate change.

The other type of psychological denial is an emotional response where people feel that they don't have any power to change anything anyway. They feel angry, they feel sad, they feel guilty, and because of that, they deny the need to mitigate or adapt to climate change.

However, Canberra Hot Air speaker Leith Bouilly emphasised some positive outcomes around 'deniers'. "We should be able to have a conversation around our differences. Differences generate creativity. For example, despite my husband having questions around science and policy, he's still willing to change," she said.

### ***Deniers and sceptics***

In May 2010, New Scientist published a series of editorials on denial and scepticism.

**Debora MacKenzie**, a New Scientist writer since 1984, wrote about sceptics, deniers, and the reasons behind denialism. MacKenzie notes that sceptics examine the evidence for a claim but are willing to change their minds based on where that evidence leads them. This is a crucial facet of good science.

On the contrary, deniers start with a predetermined position, and look for evidence that confirms their ideas. Incongruous evidence is ignored or dismissed. She says that deniers "are driven by ideologies", not evidence.

When the science around an issue needs to be taken on trust, scientists can be seen as alien or arrogant. This can cause people to establish a conspiracy or 'underdogs fighting a sinister agenda' ideology. However, the psychology behind these process, says MacKenzie, is a normal way of human thinking. It involves anecdotal evidence, appeals to emotion and cognitive shortcuts.

The primary reasons for this, writes MacKenzie, are about control. When people are faced with difficult and seemingly uncontrollable issues, decrying the science is a way for them to gain, or regain, control over 'nature'. It's a coping strategy: if it isn't true, I don't have to do anything about it.

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<sup>8</sup> Source: [www.psandman.com/col/climate.htm](http://www.psandman.com/col/climate.htm) Feb, 2009

Scientists have a lot to learn from denier movements about communicating to these people, MacKenzie says. They see appeals to emotion and anecdotal evidence as wrong and manipulative. But just “giving facts and figures” won’t always lead people to a particular (nor the same) conclusion. “There are lessons here for other scientists who engage with denial. They can only win by learning to speak to [people who engage through emotion or anecdotes], who are otherwise likely prey for denialists,” she says.

**Dr Michael Shermer** wrote on the importance of scepticism. Shermer is the founder of Skeptic magazine, regular columnist for Scientific American, and Adjunct Professor of Economics at Claremont Graduate University. He says that denial cannot merely be quashed. “We should not cover up, hide, suppress or, worst of all, use the state to quash someone else’s belief system. There are several good arguments for this,” Shermer says.

“1. They might be right and we would have just squashed a bit of truth.

2. They might be completely wrong, but in the process of examining their claims we discover the truth; we also discover how thinking can go wrong, and in the process improve our thinking skills.

3. In science, it is never possible to know the absolute truth about anything, and so we must always be on the alert for where our ideas need to change.

4. Being tolerant when you are in the believing majority means you have a greater chance of being tolerated when you are in the sceptical minority. Once censorship of ideas is established, it can work against you if and when you find yourself in the minority.”

But despite his support for freedom of ideas, Shermer believes that even after scientific evidence shows something like climate change to be unequivocal, deniers can’t simply be ignored.

“Those who are in possession of the facts have a duty to stand up to the deniers with a full-throated debunking repeated often and everywhere until they too go the way of the dinosaurs,” he says.

## Media

The media is an important source of information on climate change for many people, however the nature of the media has changed substantially over the past decade. “There is absolutely no doubt we are in the midst of a revolution in the media landscape,” said Dr Susannah Elliot. “What started as a rumble 20 years ago when the Internet started is now a major cause of change... and it’s in meltdown at the moment.” The emergence of blogging, You Tube and social networking sites such as Facebook is changing the way in which people communicate with each other. People no longer only turn to the daily newspaper or TV or radio news broadcast when looking for information. Discussions of climate change in the new media landscape should not be ignored in favour of focussing on traditional media outlets.

People’s attitudes and understanding of climate change is often shaped by the media. And scientists or science communicators providing information to the media want their information to be reported accurately.

*“I’m sorry to say that the media out there in general is a little fickle when it comes to climate change. It does sensationalise. It does pick up the bad news, because believe it or not that’s what people generally do want to hear. They don’t want to hear the good news. They don’t want to hear how we’re going to mitigate against climate change - the new environmental engineering that’s emerging to protect our coastlines, to protect people exposed to tsunamis... And like it or not, tsunamis, heat spells, and bush fires - one way or another they’re getting linked to climate change. Marriage bust ups are getting linked to climate change.”*

*- Carmelo Amalfi, Perth Hot Air Symposium*

Journalists are time poor. “When you are dealing with climate sceptics and people who are from left field, you don’t have a lot of time to weigh up their arguments, pick holes in it, and then write something well reasoned... because you simply do not have the time,” said Perth Hot Air speaker, Mike Hopkin from the *West Australian* newspaper. And editors also want to see ‘balance’ in stories (which can be understood to be a search for contrast to make the story embody some dramatic conflict). So they are looking for dissenting views. This often means that journalists call sceptics just to provide that ‘balance’/contrast, even if those views are not peer reviewed and do not reflect the majority of scientific opinion.

It can be important to differentiate between science journalists and general journalists. However, as the media panelist in the Brisbane Hot Air stated specialist science reporters are a dying breed, especially with changes to the media and the global financial crisis, which has caused science and environment reporters to be let go. This means more and more generalist reporters are communicating about climate change.

Brisbane Hot Air speaker Emma Marris, a freelance science journalist, also talks about the increasing boredom of journalists with climate change: “What I’ve been noticing recently is that the story about climate change, that it is bad and that it is happening and that there are impacts, is starting to get a little boring for the media. The tricky thing here is that there is a lag time for the public. I think the public is still coming to terms with the fact that it exists. Not everyone’s convinced. I sat next to a guy on an aeroplane recently who said: ‘Well, I know there’s just as many scientists who don’t believe in it, as do’. There’s a lag time where the public is getting used to the idea that it exists, and that it is happening, and that there are impacts you can see right now. But journalists are getting kind of a little bit bored of the impact stories.”

## **Governments**

Tim Thwaites provided an overview of the political environment in his opening address at the Perth Hot Air symposium:

*“Politically, things are hotting up as well. The Australian Government has unveiled its opening gambit in responding to climate change: a review leading to a green paper and subsequently a white paper, and the plan for an emissions trading scheme. And the lobbying has begun in earnest. Conservationists believe it’s too little too late and are pushing for a harder line. Energy dependent industries, of which metal processing and mining are not an inconsiderable part, are predicting dire things for the Australian economy and pushing for a softer line, particularly in*

*touch economic times. And the opposition seems to be doing its thing as opposition, it's simply opposing.*

*Most scientists and many eminent economists are saying that things are as bad, if not worse, than our worst predictions and if we don't stop sitting on our hands, events will overtake us. But no government yet, seems willing to absolutely commit itself to doing something about climate change.*

*And then just to make things interesting there's the global financial crisis. Some suggests it's intimately concerned with climate change, in that free enterprise, competition and capitalism are major causes of over-exploitation of fossil fuels, and therefore climate change won't be slowed without completely dismantling and re-organising our economic systems, and we'd better get on with it. Not surprisingly, many of our leaders, and many of those who will benefit most out of the system as it is, argue the contrary: that we have to strengthen our economies along traditional lines before we will be in any position to fight climate change."*

*– Tim Thwaites, Perth Hot Air Symposium*

Since the Hot Air symposium, the Australian government has failed to get its emissions trading scheme up, and some say the former Prime Minister Rudd's failure to achieve a consensus at Copenhagen or to implement an emissions trading scheme lead to his downfall.

At the Brisbane Hot Air symposium, Professor Ian Lowe spoke about politicians using scientific uncertainty as a reason for inaction. "I sometimes ask them if they were uncertain about whether the brakes on their car worked, would they regard this as cause for doing nothing," he said. "If they were uncertain about whether the plane they were about to take was going to reach its destination, would they still get on the plane? If they thought that it was only a 50% chance of the plane reaching Sydney, would they still get on it? And of course very few people would. But we're now in a position where there's about a 50% probability of doing irreversible climate damage, and people seem quite happy to get on a plane and flip the coin."

***Example: Anecdotes are powerful (source: Dr Graeme Pearman, Perth Hot Air)***

At the Perth Hot Air Symposium, climate scientist Dr Graeme Pearman shared an experience that illustrates how powerful anecdotes can be when communicating about climate change.

"About three years ago - so you'll know which political party was in power - I had an opportunity to talk to 15 Ministers, and one after the other, about climate change over a period of two days, and of those 15, five, at some point in time in the discussion, were confronted and their response was: 'Ah but I know someone who lives down the street whose uncle remembers that his grandfather said this happened'. And they did not realise that what they were doing was taking highly subjective anecdotal information and weighing that more importantly than the IPCC information... It's a behavioural issue around people defending the status quo. They [people] don't really want to change... and they find it difficult to handle the confrontation that climate change brings."

After being concerned about the uncertainty of the science, politicians then want to know the costs and benefits of action, but this is, according to Professor Lowe, generally compromised by the short terms in office that politicians face.

Dr Helen Fairweather, from the Queensland Climate Change Centre of Excellence, spoke at the Brisbane symposium about the enormous challenge for governments posed by climate change. “If we are to mitigate emissions, there will have to be dramatic shifts in either how we live our lives, or in the use of fuel that power them,” she said. “The challenge is also not just limited to the need to change behaviour to mitigate further emissions, but also the need to prepare communities to adapt to the changes expected in the climate and the consequences of these changes.”

However, Dr Fairweather said governments rely on scientists to translate their science so that governments and communities can act on it. In particular, they need to have the knowledge “to distil the complexity of the climate change problem into key messages.” The government needs sufficient information to obtain the right balance of “legislation, regulations and incentives to bring about the changes required to mitigate greenhouse gas emissions, and prepare the community for the changes that are now inevitable.”

“There is often a gap between the publication of scientific information and the development of evidence-based policy,” according to Brisbane Hot Air speaker, Amy Dumbrell from the Australian Department of Climate Change.

Those in government are often faced with the need to provide advice on different and specific science issues regularly. Ms Dumbrell said, “The research is often complicated and can even appear contradictory if you don’t understand the context or subtle differences in terminology.”

Local governments are not recognised in the Australian constitution and get their powers from the States, which means these vary across Australia, although representatives are locally elected. Brisbane Hot Air speaker, Anne Leitch, said they face a contradiction in powers: “They’re trying to manage upwards and manage downwards, and to manage sideways, all at the same time... and because these decision makers live in the community that they represent, they have to live with their everyday decisions and play personality politics at a different level to the other tiers of government...As an arm of State Government, they set and manage many strategic and long term goals and policies, but as the elected representatives of the people they take many small decisions and actions that cumulatively amount to graduate shifts in community behaviour and values... This puts them in the box seat for being managers of adaptation to climate change.

Anne Leitch talks about the challenges for local government dealing with the complex issues of climate change, especially given that:

- the facts around climate change are unknown and contested, and there are high levels of risk and uncertainty, especially about biophysical impacts – “how big and how fast?”
- action on climate change brings values, resources and rights into serious conflict where there is a need to manage private and public interests
- there is a wide range of political stakeholder interests that go across land release, zoning, development approvals, building codes, and risk assessment

## Business

The area of business that got the message of climate change earliest was the insurance industry. In Brisbane, Professor Ian Lowe spoke about how, during Kyoto Protocol negotiations, the insurance industry recognised that “the losses for property damage in the first five years of the 1990s were greater than for all the 1980s, and the losses for the 1980s were greater than for the 1960s and 1970s put together. Climate change is real.”

Some Australian-based industries are also progressive when it comes to climate change. The Australian Conservation Foundation was involved in getting together a group called the Business Leaders Round Table, which consisted of the CEOs of companies like Westpac, BP Australia, and Visy. Three years ago [2006], that group reported both on the climate science, and the risks and benefits of reaction, saying that: “The science is clear. We are changing the global climate. It does pose unacceptable risks to business, as well as to the community, and we think there should be a concerted response.” (REF)

CSIRO did a study<sup>9</sup> of 242 organisations around Australia to find out what they understand about climate adaptation and mitigation. Brisbane Hot Air speaker, CSIRO social scientist Peta Ashworth said most organisations saw climate change as an important issue affecting them. However, most of these organisations did not distinguish between mitigation and adaptation: “Many of them haven’t done vulnerability assessments from an adaptation point of view. And some respondents are waiting to be told what to do, and generally there’s a great deal of lack of expertise and resources.” This was particularly true of businesses not in the resources industries (e.g. farming and mining). For these businesses, there are no clear rules about what they should or shouldn’t be doing to mitigate or adapt to climate change.

### ***Communicating what we already know – the value of extension***

*Graeme Anderson, Senior Subject Specialist – Climate Change, Department of Primary Industries, Victoria*

DPI Victoria is two years into their first climate change extension project thanks to a recent Victorian Future Farming initiative. Graeme Anderson, the team leader, says that he and his team know all about what works and what doesn't when it comes to talking climate change in rural areas. They have already delivered over 300 sessions to 10,000 people across rural Victoria. "Good extension practice is about having skilled communicators working with local networks, and making sure the key science, policy and best practices are understood by farmers so they can make decisions accordingly," he says.

Farmers rely on the weather more than most of us, and they have in-depth knowledge of local seasons and historical weather patterns. "That's why farmers appreciate a more comprehensive explanation of what's happening with our weather patterns and climate drivers," Graeme says. "The language of climate change is complex, but it's time for a more sophisticated dialogue."

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<sup>9</sup> Gardner, J, Dowd, A-M., Mason, C. and Ashworth, P. (2009). A framework for stakeholder engagement on climate adaptation. CSIRO Climate Adaptation Flagship Working paper No.3. <http://www.csiro.au/resources/CAF-working-papers.html>.

The team surveyed 1500 farmers to find out how farmers think about climate change, seasonal variability and emissions in agriculture.

“We found that farmers don't like talking about global climate change issues, but love hearing stories and scientific explanations of what drives the trends they have witnessed in recent times. Our local ‘Upscaling’ sessions help link local observations to the latest science. This work out in the field ensures key climate science gets to where it’s needed,” Graeme says. While climate change has been discussed at leading scientific and policy levels for the past decade, he says there is a lot of information that has never been effectively communicated to farmers.

“It’s about being matter of fact and not getting caught up in who's a believer or who's a sceptic,” he says. Graeme says that, “Like most people, farmers are busy and often overwhelmed by today's information overload. They like talking about solutions. Our challenge is to make sure climate information is communicated to farmers in a way that is accessible, relevant to their location and industry, in language they understand, and from sources they can trust.”

## STEP 4: MESSAGES

### Established science basis for messages

The core science of climate change has been known for a long time. At the Brisbane Hot Air Symposium, Professor Ian Lowe spoke about *Living in the Greenhouse*, a book he wrote in 1989 when he was working as Director of the Commission for the Future. The book drew together what the science was saying 20 years ago:

*“This was saying that, by the mid 2020s, we would probably see incontrovertible evidence of climate change. It would probably manifest in increasing average temperatures, it being drier in southern Australia and wetter in northern Australia, perhaps more frequent extremes like floods, cyclones, extended dry spells, heatwaves and severe bush fires, and perhaps the spread of vector borne diseases like dengue, as the habitat range of the insects that carried them was spread by climate change... Three years ago a revised edition was brought out and... they put a picture of the Canberra bushfires on the cover, and the editor said this was a deliberate political act. He said ‘The Canberra bushfires were the culmination of a summer which was, by past standards, unusually hot and unusually dry.’ But what the science was saying was that this sort of summer will be business as usual by the 2020s, and so we could expect more events of this sort...No one such event proves that climate change is happening, but the best test of a scientific theory is can it make predictions which are testable, and in the case of climate science it was making predictions 20 years ago, all of which have been verified. The alarming thing is that the climate science 20 years ago was saying we might see these effects by the mid 2020s, and we’re seeing them already now.”*

Consensus on climate change science has been reached through the peer review process, which is fundamental to good science in any field, and the periodic assessments produced by the Intergovernmental Panel on Climate Change (IPCC). Unfortunately, peer review, which is used a lot when talking about the rigour of climate change science, is not always understood.

*“[Peer review is] the process by which scientists write a manuscript, they will submit it to a scientific journal - preferably one that is high impact, so one that does have a very high citation rate - and then of course it goes through a process of going out to be reviewed, to perhaps two or three expert reviewers in that particular field. Comments are then given back to a particular scientist, they are given advice as to whether they should make some major changes or minor changes, and sometimes they are told that this particular manuscript is rejected. So it is a very rigorous process by which scientists can actually get their information published in a peer review journal. It guarantees quality.*

*The Intergovernmental Panel on Climate Change (IPCC) doesn’t do research, it assesses the peer reviewed scientific literature... the focus in the last assessment report was on the evidence of climate change, the potential causes, projections for the future, and then looking at impacts, vulnerability, and adaptation and mitigation*



*as solutions. I won't go through the number of scientists involved as that's because I'm sure you're well aware it's in the thousands, so the sheer weight of involvement of experts in their fields is very impressive and compared to the number of sceptics that are actually publishing their views in the peer review journals, it's very, very unbalanced."*

*– Kevin Hennessy, Perth Hot Air Symposium*

Professor Will Steffen said that although we need to communicate the science, “the credibility and trust issue is new. We need to communicate the trustworthiness or reliability of the information.” Hot Air speaker Giselle Wilkinson, founder of the Sustainable Living Foundation, agrees. “It’s easy to lose credibility, like the IPCC. We need to be squeakier than squeaky clean.”

When the IPCC scientists put out their fourth assessment report in 2007, agreeing they had a consensus that climate change was definitely occurring and that it was certainly our fault, it made journalists’ jobs easier, according to *The West Australian’s* Mike Hopkin, who spoke at the Perth Hot Air Symposium. “That illustrated better than anything else the strength of the consensus...and that’s what journalists need because we don’t have time to figure these things for ourselves.” Mike used this strengthening consensus among scientists to report on the claims of a climate change sceptic and to illustrate that most reputable scientists disagreed with sceptic.

Professor Will Steffen, Canberra Hot Air speaker, said that “although details might be debated, there is no debate about the core science.” He also points out that when talking about climate change, it should be communicated that when the IPCC says ‘very likely’, they mean ‘more than 90% sure’.

Canberra Hot Air speaker Peta Ashworth, CSIRO Social Scientist, said, “We don’t try to convince sceptics – people with entrenched views will only become more entrenched. We try to use conversations. Thirty-percent of people are active and engaged with climate change, 11-17% are sceptical or want the government to fix it, but there’s a big hump of people in the middle. We want to concentrate on the middle bit, and use the actively engaged citizens to engage with them.”

## Common mistakes to avoid

Australian Chief Scientist Professor Penny Sackett said at a recent climate change communication summit that four big mistakes had been made in communicating about climate change:

- **Labelling people:** for example, as denialists. Engaging people who doubt science is difficult but ignoring or trying to shout them out is not effective. We might uncover more truth when we listen to their thoughts.
- **Use of quotes** like “there is no more room for debate”. This leaves science open to ridicule and damages credibility. We need to stress that there is uncertainty.
- **Constant focus on the negative:** It’s a disaster to focus on the results of inaction – people can’t see negative impacts yet so this leads to mistrust. Giving reason to hope will inspire them to feel included and to take action.
- **Not remembering that communication is a two-way street:** It’s important to find out how target groups want to be communicated with and how they best interpret messages. The best way to find this out is to listen.

Better messages are needed for communicating about climate change. Peter Sandman<sup>10</sup> suggests that this is particularly important for preventing emotional denial of climate change. In particular, he suggested that we need better messages that don't:

- Create fear
- Cause guilt
- Ignore technologically possible solutions
- Forget to mention unintended consequences
- Forget adaptation in the push to mitigate
- Ignore people and companies' differing abilities to adapt or mitigate
- Take pleasure in bad news
- Forget to acknowledge that there might be disagreement about scientific details, even though the core science is not debated.

### Shaping messages

How information is provided or 'framed' matters, but which 'frame' matters most will vary with context and person. As Dr Lawrence said at the first Hot Air Symposium, "The focus of policies should be on the individual, the group, or some combination of smaller and larger groups. Social marketing works. Except when it does not." Often, the facts are not as important these days to the average person as the way they are packaged.

As well, Giselle Wilkinson said, "we won't be able to get the whole population climate literate, but we need to get them environmentally literate... We need to reclaim the discussion, and we need people who are not experts – for instance, sometimes I don't know the answer, but I can tell someone where to find it."

Professor Penny Sackett said that although the science has been misconstrued, and scientists themselves have sometimes been involved in this, we "need to find the best way to present the *essence* of climate science." She also warns of confusing scientific and ideological debates: "They think their gripe is with the science when really it's with the policy being developed to deal with climate change."

Climate change information is complex and, as in every field of science, there is some disagreement about detail or interpretations of data. It is also made more difficult by the fact that we don't have long term data sets about climate given we have not been keeping records for that long. Furthermore, it is very difficult to talk about concepts that are shifting and changeable as new research happens. This means, messages about climate change science need to:

- Adjust the information that is provided according to what society needs to know – the information should be tailored to the needs of your audience
- Stick to the facts – but strip them back to the basics so anyone can understand; be prepared to give journalists pithy but accurate quotes
- Update about our climate knowledge as new information becomes available

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<sup>10</sup> Source: [www.psandman.com/col/climate.htm](http://www.psandman.com/col/climate.htm) Feb, 2009

- Acknowledge and explain scientific uncertainties – try to make space for this in your communication by taking people through the steps in logic
- Communicate the range of possibilities when making climate projections, not just the most extreme or the average

***Climate change booklet not about just sitting on a shelf***

*Dr Simon Torok, Communication Manager at CSIRO's Marine and Atmospheric Research*

"Climate change is the greatest ecological, economic and social challenge of our time." So says Dr Andrew Johnson, Chief Executive of CSIRO's Environment department.

Dr Simon Torok, a communication manager with the CSIRO, worked with a number of communicators and scientists to develop a 32-page booklet about the science behind tackling climate change.

"It summarises the basic science of climate change in very accessible language. It then goes on to address ways to reduce emissions, and addresses the need to adapt to climate changes that we're already seeing," says Simon.

Relevance to audiences was carefully designed into the content and format of the booklet. "It hasn't just been a booklet or a brochure that's produced and sits on a shelf," says Simon.

Each part of the content—the science of climate change, reducing emissions, and adaptation—includes examples and projects within CSIRO.

Published in September 2009, Simon is confident of the reach of the booklet. "We had it launched as part of a presentation by our chief executive at the National Press Club. It was also dropped in the mailboxes of every politician in Canberra, and it was up on our website."

"We are trying to ensure that the basic science, and how to tackle it, reaches those who need it," he says. "This is one of the projects we've done at CSIRO that I think has achieved this."

- Avoid overstating the facts or advocating a specific course of action that makes it look like you have a vested interest; however, embrace emotion if you can back it up with peer-reviewed publication
- Use specific local and regional examples rather than talking about global trends - provide climate change examples that make it directly relevant to people; otherwise they will think it's someone else's problem happening sometime in the future
- Talk about the possible solutions to mitigating and adapting to climate change, not just the likely impacts
- Encourage positive stories about what people are doing, instead of just what everyone is not doing
- Use images and language that are concrete, vivid and easy to imagine; people will perceive a risk to be more serious if they can easily imagine it and they are more likely to act on such risks (e.g. instead of saying 0.6°C over a century, say x days this year over y degrees, compared to last year/decade, or chances of a good/bad rain season instead of % decline). This includes geographic scales too – global examples are likely less concrete than what will happen in someone's backyard

Hot Air speaker Professor Will Steffen emphasised that “the action is really in the ocean, not the atmosphere; warming of the ocean has accelerated in the past decade – and this is what needs to be communicated”.

***Simple messages, clear images the key to media presentations***

*Robert Price, botanist, ecologist, and environment communication, Centre for Marine Studies at The University of Queensland*

Robert Price is a keen photographer, botanist, ecologist, and environmental communicator. He works at The University of Queensland’s Centre for Marine Studies. “I’ve also worked in international youth climate movement for a three-month period in the past,” Robert says.

Robert has a passion for clear communication and knows what makes for an effective media presentation.

“Messages have to be very clear and tight – not trying to cover too many bases at once. That’s the way the mass media takes it in, in small visual and audio bites. Another tip is making it visually engaging – making it look fun, in a sense,” he says.

He recalls a particularly effective media stunt. “It involved a very neat, very visual presentation of information, which was a person dressed as Obama with a Superman costume on, and ‘1.5 degrees’ on his chest. And he did it in front of a prominent landmark, the Brandenburg Gate.”

The stunt encouraged government leaders to action so that global warming does not go beyond a temperature increase of 1.5° Fahrenheit.

“What was so effective about it was that the visual image was very neat and clear, and the press release explained very clearly the messaging. It was a tight package of information,” Robert says.

The visually engaging part of the stunt was that “the media could latch on to and film” the character. Robert says he’s “seen other things that were much messier and they didn’t work because there were too many messages.”

In shaping messages it is useful to:

- Get specialist science communicators with experience in climate change to help shape messages and information
- Reflect on what social science is finding out about how to communicate with people
- Create space for different sorts of knowledge to be considered with the science, including policy, economic, and local knowledge

Professor Tony McMichael, from Australian National University’s National Centre for Epidemiology and Population Health, talks about scientists representing uncertainty. He says that he finds it useful to explain climate change uncertainty in the same way as you would be uncertain about the final total of a grocery or electricity bill.

## Delivering messages

- Avoid mixed messages; be consistent in the messages that are delivered (across organisations, projects, etc)

### **Example: Avoid mixing up messages**

At the Perth Hot Air Symposium, Simon Torok from CSIRO Marine and Atmospheric Research reported a time when he strayed from a consistent message and may have confused the story by focusing on an interesting scientific result.

*“If you have a look at the Australian-wide average rainfall, there is actually a slight positive trend, so it could be interpreted that Australia is actually getting wetter. But of course, the most populated areas of Australia and certainly in this part of Australia [Perth], and over in south-eastern Australia, it’s in drought. But there is this interesting scientific result from research in collaboration with the Bureau of Meteorology’s National Climate Centre where if you look at an Australia-wide average, we’re actually getting more rainfall due to the impact of increasing rainfall in the northwest of the country... which is also consistent with the physics of the planet as far as climate change is concerned: the planet is getting warmer and wetter.*

*So I referred to this in a media release about the results, saying Australia is getting wetter in the midst of a drought. And so we got calls... saying: “Can you just explain what you’re saying in this media release? It’s really quite confusing”. So that was, I think, a mistake in that I diverged from this consistent message about how climate is changing in Australia with some parts getting drier and others wetter, for the sake of this sort of interesting bit of science relating to an average across the whole country that I thought was worth talking about.”*

- Don’t wait to react to inaccurate media statements or sceptics getting it wrong – get the correct science out there as soon as possible
- Use the media to get messages out, but try and work with the science specialists who know the broad science around communicating climate change (The nature of the media means they often ignore the complexities of the problem and truncate messages to suit diverse audiences; for scientists this could mean it is taken out of context. However, the scientists need to understand how the media operates and work to present clear simple message to their audiences)
- Be prepared to work with generalist journalists (including economic and political writers) by preparing simple direct and factual messages (especially important as science journalists decline and climate change becomes a political and economic story rather than merely a science story)
- Encourage scientists to write opinion pieces in major newspapers
- Provide snippets of information that are easily digestible – and make these compelling, vivid and accurate
- Use Internet media – including You Tube and social networking sites to communicate your message; put your climate change messages on-line
- Use a variety of media to get messages out; sceptics are very good at this (see example box)

**Example: Use trusted and popular publications to get your messages out, sceptics do!**

A participant at the Perth Hot Air Symposium shared this story about sceptics getting their message across in a popular sustainability magazine:

“My sister is currently a stay-at-home mum, and she reads this magazine called *Kindred*. It says on the title that it’s about sustainability, connection parenting, and intelligent living. She said, ‘There’s this article on climate change, and I’d really like you to read it for me and give me your opinion, cause it’s got me questioning climate change for the first time ever’. It was just a classic sceptic’s article, with all of the same old arguments that are very easily refutable, if you have a bit of background knowledge. She didn’t really have the background knowledge, didn’t have the time to sort of go and trawl through the internet, but because this article came in a source that she trusted, it actually had her questioning the whole thing for the first time. It was astounding to me to witness that. The author was quite clever in pitching it as the environmental movement’s been duded, and he pitched himself as an environmentalist and gave this extra credibility. I think that they [sceptics] are getting a little bit cleverer about getting into different sources of media and tapping into those sources that people trust.”

## STEP 5: TACTICS

The following tactics are suggested for achieving the three key objectives suggested in Step 2:

1. To inform
2. To change attitudes and behaviours
3. To influence policy

### To inform

While it is important to be proactive, it's also important to correct misinformation about climate change that is publicly available. This includes correcting climate science where likely impacts have been exaggerated.

#### **Example I**

The communication team at the CSIRO's Division of Marine and Atmospheric Research tries to respond to public calls and emails requesting climate change information as soon as possible. They believe this helps them to get the correct science out there.

#### **Example II**

John Cook at [SkepticalScience.com](http://SkepticalScience.com) uses a rapid response system to check climate sceptic articles that are published, to see if there's a rebuttal available for the argument. He also has a network of climate writers available to respond to blogs in the same way.

John has also helped to develop an iPhone application and a Firefox plugin that can link to [SkepticalScience.com](http://SkepticalScience.com)'s appropriate rebuttal article. "The idea is that you don't have to dig through mountains of information to find answers," he says.

### To change attitudes and behaviours

Suggestions for changing behaviours and attitudes are described below under the actions of informing, engaging and consulting:

#### Informing

- Making positive behaviours the 'status quo' (e.g. a German power company asked people to tick a box if they did NOT want green power, the opposite to what normally happens, and this resulted in most people being on green power through default)
- Help people to envision a bright, detailed future (e.g. focus on better organised cities, home-grown food)
- Provide people with information about simple cheap actions they can do to make a difference (e.g. shorter hot showers can cut 25% of a household's energy use)
- Provide people with a larger range of options; people often make judgments based on processes called "anchoring and adjustment", which means a decision such as how much to donate, can be influenced by the range of options offered – the larger the categories offered, the bigger the donation made; the same might be true of energy conservation decisions

- Appeal to people’s sense of altruism and desire to do the right thing; if we can get public figures to commit to action publicly it will encourage others to do so – and such social norms are particularly powerful when there is a level of uncertainty about the information
- Demonstrate appropriate behaviours by promoting things like green houses and green transport – have things that people can see, touch, hear and feel (Some Australian TV programs such as *The Block*, *Carbon Cops* and the *Ecohouse Challenge* show people options for action, but as Brisbane Hot Air speaker, Dr Joan Leach said: “Viewers are getting a pretty strong message from commercial television that the moves they’re going to have to make in order to reduce their carbon footprint, are pretty extreme, they’re pretty difficult to do, and you can probably only do it with the help of a TV crew”)

***Music and movies: communicating to the world***

*Leanne McKnoulty, Director, SHaM Corporate Communication*

The ‘SHaM’ in SHaM Corporate Communication stands for ‘sustainability, humanism and motivation’. In line with the sustainability mission, director Leanne McKnoulty embarked on a series of student workshops about climate change.

“I was involved in workshops a couple of years ago with 120 students from Nudgee Junior College in Brisbane.” The brief was to talk to students about their relationship to the environment.

“We got them to write a song about how climate change and environmental change was likely to affect them,” Leanne says. “With the help of a very experienced musician, they came up with some really creative stories which they set to music, recorded, and put on CD.”

The songs were then taken to an even wider audience: the world. “Their songs were put on YouTube as well!”

“It was a reminder for them, in the long run, about how important the environment is to them,” says Leanne.

**Engaging**

- Use trusted messengers and champions of change; often trust in the messenger is as significant as the message in shaping public perceptions and behaviours (e.g. trustworthy public figures, Bureau of Meteorology, CSIRO)
- Appeal to niche demographics if it will significantly help with disseminating knowledge (e.g. use women to talk to women about climate change, or school kids to engage parents)
- Engineer social situations where people can act! Creating situations where people can act creates social pressure, and a response to social pressure doesn’t actually require a change in attitude. Shift the perception of what’s socially desirable.
- Engage with people in an environment they already feel safe in using a deliberative process of engagement where people develop more informed opinions throughout the process, e.g. CSIRO’s Energymark program (see example box).



### ***Energymark engages people in climate change around kitchen tables***

*Energymark* is a CSIRO program designed to inform individuals about climate change and energy, and to assist in changing behaviours for a sustainable future.

*Energymark* works through a number of small community based networks. Each network group commits to a series of eight meetings to discuss energy and climate change. Balanced information is provided to support the discussions. Groups progress through the topics at their own pace.

After each meeting, the group convenor sends a short summary of the key points raised and any scientific technical questions to CSIRO. The CSIRO research team will endeavour to find a CSIRO scientist to answer the group's questions. At various stages of the process, participants also complete questionnaires and two carbon footprints to further inform CSIRO about the range of perspectives and actions in the community.

See: <http://www.csiro.au/science/Energymark-Trial.html>

- Involve people by using their own knowledge of their surroundings; if you involve someone in the creation of knowledge, they're more likely to understand it, e.g. the Earthwatch Institute's ClimateWatch program (see example box)
- Run a series of workshops that involve conversations around climate topics
- Apply engagement principles to creating a community dialogue (see box below provided by Anne Maree Dowd, CSIRO)

## Engagement Approach

### Essential Engagement Principles

**Inclusiveness** - recognising that effort, acknowledge and incorporate ideas and perspectives

**Mutual respect** - provides the opportunity to explore, listen and understand different viewpoints, values and beliefs by encouraging others to share their experiences

**Transparency** - the open sharing of and access to information

**Mutual responsibility** and **accountability** - actively contribute to building a better solution, define boundaries and expectations helps to build confidence in the participants about the process

**Adequate resources** - confirm the overall commitment to the process

**Mutual trust** - trust is crucial if real outcomes are going to be achieved from any engagement activities



CSIRO's Dr Peta Ashworth has been engaging with businesses at various levels to communicate about climate change. She suggests:

- Engage with influential CEOs from large companies through personal dialogue
- Engage with small to medium firms through discussions to find out what information they need and then finding that information
- Provide education about the skills and knowledge needed to implement mitigation and adaptation actions
- Support collaborations (e.g. between Shell and WWF)
- Foster business leadership

### ***Public engagement through blogging helps biodiversity experts***

*Laura Miles, State Director of Museums Australia (Victoria), and Editor of the Australian Science Communicators*

Many of Australia's flagship museums have plunged into the world of geomapping. In Melbourne, for example, a recent addition to Museum Victoria's website is a biodiversity page, which maps the distribution of different animal species and how that changes over time.

Laura Miles, Victoria's State Director of Museums Australia, is excited about the website.

"It's really handy because it shows that different scientists have had special areas of interest, over time. Particular biodiversity experts back in the day were very interested in certain places. It's not necessarily an accurate description of where the species are, but it might show towns that they like visiting again and again," says Laura.

"I think there should be more initiatives in Australia for citizen blogging and biodiversity initiatives. There are a lot of Australians who are deeply interested in climate change, and I think we could do more," Laura says.

An example of a public biodiversity initiative in the UK is a website called 'I Spot' ([www.ispot.org.uk](http://www.ispot.org.uk)). The website is a citizen blogging website that actively invites members of the public to submit where and when they've seen a species.

"It allows people not just to plot species, but also ask experts questions about those species. A year and a half ago, one of the first questions was about a species of bat that was spotted," Laura says. "The experts replied to the blog, asking about this particular bat, to say what kind of bat it was and what a rare find it was."

Laura is interested in the opportunity for engaging the public like this. "The experts were also able to educate people visiting the website about how you shouldn't photograph bats because of conservation reasons and it disturbs their natural habitat," she says.

"So that was a really, really exciting development, and it was one of the very first examples [of public biodiversity initiatives]."

## Consulting

Professor Will Steffen had this to say on social consultation: “Scandinavians have a good background on social issues – they consult with people. They are using 50% renewable energy and want to be rid of fossil fuels by 2025 – and they did it by talking with industry and the community ad nauseum.”

Canberra Hot Air speaker Leith Bouilly, founding member of the Wentworth Group of Concerned Scientists, also called for more consultation. “There is less community engagement and consultation than there has ever been. It’s not really the science, but the policy responses that are divisive. This is because we are not allowed to have a voice.”

Dr Andrew Ash, Director of CSIRO’s Climate Adaptation Flagship, says that adapting to climate change is actually going to be a social and collective process. “We need to ask communities how they can adapt, and for their ideas on what to change. We also need to know more about what won’t work so we can avoid that.”

### ***ClimateWatch: using local sightings of plants and animals***

*ClimateWatch* is an Earthwatch Institute program that monitors Australia’s changing rainfall and temperatures. *ClimateWatch* engages people by collecting their observations of plants and animals in their local area, to help inform climate-related research.

Details people can enter about a sighting include location, species, behaviour (for animals), number, habitat, weather, and more. This information is not only reviewed and used by researchers, but visitors to the site can look at information collected. Participants can also build up an archive of their own sightings.

And, like *ClimateWatch*, *RedMap* is a similar fish-spotting project. A specific aim is to show people the information they provide is valuable. Projects like these not only engage participants, but help to foster communication between citizens and researchers.

See <http://www.climatewatch.org.au/> and <http://www.redmap.org.au/>

## To influence policy

Policy-makers want to base their decisions upon the best available information. At the UN Climate Change Conference in 2009, the then Prime Minister Kevin Rudd said that, “without science, we are just building castles in the air.” But scientists, by their very nature, are cautious and reluctant to get involved in policy discussions. As Hot Air speaker, Jess Tyler said: “They don’t like it. They don’t want to get pinned down into a corner to make a specific projection.” When dealing with policy makers, it is important to:

- Acknowledge any uncertainties in the science
- Keep messages short and sharp
- Update messages as new information becomes available
- Provide information relevant to their needs that is not prescriptive, e.g. be policy relevant rather than prescriptive
- Use examples and case studies to explain the science and possible solutions
- Support government leaders to create change – we need leadership

**Example: Antarctic Climate & Ecosystems Cooperative Research Centre booklets for governments**

The Antarctic Climate & Ecosystems CRC (ACE CRC) published a series of short and sharp booklets that were position analyses specifically designed for bureaucrats and people in policy. They aimed to distil the best science about climate change. They were distributed to government representatives at all levels, from Ministers, to political advisors and relevant bureaucrats. They were accompanied by a one-page summary sheet that was also distributed to the media.

The CRC progressively updates the booklets as new information becomes available. They also try to back up the messages in these booklets with other relevant information. The following position papers are available on the CRC's website <http://www.acecrc.org.au>:

- Ice sheets and climate change (June 2009)
- Ocean fertilisation: science and policy issues (Dec 2008)
- A post IPCC AR4 update on sea-level rise (Sept 2008)
- Climate change, sea-level rise and extreme events: impacts and adaptation issues (Sept 2008)
- CO2 emissions and climate change: ocean impacts and adaptation issues (June 2008)

At the Brisbane Hot Air Symposium, Amy Dumbrell from the Australian Department of Climate Change pointed out that the Department's most central need is for synthesised information. "Placing the latest research in the broader context of climate change science is crucial to assisting our policy makers understand and apply its findings," she explained, citing the ACE CRC's *Ice sheets and climate change* briefing paper (described above) as an example of what government needs in the face of conflicting messages.

*"Recently the British Antarctic Survey published a study which found that sea ice in Antarctica is increasing. The newspapers quickly picked up on the press release, focusing on specific aspects with headlines such as 'Revealed: Antarctica ice growing not shrinking'. These headlines were somewhat misleading as they did not distinguish between the sea ice and ice sheets, creating confusion and of course resulting in the Minister's office requesting an urgent briefing.*

*Our biggest challenge was ensuring that the Minister and her advisors understood that the key findings of the study, including the difference between sea ice and ice sheets, and also that the findings were consistent with what we would expect under a changing climate and ozone depletion.*

*Luckily for us, the Australian Antarctica Division and the ACE CRC were on the front foot, and very quick in providing us with synthesised information, publishing a position analysis... This position analysis answered the key questions the public were asking us such as 'Why are Arctic and Antarctic sea ice responding differently to climate change?'*

*This synthesised information saved us a lot of time... And would also prove invaluable when responding to the numerous letters we received from the public claiming the study was evidence that climate change is not occurring. This example reveals the importance of getting headline statements that are accurate and that non-experts can readily interpret, how the media's interpretation of press releases can detract from the meaning of the research, and the importance of recognising potential misunderstandings and being ready to respond quickly. It also shows that even when the Australian science community gets everything right, we still face challenges from outside Australia."*

Ms Dumbrell went on to emphasise that while research papers are useful and often required by research agencies, what policy makers need are documents that translate the science.

*"The Government needs science that assists in informing the policies of the day. Our needs include understanding and attributing the role of humans in causing climate change, determining the correlation between greenhouse gases and radiated heat and assessing the corresponding global impacts. This information is crucial to supporting and highlighting the urgency in implementing mitigation strategies, and ensuring successful international negotiations.*

*I think as these policies become implemented, and we move into the future, our focus will shift to looking at the impacts of climate change and how to adapt to them. This will also require a shift in the way that we communicate in science, from placing the findings in the global context to the local and regional. Scarce resources will mean that we have to target adaptation to priority areas, and understanding the findings that we're making, in the context of Australia, will help us to determine these target areas."*

*- Amy Dumbrell, Brisbane Hot Air Symposium*

At the Brisbane Hot Air Symposium, Anne Leitch pointed out that council staff and councillors working with local governments also want more and better information about climate change. Their information requirements are not so much about science but about useable information.

*"What we want is a red line on a map. We want a line that goes down here and says we can develop on this side, but can't develop on that side'. Others are saying they need tools to be able to do risk assessments, and they want stuff that's at the local scale. And they also are wondering how do they get the community involved, so that the community moves with them? Councillors are saying 'Look we just want proof'... In the Great Barrier Reef area that I'm working in, which is likely to face increased intensity cyclones, they're wondering how to communicate cyclone information to people to get them to act, [especially for] people who have moved up from southern parts where they don't have cyclones."*

*- Anne Leitch, Brisbane Hot Air Symposium*

## STEP 6: EVALUATION

There are two ways to evaluate your communication: as you go and at the end of a communication campaign or project. Evaluating as you go can often be more effective at making sure your communication is meeting both your objectives and the needs of target groups. With climate change communication, in particular, it can help check that you're avoiding misunderstandings or mixed messages.

Evaluation can be complex, but some simple methods are described below.

### Evaluate as you go

Evaluation as you go helps you to check progress. Are you achieving your objectives and meeting the needs of target groups?

- Ask people to complete feedback questionnaires at the end of an activity
- Pre-test the messages and design of written documents
- Collect media clippings and review coverage. What messages are coming through?
- Monitor web use, e.g. track the number of visitors each month
- Hold a team meeting to discuss progress
- Conduct a short online survey; (see: [www.surveymonkey.com](http://www.surveymonkey.com))
- Interview people from target groups

### Evaluate at the end

Evaluate at the end to measure the success of the communication effort. Was it worthwhile?

Establishing the criteria for success and identifying how you will measure success (the performance indicators) are basic components of any communication plan. They should be in place before the plan is put into operation.

Performance indicators need to be set for each objective for each target group. They can be divided into two groups: quantitative and qualitative. Examples of such measures are given below.

#### Quantitative measures

- How many people attended a public meeting?
- What was the increase in your web site traffic?
- Target group survey indicates that x% of respondents were satisfied with services provided by your project

#### Qualitative measures

- Positive coverage of organisation in the media
- Interviews with key stakeholders reveal their responses and those of their constituents and colleagues

## STEP 7: ACTION PLAN ROLES

In the communication of climate science, it is important to know who you are, what role you are playing, and who you are communicating with.

For effective communication of climate science, collaboration can be very important. Work with scientists and communicators from different areas to share information, methods and ideas for better communication of the science of climate change. Collaboration will allow creative solutions to emerge.

Scientists and communicators can also collaborate with business, governments and conservation groups to provide stronger and better targeted messages, and promote action.

Canberra Hot Air speaker and founder of the Sustainable Living Foundation, Giselle Wilkinson, said “currently, we are in silos – there is a lack of familiarity with each other’s work. The next 10 years are critical and we all need to be ready for people to come on board.”

### Science communicators

Climate change is a multi-disciplinary field of research, including knowledge of the climate system, studying the effects of climate change, and finding ways to temper the human influence as well as to adapt to the projected changes. With security, health, food, land, economic and political interests at stake, measures by policy makers need public support and engagement. This implies a crucial role for science communication.

As science communicators, our work is often in a predominantly scientific context. Climate change, however, can quickly fall outside of this context into a range of other areas.

*“The 2009 bushfire season has already raised a huge number of social issues in Victoria, with respect to insurance, building regulations, conservation, water resources, general response to climate change, disaster warning, even the State’s very future. While nobody is suggesting that Black Saturday was solely the result of climate change, most people who experienced it believe they had a pretty nasty foretaste of things to come.”*

– Tim Thwaites, Perth Hot Air Symposium

Events like Victoria’s Black Saturday bushfires, that are unprecedented in their severity and point to climate change happening now, are increasingly influencing and/or driving climate change communication. As communicators, we need to be aware of the full spectrum of contexts for communicating climate change.

*“Climate change impacts across all sectors of our lives, the environment and our social and economic structures. It is this complexity of interaction that makes the challenge of our times, and this entanglement of cause and effect also makes the likelihood of unintended consequences of actions a very real possibility.”*

– Dr Helen Fairweather, Brisbane Hot Air Symposium

### ***Answering hot questions with targeted, clear information***

*Claire Harris, CSIRO Science communicator*

Claire Harris knows all about hot topics.

“When the Victorian Bushfires occurred, CSIRO was receiving a lot of enquiries. There were big questions in the media about the science of bushfires, and the links [of extreme events] with climate change.”

“Very early on, we put up a frequently asked questions page, and that got thousands of visits,” Claire says. “It was good proof that people want targeted information, and they want it simply – they don’t want to wade through volumes of information.”

Claire’s background is in communicating science, natural resource management, and environmental science. She’s worked around the world in communication and project management.

She was also involved in developing part of the website of the Department of Climate Change with the CSIRO. “We put together hot topics about the science of climate change, the peer review process, and what synthesis of the science is.”

They worked hard to write content “in a way that the general punter and policy makers can come to the website and find that information,” Claire says.

“It’s spotting a need and then providing the information—packaging it in a very synthesised way that really cut to the bone to answer the typical questions that have come out in the media recently.”

Science communicators have an important role to communicate about what’s going on in the lab to the wider public and to governments and businesses. Many communicators spend their time responding directly to enquiries from the public. However, the media is a critical means for science communicators to get their messages out to the public more proactively. Canberra Hot Air speaker Phillip Chubb, an Assoc. Professor at Monash University, says: “The challenge for science communication is to tell the media they’re acting in a biased way”. “The fossil fuel lobby gets its message [across], just like the smoking lobby. Journalism students are taught about balance, and it finds its way through to Lord Monckton and Ian Plimer getting onto the ABC.”

Brisbane Hot Air speaker, Professor Ian Lowe, also argued that science communicators have an important role in explaining scientific risk to various groups: “Science is about physical and chemical and biological risks, and I think the task of science communication is to make clear to politicians and business people, what risks the science is saying we are running by inaction on climate change.”

Brisbane Hot Air speaker, Amy Dumbrell from the Australian Department of Climate Change stresses that public servants have specialised skills in policy development, but not in understanding, which highlights the role of science communicators: “Being able to transform the science into accessible and understandable information without losing accuracy is a highly specialised skill and one we value very highly in government.”



## Scientists

Scientists are experts in specific fields. Usually, they speak publically within their own area of expertise. However, many of the scientific sceptics are speaking outside their area of expertise (e.g. geologists talking about climate science). Experts are those who publish their findings in peer-reviewed scientific journals, which are one way to guarantee scientific quality.

Scientists face the challenge of packaging information that is easily digestible with the correct facts still included and in a timely manner. This can sometimes work against the slower peer-review process.

Dr Carmen Lawrence also drew attention to the fact that academics “currently aren’t rewarded for communicating their science – it’s all about publishing in journals. And they get judged poorly by other scientists when they do.”

## The media

Canberra Hot Air speaker Simon Grose, a Parliamentary Press Gallery Correspondent, has two examples of how the media could inform the public more realistically about the nature of climate change:

- Challenge the use of targets as the political paradigm for emissions reduction policy because there is little empirical evidence that targets will be met
- Get out of the silo! Australia is in a resource boom, which is well covered in business pages, but science is in its own world – link more with other beats (e.g. policy also)

Citizen-driven media was also mentioned during a Canberra Hot Air panel. ABC’s Sarah Clarke said that there is even more debating happening in the [web] blogging spheres than in commercial media. This element is getting bigger, she said, and even contributed to the government’s introduction of the 30-10 rule for people to clear land around their houses. Another panellist said that “science communicators need to be blogging a lot more about it.”

## Governments

Governments at all levels and businesses are involved in communication about climate change. They may be a target of communication and also may conduct communication themselves.

Some representatives from government and business may be ‘strategic deniers’ of climate change as they see that it is not in their best interests to accept climate change. Others are embracing the need to change and to become more sustainable.

The community certainly expects that the government will take a pivotal role in shaping our response to climate change and what the future will look like. Brisbane Hot Air speaker Dr Helen Fairweather said, “To shape that future, governments need to consider not just the implications of the decisions for the present but also how the actions and decisions taken now will impact on that future. And clearly climate change is a case where governments need to be making those decisions now.”

### **Example of communicating with government**

Tahl Kestin, of Climate Scientists Australia ([www.climatescientistsaustralia.org.au](http://www.climatescientistsaustralia.org.au)), leads a group of thirteen scientists trying to make a difference to the public perception of climate change and to policy. Eight scientists recently met with more than 40 politicians, gave a briefing, and then spoke one-on-one with them. They also plan to provide briefings to businesses in future.

## **Businesses**

Many businesses are also involved in communicating about climate change, either by demonstrating their actions to customers or by achieving positive practices within the company.

Brisbane Hot Air speaker Adam Chapman, Chief Winemaker at Sirromet wines, talks about the importance of their environmental actions to save water, decrease carbon emissions and recycle as being important to their business. “We’re setting ourselves as having a strong point of difference [with other companies]. I’m not going to stand up here and say I’m a greenie, it’s just that I get it and I want to be responsible, and I think I’ve had a chance to actually show that. I think our customers want to help \*with climate change.”

Another Brisbane Hot Air speaker, Dr Jan Green who manages Ecology and Sustainability with Energex – a Queensland electricity distribution company, talks about how hers was the first energy company to sign on to the Greenhouse Challenge in 1996 to record and reduce their carbon footprint. The focus of their activities have been both internal (e.g. use of energy efficient cards) and external (e.g. advertisements to stop using low energy efficiency second fridges).

### **Appealing communication: videos for visual learners**

*Caitlin McGee, Research Principle, Institute for Sustainable Futures, University of Technology Sydney*

For Caitlin McGee, it’s all about communicating in a way that appeals to the audience—and for her audience, that means videos.

The Institute for Sustainable Futures at the University of Technology Sydney has created a website called Trade Secrets ([www.tradesecrets.org.au](http://www.tradesecrets.org.au)).

The website shows builders and trades people how other businesses have adopted sustainable trade practices, and what those practices are. It invites visitors to ‘Watch their stories and learn about how they have become leaders in sustainable practice.’

“Builders and trades people are pretty visual people; so we’re doing short video grabs on green skills. It’s about using formats that they like,” Caitlin says. “We’re trying to start where the builders are, understand their daily practice, how they see things, and the processes they go through.”

Although the website isn’t designed to replace formal training, Caitlin hopes it will encourage builders to seek out skills in the area. “It’s about communication of green skills information to the mainstream builders and trades people – at least getting the basic information across.”

The website continues to be updated with more short videos.

## Conclusion

Consistent themes in the communication strategies just presented include getting to know one's target groups, acknowledging their concerns and doubts, building relationships with them, and providing opportunities for dialogue. Two-way communication enables explaining the science of climate change, answering questions for aspects of that science that others do not understand, and letting members of your audience quiz you to assess your trustworthiness. The more open that a communicator is, the more open members of the audience can become.

When dealing with policymakers and media, one needs to provide concise, synthesised information that conveys a message that is consistent with the story that the science tells. In business, people want information and examples that are relevant to them, material that is easy to absorb but also credible for the time-poor but hard-nosed recipient. In all cases, the advice continues to be – get to know your target group, know about them but also become familiar in their eyes.

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## APPENDIX 1: HOT AIR PROGRAMS

### Communicating the science of climate change in a sceptical world

24 March 2009, Perth

#### 9.30am Workshop welcome, Tim Thwaites, President Australian Science Communicators

Tim Thwaites is a freelance science writer and broadcaster who specialises in putting science, medicine and engineering into everyday language. He has 30 years experience of writing, editing, sub-editing, teaching and broadcasting in Australia and overseas. He has been President of ASC since December 2007.

#### 9.45am Panel discussion - Science communicators operating in a sceptical world

Key challenges and opportunities for science communicators communicating the science of climate change in a sceptical world.

*Chair: Jenni Metcalfe*, Director of Econnect Communication is the immediate past President of the Australian Science Communicators. She has been a science communicator for 20 years and has a background in journalism and science.

*Jess Tyler* is Communication Manager at the Antarctic Climate & Ecosystems Cooperative Research Centre, where her role is focused on delivering science outputs to decision makers in government. She has been in science communication throughout her career.

*Simon Torok*, works in communication and marketing for CSIRO Marine and Atmospheric Research in Aspendale. This involves managing a team of designers and communicators to raise awareness of the climate change research and other marine and atmospheric work.

*Susannah Elliot* is CEO of Australian Science Media Centre, an independent not for profit organisation that works with the news media to inject more evidence-based science into public discourse. She has more than 16 years of experience in science communication with the science-media nexus as her primary focus.

*Carmelo Amalfi* teaches journalism Murdoch University. Specialising in maritime and military history, he worked at The West Australian newspaper for nearly 20 years. He is a prolific freelance writer, contributing articles to ScienceNetwork WA, ABC Science Online and publications including The Australian and The Sunday Times.

#### 10.30am MORNING TEA with Greenhouse 2009 delegates

#### 11.00am Panel discussion - Identifying the credible experts

Who are the credible experts? And who are the sceptics? What roles do they play in shaping media communication about the science of climate change? Panel discussion

*Chair: Susannah Elliot*, Australian Science Media Centre (see above)

*Maria Taylor* is a professional journalist completing a PhD at the Australian National University on communicating and framing climate change in Australia, 1987-2001, and the lessons that have emerged. Her findings are being published in a number of professional journals and websites.

*Michael Hopkin* is science correspondent for the *West Australian*. He was previously senior news reporter with *Nature*, the international science journal, where he focused particularly on environment and conservation issues.

*Kevin Hennessy* is a Principal Research Scientist at CSIRO Marine and Atmospheric Research. He has been doing climate change research for over 20 years and is currently leading the Adaptation, Risk and Policy team of the Climate Change Research Group.

### **11.45am Plenary talk - Changing human behaviour to reduce global warming**

#### **Dr Carmen Lawrence, University of Western Australia**

There is no doubt that any lasting reduction in the emission of greenhouse gases will require substantial changes in society, including in people's willingness to accept the seriousness of the situation, to support the necessary government intervention and to change their own behaviour.

While scientists and policy makers have advanced various proposals to deal with climate change, few have apparently stopped to consider the most effective ways of producing the necessary and substantial changes in our individual and collective behaviour. Whether it is modifying our transport use, rates of reproduction, energy use, patterns of settlement, food consumption and the design of our homes or accepting higher prices for some products and services, there is no doubt that just as human behaviour lies as the root of the problem, so it must be a major part of the solution.

Fundamentally, it is human behaviour which must be modified to ameliorate global warming. And on a scale that has never before been contemplated.

*Chair: Dr Nancy Longnecker* coordinates the Science Communication Program at the University of Western Australia. She teaches Science Writing, Science in the Media, Communication Strategies for Change and Displays and Exhibits.

*Dr Carmen Lawrence* retired from politics in 2007 after being a Federal MP and previously Premier of Western Australia. She is currently a Professorial Fellow in the Institute of Advanced Studies at the University of Western Australia where she is working to establish a research centre to facilitate discussion of the factors contributing towards fanatical ideas and extreme behaviour, including terrorism.

### **12.15pm Panel discussion - Scientists communicating in a sceptical world**

Key challenges and opportunities for scientists communicating the science of climate change

*Chair: Dr Owen Cameron* works for Land & Water Australia, as program manager of CCRSPI – a collaborative partnership coordinating climate change mitigation and adaptation research between Australia's Federal and State Governments, Rural Research Development Corporations and CSIRO. Originally an environmental scientist, he has held roles in policy development, climate change (on the Kyoto Convention), strategy consulting, retail and investment banking, and corporate governance.

*Dr Graeme Pearman* was Chief of the CSIRO Division of Atmospheric Research, 1992–2002. He contributed over 150 scientific journal papers primarily on aspects of the global carbon budget. He is now a private consultant contracting to both private and public sector organisations.

*Clare Mullen* works for the Bureau of Meteorology as a 'Climate Communicator', in the Bureau's National Climate Centre. The Bureau's mission is to observe and understand Australian weather and climate, and provide meteorological, hydrological and oceanographic services in support of Australia's national needs and international obligations.

*Anne-Maree Dowd* is a Social Scientist at CSIRO. She is Project Manager for a nation-wide community based program, called Energymark, which is a new concept for brokering public dialogue about the role that individuals can play in moving towards a new energy future.

#### **1pm - Small group organisation and process**

*Dr Will Rifkin* is director of the Science Communication Program at UNSW. An engineer-turned-sociologist, he has consulted on managerial communication and ethics to industry and government for two decades and has appeared on radio and television.

## **Communicating the science of climate change to business and government 19 August 2009, Brisbane**

### **10.45am Welcome**

**Speaker: Tim Thwaites**, President of Australian Science Communicators (ASC), is a freelance science writer and broadcaster who specialises in putting science, medicine and engineering into everyday language. He has 30 years experience of writing, editing, sub-editing, teaching and broadcasting in Australia and overseas. He has been President of ASC since December 2007.

### **10.50am Keynote speech**

**Speaker: Professor Ian Lowe** is President of the Australian Conservation Foundation, emeritus Professor of science, technology and society at Griffith University, and a former national president of Australian Science Communicators. With a PhD in physics, he is a leading climate change scientist and communicator. He has been a referee for the Inter-Governmental Panel on Climate Change.

**Chair: Tim Thwaites**, President of Australian Science Communicators

### **11.15am Panel: The challenges and needs of industry when communicating the science of climate change**

#### **Speakers:**

**Adam Chapman** brings his international and national wine making experience and University of Melbourne qualifications together in his current position of Chief Winemaker at Sirromet Wines at Mt Cotton on the outskirts of Brisbane. He is an experienced wine judge and has judged the Brisbane Wine Show, the Brisbane Wine Festival and the Australian Small Winemakers Show.

**Dr Jan Green** manages Ecology and Sustainability for ENERGEX Limited - a Queensland electricity distribution company. She has developed the Carbon Management Plan for ENERGEX, manages the Carbon Footprint Report, Sustainability Report and Sustainability Framework, and manages a team of ecologists and environmental management advisers.

**Peta Ashworth** is a senior social scientist within CSIRO's Division of Exploration and Mining. Peta leads a team of social researchers examining stakeholder perceptions to areas of national significance to Australia. Her main research interest has been examining public perceptions to climate change and energy technologies.

**Chair: Jenni Metcalfe**, Convenor of Hot Air Symposia, is Director of Econnect Communication and the immediate past President of the Australian Science Communicators. She has been a science communicator for 20 years and has a background in journalism and science.

**12.00pm Panel: The challenges and needs of governments when communicating the science of climate change**

**Dr Helen Fairweather** is the Manager of the Coastal impacts group with the Queensland Climate Change Centre of Excellence. Helen's current focus is on the assessment of risk from climate change for State government, particularly in relation to sea level rise and extreme events, such as flooding and cyclones.

**Amy Dumbrell** works in the Climate Change Science Team within the Department of Climate Change (DCC). She joined the public service following an environmental management and laws degree at Macquarie University. Much of her work in the Department involves communicating climate change science to various audiences, both within and outside of government.

**Anne Leitch** has a background in science communication and is currently a doctoral student working on issues of climate change and environmental planning and governance with the Centre of Excellence for Coral Reef Studies at James Cook University and CSIRO Sustainable Ecosystems.

**Chair: Dr Louise Goggin** is the science communicator for the NSW Department of Environment, Climate Change and Water in Sydney. She has worked as a web and communications manager with CSIRO and CRC Reef Research Centre, as events manager with the Australian Science Festival, and as a freelance science writer and scientific editor. She has a doctorate in marine biology and a Graduate Diploma in Science Communication.

**12.45pm Lunch**

**1.30pm Panel: Reporting on the science of climate change given vested interests of government and business**

**Speakers:**

**Robyn Williams** has been presenting the *Science Show* on ABC Radio for more than 30 years, and is the best known voice (and sometimes face) in science communication in Australia. He is the only journalist elected a Fellow of the Australian Academy of Science.

**Emma Marris** is a freelance journalist, with an expertise and special interest in environmental issues. She has been retained by *Nature* since 2007. Recent activities include a lecture on *Making science matter - increasing the impact of ecological findings* In Finland in Spring 2009.

**Dr Joan Leach** teaches in the School of English at the University Of Queensland. Her work focuses on the growth in professional science communicators, who specialise in explaining sometimes complicated research to the public.

**Chair: David Ellyard** has been active in science communication for nearly 40 years, covering radio and TV, talks, journalism and book writing. He is a former President of the Australian Science Communicators and is currently Treasurer.

**2.30pm Problem solving scenarios in small groups to extract pros and cons of 'best practices'**



**Coordinating facilitator: Dr Will Rifkin** is director of the Science Communication Program at UNSW. An engineer- turned-sociologist, he has been recognised as one of the most innovative and effective university educators in Australia. Originator of the World-Wide Day in Science ‘virtual event’, he designs participant-centred activities.

## Communicating the science of climate with the people

9 February 2010, Canberra

8.45am            **Welcome**

**Introductions and organisation:** “Why are you here?” -- **Coordinating facilitator: Dr Will Rifkin** is director of the Science Communication Program at UNSW. An engineer-turned-sociologist, he has been recognised as one of the most innovative and effective university educators in Australia. Originator of the World-Wide Day in Science ‘virtual event’, he designs participant-centred activities. He will take 2 minutes to get you networking and outline audience-participation aspects of the forum.

**Speaker: Tim Thwaites**, President of Australian Science Communicators (ASC), is a freelance science writer and broadcaster who specialises in putting science, medicine and engineering into everyday language. He has 30 years experience of writing, editing, sub-editing, teaching and broadcasting in Australia and overseas. He has been President of ASC since December 2007

9am                **Keynote speech**

**Keynote Speaker: Professor Will Steffen, Executive Director of the Climate Change Institute at the Australian National University, Canberra**

Professor Will Steffen is also Science Adviser, Department of Climate Change, Australian Government. From 1998 to mid-2004, he served as Executive Director of the International Geosphere-Biosphere Programme, based in Stockholm, Sweden. His research interests span a broad range within the field of Earth System science, with a special emphasis on terrestrial ecosystem interactions with global change; the global carbon cycle; incorporation of human processes in Earth System modelling and analysis; and sustainability, climate change and the Earth System.

**Chair: Toss Gascoigne** is Executive Director of Australian Science Innovations (ASI), and former President and a Life Member of ASC. He is President of the international network of Public Communication of Science & Technology. Toss has a long interest in communicating science issues with the public, politicians and policy-makers; and encouraging the next generation of scientists.

10am              **Morning Tea as part of ASC Conference**

**10.30am Panel: The challenges and needs of urban communities when communicating the science of climate change**

**Giselle Wilkinson** has been a social and environmental activist for other 30 years. She helped to found and shape the Sustainable Living Foundation, a community-based not for profit organisation that informs and inspires the wider community about sustainable living. She is a Director of Safe Climate Australia and is currently facilitating Victoria’s first urban affordable / sustainable co-housing development.

**Richard Gilmore** is Executive Director of Earthwatch, which is currently running the ClimateWatch program. Prior to joining Earthwatch in 2007, Richard worked at Amcor Recycling where he held a number of roles, most recently as NSW Business Development Manager.

**Peta Ashworth** is a senior social scientist within CSIRO's Division of Exploration and Mining. Peta leads a team of social researchers examining stakeholder perceptions to areas of national significance to Australia. Her main research interest has been examining public perceptions to climate change and energy technologies. Her team developed the EnergyMark process of engaging communities in climate change.

**Chair: Dr Simon Torok** works in communication and marketing for CSIRO Marine and Atmospheric Research in Melbourne. This involves managing a team of designers and communicators to raise awareness of the division's climate change research and other marine and atmospheric work.

**11.30am Panel: The challenges and needs of rural and regional communities when communicating the science of climate change**

**Leith Bouilly** and her family have an irrigation and dryland farming and grazing property at Dirranbandi in Queensland. She has been involved in natural resource management (particularly water) at local, State and National levels for about 20 years. Leith is passionate about developing the capacity of individuals and communities to participate effectively in these processes. Leith is Chairman Bouilly Pastoral Co and founding member of the Wentworth Group of Concerned Scientists.

**Clare Mullen** works for the Bureau of Meteorology as a 'Climate Communicator', in the Bureau's National Climate Centre. The Bureau's mission is to observe and understand Australian weather and climate, and provide meteorological, hydrological and oceanographic services in support of Australia's national needs and international obligations.

**Dr Peter Hayman** is the Principal Scientist in Climate Applications at the South Australian Research and Development Institute (SARDI) based at the Waite Institute, a position he has held since May 2004. Prior to moving to Adelaide he was coordinator of climate applications for NSW Agriculture. Peter is an agricultural scientist with an interest in applying climate information to dryland and irrigated farming systems. Since the early 1990s he has worked with farmers in managing climate risk on a range of projects in Australia, Cambodia and The Philippines.

**Dr Gretta Pecl** is a marine ecologist focused on interdisciplinary research to address questions critical to both ecological understanding of our marine systems and sustainable management of resources. She is particularly interested in assessing how the movement and migration of marine species affects their population structure.

**Chair: David Salt** is a Canberra-based science writer and editor. In years gone by he has set up *The Helix* magazine for CSIRO and *Newton* magazine for Australian Geographic. He has co-authored two environmental texts on resilience and agroforestry, and these days works half-time at the Australian National University producing/ *Decision Point*/, a research magazine on environmental decision theory. His greatest joy is engaging an average Australian with some aspect of complex science.

**12.30pm Bringing it all together – report on Hot Air 1 and 2 outcomes and progress on 'best practice' guidelines for communicating the science of climate change**

**Jenni Metcalfe**, Convenor of Hot Air Symposia, is Director of Econnect Communication and the immediate past President of the Australian Science Communicators. She has been a science communicator for 20 years and has a background in journalism and science. She is employing input from these Hot Air Symposia to assemble a 'best practice' guide in climate change communication, with symposia presenters and audience members as co-authors.

**12.45pm      Lunch with ASC**

Opportunity for audience members to contribute one-minute case studies on their experiences in communicating the science of climate change. Audio/video recording to augment 'best practice' guide.

**2pm            Panel: Media coverage of the science of climate change – challenges and opportunities**

**Sarah Clarke** is the ABC's national environment and science correspondent, reporting for both ABC Radio and Television. She has travelled extensively around Australia reporting on the environment and the impacts of the drought and climate change across a number of programs including ABC's 7pm news, [Lateline](#), [7.30 Report](#), [Foreign Correspondent](#) and across radio news and the ABC's flagship radio current affairs programs [AM](#), [The World Today](#) and [PM](#).

**Simon Grose** is Science Media's Parliamentary Press Gallery Correspondent and a freelance S&T writer and editor. He joined CSIRO Public Affairs in Canberra in 1988 and from 1990–93 was press secretary to a Federal Minister. From 1994 to 2002 he was S&T Editor and Computing Editor for *The Canberra Times*. Since 2002 he has been a contributor to *The Canberra Times* and other publications including *Crikey*, *Nature Medicine*, and *Australasian Science*.

**Assoc. Professor Philip Chubb's** career combines leadership positions in print, television and online media with publishing, business and communications technology. Prior to joining Monash University as Associate Professor in 2008, his industry roles included Melbourne Editor of *The National Times*, leader writer of *The Age* and deputy editor of *Time Australia*; in television he was Executive Producer of *The 7.30 Report* (Victoria) and National Editor of *The 7.30 Report*.

**Dr Jonathon Howard** is a teacher and researcher at Charles Sturt University where his research focuses on water and society– including how people value and use water, and how it is managed. He is currently a Ministerial appointee to the Murray Catchment Authority and chairs its Community and Implementation Committee. He is also on the Executive of the Australian Association for Environmental Education.

**Chair: David Ellyard** has been active in science communication for nearly 40 years, covering radio and TV, talks, journalism and book writing. He is a former President of the Australian Science Communicators and is currently Treasurer.

**3pm            Summary of key outcomes of sessions today – Jenni Metcalfe**

**3.15pm        Evaluation of 'best practice' guidelines for communicating the science of climate change - Coordinating facilitator: Dr Will Rifkin**

## APPENDIX 2: HOT AIR SYMPOSIA VOLUNTEERS AND SMALL GROUP PARTICIPANTS

### Perth

#### Volunteers

Joanne Castelli, Mark Cornish, Rita Costa, Chelsea Hopkins-Allan, Mark Lehmann, Nancy Longnecker, Coral Pepper, Zarin Salter, Miriam Sullivan

#### Small group participants

Greg	Allen	Department of Environment and Conservation
Carmelo	Amalfi	Faculty of Creative Technologies and Media
Graeme	Anderson	Dept Primary Industries
Jean-Philippe	Aurambout	DPI Victoria
Sarah	Bugg	Scitech
Owen	Cameron	Land and Water Australia
Joanne	Castelli	UWA Science Communication Program
Hazen	Cleary	Dept of Water
Liese	Coulter	Change123 Communications
Aysha	Fleming	TIAR
Barb	Frey	Beyond Green
Chris	Gerbing	Department of Primary Industries
Kevin	Hennessy	CSIRO Marine and Atmospheric Research
Nicole	Hodgson	Murdoch University
Chelsea	Hopkins-Allan	UWA Science Communication Program
Stefan	Kaufman	EPA Victoria
Neil	Kaye	Met Office
Sarah	Lau	Scitech
Carmen	Lawrence	The University of Western Australia
Mark	Lehmann	UWA Science Communication Program
Matthew	Levinson	CSIRO
Zoe	Leviston	CSIRO
Ugo	Mantelli	Victorian Department of Primary Industries
Melanie	McKenzie	Econnect Communication
Jennifer	Metcalfe	Econnect Communication
Nicola	Mitchell	The University of Western Australia
Clare	Mullen	Bureau of Meteorology
Kylie	Paulsen	GRDC
Karen	Pearce	Bloom Communication
Robert	Smith	Powerhouse Museum
Chris	Sounness	DPI, Victoria
Maria	Taylor	ANU
Tim	Thwaites	Australian Science Communicators
Indra	Tomic	CSIRO
Sean	Walsh	EPA Victoria
Alex	Waterhouse	Department of Water
Stuart	Waters	Twyfords
Michael	West	University of Sydney
Sandra	Wilson	Dept Sustainability & Environment

## Brisbane

### Volunteers

Simon Chester, Sarah Cole, David Ellyard, Louise Goggin, Joan Leach, Leanne McKnoulty, Jenni Metcalfe, Jan-Olaf Meynecke, Meg Rive, Janet Salisbury, Michelle Tan, Tim Thwaites, Patricia Weir

### Small group participants

Simon	Chester	University of Queensland
Sarah	Cole	University of Queensland
Liese	Coulter	Change123
Barry	Crook	The Queensland Water Commission
Anna	Duffield	The Queensland Water Commission
David	Ellyard	Australian Science Communicators
Louise	Goggin	NSW Department of Environment, Climate Change and Water
Wren	Green	
Jan	Green	Energex
Fiona	Henderson	
Imogen	Jubb	CSIRO/Bureau of Meteorology
Sarah-Jane	Matthews	
Leanne	McKnoulty	SHaM Communication
Jenni	Metcalfe	Econnect Communication
Catherine	Naum	James Cook University
Mary	O'Callaghan	Econnect Communication
Meg	Rive	CSIRO
Janet	Salisbury	Biotext
Roger	Suffling	
Michelle	Tan	University of Queensland
Tim	Thwaites	Australian Science Communicators
Adriana`	Velez	Australian Biosecurity CRC
Patricia	Weir	University of Queensland
Perry	Wiles	

## Canberra

### Volunteers

Hilary Frances, Lisa Horsley, James Hutson, Edward Jones, Augusta Macdonald, Leanne McKnoulty (SHaM Communication), Maia Sauren

### Small group participants

Peta	Ashworth	CSIRO
Vivienne	Benton	University of Technology, Sydney
Anna	Carr	Bureau of Rural Sciences
Bobby	Cerini	ANU
Glenn	Conroy	Freelance
David	Ellyard	Freelance
Suzie	Gaynor	Antarctic Climate & Ecosystems CRC
Claire	Harris	CSIRO
Elisa	Idris	Kogarah Council
Nancy	Longnecker	University of Western Australia
Caitlin	McGee	University of Technology, Sydney
Theresa	McGillian	CSIRO
Seona	Meharg	CSIRO
Laura	Miles	Museums Australia (Victoria)
Clare	Mullen	Bureau of Meteorology
Roger	Nicoll	CSIRO
Karen	Pearce	Bloom Communication
Patty	Please	Department of Agriculture, Forestry and Fisheries
Carolyn	Poutiainen	McGill University
Jill	Rischbieth	Freelance
Simon	Torok	CSIRO
Kitty	Van Buuren	The University of Queensland