Australian Government
Productivity Commission

PRODUCTIVITY COMMISSION

INQUIRY INTO BARRIERS TO EFFECTIVE CLIMATE CHANGE ADAPTATION

DR W. CRAIK, Presiding Commissioner
MR J. COPPEL, Commissioner
DR N. BYRON, Associate Commissioner

TRANSCRIPT OF PROCEEDINGS

AT CANBERRA ON WEDNESDAY, 18 JULY 2012, AT 8.45 AM

Continued from 16/7/12 in Melbourne

INDEX

DR CRAIK: Welcome and good morning to the public hearing of the Productivity Commission Inquiry into Barriers to Effective Climate Change Adaptation. My name is Wendy Craik and I'm the presiding commissioner in this inquiry and with me is Jonathan Coppel and Neil Byron.

The commission received terms of reference for the inquiry on 29 September 2011 and the inquiry terms of reference gave us two key tasks: the first was to assess regulatory and policy barriers to effective adaptation, and the second to identify high-priority reforms to address barriers. We've held consultations with governments, businesses and other organisations and received 79 submissions prior to releasing the draft report on 27 April. Since the draft report we've received another 82 submissions so far and they're still coming in.

We're grateful to the many organisations and individuals who have already participated in the inquiry. We've held hearings in Sydney and Melbourne, and following these hearings in Canberra, other hearings will be held in Adelaide with participants from other locations able to participate via phone or video conference. We'll then be working towards providing a final report to government in September. We'd like to conduct all hearings in a reasonably informal manner but I remind participants that a full transcript is being taken. For this reason, comments from the floor cannot be taken, but at the end of today's proceedings I'll provide an opportunity for anyone who wishes to do so to make a brief presentation.

Participants are not required to take an oath but are required under the Productivity Commission Act to be truthful in their remarks. Participants are welcome to comment on the issues raised in other submissions. The transcript will be made available to participants and will be available from the commission's web site following the hearings. Copies may also be purchased using an order form available from staff here today.

To comply with the requirements of the Commonwealth Occupational Health and Safety legislation, you're advised that in the unlikely event of an emergency requiring the evacuation of this building, you should follow the green exit signs to the nearest stairwell, that is go out and come through the glass doors that you came in earlier, and you'll seen the green exit signs at the nearest stairwell. Lifts are not to be used. Please follow the instructions of floor wardens at all times. If you believe you're unable to walk down the stairs, it's important that you advise the wardens who will make alternative arrangements for you. Unless otherwise advised, the assembly point for the commission in Canberra is the corner of Marcus Clarke and Rudd Streets, in other words, at the ground floor, turn right and then left. Can I also ask the audience to please turn off mobile phones or turn them to silent. If there is any media in the room - somehow I don't think so - could they get in touch with the staff, please.

I'd now like to welcome the Housing Industry Association. If you could state your name and position for the record and then if you'd like to make a brief opening statement we would be very happy to hear from you. Thank you.

MS BROOKFIELD (HIA): Good morning, my name is Kristin Brookfield. I'm the senior executive director of building development and environment with the Housing Industry Association.

MR WOLFE (HIA): I'm Graham Wolfe from the Housing Industry Association, chief executive of industry policy.

MS BROOKFIELD (HIA): We will take the opportunity to make a brief statement.

DR CRAIK: Thank you.

MS BROOKFIELD (HIA): Firstly, thank you for giving HIA the opportunity to present to you this morning. HIA represents all facets of the residential building industry in Australia, from builders to trade contractors, apartment builders, land developers, along with building product manufacturers and suppliers. As we set out in our first submission to the inquiry, the research into climate change and the impact of current and future responses by all levels of government to adaptation and mitigation has emerged as a key issue for HIA members over the last few years. On this basis, HIA has taken an active role in the debate on climate change, and the implications it has for land use planning and building to ensure that the industry's views are taken into consideration as governments develop their responses.

Residential builders and land developers are working in a business environment that recognises the need to manage the risks associated with climate change and the potential impacts this may have on existing and future housing projects. One of the important points we'd like to make today relates to who is managing the implementation of policy responses to climate change. This in itself could act as a barrier to an effective response if clear lines of demarcation are not set out. There are several competing interests across all levels of government. However, there appears to be limited coordination of these interests and it is unclear which agency is ultimately responsible for settling any differences of opinion.

HIA's submissions highlighted some examples of these situations. Decisions about the protection of native vegetation, as opposed to the protection of buildings for bushfire planning purposes, or setting minimum requirements to construct suspended floors in homes to meet flood levels which conflicts with the need to achieve the minimum energy ratings for homes. Residential development is being asked to juggle a multitude of responses whilst delivering housing at an affordable price. It's essential that guidance be given, firstly, about who the most relevant

authority is to be managing these competing interests and, secondly, that guidance be given about how to weigh up these competing interests, which one prevails. Without this there is potential for some responses to be excessive, whilst others may be inadequate. In our view this is a barrier to effective adaptation.

The second issue we'd like to highlight is the need to recognise that the potential impacts from climate change will be incremental and we will need to carry out ongoing monitoring to confirm that the specific changes predicted are taking place to ensure that the policy responses remain relevant. On this basis, HIA would argue that the current policy responses by all levels of government, but in particular local government, should also be incremental and provide scope to be adjusted, based on future monitoring and research that will occur.

The clearest example of this is the current response to sea-level rise. The state government directions on sea-level rise predict around a 800 to 900-millimetre increase in sea levels by 2100. In most states, mapping of the coastline has occurred and state planning policies are in place that require local governments to have regard to the potential risk. Local governments are supplementing this information with their own research and developing local planning and building controls. The majority of local government responses have adopted the 2100 levels as their planning level for applications which are being considered today, yet they could take an incremental approach and design to a 10 or 20-year level over the next five to 10 years, and then based on research during that period, re-establish an adjusted level as a planning benchmark from time to time. The Victorian government has recently announced it will take this type of approach and we believe there's merit in considering that more broadly.

Perhaps the next matter I would like to highlight is one which was set out in our second submission. The draft report recommendations on planning and building raised questions about the role of the Building Code of Australia and suggested a need for the Australian Building Codes Board to more actively deliver building standards that respond to climate change. The BCA already has a number of elements that would be defined as provisions to respond to climate change, and the view that this is not the case is more rightly a view that standards are not high enough and should be represented as such. The BCA also suffers from the competing interests I've highlighted previously. The BCA should not be responsible for weighing up these interests, rather policy direction needs to come from the Commonwealth and state governments.

This leads me to the last matter I'd like to raise, that being the need for the debate around adaptation to be intricately linked to the discussion about mitigation. Changes to land use patterns and planning and building codes need to be considered in light of the fact that all three levels of government will be faced with the unenviable task of funding mitigation works to protect existing infrastructure,

existing cities and communities across Australia. These mitigation works will see bridges rebuilt, road levels raised, community buildings renovated or completely rebuilt, and so on. These works will serve to protect - to the best level possible with the funds available - the existing fabric of our cities.

The by-product of this effort in some cases will be a reduction in the risks to our built environment and this needs to be taken into account when determining the right thresholds for adaptation in the built environment. Again using sea-level rise as an example, if changes take place through mitigation to protect areas from sea-level rise that would otherwise be directly affected, this will reduce the need for buildings in these areas to be built to higher standards. Standards may still need to change from what they are today but the increment may be smaller and hence the cost reduced.

This means that when monitoring and ongoing research is done of the impacts, the benefits of mitigation need to be factored in. Moreover when decisions are being made, such as the Victorian case where a subdivision of an existing lot with an existing dwelling was refused due to the access being inundated - and the decision specified that no regard was given to the council implementing mitigation measures to the existing roadway - concern needs to be raised.

I hope this highlights some of the key issues raised in our submissions, and both Graham and I would be happy to answer any questions you may have.

DR CRAIK: Thanks very much, and thank you for your submissions and the practical issues you actually raise. Can you give us an idea of the sorts of information the residential building industry needs in order to manage climate change? What do you actually need?

MR WOLFE (HIA): The whole process of land management, land development, bringing land to market and development, is a fairly extensive and longwinded process that can take as little as a year or two for a domestic site on a domestic block of land up to about 15 to 20 years to bring new development to the table and bring new houses to the marketplace. So certainty is one of the things that the industry needs and that certainty needs to follow over a period of anywhere between five and 20 years. I'm extrapolating a little bit, normally we would say 15 years, but when we're talking about significant work to predict climate change and the implications of climate change and forecasting out to 2100, I've extrapolated from 15 years to a 20-year process and included in that all the feasibility studies and the land purchasing works that need to be done. So certainly it's firstly one of the areas that the industry needs to be better equipped with.

DR CRAIK: So are you saying essentially that a forecast out to 2100 is less useful to the building industry, say, than a forecast out to, say, 2030 would be, in terms of

something like - - -

MR WOLFE (HIA): In a practical sense, absolutely, yes. Forecasts out to 2100 gives some indication about what predicted levels of change might be, but the here and now for land development, the provision of housing and the provision of infrastructure and facilities and all those things that the communities need, are a vision for the next 15 to 20 years. Some plans go beyond that, but rarely in a residential development process do they go beyond that. The real life day-to-day commercial decisions, feasibility studies, whether or not we do go ahead with a project or not, are being made on a time frame of around about 15 to 20 years.

DR CRAIK: Is that information not available to the industry, or not readily available, or differentially available?

MR WOLFE (HIA): First of all, there's not a great deal of certainty, and in the time line climate change, climate change adaptation, predictions and projections about sea level rise, cyclones and bushfires and all of those consequences, are reasonably new predictions and forecasts. They're reasonably new information to the marketplace. I say "new" from the sense that there's always been a knowledge that these things are happening, occurring or changing, but putting figures to them has been a reasonably new phenomenon.

So when the industry is confronted with, for example, about a metre rise in sea level by the year 2100, the question is stand back and, "Well, what does that mean? What does that mean today? What does that mean for five-year developments? What does that mean for our feasibility studies where we have to contemplate financing projects with hundreds of millions of dollars? How do we deal with studies and projections that suggest that what we would have normally known to be the facts have now changed?" I guess that the information that's coming to hand is threatening, it's challenging, it's difficult to comprehend and it's difficult to put into a study about whether or not we do go ahead with a project. That's the developers, and then they are negotiating with the local councils. The councils are sort of looking at the same issues but from a different perspective, and that creates confusion, tension and uncertainty.

MS BROOKFIELD (HIA): If I can add, I think the other problem we have is that not all of these things are actually measurable. So sea-level rise is measurable and the problem we have with implementing that one today is that, as Graham said, you've got a 100 and there's a 50-year number, but then anything less than that in the 10 and 20 year is really open for debate between the council's engineer and the developer's designers, and they all get together and they pick a level that they're comfortable with. So there's no certainty there. When you look at bushfires and cyclones and the other things, loss of vegetation, they're not number things, so you can't measure them and say this will or won't happen in a five-year or a hundred-year

period. So there's a lot of differences in the things we're juggling.

DR CRAIK: Some of the things it may never be possible to - - -

MS BROOKFIELD (HIA): Absolutely.

DR CRAIK: Things like bushfires and things like that.

MS BROOKFIELD (HIA): Yes.

DR CRAIK: Things like the Victorian government's overlay for bushfires and things like that, is that useful information for the housing builders, developers, those overlays? Are they helpful?

MR WOLFE (HIA): I'm not sure whether you're talking about the initial overlays that put the whole state in a bushfire-prone - - -

DR CRAIK: I'm really talking about the nature of overlays, I suppose.

MR WOLFE (HIA): One of the other points I was going to make about what industry needs is a point that Kristin made in her opening statement about the number, variety and variation between the different agencies in their approaches, and the inconsistency between what the implications are going to be on the consequence of the developers and the delivery of housing. Overlays do work very well. Principally they are developed and prepared by government agencies, state agencies, and you do get a degree of consistency where you have different councils that are applying different processes or different subjective analysis and decision-making processes. You do get some differences and that creates some uncertainty or at least some confusion between one council area and another council area.

But, generally speaking, an overlay that is looked at from a state perspective does tick that first box. It does tick the box about providing certainty for people to go onto a web site or into a plan and know exactly what the government of the day - the state government - requires. The question is whether or not the councils then apply other layers of regulatory compliance.

DR CRAIK: How do you think these issues of differential and competing - you know, vegetation management and bushfire protection and the sorts of things you're talking about, firstly, are they forcing the building industry to - you made that comment I think in your submission - adapt to climate change in a certain way and saying, "You have to do it this way," as opposed to leaving your choice open. Also how would it best be resolved from the point of view of the building sector?

MS BROOKFIELD (HIA): There are some good examples that we've seen in

practice - and this goes to another point which I think is in our second submission that I wanted to raise. There are two elements to this story: one is about future development and one is about current development and infill. The overlays and forward planning work can be done very well. We've seen it in New South Wales with the two growth areas in the Sydney metropolitan region. They brought every agency into the room and at that strategic planning phase - - -

DR CRAIK: Is this the infill or - - -

MS BROOKFIELD (HIA): No, this is the greenfield.

DR CRAIK: Okay.

MS BROOKFIELD (HIA): So bringing every relevant agency into the room and having those agencies argue the trade-offs and the responses, but that was led by probably a combination of the Premier's Department and the planning agency as the lead agency. You need certainty of who is the lead agency. Who ultimately has to either bang heads together or say, "We're sorry but you've gone a bridge too far."

DR CRAIK: Can you give us some detail about that process?

MS BROOKFIELD (HIA): We can print that out. It's about four or five years old. So what's happened in those two growth areas is there is now a map that says, "Here is the area for residential development, here is the area to be protected for open space, here are all of the things we need to look after." They're not affected by coastal issues, these particular sites. Contrast that with the recent Queensland example of mapping the coastline for sea level rise issues which has been simply placed upon the whole of the Queensland coast, so somewhere like Townsville has been completely put under water on a map. What's the impact of that for all the existing homes and therefore infill development? That's where one agency has come out with the mapping and the information but they haven't coordinated with the planning agency about how they will manage that, so that's a poor example of it.

DR CRAIK: Has Queensland come up with any way of resolving the matter?

MS BROOKFIELD (HIA): The new government is reconsidering that mapping.

DR CRAIK: If you could send us some information on the New South Wales one, that would be helpful.

MS BROOKFIELD (HIA): Yes.

DR CRAIK: The issue of local government capacity for adaptation, I mean, this is an issue that's come up a lot, of course, in this inquiry. Local government is really

where the impact of climate change is a big issue, and the numbers of local governments, their capacity, their resources and things like that is a real issue and a lot of the planning issues and the interaction in the section being planning and building. The other day the chair of the Australian Building Codes Board suggested that one possible issue to help resolve some of these planning issues and to pick up climate adaptation along the way would be to establish some kind of a body similar to something like the National Water Commission, so the commissioners are selected by all jurisdictions.

It's not just a Commonwealth body, it's a relatively small body. It has no determinative power, in a sense, but it commissions research and raises issues and discusses best practice and puts out papers and things like that and so leads to a general discussion about things. Do you have a view about that? Given there's no Planning Ministers Forum any more like there used to be, is there a need for something and is that model - would that be of any assistance, do you think?

MR WOLFE (HIA): The initial response would be more information is good information. What we have found over the initial years, particularly with sea level rise projections has been suggestions from an agency that the sea level is rising; projections from the various sources about the quantum of that sea level rise; a report from the Commonwealth that addresses some of those things; a report from the states that slightly addresses those, and then some more information from other stakeholders - not necessarily government agencies - about the magnitude again. You get a cascading effect of information that has a sprinkling of other information from other sources.

Local councils, of which there are a few around Australia, coastal councils, respond, and they respond based on political reasons; based on whether or not there's a perception that their area is more likely or less likely to be affected; depending on the magnitude; the extent to which there is existing development in possibly affected areas; whether they're expansionary or contractionary type councils. A whole lot of various factors are taken into account. Councils are responding, and there isn't a great deal of consistency about that response. You can take the view that that's fine, that's how Australia works or you can take the view that it's more ad hoc than scientific or properly considered.

I tend to take the view that an ad hoc approach by councils isn't terribly productive. As an industry we sit back and go, "Well then, we're not going to be able to do work in that council area," or, "We're not going to go near that council area," which is fine from a global land development perspective, but if you happen to be a householder or a property-owner in those areas, the world may potentially pass you by. More information is good information, I would think, in the first instance. That more information coming from reliable, authoritative sources makes a lot of sense.

DR CRAIK: One of the issues - and you've sort of alluded to it - is issues of managing climate change risk in existing settlements and how that will play out. What do you think the responsibility of property-owners and the community is, and how do you think that should operate? Do you have views about that? Some councils have given vulnerability warnings.

MS BROOKFIELD (HIA): We've seen examples of trying to put the covenants on land and that. Your report raised that kind of issue. Owner awareness and buyer awareness is a good thing and is important. At some point we will gain that critical mass of local support for these sorts of problems, but I'm not sure we're there yet. I think we're a long way from having everyone, even in somewhere like Byron Bay Council area, agree with the approach that that particular council is taking, but everyone is aware that there's a significant issue in that council area. Awareness is part of it. The costs associated with mitigation and protecting the existing areas is something we will all need to share.

DR CRAIK: The decision about which to do - retreat, protect

MS BROOKFIELD (HIA): Yes.

MR WOLFE (HIA): Allocation of resources.

DR CRAIK: Yes, that's right.

MS BROOKFIELD (HIA): Where it gets really sticky then is the individual lot and the individual trying to do something to that lot which is already zoned for housing, which, in a lot of instances, already has a building on it of some nature, and now we're trying to unzone it, and I raise that issue in the second submission, that we've got to start putting our thinking hats on about how we manage down-zoning or unzoning.

DR CRAIK: What is down-zoning? I know you mentioned it; I wondered what it was.

MS BROOKFIELD (HIA): It's residential now and it has a building right of some description, and effectively these kind of layers are going to take that away. So somebody needs to make the decision, somebody needs to understand whether there's compensation required and what do we do to assist the person who owns that land today. In the Queensland flood scenario, we saw people being assisted to move from houses; some bushfire stuff in Victoria we saw assistance. To do that on a much broader scale, when you map Townsville out, we've got to think pretty smartly about how we're going to manage that.

DR CRAIK: Do you have a view about how that can be managed? It seems a very

fraught issue wherever it actually really happens and your example, I think it was Waratah in Victoria, is a similar sort of issue. Do you have a view about how those issues should be resolved?

MR WOLFE (HIA): I guess you've got to contemplate councils' responses or government responses to climate change to existing property, whether or not that is public property or private property, in terms of resources but in terms also of councils' response and state governments' response, other than its own buildings, its own built environment, will be about access. That tends to be one of the stickling points when we talk about climate change adaptation policies and its impact on land development. Structurally and from a building perspective we can build to withstand cyclones, floods, bushfires. So most of those things we can build to withstand.

DR CRAIK: At what cost?

MR WOLFE (HIA): That's an important question but that doesn't become an issue if the council says, "We don't think you'll get access to that property, so you're not going to build there in the first place." There's two components to how councils and governments respond, and that is, do they respond firstly to the question of access to that property, or do they assume that access is going to be retained, so that's a cost; and now we've got to respond to the structural implications or the building implications to the built environment that they're going to continue to maintain access to. That happens in bushfires, it happens in cyclones, it happens in floods, it happens in rising sea levels. So there's a lot of instances where we've got to contemplate whether or not we're going to continue using that whatever it is, and if the answer to that is, "Yes, but at what price," then how much to upgrade the existing buildings to withstand whatever additional loads are going to be placed on that infrastructure.

DR CRAIK: Do you think if access is granted in those places, then there should be building mandatory standards?

MR WOLFE (HIA): Well, there always has been and there always will be. The question is the level of stringency that will apply to those building standards. It is a balance between access today, in 10 years time and in 90 years time, and the building standards that would apply today, in 10 years time and in 90 years time, and Kristin has suggested an incremental approach would provide mechanisms that allow councils to better contemplate the allocation of resources, both for purposes of access and for upgrading of existing buildings, but it also allows the industry to have some comfort and potential property purchasers to have - - -

DR CRAIK: Is an incremental approach, though, difficult because it doesn't actually provide certainty? You know, an incremental approach, we change it every 10 years or whatever period it is, so someone says, "Well, only 10 years; I built a

building for 50 years."

MR WOLFE (HIA): We're looking for in the order of 20 years so that, from an access point of view, the incremental implications of climate change adaptation are less significant, allows a greater understanding of the trend lines and whether they're projected accurately or they're greater or lesser in their severeness. It also allows industry to understand that there is a projection about access to that property, there is a projection about the loads that that property is going to have to apply to.

We're not going to impose the costs of a one in a thousand year cyclone, we're going to apply costs of a one in a hundred year cyclone, and if that is, in 20 years time, shown to be inadequate, then we've got a better design than we built 10 years ago, so incremental costs in upgrading that building and we can make decisions about that at that point in time. So we're not making resource allocation decisions based on the next 90 years, which are, for many, industry and government, fairly mind-blowing. Unfortunately, that resource allocation is difficult to do in political cycles and other cycles.

MS BROOKFIELD (HIA): I just wanted to add to that that I think the main benefit of the incremental approach is for the infill situation that we're talking about. In that case it's then really a risk management approach of we already have nine million homes that are at risk of particular things, we add a number of homes to that nine million that are in a slightly better position but perhaps not the hundred-year position. So if you sort of say you're adding to a known existing risk but in a hopefully more controlled manner, without going to the nth degree, I think that gives it the balance you're looking for.

DR CRAIK: Just a final question: things like these energy ratings and Basix and things like that, which are sort of related to climate change, I suppose, in some ways, amongst other things, does the industry have a view about them and their assistance in adaptation or not, or mitigation or not, relative to their costs?

MR WOLFE (HIA): Well, we need to contemplate what the consequences - or what's trying to be achieved by those levels of stringency, which have been increasing over time. I must say that there is a little bit of confusion. I speak more within our own organisation but projected outside into other industries, about what is trying to be achieved externally by increasing the level of stringency of energy efficiency requirements on new houses when we have nine million existing houses out there that have a far lower level of energy efficiency. It's about the question of how and why we're targeting.

In terms of climate change adaptation, you can take the perspective that it's trying to allow a household to adapt to climate change by making them more efficient, so therefore warmer in winter - or less cold in winter and less hot in

summer, and that's good. Is it about trying to reduce the amount of energy that's consumed in households and therefore reduce the demand on coal or gas-fired or oil-fired power production? There is a healthy level of scepticism that it's less about that and more about peak load. Is that about climate change adaptation or is that about infrastructure costs and government spending and private investment and financing in a global financial crisis and everything else. So there's a great deal of healthy criticism and cynicism about continually increasing energy efficiency requirements in new homes. More can be done in other places.

DR CRAIK: Like what?

MR WOLFE (HIA): Well, nine million existing homes out there that - well, depending on the ABS, a few less than that - have an energy rating that is far lower than the current standards or even the standards of a few years ago. In terms of cost benefit I think the last increment, the six stars, showed that the benefit cost was less than one. So the cost to the consumer is the cost to industry, and the impact on affordability and the impact on housing stock and housing supply, is disadvantaged and you'll have the other social consequences arising from that with an uncertainty in terms of outcomes that you're trying to achieve by increasing that stringency.

DR CRAIK: Thanks very much. That's been very helpful, thank you. So if you could send us some information on New South Wales as well - - -

MS BROOKFIELD (HIA): Yes, New South Wales - happy to.

DR CRAIK: - - - that would be good. Thanks very much.

DR CRAIK: Next we have CSIRO and Mark Stafford-Smith. Mark, if you could, when you're comfortable, state your name and position for the record and then if you would like to make a brief opening statement, feel free.

MR STAFFORD-SMITH (CSIRO): Good morning. I'm Mark Stafford-Smith, science director with CSIRO's climate adaptation flagship. I would like to just make a quick opening statement. I guess our submission in response to the draft report was reasonably critical, particularly in terms of the framing of some of the report and the timbre, I think, that emerged from that. But I'm well aware that it would probably be frustrating for you to simply have that complained about at this stage and so I hope we can get into some specific issues around that.

Nonetheless, just to introduce quickly perhaps the four high-level points that we think are particularly important out there, amongst many others. I think, firstly, the sense that the framing in there has given really an overstatement of the uncertainty about the minimum levels of change that we face into the future, as well as a bit of an overstatement of the degree to which we're already currently adapted to the existing climate variability and some aspects that might even be the beginnings of climate change, coupled, in a sense, with perhaps an understatement of the potential maximum magnitude of change, gives an overall sense of false security about the amount to which we should be, in a sense, taking something of a precautionary principle about where we're going in the future.

So that raft of things, which I think we've talked about a reasonable bit in the submission and I'm sure you've heard from other people about too, does lead through then to, I think, a sense in the recommendations and in fact the overall flavour of the summary of the chapters and the overall draft report, that we can expect that a large part of what's there will either be handled readily by very bottom-up sort of responses, very local responses, and/or that the assessment methodologies that one might use to look at other things can be reasonably narrowly framed around real options and that all of this then gives a sense of overstatement of the degree to which it's a good thing to delay action.

I want to emphasise that we completely agree that the existence of potential problems doesn't mean that you should necessarily take action now, they don't necessarily mean that they're issues that government should deal with anyway and they don't necessarily mean there's a barrier there that's within the control of government. So we completely agree with the framing of the report in that regard, but the balance, the sort of timbre as to how much of an issue there might be there and how much effort we might therefore put into exploring the prospects for further issues in sectors that aren't currently thinking about this, seems to us to be underplayed.

So that leads to the third point I'd just make quickly, which is we see that the

report would benefit greatly from even a very qualitative but systematic analysis across sectors that might draw in a little bit of data on things like typical asset turnover rates, asset lifetimes in those different sectors, to try and identify sectors where there at least ought to be close attention paid, even if they're not actually turning up to your hearings or in other ways already starting to act.

Then, lastly, I think there are some specific areas where one could point fairly easily to things which are clearly in the government domain. I could pick up a number of these but I'll perhaps just - we mentioned particularly in our submission the whole conservation sector, where the long-term objectives fairly clearly, it seems to us from quite a variety of bits of work, need attention. They don't tend to deal with, in a whole lot of both obvious and then subtle ways, the idea that the landscape might be very mobile and changing and that therefore the objectives, which implicitly assume that you're trying to maintain a static view on where things live today, aren't going to be appropriate for the future.

The same sort of thing flows through in other areas. Just bouncing off that last point that you were talking to with the previous people here, I mean, the energy star ratings, for example, the way in which those are actually measured. I think some of our work has shown, will become what will result in the energy star rating of a building today, in a changing climate, actually changing so that the actual star rating that you think you've got today will actually be different in 50 years time. So I mean, there are issues like that which all have to deal with this issue of nonstationarity of conditions which flow through systemically in many areas that the government has to deal with, I think. So lots more I could say, but over to you.

DR CRAIK: Thanks very much, Mark. Over to you, John.

MR COPPEL: Thank you, Mark, and also thank you for the submissions from the CSIRO. I know at the outset that there have been a number of submissions that have interpreted in a similar way the way we've characterised the science of climate change is perhaps over-emphasising the uncertainty and we'll be taking a look at that. One of the things, however, that you criticise is the framework that we use and you mentioned that this framework isn't suitable for looking at things like nonstationarity of the environment, threshold effects, nonlinear changes. Can you explain a little bit why you think that is the case, that it's not a framework that is able to analyse such issue?

MR STAFFORD-SMITH (CSIRO): I guess this plays out in a variety of different ways. At a high level I guess there's a sense that I think comes through from the draft report that issues like thresholds are greatly underplayed. So, I mean, your chapter 4 acknowledges that they exist as an issue, but in the context, for example, of environmental conditions where thresholds are extremely well known and well documented very, very widely in the literature - I mean, there's actually an assertion

in there that if such "thresholds" exist, then they're likely to be very uncertain and this interacts then with the application with, I think - with a very variable application of the real options methodology in the way that it comes through in the report to imply, in that case very clearly because there's a sentence which actually says it - to imply very strongly that there will be no need to act in the near future because of this uncertainty.

So I think one of the challenges of this is that it's got a systemic and flavour sort of thing. It's not in many cases we would agree with it. We would agree, for example, very much with the idea that one should use real options analysis in appropriate circumstances, but it may not be appropriate in certain circumstances, and some of those relate to these issues. So just to pick that particular point for a moment, I think there's some fairly good work coming out now demonstrating that as you move from a circumstance where there is relatively low uncertainty about costs and benefits and future risk, where a classic cost benefit sort of analysis framework works fine - as you move from that to greater uncertainty, things like real options become really important.

As you move, then, on to other sorts of uncertainty where you have contested values, where even the institutions to resolve those values are contested, then that sort of framework is not much use either because you can't come to any agreement on what sort of measures to put in there for future uncertainty and the value of getting further information. So all of those things - - -

MR COPPEL: How do you put values on such things? What sort of framework would you use that would be able to produce such an outcome?

MR STAFFORD-SMITH (CSIRO): I think you need to move into frameworks which are more about participatory engagement and that sort of analysis and so you actually can't do it as a stand-alone analysis which is done from far away. So we referred in our submission to some work that's going on on the coastal issues in the Eurobodalla Shire, and now being extended to other areas and we can certainly provide you with more information about that. To take three or four concrete examples of that, I mean, I think you can look at some of these issues - so for example, we mentioned in our report the analysis of the impacts of wind in south-east Queensland by Mark Stewart and Xiaoming Wang and others and there you have a situation where we actually don't have very much certainty about what the changing future might be primarily for cyclone patterns in that area, but actually their fairly comprehensive analysis strongly suggests that there is a reasonable net present benefit even if there no change, even today, of making some changes to building standards.

As you look at a variety of possible future changes which are not particularly related to the amount of warming but more to the uncertainty as to whether cyclones

track further south and things like that, as you look at that the net present value today actually increases. So applying a real options thing in that context is not going to give you any extra information because it's already a net present value. It's only going to make that, if anything, more certain.

MR COPPEL: Aren't these examples where you could in the framework use sensitivity analysis, you could test different assumptions and you will come up with a range of outcomes and then you use some form of decision criteria to make a decision? I'm just wondering whether it's not much the framework that you take exception to or how the framework is described and some of the deductions from the language to the conclusions that are made.

MR STAFFORD-SMITH (CSIRO): It is certainly the latter in the sense that I think there is actually quite a disjunction between the content of some of the chapters and the way in which it is summarised and reported which, of course, is the thing that many people will see mostly where there is a much stronger sense in the summary that a real options approach will inevitably result in decisions being delayed which, of course, isn't the intention of real options at all as a method. There is, I think, in the overall summary even a sense that real options itself is a policy option and can actually identify policy options whereas it's really primarily about an analytical valuation technique, of course. So there is certainly that sort of connection.

Whether it is in the framing of the underlying philosophy that sits behind that or whatever, there is this huge downplaying of nonlinear effects in the approaches and I think the result of having a different view on that would be emphasise other sorts of methodologies much more. So in that sense I guess we could quibble on exactly what the framework is, but certainly the connections from the underlying approaches taken into the thinking about this seemed to us, through to the implications in terms of how you act, to not connect very well or not deal with some of these issues very well.

If I pursue that example just for a moment. There is the wind one there where really it's a no-regrets situation so there is nothing wrong with your framing for potentially looking at that. But that's an interesting one where at the moment Building Codes Australia has made an assessment of that and using their own risk management methodology and decided not to act, having initially thought that they should act. So that is something where there is a disjunction I think which is a potential barrier to action between the different sorts of methods that are used but that is always something that can be worked out in the fullness of time.

I just want to run through these quickly because I think they exemplify some of the different levels of certainty that one faces in different things. If you look at things like heatwaves, clearly we've got a very high degree of near certainty - certainly a much higher degree of certainty than we have in things like population

projections - that we will see a greater incidence of heatwaves in a whole variety of different ways by the middle of the century. You can talk about things like the star ratings or changes in built form with a great deal more certainty there than really needs a real options type of analysis.

Then there are some things where we really do have genuine uncertainty in some issues. For example, the rainfall in south-east Queensland that's something where we don't have a strong sense of direction or anything and so a real options approach is likely to be very useful and then things like sensitivity analysis, looking at large numbers of stochastic runs for risk can provide big information. But then you get to the other end of the spectrum, if you like, with things like environment and housing and building trade-offs on the coastlines, for example, in defend or retreat options where we really do have very strongly contested values, but not only the values are contested which, if you could decontest, you could stick into a real option analysis but even the sort of legitimacy of some of the institutions that are involved in doing it is contested. So in a circumstance like that one has to move into other types of modes of decision support and I think there are plenty of examples of those emerging which are not touched on in the report.

MR COPPEL: In your submission you set out in table 1 a framework for thinking about the two types of approach, one which is adapting incrementally as innovation improves and as impacts come to light and the other which is more proactive and it comes across as a very methodological approach, almost a scientific approach. I'm just wondering how would you go about implementing such a framework. Is it really something that is pragmatic or is it really just to illustrate some of the ideas?

MR STAFFORD-SMITH (CSIRO): I think that table is included in there - and it's work not primarily by CSIRO - more to make the point that it is possible to take a systematic view across a whole series of sectors and make some appraisal as a result of that which actually lays out the logic behind that appraisal. So I think one of the things that concerned us about the draft report was the assertion in there that there had been a look across sectors and you have ended up focusing in on the ones that you have - which are all undoubtedly important sectors by the way - but you have ended up focusing in on those for reasons which weren't clear anywhere in the draft report, certainly not to us.

I think the purpose of putting that table in was specifically my third opening point which is that I think we are talking about a sufficiently important and major public policy decision here that we don't feel that it's sufficient to articulate that there are some areas which are important but not have a reasoned basis for omitting other areas basically. You might go through that analysis and still come back to the same ones. We suspect that that wouldn't be the case, that there are a number of other areas where quite often people are not thinking about things so much yet but where it's possible to see that there could be issues. One of the challenges is that if work

hasn't been done in those areas, then we may not know that yet. But I think it is very important that there is an articulation of a complete assessment like that.

So in that regard I think that table was trying to probably do two things, one was to illustrate the potential for some sort of approach to systematically working across sectors and I think you could do that in a qualitative way relatively quickly and easily, the sort of thing that one might do in a couple of workshops but still have a well-articulated basis for then focusing in on some of those sectors and perhaps highlighting some others that need further attention but for which there isn't information at the moment.

MR COPPEL: Has that been done?

MR STAFFORD-SMITH (CSIRO): No, I don't believe it has and we had rather imagined you might do it. Sorry, the second thing, as you mentioned, there are those different columns and it essentially tries to articulate what it appears that people are already doing in that sector. What you would do, just responding again to the previous submission talking about incremental aspects of things, is essentially the things you would do if you thought there was some change happening but it didn't look like too much so this perhaps is a bit of a real options approach, saying, "Let's do the stuff that you really have to do anyway," but not push on into the more transformative stuff that you would do if you really did get to 2030 and discovered that you weren't heading towards some stabilising climate, that you were really seeing a runaway change in which case you would need to start acting much more.

The interesting thing about doing that quickly is that there are some things in the - especially where there are longer lived assets - where even if you're only conceptualising where you need to be for a two-degree world, if you're trying to make those decisions now because it's about decisions that we make now or in the near future, you would still want to be taking some of the approaches that allow for the bigger amounts of change because it would not be adequate risk management otherwise.

MR COPPEL: So what would the government need to be doing now or be doing differently for such nonlinear impacts?

MR STAFFORD-SMITH (CSIRO): I think it changes the risk profile of what you're assessing against and there are some very difficult areas where you have low risk but very, very high impact end of things and again, those I think by and large are very hard to put in a very simplistic way into any sort of economic analysis. So it really sets you down the path of trying to understand far better what the risk tolerance of society is. It sets you down in a much more of a consultative path rather than a deus ex machina economic analysis.

MR COPPEL: Many submissions and many of our meetings have emphasised the need for better coordination to climate change adaptation by different levels of government, by different stakeholders. What's your view on the level of need for coordination? At what level should it be undertaken and how should it be organised?

MR STAFFORD-SMITH (CSIRO): Well, I mean, as a general point it's something that should be susceptible to analysis and conscious thought about just as some of these other issues should be in a logical way because it won't be the same for every area, of course. Perhaps also slightly at a general level, I think it is a very widely repeated proposition that most adaptation is local. You made that in your speech in Melbourne, Wendy, and I think whilst in a general sense that's true, it does tend to let off the hook high levels of organisation to thinking about what they might do. There are clearly actual adaptation actions which can be taken - adaptation actions, not just context setting actions - at a government and other levels as well.

Let me give you one specific example: I was addressing some of the chief medical officers across the states a few weeks ago and one of the issues that emerged very strongly there - ultimately talking about climate change - was probably a lot of the day-to-day clinical response things that the system is pretty good at. The much more challenging things are thinking about the interactions between the health system and things like urban design and various other issues like that. That's an area where it's very hard to get deep conversations in government. That sort of issue which is certainly not restricted to climate change issues alone, of finding better ways of interactions in government is an adaptation in government in its own adaptive capacity to be able to deal with these complex issues.

I think in fact having an entity like NCCARF, the National Climate Change Adaptation Research Facility, is in essence an adaptation at a national level. I just say that because we tend to - by saying that most adaptation, and by "most" meaning "almost all" is at a local level, we actually downplay the significance of looking at the adaptive capacity and ability of other levels to act, not only to set the right policy contexts for other levels but to act in their own right as well.

In that sense, to come back to your question, I think this a profound part of what your report is trying to get at which is where it is appropriate to have those actions and where isn't it. Again I come back to, as a generalisation, it's not helpful to say it should always be at one level, because that's just not true. I think there are some clear areas and you've identified some of them with local government where the clarity in roles and the potential for coordinating across areas is being canvassed quite well, and there are some areas which clearly do need greater clarity and do need consequently that high level of action.

MR COPPEL: Such as?

MR STAFFORD-SMITH (CSIRO): Local government has talked to us a lot - and you could probably get this better from them direct, and I'm sure you have, and some of them are canvassed in the report. Local governments talk about really getting clarity on whose responsibility ultimately are things like "defend" or "retreat" policies. That's probably not something which is a generality either, it's something which, because of those complex values and trade-offs, needs to be worked out almost location by location, but nonetheless through using some reasonably standardised approaches so that people don't feel like one council is doing it differently to another and that it's unfair.

We see comments by investment organisations that they would like to see that sort of thing standardised more so they're able to compare apples with apples across different locations when they're making investments, and know whether they're consistently better or worse. That requires a level of organisation at a higher level. We have already touched on a few of the policy-type actions, such as conservation objectives, for example, which it's not possible to logically set at a household level. You may interpret them down at that level but you have to have some consistent agreement at a higher level, and there are many examples of that.

MR COPPEL: You've noted that we've focused on insurance planning and development, the role of information in the report, and we've taken that thematic approach rather than a sector of the economy approach. Your framework also puts a lot of emphasis on sectoral approach. Are there any sectors that you think are not adapting to climate change appropriately and other particular barriers that explain that under adaptation?

MR STAFFORD-SMITH (CSIRO): I guess CSIRO has work across a number of sectors, but we have a large number of sectors that we don't work into. I'd be happy to try and talk through - we have 300 scientists so I need a bit of guidance of the sorts of areas that you'd like input in there. I'm certainly happy to take that on notice. We've identified some specific ones, like the conservation sector. I mentioned some of the issues in the health sector but they're particularly inter-sectoral ones. I will say, as stated there, these inter-sectoral issues are crucially important. I don't mean for a second to suggest that by looking across sectors, one is not also trying to look at the inter-sectoral interactions.

I think the question you've asked is the entirety of your report. I'm happy to try and address it in more specific ways - - -

MR COPPEL: I'm asking specifically about those that are not in the report. We don't look at it from a sectoral point of view as such. Particular sectors stand out.

MR STAFFORD-SMITH (CSIRO): We've been through and identified some issues in almost all of those sectors, whether it's in transport or health or in almost

any of the others that we've listed there. If you're asking if we can come back with a specific set of suggestions there, then we can certainly try and do that, in some areas anyway that we work in. But I think our point there is not so much that we would suggest that we have the expertise in all of those sectors, it is that without some sort of systematic look across - and whether you carve it up by sectors or by other ways, but without a systematic look that explores the areas with long asset lives, for example, in particular are that have potentially issues, then it's very hard to assert that there are some sectors which shouldn't be at least considered.

DR BYRON: One of the points you make in your submission - or one of the criticisms, perhaps - is that we put a lot of emphasis on the role of providing information in terms of hazard mapping; in terms of research into the scientific impacts of climate change, and that information is then responded to by individual households, businesses and so forth. Your view on that was that wouldn't be sufficient or wouldn't lead to a sufficient level of adaptation at the national level. I think you make the point there's a role for national leadership. What more needs to be done by government and what would a role of national leadership look like?

MR STAFFORD-SMITH (CSIRO): That's a good question. I must be clear, we're not suggesting that the information is of no value, just that it's a necessary but not sufficient step, and in some cases there is a risk of putting so much effort into the information that you don't do some of the other things that are necessary, so there is a trade-off there if you've got limited resources, of course. With that caveat, what we're pointing to here is that in essence, information about threats or impacts is just one of a number of legs that you need for adaptation. Information is one thing, you need methodologies for choosing - well, you need actual adaptation responses is the next thing.

A large number of those can be left to individuals to consider but there are clearly areas where there is collective benefit in doing that at a larger scale, and of course developing new things potentially in some cases, and those may include anything from different planning regimes to specific suggestions for urban planning and things like that. Then there's a third element which is the mechanism for choosing between these. Our disappointment there is the overemphasis on real options as we see it, in the way the report comes out, where in fact there's a smorgasbord of potential ways but I think we're increasingly able to say what sort of approach is likely to be appropriate in different circumstances. There's a real role in government, whether you call that an information delivery role. It's providing guidelines basically for how one might use different approaches in different circumstances and justifying those.

Then a fourth element is this whole area of adaptive barriers and understanding things like contingent pathways and so on where there are at times clearly roles for government. One other one which I don't think we've mentioned in the submission

there but which is emerging more and more from some of our research at the moment with individual organisations that are doing adaptation, or appear to be reasonably well advanced with adaptation, is the role of government in triggering case studies or seed funding as well, and how important that can be - this is not written-up work yet but in a series of interviews we've been doing. If there are two or three things that come through regularly in terms of organisations that seem to be achieving adaptation actions, getting beyond planning to actions, they very frequently have been part of some sort of seed funding program. There is almost invariably significant leadership issues inside that organisation which have enabled things to be pursued. There are a number of other characteristics like that. In at least some of those, government also has a potential role to overcome some of the barriers, and the seed funding is an example of that.

I think information is necessary but not sufficient, and focusing on that too much may end up delivering too much information, rather than delivering the right amount of information with these other supporting elements.

DR BYRON: Getting back to the science where we've based the chapter that synthesises the knowledge on the science of climate change on essentially the work of the CSIRO and IPCC, fourth assessment. You note that the fifth assessment is currently being prepared. Is that something which is available in the public domain, or a draft that we would be able to get?

MR STAFFORD-SMITH (CSIRO): No, it's not. I don't think, on the time frame you've got, you can access it, no. However, there are many other sources of updated scientific information other than the sort of clunky five-year process of the IPCC. The areas that we point you to most importantly which are, I think, increasingly uncontested in the literature, it's almost the arithmetic of calculating how quickly we could decarbonise the economy which leads to some pretty clear conclusions about the prospects of avoiding at least two degrees sea warming. There are quite a number of update reports.

There was one that just came out last week from the US Academy of Sciences, I think it was, which I can certainly give you the connection to, which would probably be the most recent update. There are things, such as the special report on extreme events from the IPCC that came out earlier this year, which also updates things a little bit, although it's mostly based on the AR4. Anyway, there's quite a bit there and I think it would be remiss to take the AR4 only and not some of these things which are pretty well documented with pretty much the same level of rigour.

DR BYRON: Another thing in your submission is the measure of adaptation which is something you've grappled with, an extremely complicated area. It's very difficult to know what would have happened otherwise.

MR STAFFORD-SMITH (CSIRO): Yes, that's right.

DR BYRON: What's your view on the ability to input metrics adaptation to climate change?

MR STAFFORD-SMITH (CSIRO): We could have a good long conversation on this one.

DR BYRON: Whether it should be measured.

MR STAFFORD-SMITH (CSIRO): Yes. I think it's very important. The most promising approach to this at the moment is the UK adaptation subcommittee's approach. You've seen their report from the end of last year in which they have essentially broken this problem down into two issues. One can think about lead indicators or lag indicators in a simplistic sort of way. Lead indicators are indicating behaviour that ought to mean we end up being adaptive but which doesn't show the adaptation benefit just yet; and lag indicators where you might see adaptation benefits or at least explicit reductions in vulnerability. They have taken an approach there of essentially saying there are a suite of exposure and impact measures where we know we should be at least trending in the right direction just as a result of risks today.

An example is the number of houses built on flood plains. Then they've gone out and looked at those things and they can show - in the case studies they did in last year's report anyway - the numbers of houses in harm's way on flood plains is increasing, not decreasing. Whether or not we have done the right amount of adaptation for the future becomes a moot point. We're not even going in the right direction, or the UK isn't there, and it's quite possible that would be true here too.

That's one class of indicators they talk about, things where there's essentially exposure today. The second one is particularly for areas which do have long-lived infrastructure or long-lived assets in general terms; whether adaptation planning is being translated into actual investments inside companies. They look at things like the water industry for that, and they conclude that although there's a lot of planning and talk, there's not much sign as yet of any actual asset investment, and that comes back to the issue that I mentioned at the beginning of not overstating the degree to which we're acting already.

From that they conclude - at least at the moment - that they haven't got any strong confidence that some of those managers of long-lived assets are yet acting on adaptation. Those two categories are useful and they seem to fit in with your two categories of things which are short-term, immediate and apparent risks right now, and there are things which are going to become risks in the future but which may or may not be appropriate to act just yet. That's the most promising approach at the

moment and we haven't really managed to implement that yet in Australia, although there are discussions going on about it.

DR BYRON: You think it would be something that would be useful to have a set of indicators of similar sort for Australia?

MR STAFFORD-SMITH (CSIRO): Well, at the very least the first category of clear and current risks, and whether we're trending in the right direction or not on those, it would seem to be a useful thing, yes. If we're clearly trending to putting more houses in danger which we are clearly trending in a very approximate sense, but if we could have some regular assessment of that, I think that would give us some confidence as to whether we're responding or not to the current risks, which it's quite likely we're not.

DR BYRON: Just a clarification on action, because I tend to think of adaptation not as an event at the moment in time but as a process that in some cases takes a decade, because when you become aware of the issue you start to think, you get consultants' reports, you start to consider them and all the rest of it, and maybe at the end of it you build something, you pour concrete. Now, you seem to be taking only that last point as action, and yet from some of our meetings with major infrastructure operators they're 18 years into a 20-year process, but the concrete trucks haven't arrived yet.

We said they are actually taking action, it's just that they haven't yet got to the point where the concrete starts to pour.

MR STAFFORD-SMITH (CSIRO): Yes, I completely agree, you're quite right. I was reporting how the UK is interpreting. I think it's actually about investment but investment decisions are significantly changed by those things as an indicator of serious acceptance of this, as opposed to lighter-weight involvement in the issue. It is challenging to do this, as you said at the start, because there are cases where you might go through all of that planning and quite legitimately decide not to act but you need to be able to see that as an unequivocal decision, rather than just a failure to get around to it.

I'm not suggesting for a moment that this is easy, but there does come a point where if you want confidence that adaptation is happening, then you've actually got to see changes in investment decisions. I think you've got to see an allocation of funds because otherwise it's impossible to do an awful lot without doing that.

So if one reads the text of last year's report from the UK on that particular point I think they hedge it appropriately in the way that you're saying but it's not suggesting that particularly their water managers aren't thinking about the issue but they're just not seeing yet any pointy end major adjustments to investment decisions

which we would say, "We have taken this in and it has actually caused a significant change to something which is actually out of our business usual."

DR BYRON: But the problem for us then is to be able to say that we think that the water manager - Sydney Water or Sydney Airport or whatever - has got it wrong because we think they should have started actually doing physical works yet they, the owners and managers who have spent years thinking about this, have decided in their wisdom - from their point of view the answer is, "Not just yet but maybe in five years or seven years when X, Y and Z happen." So the question is how confident can we be to say they've got it wrong because they haven't started doing the engineering works yet? It may well be that they know their business better than we do.

MR STAFFORD-SMITH (CSIRO): Yes. But I think that might be framing the question wrongly. The question is whether, as a result of that, you can confidently say that they are doing it correctly and I don't think you can.

DR CRAIK: We certainly can't say they're not.

MR STAFFORD-SMITH (CSIRO): No, not in that particular example. I think, having said that though, you can get into a somewhat more sophisticated analysis. So again in some of our work currently on mainstreaming we are trying to untangle inside organisations the degree to which within one organisations different parts of that organisation are acting or not acting and using the understanding of people who are themselves inside the organisation and who are able to articulate that their engagement with this part of the organisation is enabling action to actually happen, it may or may not be big investment things; their engagement in this part is actually not engaging at that point we're talking about. We've done a couple of interviews with a water organisation here in Australia, for example, where it's clear that they're engaging pretty successfully across the organisation. So for that particular organisation I would be pretty confident that they are heading down that path.

I come back again to the question of where the burden of proof lies and not acting in the face of the prospect of major change does require a bit of a burden of proof that things are happening successfully rather than that we simply can't show that they aren't.

DR CRAIK: Just while we're on that point, Mark, you refer to possibly utilities that are regulated utilities and that perhaps the regulation is actually impeding investments for adaptation. Is there any example that you're aware of because this has been with us but nobody has been able to produce an example of an investment actually being refused by an economic regulator for adaptation.

MR STAFFORD-SMITH (CSIRO): Again in our interviews we've had a couple

of organisations who have expressed difficulty, probably not refusal, so it's more an attitude and flavour again.

DR CRAIK: But regulators question everything.

MR STAFFORD-SMITH (CSIRO): Sure. No, I understand that, but they're saying enough. It's not an area that we've done a great deal of research on so we are just highlighting that as something which can't be dismissed at the moment.

DR CRAIK: We have tried to seek information about it and so far, even with all the utilities that we have dealt with one way and another, we still haven't managed to get any information that backs it up.

MR STAFFORD-SMITH (CSIRO): We cite one reference in there which isn't from our own work.

DR CRAIK: No, okay.

DR BYRON: Just one more thing. You suggest that the way we view real options implies that all reforms where there is uncertainty should be delayed. I don't think that's what we've said at all. But we have said that there are some cases, some particular contexts, depending on the nature of the flow of expenditure and the flow of benefits and where there is reasonable expectation of greater information becoming available, then the real options approach might suggest a benefit in deferring the major physical investment. It's not saying, defer, start to think about it or defer thinking about contingency plans.

But you pointed to that tension in the report between some cases where waiting for more information might be the smartest thing to do and there are other cases where early proactive, preventative, precautionary measures might give you very large increases in adaptive capacity at relatively low cost. So my understanding of what we're saying is not that it's better to always defer action, we're saying that you need to be able to tell the difference between the cases where early preventative action, because of the nature of the benefits and the cost of risk and so on is a no-brainer.

MR STAFFORD-SMITH (CSIRO): Yes.

DR BYRON: The other case is where are strong grounds for believing that in this case it would be better to wait for more information. I think you have also assumed or read between the lines that we're talking only about climate information. But that is one of the many types of information and it may be that as the whole operating environment for the enterprise reveals itself about what the customers are doing, what your competitors are doing, what your suppliers are doing and all the rest of it,

then you would be in a much better position to make a large capital investment decision in five or 10 years time.

So I don't think that we are saying categorically that the real options is a reason for not ever taking any decision and the problem is we're trying to see where the barriers are and can we be confident that people can tell the difference between those two very different type of context, one where waiting make sense and one where waiting leads to increased costs. That is where the evidence, the metric becomes really difficult.

MR STAFFORD-SMITH (CSIRO): Thanks for raising that. I think most of what you've written up in your methodology chapter, chapter 4 I think it is, reflects what you just said. But I think actually there are several places where things come through that then don't take that through to give the same implications in the summary. So it may be largely a dislocation, as I said at the start, between the content of the text and the summary. But there are several questions, we cite one on the biodiversity area where that is not the way it's actually expressed in the words that are in there and I think in the end - and this may be a matter of timing things more than - and I'm sure it's not deliberate intent - the specific explicit underlying logic but where it strongly comes across that the articulation is that that first category of things which are current no-regret risks you will act on and the second category of things where there is uncertainty about the future and it's long term we won't act on and that's the wrong - - -

DR CRAIK: So your interpretation of classification of lower and higher priority perhaps?

MR STAFFORD-SMITH (CSIRO): That's right.

DR CRAIK: It wasn't the right terminology.

MR STAFFORD-SMITH (CSIRO): So it's the wrong framing. The framing should be that if you can show that after taking account of the uncertainty and the benefits of waiting for the knowledge that you shouldn't act yet, then you shouldn't act yet. If you don't show that, which will often be the case with the short-term things, then you should act. But that's a very different framing to saying, you know, your low and high things and you just act or don't act on them and that is, I think, the way that it comes through.

DR CRAIK: You are not the only person who has said that.

MR STAFFORD-SMITH (CSIRO): Having said that, I will just make the point that even with that caveat, even with that fixed up, I think there are still circumstances where real options isn't actually the appropriate analytical frame

anyway and it would be good to address that. I think that would be a really constructive thing for the nation and it is something that at government level one can provide the right guidelines for to be able to identify when different sorts of evaluation processes or decisions of thought processes are appropriate given the different contexts.

DR CRAIK: Thanks very much, Mark.

MR STAFFORD-SMITH (CSIRO): Thank you.

DR CRAIK: Next we have the Australian Chamber of Commerce and Industry. If you would like to state your names and positions for the record and then if you would like to make a brief opening statement we would be happy to hear from you.

MR EVANS (ACCI): Thank you, commissioner. Greg Evans, director of economics, Australian Chamber of Commerce and Industry.

DR GOO (ACCI): Siwei Goo, policy adviser for ACCI.

MR EVANS (ACCI): Just to take you up on your invitation to make a brief opening statement. ACCI considers that business is best placed to make rational and effective climate change adaptation decisions in ways that reflect their own circumstances, resource constraints and risk preferences. Nonetheless, ACCI agrees that governments do have some role in facilitating effective adaptation strategies. In particular, governments should ensure that regulatory and policy frameworks do not impede the flexibility of business to respond to climate variability. Therefore government should only intervene if there exists a clear market failure and any government policy responses to address the barriers to adaptation should go through transparent and robust cost and benefit analysis.

ACCI supports the real options approach identified in the draft report to adaptation policy as it recognises that where there is uncertainty about the future there can be value in deferring investment until better information becomes available while retaining the option to take action as the need arises. Therefore, ACCI supports the commission's draft recommendation 4.1. This draft recommendation we note underpins ACCI's opposition to the clean energy future plan, including an unilaterally imposed carbon tax and related programs including the Clean Energy Finance Corporation which imposes a high up-front cost to the Australian economy and yet delivers barely discernible benefits to the environment. In fact the approach provides a perverse incentive to move production offshore to markets which may have less stringent emission concerns.

The implementation of a clean energy future plan is at odds with the stance of the commission's draft 4.1. The high initial carbon tax in Australian coupled with the 20 per cent renewable energy target entrenches high energy costs and erodes our relative trade competitiveness. Without a global binding agreement to reduce greenhouse gas emissions any effort to reduce carbon emissions in Australia unilaterally is futile for the environment. The high structural adjustment costs imposed by the unilateral carbon tax also constrains the ability of Australian business to adjust to the consequences of climate change as it arises. ACCI is concerned that government's knee-jerk policy responses to climate change in recent years have failed to meet the transparent and robust cost benefit analysis as discussed in the draft report.

ACCI argues that the government policy responses to climate change adaptation, especially in the form of taxes and additional regulations, should go through transparent and rigorous policy assessment. The opportunity cost in complying with new regulatory measures and their distributional impact on the community, including businesses should also be considered in the analysis. In addition, existing and future reform measures should be subject to ongoing independent review to ensure that policy measures continue to meet their objective or intent and do not impose excessive compliance cost burdens. In particular the Renewable Energy Targets should be reviewed and tested by the Productivity Commission and not the Climate Change Authority which may have a predisposed view on the policy.

ACCI argues that businesses that are flexible and less bound by government regulations are more able to respond effectively in the face of changing business environment, the expectations of customers and thus better able to deal with events, including the possibility of climate change. Therefore, efforts to reduce regulatory burden on Australian business should always been on the government's reform agenda. Thank you.

DR CRAIK: Thanks very much, Greg. I know you'll be aware of this but we're not actually dealing with mitigation in this inquiry. We are really focusing very much on adaptation and barriers.

MR EVANS (ACCI): That's not always a distinction that we appreciate.

DR CRAIK: The difference is not always very large. Given adaptation of businesses, what sort of information and guidance do businesses actually need to adapt and what's useful to them and are there any difficulties in getting this information or are they overloaded with it? What are the challenges for them?

MR EVANS (ACCI): I think it has been a confused policy environment for business in recent years and they tend to be reactive to policies imposed by government and to some extent they reduce their own actions because they feel as though the government has taken a policy step. So the confused policy environment has actually hindered businesses from adopting measures that they otherwise would have.

DR CRAIK: Can you give an example.

MR EVANS (ACCI): I think over the last decade we have had a number of programs to help reduce greenhouse gas emissions and we had voluntary programs. In fact in the earlier part of this decade and in the late 1990s the Greenhouse Challenge Plus Program, for example, where companies were, on a voluntary basis, signing up and actually saw some marketing advantage associated with reducing

their greenhouse gas emissions. That program has collapsed and it seemed the government is going to introduce specific policies, that's being handled, then we won't necessarily do anything in response on a voluntary basis. That being said, the overwhelming view of businesses across the board, large and small, is that they're fully in favour of adopting policies which deliver an energy efficiency. They don't want to pay more for energy than they have to, so they have an economic incentive to reduce their energy consumption and hence their emissions.

DR CRAIK: ACCI deals with small business, to what extent are people actually focused on the business surviving, given the attrition rate of particularly small business; a big annual attrition rate and numbers are disappearing in the first three years and the first five years which are remarkably high. To what extent are they actually able to focus on adaptation to climate change 30 years out as opposed to changing to the current environment as they try to exist?

MR EVANS (ACCI): Non-existent basically. They are focused on their business viability. Due to economic circumstances, small business is going through a very difficult time. They're mostly outside in the mining and mining-related areas so therefore profitability and all business indicators are at very subdued levels at the moment. So they're not in the business and coming off the global financial crisis they don't have the financial resources. They find it very hard to borrow money for anything, even their core business functions, let alone investing in new plant and equipment which might derive them an efficiency benefit or the like. so they're not in a good position.

Small business in particular are quite often - they don't own their own premises, for example, they're tenants so they don't have the capacity to change their heating or cooling or whatever or some productive process. So they're not in a good position to implement major changes which would derive an energy efficiency or reduce their emissions. Do you want to add anything, Siwei?

DR GOO (ACCI): I think from our survey indicators we note that the profitability of small business has been hit hard, especially since the crisis. So right now they don't have a capacity to invest in perhaps energy efficient products. That is why the current clean energy future plan or the carbon tax actually gets lots of questions and lots of protests from small business.

MR EVANS (ACCI): In short, they see any additional requirement, especially imposed by government, as just another tax or regulatory burden.

DR CRAIK: So what can government actually do to help small businesses adapt to climate change? Is there anything positive they can do? You talk about policy certainty but - - -

DR GOO (ACCI): One of the good things is to provide them, for example, information about energy in a simple way. If you're looking at CSIRO reports, it's like a couple of hundred pages, I think it's best to provide them with simple information about how much the economy is actually affected by climate change, how much the sea level will rise and this is especially important for small business where the information are straightforward and not asking them to read long-winded reports.

MR EVANS (ACCI): We wouldn't overstate the extent to which small business identify climate change as a problem in the first place, other than something they will deal with along the way.

DR CRAIK: Are there specific barriers that are stopping them from adapting, do you think?

DR GOO (ACCI): I think capital constraint will be one of the things for small business as well as there is information constraint because the first time when we do a polling on small business understanding of the carbon pricing, I think when the CPRS is actually introduced, we note that the information for small business are really minimal, so they don't understand what is the obligations, what do they need to do when we have a carbon tax.

DR CRAIK: What about the regulatory barriers?

MR EVANS (ACCI): We can't say any particular examples that mainstream business would typically cite. Only to say that, as I just repeat my point before, if government seems to be coming up with a particular policy response, then business won't do anything. Not necessarily they won't welcome it, but they will just abide by the new regulatory approach rather than try and do anything themselves.

DR CRAIK: Are planning and building regulations a problem for small business in terms of adaptation, do you think? Are you aware?

MR EVANS (ACCI): We're an overarching business body. We have members in that area, Housing Industry and the Master Builders, so they'd be probably better off talking about that in detail. But we note their concerns that energy and efficiency criteria is adding to costs and lowering affordability. Those policies need to be carefully implemented and, understanding that, imposing these extra costs implies high costs for housing and building.

DR CRAIK: I note you quote a CIE report on some of these energy efficiency star ratings for building. Is that CIE report generally available, do you know?

MR EVANS (ACCI): Yes, it is. We also note that, in respect of carbon tax, carbon

tax will add something like five to six thousand to construction of a typical dwelling in Australia. It is significant amounts which could have been spent on energy efficiency.

DR CRAIK: Things like sea-level rise and the impacts on existing settlements of things like sea-level rise and dealing with that, there's people posing options like accommodate, retreat, protect and things like that. Do you have a view about how those sorts of things might be dealt with from businesses' point of view? Does business raise this or is it kind of not on their radar really - small business?

MR EVANS (ACCI): To some extent only in a minor way these issues are canvassed, but I think the main concern expressed by business is the reaction of local government to these issues; they're imposing more onerous regulations on them because of some perceived issue with respect to those issues, rising sea levels or whatever. I think they note that local government is ill-equipped to deal with the complexities of climate variability and therefore will take a totally risk-averse attitude and probably just adopt the worst policy possible in order to achieve a hundred per cent risk-averse outcome.

DR CRAIK: Has small business had any problems in getting insurance for climate-related risks that you're aware of? Has that been an issue?

MR EVANS (ACCI): I think the cost of insurance has been an issue, and we identified this in the context of tax reform a decade or more ago, that taxes imposed on insurance levies decreased the affordability of insurance and leads to both underinsurance and people not taking out insurance. In many instances the tax component, state taxes in particular, represent a large proportion of premiums paid by business. This has been advanced as a tax reform issue but we understand the issues associated in this context as well.

DR CRAIK: Certainly households have raised concerns, say, some strata units, after some of these recent events, like floods and cyclones and things, where insurance premiums have gone through the roof. Have you had that raised with you by small business at all, or insurance withdrawn, I suppose - you know, Emerald and Roma where Suncorp has withdrawn I think household and businesses' new insurance?

MR EVANS (ACCI): I think that has been the case, especially in the aftermath of the Queensland floods where much of the assistance, for example, was provided to households and the farm sector and small businesses quite often were left out of that.

DR CRAIK: Is there any information on that, where households and, say, the farm sector got assistance but small business didn't?

MR EVANS (ACCI): I think initially that was the response and I think it was dealt with in the context of Queensland that small businesses that weren't able to trade, for example, got some compensation, not necessarily adequate but I think the policy gap was addressed to some extent. I think it's typically been a problem in Australia where there's been disasters; more of that immediate relief is provided to farmers and households rather than businesses on the main street of towns, for example, for cessation of trading and the like.

I guess one of the other points we make is that over the last decade we've had a series of calamities. We've had bushfires, floods and cyclones et cetera, but I think it would be dangerous to attribute these to necessarily the climate change because we, as a country, have gone through centuries of these events. Some of these are now exaggerated because there are population centres where these have occurred.

DR CRAIK: The impacts are so much greater.

MR EVANS (ACCI): Yes, and there's economic infrastructure, such as plantations, banana plantations and the like, where there once wasn't. So there's losses that once wouldn't have occurred and wouldn't have been known about and there's areas that have had it that once weren't. So we should be careful not to attribute these recent events, horrific as they are, to the impact of climate change when they may well just be naturally occurring events. Well, in the case of fire some are actually started by arsonists, so you can hardly attribute that to climate change.

MR COPPEL: I just noticed in your submission you reproduced a table based on a survey that the Australian Institute of Management undertook, which is labelled Adaptation Initiative, but many of the actual initiatives refer more to mitigation and then in your remarks you noted that small businesses typically don't see climate change as an issue or as an issue that they respond to as it evolves. Has there been any sort of survey that really tries to measure that sort of awareness of climate change and responses on the adaptation side by small business?

MR EVANS (ACCI): Well, yes, in the past we have done such surveys and we can give you more specific information about that. The view has been, "If climate change was a problem, how would you want to deal with it?" and the overwhelming response has always been through the use of efficiency and technology, rather than through the imposition of a new tax or regulation; and that's been an overwhelming response, especially amongst small, medium-sized businesses. That was a survey that probably we did three years ago and we can provide you that information.

DR GOO (ACCI): But the survey was based on mitigations rather than an objective of adaptation, so it's slightly different. We do ask a set of different questions about climate change and what you need to do and what's your view on climate change as well.

DR CRAIK: It would be interesting, if it's possible, if we could have a look at that.

DR GOO (ACCI): Yes.

DR BYRON: If you were here for the previous questions when we were talking about adaptation being a process that might take quite a long time between being aware that there might be threats to the business and then looking at options and thinking about getting reports and all the rest of it, it's very hard for anybody, including us, to get a clear picture of how much adaptation is being done, especially in the small, medium enterprises. Governments seem to have the impression that however much it is, it's not enough and should be more, bigger, faster, sooner et cetera, but the question is, compared to what. So are we right in thinking that for the majority of small businesses the greater imperative is just to survive and to still be here in the next couple of years, rather than worrying about expending a lot of money that they probably don't have to look 20, 30, 50 years in advance?

MR EVANS (ACCI): Absolutely. Small business doesn't have that time; it has a much shorter time frame to look at these issues. The other point is they see government is making investments, correctly or incorrectly, and therefore that's dealing with the issue as far as they're concerned.

DR BYRON: So disaster mitigation measures, whether it's building flood levees or sea walls or whatever it is that needs to be done, the Commonwealth, state and local governments between them will take some sort of protective measures, and in the meantime, small business will get on with running small business.

MR EVANS (ACCI): Yes, I guess a reasonable summary, and governments will make mistakes. For example, they chose to build a desalination plant in Sydney - and this is what I was talking about earlier. They want to be 100 per cent risk averse so they will make potentially irrational decisions in that regard. I think that, in a sense, crowds out the private sector. They believe, "If government is making those decisions then we won't."

DR GOO (ACCI): I think one of the points was businesses will think about adaptation when that's very important in terms of making profits or they can use it as a marketing pitch. So they might market themselves as green companies and then they respond to their customers' demands and things like that.

DR BYRON: So if it fits in well with their business plan and things that they might have done or whether they can see a pay-off for it, they will do it?

DR GOO (ACCI): Yes, they will do it.

DR BYRON: Okay.

MR EVANS (ACCI): But that's the minority of companies. I mean, not every company can go out with a green pitch.

DR BYRON: If everybody does it, it doesn't differentiate.

MR EVANS (ACCI): That's right.

DR CRAIK: Thanks very much, Greg and Siwei. If you could send us that survey that would be great.

MR EVANS (ACCI): Yes.

DR CRAIK: We will now break for morning tea and resume at about 10 to 11.

DR CRAIK: We will now resume. We have Andrew Petersen. Andrew, if you could state your name and position for the record, and then if you would like to make a brief opening statement.

MR PETERSEN (SBA): Yes, thank you, commissioner. My full name is Andrew Ian Robert Petersen. I am the chief executive officer of Sustainable Business Australia. SBA is a not-for-profit business organisation and think tank that has been in existence now for over 20 years. It was actually established on 27 May 1991. Its function, its role, its purpose and its mission is to promote the performance of sustainable business in enterprises within Australia, whether they are the private sector or in the public sector. The representative body has just over 100 members, and that membership comes from ASX listed companies to private companies to SMEs, local government.

It also has a very strong alliance arrangement with a number of other organisations, including the WWF, the Clean Energy Council, the Investor Group on Climate Change, the Carbon Markets and Investors Association, the Meat and Livestock Association. It sounds like a check list. We also have a very progressive relationship with NGOs in civil societies. SBA has a memorandum of understanding to develop sustainability and best practice for Apex Australia. We see ourselves as not an industry association, it is a broad based business organisation that seeks to engage with government and business and all stakeholders on sustainability, primarily environmental sustainability but also social sustainability.

DR CRAIK: Thank you.

MR PETERSEN (SBA): In terms of the opening, I would like to address two points: the first is why progressive business thinks this issue is important; the second is some very brief comments about the draft report. In terms of why SBA and the members of SBA think this is an important issue, the issue of adaptation for SBA and its membership is a critical one, particularly for certain businesses within the SBA community and have it currently on their agenda. The impacts will affect not only their operations but also the markets and the asset bases in which they participate, and the communities where their employees and their customers live.

Adaptation is therefore essential in their minds, both as an issue in the developed, as well as the developing world. SBA supports the development of activities to plan and prepare for the implementation of adaptation and, in particular, given the wide impact, the integration of adaptation into a wide variety of relevant policies, strategies and programs. Business, we believe, is also willing to share experiences and best practice, and SBA is currently undertaking the development of at least two case studies - one from the energy sector and one from the finance sector - which we believe are relevant to the challenges of adaptation. We would strongly support improving the environment for doing business and in particular for small and

medium enterprises.

Appropriate long-term policies for adaptation need to understand all the potential impacts and the knock-on effects of national policy, as well as regional and international relations. Many adaptation measures will require cross-border and regional cooperation, and in that respect, certain businesses within SBA have the ability, such as GE, to bring across the work that they've been doing in other countries on adaptation into Australia, and have documented it at levels such as the UNFCCC.

Specifically, the cross-sectoral barriers to climate change adaptation, we believe, can be understood and categorised in a number of ways, but for the purposes of this submission we consider that the barriers, as they arose at each stage of the climate change adaptation process, were understanding, planning, implementation, monitoring and management, and in doing so we've referenced the work of Moser and Ekstrom in 2010.

In these terms, SBA identifies the effective adaptation to climate change that the commission seeks to explore is a call for a coordinated and dynamic response - or answer rather - from business, households and governments to cope with the alterations to the Australian environment and the economy as the shortage of resources, increasing in frequency and severity of extreme events seems to emerge. The Australian economy, we believe, faces an increasing level of financial risk associated with natural disaster with more frequent and severe, extreme local weather episodes, in concert with a population shift towards higher-value homes - as was identified in the submission by the Insurance Council - in high-risk areas. We believe this has resulted in higher concentration of risk in Australia than ever before.

An example that we will be giving is that the National Australia Bank has witnessed in the recent Toowoomba floods, in Innisfail, as a result of those activities, or those events, causing an unanticipated and incalculable, at this stage, impact upon the mortgages of those households that were in fact impacted during the course of that flooding. That has resulted in the banking industry starting to understand the need to price in the risk associated with climate change into the mortgage profiles of those communities that are in higher-risk areas. It could potentially be an unanticipated and perhaps a perverse and unintended consequence of what is climate change emerging in Australia.

We believe that in concert with, as I say, the population shift and the concentration of risk in Australia that there is a risk of certain, significant financial loss to business, as well as to the broader Australian community, and it must be the case that national frameworks of risk management must be enhanced and improved. SBA considers that the draft report does highlight the four phases of emergency management and prevention preparedness response and recovery, and notes that the

issue of balance of these four phases must achieve an optimal outcome to the community, which we would agree.

We believe, though, that imbalance prevention is better than cure. SBA is of the view that the current national approach to risk management with respect to climate change needs to appropriately evaluate the four phases of emergency management. The communities, and therefore the government, instinctively must focus, we appreciate, on disaster response and recovery, and it is evident that when disaster strikes that strong and decisive action is needed to appropriately manage the impacts of the disaster. It is, however, we believe substantially more difficult to determine what action should be taken prior to the disaster.

The natural focus on response and recovery has led to significant and long-term under-investment in the prevention phase, we believe, throughout Australia. To improve disaster prevention there is a need for a more systemic approach with national leadership, increased funding and local level implementation. SBA acknowledges the crucial role that this commission gives to the business community in addressing the climate change adaptation issue, and the importance of government assistance for identifying and removing policy regulatory governance and market failure barriers to adaptation.

SBA understands that numerous changes are in fact occurring to affect businesses as regulatory or information reforms, and we embrace those. SBA shares the idea of behavioural barriers and the significant impact that behavioural component can have on adaptation responses, and the need for adopting a planning horizon of perhaps not less than 25 years in the first instance for consideration of these risks to climate change.

Ostensibly, SBA believes that barriers for business to understanding and responding to climate change adaptation in Australia are fourfold. The first is a negligible appreciation on their part and comprehension of the risk, including limited access to and the uncertainty of climate change impact related information to date; secondly, an inadequate governance structure, planning, coordination, communication and leadership between both the vertical tiers and horizontal levels of government and its interaction with business; thirdly, an inconsistent problem definition and appropriate climate change adaptation framework to use for planning and relevant financial risk identification; fourthly, and finally, competing priorities due to limited operational resources within business, as well as government, such as staffing and funding to plan and implement these responses.

In terms of the draft report, in summary, we have four key points. The first is that we believe that the absence of a consideration of a full appreciation of the economic and social implications of climate change and the resultant adaptation solutions within the commission's initial terms of reference is an opportunity lost in

this critical discussion; secondly, we support the draft recommendations related to insurance, taxation, risk, information-sharing, building codes and standards, and insurance regulation; thirdly, we support the draft report and the commission's approach to addressing several barriers to effective climate change adaptation. Finally, we are concerned by the lack of national governance and investment in disaster mitigation. I think I might leave it there and invite comment.

DR CRAIK: Thanks very much for that, Andrew, and hopefully we'll get a written version soon.

MR PETERSEN (SBA): Yes. As I indicated, my apologies for not sending it but we will do so by the end of today.

DR CRAIK: One of the four issues that you just raised at the end there: the terms of reference, we work with the terms of reference that we're given.

MR PETERSEN (SBA): Indeed.

DR CRAIK: On the fourth one, the lack of governance and investment in prevention for disasters, in that sense do you believe that the recommendations that we've put in place are the appropriate ones or do you think there is something missing?

MR PETERSEN (SBA): We do believe that they are effective to the extent that they have been identified within the terms of reference. We are, I suppose, a little despondent that the work that was set up in 2011 has not been followed through in terms of the COAG level identifying appropriate governance at that national and state government level and then feeding it out back through the agencies. To a large extent the observations that our members make is that Katrina and the US government response really has yet to happen here and we would want to know that - - -

DR CRAIK: When you say that, what do you mean the US government response?

MR PETERSEN (SBA): In that that Cyclone Katrina identified that there was a massive governance lapse within the organisation that was FEMA and that it is a timely warning to Australia that we should prepare now rather than wait for our own Katrina and that the amount of effort that has gone into purposing what should be done is noble but what now needs to be done is some implementation around the policy commitments that have been made some time ago.

DR CRAIK: Is it the response side of things you're talking about there or is it the prevention side you're talking about?

MR PETERSEN (SBA): Well, both, prevention and we talk about the issue of information symmetry and I would echo the comments made earlier by the ACCI in relation to local government. That is also an issue because business itself has not fully appreciated that adaptation is just as important as mitigation. But in terms of response by reason of disaster management, whilst we feel that at this stage the proposal in relation to it is the right one to go with, the question we have is, is there sufficient governance going to be to coordinate all the disparate agencies that go on within the states and how is that going to be done and is it going to be effective if we were to have another event such as Queensland did a year and a half, two years ago.

DR CRAIK: One of the other things you mentioned was the realisation by NAB after the Toowoomba floods and Innisfail - I suppose we're talking about Cyclone Larry.

MR PETERSEN (SBA): Yes.

DR CRAIK: The impact that that has had on, I suppose - well, that they need to price that sort of risk into mortgages in those parts of the world.

MR PETERSEN (SBA): Yes.

DR CRAIK: Given that cyclones have been a regular feature of the North Queensland coast for a long time - - -

MR PETERSEN (SBA): It was the sheer number this time. In the past the identification of risk by the bank - and I think for that matter the other three banks who were largely responsible for the home mortgage market had priced it in. What came as a complete surprise was the intensity of the event itself, the time that it took to get people back up and running and it had that significant impact of - its impact occurred within an urban area, so Toowoomba particularly, and that meant that people were not able to get back into business, back into their homes, back into work to be able to fund the mortgages that needed to be funded. That came as a surprise, particularly to the borrowers, when they went back to the banks to say, "We need some relief," and the banks themselves, and NAB and it is my understanding that the others felt the same way, that there was not an understood appreciation of how that would impact upon their loan portfolio if that were to occur - perhaps not on a regular basis but if it was as intense as that in certain parts of Australia and those were perhaps lower economic demographic areas, then the challenge would be quite great.

You would find the same concerns that were raised after Katrina, that the insurance market were going to remove themselves from parts of New Orleans because of that and you wouldn't want to see the same thing occur within the mortgage market.

DR CRAIK: Is that information about the banks available?

MR PETERSEN (SBA): NAB has documented the work that they did, yes, and we're currently writing up a case study.

DR CRAIK: Is it possible to get hold of that?

MR PETERSEN (SBA): Yes, it is.

DR CRAIK: What have they done in response?

MR PETERSEN (SBA): It's been a look at their loan practices in relation to no interest and low interest loan repayments during events such as those. That has been the first response. It is to then identify and no doubt to engage with the insurance market about what their assessment is of the likely impact of flooding occurring within areas that they previously thought perhaps were not as impacted as they may have been.

DR CRAIK: We would certainly be interested in seeing that information. That leads me to the case studies that you mentioned. You said there is one finance, is that the one on finance?

MR PETERSEN (SBA): That's one.

DR CRAIK: The one was energy, you said.

MR PETERSEN (SBA): The other is an interesting one that's been raised by AGL, who is also a member, and that is the point that they have made around energy poverty and the issue of again low-income demographic areas being most impacted by climate change and, as a result, the outcome of price in that impact by reason of carbon price but also it will have potentially a challenge for those households to respond, notwithstanding the government assistance, in relation to adapting homes to climate change. AGL have identified that those homes that are in the lower-income demographic quadrant are going to be most stressed when it comes to climate change and as a result they are going to be drawing upon electricity far higher than perhaps other areas may do so and in doing so their homes are likely to be more ill equipped to deal with climate change as a result, so lack of insulation, homes that are probably in excess of 40 to 50 years and therefore not able to be modified as quickly.

DR CRAIK: They're probably renters anyway.

MR PETERSEN (SBA): And renters as well. So the challenge then becomes, "Well, that's an adaptation issue as opposed to a mitigation issue," because you need

to be able to have those homes, those settlements adapted so that they are capable of accommodating those future challenges.

DR CRAIK: What's AGL's response to it?

MR PETERSEN (SBA): AGL's response at this stage is to identify the issue and start and engagement with government and through this process highlight that that may need to be an area where policy and/or funding might need to be brought forward.

DR CRAIK: It is certainly an issue that has been raised with us by people like Brotherhood of St Laurence and some of the social - - -

MR PETERSEN (SBA): AGL would echo it from their perspective.

DR CRAIK: UnitingCare. Is anything written up on that one too?

MR PETERSEN (SBA): AGL have done a paper on that and again, we're putting it together a case study on adaptation.

DR CRAIK: If it's possible to get hold of it, that would be great actually.

MR PETERSEN (SBA): Okay.

DR CRAIK: One other thing you did mention was cross-border - drawing on experiences in other parts of the world in relation to adaptation and you mentioned GE.

MR PETERSEN (SBA): Yes.

DR CRAIK: Can you say what they have actually - - -

MR PETERSEN (SBA): I haven't delved too deeply into what work they have done but they have actually reported some adaptation work on the UNFCCC web site that they have been doing I think in Africa and parts of Asia. I identified this in the last couple of days thinking that it might actually have some relevance to this particular inquiry, so I have asked them if they can dig further to get that information out because they're obviously using technology for the purpose of responding to the issue and it's relevant to the situation. So, yes, more than happy to pull that out and present it as well.

DR CRAIK: Yes, that would be really helpful. When you listed off a few barriers to adaptation to climate change, appreciation of the risk, what sort of information does business need - the sorts of businesses that are in your organisation - or

guidance that would help them?

MR PETERSEN (SBA): I think the work that CSIRO have been under taking and NCCARF have been working up over the last few years is helpful. My observation is that there has not been a forum/avenue/venue by which business with those agencies will actually engage with that information. So there has not been a conference or a public forum by which they can participate and that is as lamentable by business as it is by government I would suggest to you.

DR CRAIK: Shouldn't that be the responsibility of business organisations, overarching groups to run those conferences?

MR PETERSEN (SBA): I would agree with that and that is something that we're trying to raise. The other is the level of information that government has and its coordination so that it is readily available. So the information from ABS, the information from CSIRO and other agencies and particularly state agencies that have over the years gained information around, for example, coastal communities and mean high water mark, that information has resided within local government now. New South Wales has 155 of them and they don't talk to each other necessarily. That is lamentable because by having it aggregated or at least in one place for access by business it would make the task then of pricing the finance risk associated with it a lot easier and be able to bring out to the market more effective product that would respond to it and that in itself would create behavioural response by consumers as well.

DR CRAIK: Is that unique to adaptation issues though?

MR PETERSEN (SBA): I don't think it is, no, but this is the topic it had. So the information - and I'm not speaking on behalf of SBA members but just my understanding of what the insurance sector has done is basically to go and re-mark what the mean high water mark means in the absence of information coming from local government. So comments made by ACCI around that being something that is not worthy of local government is understandable but given resourcing and lack of funding you can understand why they haven't done it, whereas the information probably does reside within business.

Arguably there needs to be, as equally from business, a release of that information into a collective comment so that all can understand what the risk is or the perceived risk is in relation to flooding, not so much in coastal areas because I think there has been a lot of work done on that. I actually think that the greater area is in flood plains and rivers because Toowoomba told us and particularly the events down into New South Wales told us that perhaps the assumptions that have been made over one in one hundred year and two hundred year floods are not as firm as they used to be.

DR CRAIK: Particularly with the encroachment of the built environment.

MR PETERSEN (SBA): That's correct.

DR CRAIK: Yes, and areas previously not built up. You also raised the issue of inadequate governance framework, both vertically and horizontally, in relation to adaptation. You've talked about local government and the problems with local government. Do you see a particular framework where - do you see a specified role for the feds and then the states? Do you have an outline of what that would look like to best help businesses back to life?

MR PETERSEN (SBA): It's hard to say and in our research we haven't found any one country that has done it necessarily any better than we have. You also have the added complication of how you coordinate that at an international level so that you draw down on best practice as well and therefore do you field it as policy initiatives or do you actually try to implement it? I think at the end of the day though it's an infrastructure issue and it really challenges us in Australia to understand infrastructure as the purpose by which we protect and enhance our economic value. If we look at it from that perspective and add adaptation into it, then adaptation probably could reside within infrastructure as a requirement rather than as climate change per se.

So that one of the submissions we have made is that - and we have members that sit also on the Australian Green Infrastructure Council and we believe that that tool is absolutely critical to assist in adaptation response. It begs the question, why couldn't it been done? It's already been supported by both business and government. It has brought, as I understand it, stakeholder support and it is a cost-effective, economically-effective, environmental-effective means by which to address adaptation. It would then send a message to the private sector marketplace that if government is going to be promoting that through procurement requirements, particularly for, say, larger public infrastructure, then it becomes priced and weighted into private infrastructure proposals as well.

DR CRAIK: Why wouldn't business just pass it into their proposals?

MR PETERSEN (SBA): Because it does require a signal. It doesn't understand, I think at this stage, notwithstanding the debate and discourse we've had in this country about climate change and its price. I think that largely business believes at this stage that the carbon price is the thing that sets the agenda and that we have not yet adequately priced the implications of what not adapting are going to mean.

DR CRAIK: That's interesting. In terms of the biggest barrier you think your businesses would see to adaptation - I mean, if there was one thing that government

could do, what would it be to improve the environment for adaptation of your sort of businesses?

MR PETERSEN (SBA): I'm tempted to say education but that's an easy one. I think that a coordinated response on disaster management does become the most immediate need because it's that we don't know what we don't know. We don't know when the next critical high weather event is going to occur and what that's going to mean in terms of economic cost. That, I suppose is, in terms of the most immediate need, the thing that we, as a business would like to see effectively put into place. Again, it will send a signal to business that the government takes the financial implications of climate change in terms of adaptation seriously and particularly in the insurance and finance sector response accordingly. That has a ripple effect back into broader business if they understand what's going on. So I suppose it is having an effective governance structure around disaster management.

DR CRAIK: Okay.

MR PETERSEN (SBA): If I can offer the medium term though I think is longer-term strategic assessment on planning and I know that that has been a common submission being made by both local government and also business. I think that you will start to see business much more involved in strategic assessment around Australia and not just in the property sector.

DR CRAIK: You're talking about sea-level rise risk and flooding risk and bushfire risk and how you deal with that and existing in new settlements.

MR PETERSEN (SBA): Yes. Firstly, the insurance sector and I suspect finance and others will follow.

DR CRAIK: The chairman of the Australian Building Codes Board the other day was talking about the demise of the planning ministers forum and he was suggesting that one possible way of filling in this planning gap in the Australian governance was to set up something like the National Board of Commissioners that are appointed by the states and the federal government and they don't have a directive role - a kind of a decision-making role - but they do have a role in raising issues in doing research and promoting discussion on and raising issues of best practice and things like that in the planning arena and giving a forum for issues related to planning which would include adaptation issues to be raised.

MR PETERSEN (SBA): I think that would be worthy. I think it should be connected with the work done at a federal level and also at state level on infrastructure because I don't think you can have one - you can't strategically have one without the other.

DR CRAIK: It was supposed to pick up the intersection between building and planning.

MR PETERSEN (SBA): In which case I think that's - particularly as the cost of infrastructure and even without the added financial implications of adaptation is significant, so it should be done at a national level.

DR CRAIK: Thanks you. Do you have any questions, Jonathan?

MR COPPEL: One of the concerns you mentioned was a lack of investment in mitigation infrastructure. I was wondering if you have any explanation for why that may be the case that a particular obstacle that leads to underinvestment in mitigation?

MR PETERSEN (SBA): A lack of a carbon price signal. That's a difficult one for business to answer in the sense that they haven't yet fully appreciated, I think, the full carbon price implications when they do so and a carbon price, in itself, sends an investment signal and in some businesses' eyes at this stage that price signal is weak and therefore the opportunity to invest is not there. There is technology. I would agree with the ACCI on that and I think that is important, but economic theory tells me that the technology is not going to come forward unless it's cost-effective, and as you are pricing in the externalities by which it wasn't in the first place, then it's never going to come to the fore.

MR COPPEL: I'm speaking of mitigation infrastructure of an adaptation kind, like a sea wall.

MR PETERSEN (SBA): The work that was done by the Queensland government some years ago and their policy paper around that really asked the question, was it worth putting a bridge - increase the height of a bridge by five centimetres when the cost of that was going to be X, and you've then got the knock-on consequences of the road network around it that would need to be increased anyway. So I think that it's because there has not been a substantial financial assessment of the cost of adaptation at a national level, that we haven't truly understood what needs to be done to mitigate and therefore adapt as well. So I think it's because there has not been some hard economic analysis done of the issue, to be honest.

DR BYRON: The suggestion is that there are probably dozens, perhaps hundreds, of worthwhile disaster mitigation investments that could be made around Australia, whether it's flood levies for Roma and Emerald and so on, and failure to construct those activities means that insurance companies will withdraw insurance coverage, which means that people will be either uninsured or underinsured, particularly those who can least afford premiums and are probably most in need of insurance coverage, which is clearly not a desirable outcome. So the suggestion is that if in fact there are all these disaster mitigation activities that would produce a substantial social benefit,

why aren't they being done?

MR PETERSEN (SBA): Because I don't think that the connection has been made yet with its economic benefit.

DR BYRON: You mentioned before the balance between the pre disaster and post disaster, and from what we've been able to find out, that in most countries there's a significant prevention, precaution planning before the event and Australia we don't seem to do very much of that and we spend billions in the clean up and really for recovery. So your question of balance, that maybe Australia should be spending more - - -

MR PETERSEN (SBA): On the side of prevention, yes.

DR BYRON: - - - on the precautionary side and that we're getting evidence to say that these opportunities exist but aren't being taken up, now, is it because the Commonwealth and the state assume that local governments will do it, but local governments don't have the money to do it, or do we not have a process for sniffing out all these opportunities and making sure that they are taken up?

MR PETERSEN (SBA): I can't speak for government. I would have thought, though, that business would observe that there's not been an economic case made for them in terms of the economic upside of doing it.

DR CRAIK: Yet some of them, as we understand it, say, for Emerald and Roma - a case has been reported in the newspaper at least, with whatever accuracy, who knows - that the cost, say, in Roma, I think, would be between two and nine million for - I think that's the numbers - a levy, or maybe even up to 15, but three times Roma has been flooded in the last few years and the costs are certainly well in excess of - - -

MR PETERSEN (SBA): I would pose the question, why isn't it seen as a national infrastructure project, because it would, in and of itself, preserve, if not increase, economic value in the area by putting it in place. I think that that's where the behaviour or the mindset of business hasn't yet passed that Rubicon. It's getting there, because I think that the price signal of carbon from 1 July has started that.

DR CRAIK: Doesn't the price signal of cleaning up after the flood three times in three years get to businesses?

MR PETERSEN (SBA): You'd like to think so, but I do think that there is a social mindset in Australia that that's what we do after an event. We do the right thing, we do the fair thing, after an event, rather than doing the right thing and the fair thing before the event may happen.

DR BYRON: If we couldn't find $9 million to prevent three floods in Roma, but we could find $30 million to spend on helicopters on one Thursday afternoon in Roma, it suggests there's something wrong with the way our allocation of resources for pre event and post event is skewed.

MR PETERSEN (SBA): My nodding indicates I agree with you.

DR CRAIK: We're going to have to wind up there. Thanks very much, Andrew, that's been very helpful and we look forward to your submission and the other things you're going to send to us as well, which is very helpful.

DR CRAIK: Next we move on to Nick Abel. Nick, if you can state your name and position for the record and if you'd like to make a brief opening statement, that would be great, thank you.

DR ABEL (CCC): I'm Nick Abel and I work for myself under the name of Catchment to Coast Consultants. I retired from CSIRO in 2011. I want to talk about, first of all, the conceptual framework that you've used in the draft report; and then about the effects of intergenerational equity; and then about some elements of an adaptive society as I see it. Before I talk about the framework, there's a lot of things I like a lot in this draft report and I'm also well aware, I think, of the constraints put on yourselves by the terms of reference, but also the constraints that the Productivity Commission itself works under, given it's disciplinary make-up.

Having said that, I would still say that the framework that you use is essentially neoclassical and that if, in the time available, I can only caricature it in this way, without nuance, and that it's about equilibria, it's about market failures, it's about marginal changes to improve efficiency, even if the system - it's about finetuning a system regardless of whether it's on the right waveband. The society comprises individuals and firms. The time horizon - well, the long run is 20 years. Ecosystems are essentially a set of monotonic production functions. Then finally, Australia is connected to the world only by markets. I know that's a caricature and you can get back at me on that later.

The draft report does apply something like this framework to a world where there's rapid technological change; unprecedented population pressure; sea-level rise, flooding of farm lands; there will be displacement of people; there's degradation and scarcities of land and water; unprecedented decline in biodiversity and increasing pollution; major geopolitical changes and likely wars; and as if this wasn't enough we chuck climate change on top of it. Now, some of these changes are going to be nonlinear, they're going to be irreversible, they're going to be path dependent and they're going to interact with other changes, sometimes to magnify the effects.

So when we look into the future, supply and demand for factors, for goods and services, they're likely to be very, very different from what they are now, and so prices can't be known at this stage. So long-term cost benefit analysis will be meaningless. The primary focus in these circumstances needs to be on intergenerational ethics rather than on the numbers that we can estimate around cost benefit analysis. In these circumstances the need is for, among other things, first of all maintaining options for future generations, and you've covered some of these. I would name trust funds, maintaining reserves of land, water, minerals and biodiversity - in other words, not using them to full capacity because we can - establishing easements for infrastructure, biodiversity, connectivity, coastal retreat - you've talked about those things too.

Above all, in these circumstances of uncertainty, we need to build an adaptive society. I think the elements of an adaptive society are, first of all, pardon the words, but polycentric governance, which to us means devolving substantial authority as well as resources to lower levels from where they are now. We've overcentralised, and I'd happily expand on that in relation to coastal adaptation if you want to press me. The second element of an adaptable society is adaptable institutions, which to me means rules for changing the rules. For example, flexible property rights, and you've cited the Byron Bay example, which has been screwed up by the state governments subsequently.

The third element to me is psychological adaptability, and I'd be happy to expand on that a bit, especially in relation to information, which can have a counter-effect to the one we would predict. I'd also point to a survey that we did in CSIRO that's not yet released and I would be very happy if you put pressure on CSIRO to give it to you. Then I think the final element of an adaptable society is identifying transformational change where needed, and the obvious one I think is the way we use water, but there are many other examples.

So to conclude I'd just say that from my perspective the economy is a subsystem of society, which is the subordinate part of the biophysical system. I think the framework has got it the other way round. I think the order of priority, if I am right, needs to be first of all the identification of thresholds and irreversibilities. Secondly, a good analysis of intergenerational ethics and the principles for investment based around that. Thirdly, it needs to be around the governance arrangements, which I'd be very happy to talk about. If you have those things, then we can pay our attention to an economy that's attuned to the biophysical realities.

If you do have questions for me, I should probably point out that those places I'm probably best informed would be perhaps around the psychology of adaptation and information. I could talk a bit about regional resilience and I could talk about coastal adaptation because these are things I have worked on. Thank you very much.

DR CRAIK: Thanks very much, Nick. Thanks for your submission and thanks for your comments today.

MR COPPEL: I will take you up on psychological adaptability, but first I wanted to get back to a point that you made, which I think relates to governance arrangements. You made the point that the adaptation policies are overcentralised and we need to defer to lower levels of government, which sort of runs counter to many of the views we've heard that there's a lack of coordination leading to inconsistency. Can you explain what are the advantages of action at a lower level of government and what level of government do you have in mind?

DR ABEL (CCC): I think local governments are probably going to be responsible

for a lot of practical adaptation that occurs because of their control, supposed control over land allocation approvals. The reason for my comment is because of my own experience where I've seen coastal councils attempting to not only restrict their total population in their council area, but also to keep the buildings away from the sea by zoning, and the state minister in Queensland and in New South Wales has overridden those councils. So they've tried to do the right thing but have been prevented. In that case it's not so much a question of resources but more a question of authority. They should have the ability to do the right thing and not be overridden just possibly because of voting at state level.

MR COPPEL: What would need to change - this is referring to state powers that can undo decisions taken by local governments?

DR ABEL (CCC): Yes, they do.

MR COPPEL: One of things that you're right, local governments are really at the coalface when it comes to taking measures and response to climate change, but one of the things repeatedly being said by local governments is that they need some form of direction from state government or at a higher level and there's also a need for information, guidance and tools and so forth to enable them to take appropriate decisions, which suggests that there are certain roles and responsibilities in it.

DR ABEL (CCC): Absolutely. I'm sure you're familiar with it, but the idea of subsidiarity is that you only centralise those functions and the resources that support them - you only centralise them when it can't be done at the local level, and that coordination role cannot be done at the local level. At the coast you've got coordination among councils because erosion happens along the coast and if you build a wall here, it erodes elsewhere. So that sort of thing has to be done at state level. The starting point for an ideal polycentric system is that you start off with all the resources local and you only pass them upwards and authorities only pass them upwards when you cannot do them at that local level. So the default is actually local authority.

MR COPPEL: Can you give a sense of what sort of things, then, would be the responsibility at local government level?

DR ABEL (CCC): Well, it's certainly strong controls over land use; sufficient resources so that they're actually able to implement adaptive change. At the moment one of the problems is that the funding cycle means they can never afford to invest in anything long term. They're constantly just trying to break even. To make adaptive changes they have to be funded from state or federal coffers.

MR COPPEL: Maybe I'll then turn to take you up on psychological adaptation. Can you explain a little bit what that is?

DR ABEL (CCC): We got interested in the psychology of adaptation because we did a coastal survey and we got a lot of hate mail just because we were doing the survey. So we got into the literature on it and it seems that there's quite strong theory around the fact that denial is psychologically predetermined by your political ideology. If you're a free market person you don't want government interfering. Therefore, anything that implies government interference is not true.

Now, there are extreme cases of this. I mean, with creationists, the approach they take is legalistic. You look at the evidence. In the scientific evidence there's always gaps. Every place there's a gap is evidence that the theory is wrong. We know that the theory can never be complete. The more information you put out, the more gaps you put out inevitably. It confirms the belief that the whole theory of evolution is wrong. Exactly the same thing is happening with climatic science. You put out more information, it raises more questions. People pick, legalistically, on the holes in the data. It just reinforces the insistence that it's not happening.

If I could predict your next question would be, "What in the hell do we do about it?" I would say we need quite big scale social engagement because I've seen these kind of changes happen before. In South Africa, after apartheid you couldn't find anybody in South Africa - any white person in South Africa - who had ever supported apartheid. They just disappeared. I mean, of course, they just changed their minds. But they changed their minds through the social experience that they went through. I would say the same thing about Nazi Germany, that after the war it was very hard to find any Nazis, post-World War II. There are these tipping points in society where if enough of your friends have changed their minds, you will change yours too.

DR CRAIK: Is it because your friends changed your mind or because you'd been through an experience - I mean, Nazi Germany, people have lived through the experience - - -

DR ABEL (CCC): Yes.

DR CRAIK: - - - and apartheid, the same again, people had lived through it. Do you actually have to live through it?

DR ABEL (CCC): I can't give an empirical answer, Wendy, I can only give an opinion. My belief is that it's both those things. If enough people change their minds you reach a tipping point and then it becomes the new norm. The norm shifts. Clearly the norm has been going in the opposite direction. Putting up more and more scientific information doesn't do it, whereas engaging people in processes that discuss it, might do. You've got a much better chance.

DR CRAIK: Cigarette smoking, I guess, would be an example where a lot of people for a long time resisted the evidence.

DR ABEL (CCC): Yes.

DR CRAIK: I don't know what made people change their minds but these days you wouldn't find too many people - - -

DR ABEL (CCC): It certainly became very uncool to smoke.

DR CRAIK: That's true.

MR COPPEL: You mentioned transformational change, and you gave an example of the way we use water. Can you give us any other examples?

DR CRAIK: Can you explain what you mean by the way we use water?

DR ABEL (CCC): I was thinking about the Murray-Darling Basin. We're entering what we expect to be big climatic changes and we're still talking about water allocation as if it wasn't even on the agenda. It's not in the current plan. The way we allocate water is completely insane, if we want to look after the basin. That's an example of the tough transformational change. I wasn't thinking so much about all the efficiencies which are relatively easy to implement around urban water use, but the astonishing way we neglect riverine and wetland function when we allocate water in irrigation, so transformational change of that kind.

Other transformational changes would be around redundancy - redundancy and infrastructure - it's something we don't do. We're still building stuff that we're heavily reliant on, and communication systems that we're heavily reliant on, as if we can keep working if they are hit catastrophically to our coastal roads are quite close to the sea; we've got communication systems likewise. In relation to that we have the sorts of transformational change you can have along coastal roads, at an early stage, say, spine roads, distribution roads set well back and spurs going out, as they have in Western Australia. It's completely different here along our coast.

MR COPPEL: One final question. You talked about the nonlinearity threshold. You raised the notion of path dependency.

DR ABEL (CCC): Yes.

MR COPPEL: What does that mean?

DR ABEL (CCC): My favourite example of path dependency comes from the coastal experience where councils know what they need to do. They need to stop

people building on low-lying ground. The state government knows that, acknowledges it. The plans all acknowledge it but the reality is that planning is incremental. For legal reasons, a council is not allowed to refuse a development allocation if it meets the criteria. There has got to be a good reason. If you do refuse them for any reason then the council can be taken to court and challenged in court for refusing that approval. The development criteria all depend on the zoning system which is not proactive. It's not looking far enough ahead to say, "This is where we expect the sea level to be in 50 years. Therefore we'll let housing go here."

The other thing is, as I've already said, those zoning decisions get overridden by the state government which is very pro-growth, and given some of the affordable housing projects that the Queensland government has been pushing are actually in low-lying areas. You've got those pressures from the state government on the councils to keep letting people live closer and closer to the city. Step by step, and incrementally, and because councils don't take account of cumulative damage, they only look at the impact of one house, not of the impact of another thousand houses, retrospectively, because they don't take account of cumulative damage, that's not taken into account. The houses creep closer and closer to the sea even though we know they ought to be going in the other direction. That's the sort of path dependency.

The other more obvious one is, of course, "You stick a new road in, you'll get development around it." Development attracts development.

MR COPPEL: The solution, so to speak, would be in terms of longer time horizons for planning. How else do you address path dependency? It's looking forward a longer period of time and then taking decisions based on what?

DR ABEL (CCC): In the coastal case one of the most important things you can do is to look at how the benefits and costs of development are distributed, because currently the costs are picked up by the taxpayer, and the benefits go to the householders between floods, but primarily they go to the developers. The developers don't have to pay - well, they do pay bonds but there's no call on them if the housing estate is flooded in 20 years' time, so the developers push like hell. I've been out to look at new developments where we walked around with our ankles in water and the frogs were singing. It was a swamp.

This is happening right now in south-east Queensland. They had to bulldoze paperbark trees and put in big, deep drains so they could start to put the foundations for the houses down. The costs of development need to be put back onto the people who want to live there, and on to the developers who want to make money from building in those places, and taken away from the taxpayer. If you redistribute those benefits and costs, put the costs back on the people who benefit from them instead of on the taxpayer, that will be a hell of a disincentive to go down that path dependent

course.

DR CRAIK: We better call a halt there. Thank you very much, Nick.

DR ABEL (CCC): It's a pleasure; thank you.

DR CRAIK: Thanks for your submission

DR CRAIK: Our final one this morning is Bob. Bob, if you'd like to state your name and position and if you'd like to make a brief opening statement, we'd be happy to hear from you.

DR WEBB: Robert Webb, Senior Fellow with the Fenner School of Environment and Society at the ANU and also affiliated with the ANU Climate Change Institute. Thank you for the opportunity. I would like to perhaps draw attention to a few aspects of the paper that we put into the commission.

First, the context for it: it is effectively a report on a workshop that informed adaptation policy on 3, 4 May in Canberra and the characteristic of it I think was that we brought together over 50 people from a wide range of perspectives and interests. They were public and private sectors; all four levels of government, if you include, as another level, regional level, even though perhaps not a formal level of government, but I'll come back to that in a moment; community sector representatives, consultants, researchers and so on. Perhaps in some way, possibly one or more, the most diverse range of people brought together to talk about adaptation in Australia, at least that we're aware of.

Whilst a workshop is not, of course, by itself sufficient evidence on which to base policy decisions, I think there were some interesting aspects, which led to us also putting the outcome of that workshop to the commission. Part of it was indeed that diverse range of people who were brought together for it, but surprisingly, to us and perhaps to themselves too, there was a remarkable degree of consensus on the conclusions. Also we tested this by formally following up the draft outcomes report with the individuals to say, "Well, did we get this right or wrong," and got a very high response rate on that and very strong consensus around the points that we made in the workshop outcome report and as reflected in the submission.

I mean, just as a manifestation of that, if I can just mention by way of interest, the only element where we saw a seemingly discernible difference was around a very specific item, around building codes. For example, because we had such a wide range of stakeholders there, there were some who were of the view that perhaps the building code in Australia was quite adequate to what was needed now and any change to it might lead to unnecessary cost pressures prematurely, that sort of thing, as opposed to others who thought it was already deficient and leading to risks. I cite that only example, saying, well, that was almost the only variation of any significance we could pick on what was a very wide range of issues that were brought up.

So what I'd like to do if I can is, because it covers quite a wide range of territory, just perhaps refer to five areas or five themes. I'll emphasise those that perhaps appear to, in comparison with the draft Productivity Commission report, provide either differences of emphasis or degree, or in some cases direction maybe.

But I should also say there were a lot of conclusions that also aligned with the Productivity Commission report, and I probably won't emphasise those, or I'm happy to talk about those as well.

So the first issue was maturity of adaptation response. The extent and maturity of adaptation response in government and private sectors and the extent to which the decision-makers and markets are and feel well informed was reflected by the participants as being overall low and very patchy, leading to significant exposure, in their view, if left unaddressed. In some cases this was put down to inadequacy and inconsistency of approaches, information and understanding by those who have to make decisions in this area, and in some it was just that the sorts of issues being raised are new and quite complex for the individual types of decision-makers we have. That might typically be the case in a council, for example, or in small business, or smaller business.

I suppose this overall conclusion contrasted a bit with the impression that came from the draft Productivity Commission report that various actors could perhaps substantially be left to get on with the job and that adaptation responses are likely to take place somewhat spontaneously in a timely fashion. I know that's a bit of an unfair summary, but it was a flavour I think that came through to the participants from the Productivity Commission report, and the feeling was that the maturity of adaptation response doesn't really position a lot of our decision-makers in that way.

The second issue was appropriate framing of adaptation. I think it was recognised by the participants that from a policy point of view one of the challenges is that there are quite a variety of available framings for adaptation and for the associated narratives that go with policy. There were four broad possible framings that were discussed: one is managing today's risks; the second was managing future risks; the third was building capacity and resilience; and the fourth was addressing structural and transformational changes. Now, I think the view was all these are quite legitimate framings of adaptation. It's not that one is right or wrong, they're in fact all quite legitimate alternative adaptation framings.

The main conclusion that we came to was though, that it's pretty important to be clear about which ones are in play at any particular time, which ones are being adopted for any particular purpose, as they do have very different objectives and are likely to lead to very different outcomes depending on which of those framings is chosen. Now, I should note I think, personally, these framings are implied very heavily in the Productivity Commission report but could benefit from a clearer articulation. I'm not saying that's the only way you can frame things, in those four options; they were ones that we found helpful.

I think a clearer articulation of what the alternative framings for adaptation might be, might then be helpful not only in thinking about what are the appropriate

policy directions which may relate to those particular framings, but also could lead to more meaningful, engaging and accountable goals and narratives for each of the framings. I mean, I quite readily agree with the Productivity Commission's view that overall wellbeing is an appropriate high-level statement, and the preservation or enhancement of that is a quite appropriate sort of goal in a broad adaptation sense, but if one looks at those four alternative framings, then there may be some alternative ways of thinking about, related to each of those framings, what are more tangible goals associated with each of those.

The third issue I'd like to draw attention to is the approach to and extent of transformational change. The feeling was that the risk of not adequately addressing significant actual and potential, and in some cases transformational risk, is generally understated. Many sectors were quoted and considered vulnerable to significant change and possible step or nonlinear change, and, especially given the lead times, the view was that many of these need specific planning now and, subject to the planning of course, are likely in many cases to require action now as well, notwithstanding the uncertainties. Some of these changes may be sector specific and others might emerge from quite complex interdependencies across the sectors.

So I think, again, the feeling was that perhaps relative to the draft report, where the emphasis was quite appropriately on today's hazards as a priority, that the need for transformational change should be more highly rated and, as I say, examples were quoted and discussed around some of the areas of transformational change.

In this context and in the right circumstances, and the emphasis that the draft report put on things like contingency planning and real options analysis, I don't think there was any sort of argument with that and I don't have any argument with that as a quite important aspect of approach to an uncertain environment. Indeed I worked, myself, in the oil and gas industry for a period where it was a way of life to think in those terms and scenario planning. That sort of thing, was pretty much invented, in the business world at least, by Shell. So in a sense that's not remarkable and very valid. I think perhaps what might be understated is the amount of effort that's needed to actually get to the point where you can make sensible judgments on things like real options or other contingency approaches and uncertain environments. The draft report mentions, I think, the Thames Barrier as perhaps a good example of where scenario planning and real options approaches were taken in order to not overinvest up-front but actually to stage it out in that way and that's very true and it's a very good example, I think.

The thing I would point to though on that is perhaps one of the main lessons in that is just how much effort was required for the authorities to get to that point. It was not a trivial exercise, it was a major planning, decision-making exercise in its own right to reach the point of being able to then adopt a real options approach and know what it was and I think that is probably something that didn't come through

strongly, particularly for more significant decisions, that that is a planning and decision-making exercise in itself.

The fourth area I would like to talk about is government leadership. Government leadership and coordination came up repeatedly with a number of specific roles mentioned and especially also the real risks of mainstreaming too early. I think generally speaking there was no problem with the view of mainstreaming adaptation into the natural owners, whether it was in the government or the business world as a highly desirable direction and ultimately the best answer. I think at stake was more to say, "Well, given the current state of maturity of our understanding of the issues, there may be some significant dangers in mainstreaming and assuming mainstreaming too early."

So there were, therefore, quite a few suggestions around the most appropriate roles that were suggested for Commonwealth government in particular but jointly with the states and territories to the extent possible and some of the key roles that were identified are set out in the submission on the second-last page. Therefore, perhaps the role of governance certainly comes in here, like CSIRO and Bureau of Meteorology in a more technical sense. But this was more to do with policy coordination and program coordination.

I think one of the other interesting aspects that came out of that was the emphasis that came on regional matters. I mentioned before, not quite accurately, the four levels of government but the question of regional importance came through quite strongly. In other words, smaller than state and bigger than local government. It was felt that many adaptation issues were perhaps often most appropriately understood and even maybe addressed at that more regional level, both by the nature of the issues and also for practical matters of governance and critical mass and capacity to handle things. Also it came up in the context of providing perhaps better support for decision-makers at a regional level as well. So that was one other dimension, as well as that at Commonwealth and state level, that was brought out.

The fifth and final one was around knowledge, development and sharing. One of the most significant roles consistently identified was ensuring more effective knowledge and experienced development, distillation and sharing, whether it's to do with the right approaches and processes to manage adaptation issues or the right and available data and information to use in those processes. But this is a significant gap at the moment. Perhaps I should note there is a quite separate NCCARF-funded project we are currently doing - this is quite separate from the workshop - on leading adaptation practices and related support products and tools for end users and decision-makers. There is a clear fragmentation and confusion in this area that has become apparent and does suggest some different approaches going forward and I would be quite happy to provide the commission with additional information on that.

So I just wanted to bring out those five points out of what was a somewhat broader set of issues that were raised in the submission. And I do emphasise - and some of these are covered in the submission and the outcome report - there were, of course, quite a few areas where the conclusion to the workshop and the report were quite aligned with the draft Productivity Commission report as well in areas such as the importance of support for local councils and resourcing for local councils and the capability of local councils as well as the emphasis on planning and more coordinated planning, just as a couple of examples. There were many others as well. Thank you.

DR CRAIK: Thanks very much, Rob. Thanks for the dilation of the report, it was good.

DR BYRON: Thanks, Bob. I found the summary of the workshop very, very interesting in many ways and there are many issues there that we will have to grapple with. One of the phrases that struck me, "It was concluded that we're neither nationally nor locally where we want to be on climate adaptation response and preparedness." I think one of the things that we've been grappling throughout this inquiry - and you and I have been discussing this for over a year - how do we actually know where we are and how do we know where we want to be?

We are getting assertions coming to us that the rate of adaptation across various sectors in Australia is either too little too late or it's too much too soon and the question we're grappling with is: how can we tell? How do we even take a snapshot of where we are, let alone assess the rate and direction of change? Can you just flesh out a little bit more about where this unanimous feeling that we're not where we need to be adaptation - how does that get substantiated?

DR WEBB: First of all, I totally agree that it needs to be substantiated because it's not at the moment. I think that's a very fair question currently raised. One of the reasons we had discussion around those framing options was because it was felt that they may provide a far more tangible way by segmenting the issue in a sense, into in that case four, but there may be other ways of breaking it up, and where you may be able to get far more meaningful and tangible criteria, if you like, of which you could say, "Are we really at this point or not in terms of our capacity to respond to climate change." The sort of criteria you might use, for example, managing today's risks like some of the hazards that you have clearly been talking about this morning; and it would clearly be quite different from an issue of where you had - for example, using again something discussed this morning, the Murray-Darling Basin Authority and the risks of water and agricultural transformational change that may be needed there, particularly if climate projections start to come about - then it would be very different criteria to say, "Have we responded well to that," as opposed to responding to a flood, for example.

That was one of the reasons for emphasising the question of how can you break up a very broad topic like adaptation into meaningful chunks for which you can have better criteria of assessment and accountability as well as a proper policy narrative around those as subsets of perhaps a broader adaptation agenda. So that is a partial answer in the sense that it's perhaps a way forward of trying to approach the 'where we want to be' question.

The question of 'where we are', well, given that 'where we want to be' is not well defined at the moment, it's a bit hard to say there is an objective assessment against where we are and I don't think there is, nor would, I think, the participants claim that. The uneasiness, if you like, came from a variety of partial sources.

Take the council side of things, for example. The people from the councils there, and the local government associations clearly feel very uncomfortable about the fact that the councils did not feel either empowered or informed or well enough resourced to actually handle things like the planning regimes and the implications of that. So they had no trouble in saying, "From our point of view, we're not where we want to be," and their daily work, if you like, was evidence.

I think some of the discussion - we had input from the insurance industry into the meeting as well as other private sector people, like the Investor Group on Climate Change and investors - and they were clearly in a position of feeling very uncomfortable about the sort of investments on the investor group side of things, in a context where they felt the assessment of current and future flood risks - hazard risks more broadly - were not well understood and the right sort of information provision was not on the table to help them make those assessments.

So that was a broader economic level in that sense but there was again strong evidence to say, "Well, we're really not working on the basis of the information and the knowledge that we really want to be working on order to make good investment decisions."

DR BYRON: That brings us back to the leadership/coordination/information provision themes that seem to be going right through all this and the question is, "I understand what the local governments were say but they have been saying to us, 'We need more and better frameworks,' and the state governments and Commonwealth are saying, 'But we've given them so many frameworks already.'"

DR WEBB: Yes.

DR BYRON: Maybe there are too many frameworks and they're not entirely compatible and they're confused. Is it just a question of providing local governments, for example, with more information, better information, more consistent information, more focused information? What would be best going to

equip them to get to where they feel that they're empowered and have the resources and competencies to do what they need to do.

DR WEBB: I think there are many, many factors behind that but to mention a few. Certainly the inconsistency in planning regimes and the lack of clarity of what the expectations are from state and from Commonwealth or state - and especially state in the planning area, of course, because they have the main role in that - seems to come through very frequently as an issue, which means that when a council is faced - as several of them are - with sometimes quite hostile local community environments to any of the hard decisions that may be taken, they don't feel empowered to do that. That is partly a matter therefore of clearer state, and supported by Commonwealth, policy direction and intent, and more consistency in that in terms of planning regimes; and I think the Productivity Commission draft report covered that quite extensively, I thought.

But also a sort of leadership, if you like, is important - policy leadership and role leadership, and clarity of role is a critical determinant. Then, I think, because still the decisions need to be made relatively locally (it is a characteristic of this) - the second factor that comes in is this question of good information, knowing how to make decisions. I was listening earlier to your discussion around hazard mitigation issues and the reasons why it's good to have hazard mitigation. Our sense is that councils find it very hard to get to the cost benefit economics of hazard mitigation very often. Again, there are many factors that might hinder hazard mitigation, including the insurer of last resort with the government might be a factor that hinders it as well - but not least of all is just knowing how you make these quite complex cost-benefit trade-off decisions, how do you do it, especially if there may be implications for or with adjoining councils as well as yourself.

So there are many issues there which are more to do perhaps with how do you make these decisions, what's the processes, approaches, good methodologies and then good data and information that you can rely on and is dependable and you can interpret properly. There is a lot of climate information out there but there is no doubt that businesses and councils and governments find it hard to interpret how do you use this most effectively. I see there are two main aspects: one is the policy guidance/leadership/consistency; the second then is this enabling capacity of information support and perhaps case studies and understanding of how you go about doing these things.

DR BYRON: That leads to the other point you raised about the appropriate spatial scale. Somewhere between municipality and state government maybe a more appropriate scale just having the resources to be able to get their heads around all this information and other resources.

DR WEBB: Yes.

DR BYRON: Are you thinking of something along the scales of regional natural resource management bodies and catchment management authorities where there is already that - or the regional organisations of council and so on, there is a scale between municipality and state.

DR WEBB: That sort of scale. How you draw boundaries, spatial boundaries might be a bit - not unambiguous, if you like, because I think there are three main regional entities, if you like, that would play in that game. One is the regional development authorities which are playing an increasing role generally, was supported Commonwealth government as well; the NRM or catchment management authorities, as you mentioned; and then to varying extents, in some cases not at all though, regional organisations of councils, often in some cases quite strong regional organisation councils.

In some cases - and I think my understanding is that South Australia is a good example of this and might be a good prototype or archetype of what might be possible - you find those three bodies actually now working with the state government to get involved in regional adaptation planning. Now, it doesn't have the decision-making authorities at the regional levels; in very few places is there strong regional authority to make decisions. But if you have that sort of grouping brought together, even for the planning side there are quite complex issues, they set priorities and that provides greater confidence for local government to then make its decisions within the regional planning context. That might quite a powerful sort of model.

The other thing that came up in the workshop especially was - and that's more to do with the planning - this question of support. So if you imagine, for example, that Commonwealth and/or state governments were able to bring together a more coherent range of support about how you go about doing adaptation and also the reliable source of information that you use and how you use it and interpret, assume that that was done - it's not there at the moment, but assume it was done - then one of the thoughts that came up quite strongly was that having a regionally based resource that helped in that translation/interpretation might be - almost like an extension-type role in the primary industry sort of context, but resourced to help regionally in that way might be quite a powerful enabling characteristic as well.

DR BYRON: With the spatial scale, on the time scale you said in your comments there was the sense that now is too early for mainstream of adaptation of climate change and that led me to wonder how would we know is the right time? I'm not talking about number of years but under what conditions. What would have to be in place for us to be able to say, "Yes, now is a good time to go mainstream"?

DR WEBB: Probably the single biggest factor to me would be perhaps understanding of the complex interdependencies that climate impacts might create.

What I mean by that is - I talked about the level of maturity of response and the workshop in our experience has indicated that it is quite variable. So in terms of water and agricultural sectors there is clearly a long history of responding to climate issues in the way that in the planning and settlements areas there has not been, so there are already different levels of maturity there. You could hypothesise, if you like, that therefore mainstreaming into water and agriculture is likely to have a healthier impact than perhaps in planning where perhaps some more broader interventions are necessary to get to the point where you would be happy to mainstream things.

But even with more mature areas like water and agriculture, I think one of the characteristics of climate change adaptation is its pervasiveness. If I ever think of a word about climate change adaptation, pervasive is the word that comes into my mind because it seems to get into every nook and cranny of the economy and society one way or another, to varying degrees and often uncertain and unpredictable. A feature of that of course is a highly interdependent set of responses that may be required, so the crossover between water, agriculture, land use, planning, settlements, infrastructure, there are multiple interactions there, all of which impact into different domains and to different degrees.

So the biggest risk of mainstreaming to me is that without a coordinating and integrating sort of role, that the chance of understanding those just as they're starting to emerge - because I think we don't understand all of those interdependencies yet - but just as they're starting to emerge, that you really don't have any capability or focus on those cross-sector issues.

So I think there's two answers in part: one is mainstreaming is more possible in some sectors than others just by dint of the experience of those sectors in dealing with things; but across the board and looked at as an overall policy change, that we're only still starting to understand some of the nature of those interdependencies across sector and that alone justifies not mainstreaming everything just yet. Now, how would you know when you get there? I suppose it's a bit hard to say in those terms. It's a level of maturity and understanding of the issues I think. If you understand the issues and you have the empowerment to do it, then mainstreaming becomes quite viable. If you don't have the understanding and you don't have the empowerment, then mainstreaming is not good.

DR BYRON: We, in the past, have had long discussions about ecologically sustainable development and why it was rarely accepted as core business by any other government agencies, and one of the most frequent responses was, "Well, that's what the environment department is there for." Because you can say, "Well, they're doing it," became an excuse for everybody else to say, "Well, we don't need to." So that sense is if you want to get something broadly engaged right across all the silos that are all layers of government, having one flagship can actually be

counterproductive.

I'm just trying to get the pros and cons of having a central leadership role, as opposed to a very diffused responsibility that says, "This is everybody's business. You've all got to think about this," which seems to be the way we've gone with discrimination, with disability, with a whole lot of other areas where it's everybody's responsibility to think about it, not just one agency's responsibility. Any reaction to that?

DR WEBB: Well, yes, it's a very valid dilemma you raise there. I think it is a characteristic not just in government. A lot of my career has been involved in change management and transformational change issues, prior to the public sector, and I guess this dilemma crops up every time you have a significant transformational issue on board. To what extent do you centralise and to what extent drive for it - and therefore risk ownership, which is what you're saying; or to what extent do you increase ownership by decentralising but actually then lose the plot as it all drifts into the sand and quite what the original intent was just disappears, disappears without trace sometimes.

This is going beyond discussion of the workshops - we had better be clear on that, I'm expressing a very personal view now. Which is that the experiences that I've seen that seem to work are ones where your ambition clearly is to have it decentralised as fast as possible, but for a period of time, if it's a significant change agenda that you have on, then it's almost certain not to work unless you have some sort of driving, coordination with top leadership. And of course that means in a 'policy sense' top leadership as well, to drive for a period of time. And it just means you have to work overtime on the engagement side to create the ownership while you're doing that as well. That's not a natural way for governments or organisations to behave, not saying discussions with government and things like that, the fact is they're very hard work to make those sort of things work.

So that was general, I'm not specifically talking about adaptation there, it's just an experience from broader exposure, but I think one that applies particularly at this point where we are now in the adaptation agenda. And I think it's a bit of a watershed, in a sense, to decide after four or five years of what's been in a way, remarkable progress in Australia, I think, in understanding from a standing start almost. But it's a bit of a watershed now to say, "Well, is that sort of thrown away as an interesting five-year experiment and now we just let it sort of go back into the sand," or do we build on that five years by having - and you didn't ask me to but I wrote down, is it five years, 10 years or whatever it is, but let me say - at least five years - to have a consistent drive forward to get to a position where you feel you've broken the back of your understanding of this and then you can safely have devolution as the main path.

DR BYRON: Thanks, Bob.

DR WEBB: Okay.

DR CRAIK: Thanks very much, Bob. Thanks for coming along and thanks for that submission and for your workshop report.

DR WEBB: My pleasure.

DR CRAIK: So, ladies and gentlemen, that concludes today's proceedings. For the record, is there anyone else who wants to appear briefly before the commission today? I adjourn these proceedings and the commission will resume at 8.30 in Adelaide on Friday, 20 July. Thank you.

AT 12.25 PM THE INQUIRY WAS ADJOURNED UNTIL
FRIDAY, 20 JULY 2012