



**TRANSCRIPT
OF PROCEEDINGS**

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PRODUCTIVITY COMMISSION

DRAFT REPORT ON ENERGY EFFICIENCY

DR N. BYRON, Presiding Commissioner
PROF M. WOODS, Commissioner

TRANSCRIPT OF PROCEEDINGS

AT MELBOURNE ON TUESDAY, 7 JUNE 2005, AT 9.02 AM

Continued from 6/6/05

DR BYRON: Good morning, ladies and gentlemen. Welcome to the public hearings for the Productivity Commission's inquiry into improvement in energy efficiency following the release of our draft report last April. My name is Neil Byron and I've been appointed the presiding commissioner for this inquiry. The inquiry began with a reference from the Australian government on 31 August last year. It covers the potential economic and environment benefits offered by measures to enhance energy efficiency that are cost-effective for individual producers and consumers.

We're very grateful to the many organisations and individuals who have already participated in this inquiry. The purpose of these hearings is to facilitate public scrutiny of the commission's work and to get comment and feedback on the draft report. Hearings have already been held in Brisbane, Sydney and Canberra last week and yesterday here. We'll be working towards completing the final report for government by the end of August, having considered all the evidence presented at the hearings and in written submissions as well as other relevant information.

Participants in the inquiry automatically receive a copy of the final report once it has been released by the government, which may be up to 25 parliamentary sitting days after we've completed our part of the inquiry. We always like to conduct the hearings in a reasonably informal manner but I remind everybody that we are taking a transcript and so comments from the floor are unhelpful. But at the end of the day's proceedings I always provide an opportunity for anyone in the room who wants to make a statement on the public record to come forward and do so. Participants are not required to take an oath but are required under the Productivity Commission Act to be truthful in their remarks, but participants are perfectly welcome and encouraged to comment on issues raised in other submissions or by other speakers here today.

The transcript will be available for participants for checking validation of the transcription and then will be available from the commission's web site following the hearings, usually within a couple of days, like the submissions available on the web and also available by order from here today.

To comply with the Commonwealth Occupational Health and Safety legislation I have to point out that the fire exit is just past the lifts in the lobby, down the stairs, down 28 floors and the assembly point is in Fitzroy Gardens across Spring Street. Can I ask anybody in the audience with a mobile phone to turn it off or onto silent mode? That completes the housekeeping. So I'd now like to welcome Don Henry and Kate Noble from the ACF. Thank you both very much for coming and thanks for the submission.

MR HENRY: Thank you very much, Commissioner Byron. Is it all right if we just briefly speak to the submission we've put in, highlighting some points we want to make, and then very happy to do any elaboration that's of use?

DR BYRON: That's the standard format. Thank you very much. That will be great.

MR HENRY: Thank you very much for the opportunity to appear before you. We feel that the whole issue of energy efficiency is a very important one. Thus we've put some emphasis on it as an organisation. Our principal interest as an organisation is obviously environment dimensions. But we pursue that, not aware that in many cases pursuing good environmental outcomes also has some significant economic and social benefits attached to them.

It's in that vein that I do want to draw your attention to our concern that the terms of reference for this inquiry are narrower than we'd like to see, because we believe not only are there profound economic issues but there are profound public good issues in relation to whole issue of climate change. In our view, there is some restriction in the terms of reference in what the commission would have been able to examine otherwise, and we'd urge you to ensure that that's drawn to the attention of those that would consider the report at the end of the day.

Having said that, I do note that the commission is able to, in the terms of reference, consider environmental costs and benefits arising from energy efficiency improvement, and it's in that spirit that we'd urge a greater highlighting, an emphasis, in the report and its recommendations on environmental costs and benefits. Once again, the commission may want to more fully consider some of the policy contexts by which governments, including the federal government, are looking at issues of environmental costs and benefits in relation to climate change. I probably don't need to do this, but it's useful to reflect that Australia is a signatory of the United Nations Climate Change Framework Convention, that at the federal level we've signed, although not ratified, the Kyoto Protocol, and the federal government has taken a policy position of achieving Australia's Kyoto target.

More recently, in fact at COAG on Friday - and I'd refer you to the communique from the COAG meeting - we had the federal and state governments establishing a working group on climate change which notes that it's going to tackle, among other things or examine among other things, energy efficiency. I won't go through various state government approaches but they also highlight our government's focus on the issue of climate change and the importance of driving public and private outcomes in relation to these issues.

So if I could just draw your attention to that policy context and the usefulness of the commission examining fully environmental costs and benefits in the context of this inquiry. I think that's particularly relevant because it would be our view that significant advances around the issue of land clearing, which are very beneficial in our greenhouse accounting as a nation, are tending to mask some underlying serious

issues in relation to the emissions from, for example, both the stationary energy and transport sectors in Australia. If one has a close look at those it perhaps highlights a sense of urgency that we're starting to see reflected in government policy around the importance of action now in relation to climate change. So if you don't mind, if I may context our comments within that.

I'd like to just perhaps highlight a couple of key elements that we'd like to go into. We support the evaluation of the effectiveness of energy efficiency programs as part of good policy implementation but we'd urge that a lack of data or lack of evaluations shouldn't be viewed as an impediment or reason for delay in moving forward planned energy efficiency measures. We'd also urge the commission to more fully acknowledge that a full evaluation of public and environmental benefits of energy efficiency, which may or may not be viewed as outside your terms of reference - I assume at the end of the day that probably swings on how one considers the reference on environmental costs and benefits. We'd urge, wherever you're able to, to exercise that part of your reference fully.

But we believe that full evaluation of public and environmental benefits of energy efficiency should be a trigger for government regulatory intervention where there's market failure. You can refer to COAG principles and guidelines for national standard setting and regulation and competition policy in relation to that.

We've got concerns, if I may mention them just specifically, about recommendations 11.1, 7.1, 7.2, 7.3, 8.1 and 8.2 relating to mandatory energy efficiency standards and regulatory intervention. And I just make a side comment on that. Depending on one's terms of reference and also different perspectives, one can come at regulation from various perspectives. We've often found in the environment arena a mix of regulatory instruments and then more efficient functioning of markets, combined with some incentives where appropriate, as very effective in delivering policy outcomes. We believe in the area of energy efficiency because of a range of factors, a number of which you've highlighted that relate to barriers and market failures; that it is quite important to prime, in some ways prime the pump, for action on energy efficiency by both an approach of regulation and also an approach on getting the market working more effectively with various mechanisms, a number of which you've canvassed.

We'd be concerned about any delays in introducing governments' commitments in relation to energy efficiency, including we are aware there's significant private capital already invested in a modest way in moving a number of these initiatives forward, and delays could impact that investment that indeed we'd like to see at a much higher and much stronger level.

I'd just also like to highlight very briefly, if I may: there are a number of elements of the report that we'd commend including some of your examination of the

national energy market, some of your observations around better price signals in that market, including some of your discussion on interval metering devices, and then some of the discussion in transport as well where you've examined issues of rail versus road, you've examined fringe benefits tax and the like. We think they're useful observations and useful analysis that we'd like to be taken through more fully.

I just want to make one point, if I may, in relation to not only perhaps highlighting environmental benefits, costs benefits, more strongly in the report but our own observation is that there is very substantial barriers and market failure across the stationary energy sector in particular. You've examined a whole range of those and you've also touched on a whole range of issues behind energy pricing, and there's no way that the market is performing anywhere near efficiently as it is.

Then secondly, an issue of great concern to us is at the moment we're not internalising the costs of what we would call greenhouse pollution in the market, in anywhere near an effective way - and that's probably being totally generous. I'd urge that to be taken into account and once again that's perhaps not just a view from ACF but in the COAG communique governments are starting to apply their minds to the difficult question of very substantial investments that may well be required in the, for example, stationary energy sector into infrastructure that will be around for the next 40 to 50 years and we're finding ourselves a number of very substantial companies are engaging in dialogue with us, because they're very concerned that they're coming to points of major investment without a carbon signal in the economy and the high risk that they're carrying in relation to that.

That has been examined in more detail and emphasised by a report released by the AMP recently and one can see the insurance sector starting to highlight a range of these concerns. I think this is an issue that needs far more emphasis in your report. There are a number of ways of dealing with that. There should be a discussion on environmental costs and benefits around that, but there are important economic implications. We've been strong supporters of a mix of policy interventions including emissions trading as ways of ensuring there's internalisation or a price put on the pollution. We think that's a crucial element that needs to be driven into this report and would argue that it would appear to us that you can pick that up much more strongly within the existing terms of reference, even though I've made the point we'd like to see those terms of reference more broadly.

The only other thing I'd say is, we believe a regulatory approach and a diversity of approaches has merit because one is still at a learning stage, as our economies adjust to the issues of needing to deal with efficiency and greenhouse pollution. I'd also urge some further thinking on additional - so I want to make my comment very strongly on the importance of regulation. But additionally we believe in this sector there may be some opportunities for much stronger innovation and incentivisation. For instance there is already some government leadership in government's own, for

example, properties and building stock to drive energy efficiency.

We would love to see, you know, all governments for example agreeing that wherever you can get a, you know, 20 per cent profit return over a reasonable period of time or some base calculation on return, that governments would commit to move more vigorously down the energy efficiency path. We believe that might help prime the market a little bit more as well. There will be learning there by the private sector as they learn to provide those services as they develop a scale of efficiency and knowledge.

So there's an important piece of work of government leadership that we would commend and once again, while we don't pretend to have this expertise ourselves, we also wonder if mechanisms like pooled investment funds or bonds, or other initiatives that can prime effective parts to the private sector to stimulate investment in providing the services that can deliver both a public and private good here are well worth thinking about, because some of the market failure we've seen in other environment economic arenas - one can look at salinity issues, one can look at issues in relation to water quality with the Barrier Reef.

There is a question that we often run into around environmental issues of not only the importance of internalising some of the external elements, but often there's a lack of familiarity in our economy and a lack of scale initially in dealing with these issues that accentuate the barriers that are there. So once again, some very substantial innovative economic thinking here could in some ways put some icing on the cake. We've noticed the benefits or the economic priming that's come from instruments like pooled investment funds with infrastructure.

We've examined the same in a report that we'd be happy to make available to the commission that Allens Consulting did for ourselves in a range of business leaders on the issue of salinity, where the proposition of pooled investment funds was put forward as a way of getting over the hurdle of a very diffuse, poorly functioning marketplace in the rural sector insofar as house sustainability was being picked up. So if I may, with opening comments, ask Kate to give some elaboration and particularly in relation to the built environment sector.

MS NOBLE: Sure. I will be following up with more detailed written analysis, but I thought I would just pick up on a few points that Don mentioned briefly. The first one is, the commission's interpretation of the terms of reference we think is unnecessarily narrow. It seems that there has been a strict Pareto criteria applied and by that I mean that the net benefit hasn't been taken into account in the evaluation of policy options and because of this, the commission - the draft report seems to have dismissed the full extent of the market failure, particularly in relation to the built environment and the building industry.

The reason I say this is that there was a recent Productivity Commission review into building regulation that came out quite clearly and had a very detailed assessment of the market failure in this sector, and clearly saw that there was a need for regulatory intervention to ensure the delivery of energy efficiency in buildings and better greenhouse performance, amongst other things.

DR BYRON: We were quite closely involved in that one too.

MS NOBLE: So it seems that because in this the current inquiry doesn't pay as much attention to this aspect of the market failure, it seems that the report is arguing that because there's low energy prices in Australia that international comparisons are less relevant and we're concerned with this argument because the international examples, which do tend to have higher regulation even in climate zones that are quite similar to Australia in Europe and the United States, the driver there doesn't seem to be the higher electricity prices. It does seem to be recognition of the market failure.

But even if electricity prices were higher, it's not going to sufficiently address the market failure in terms of the split incentives between builders and occupants in the commercial as well as the residential sector. The commission seems to conclude that market mechanisms such as cost-effective pricing, which we do support by the way - we support but that it's not a sufficient approach to addressing the market failure - and the argument put forward by the commission that because electricity prices are a small portion of a household budget that they are not being taken up, even if they are privately beneficial, privately cost-effective.

The recent competition, the review of competition policy done by the Productivity Commission, cites a European Union estimate that electricity prices could be doubled in Australia. So even if that were to be the case it would still only be, on average, \$4 a week for a householder. So we're not really going to get the drive there that we need to get unless we complement it with energy efficiency measures. So we would ask that the commission does take into account the two other reports that have recently come out, the Review of Building Regulations and the Review of Competition Policy, in that regard.

So furthermore with the Review of Competition Policy, it was implied in that report's findings that the current review would be looking at phase 2 approaches to implementing the National Framework of Energy Efficiency, rather than a review of current and existing programs. We think in the current report there is a lot of scope for a more future oriented examination of how we can address energy efficiency.

In relation to the evaluation of the effectiveness of the current energy efficiency programs, as Don mentioned we do support this very strongly, but that this process should be iterative, it should be part of good policy implementation, and we

actually think that if this approach was taken with current proposed requirements by the Building Code of Australia, for example for the commercial building minimum requirements what we would find is that more stringent requirements would be far more cost-effective overall and far more efficient in addressing the market failure. So we would strongly encourage the evaluation of energy efficiency measures as part of implementation.

In relation to the Mr Evans, in support of energy efficiency measures I would just like to point out that there is a lot of evidence in support of energy efficiency that has not been referred to in the draft report. We'd like to emphasise the importance of the commission in being independent in taking into account the full range of expertise and the full range of evidence out there on the economics and the science of energy efficiency, and I understand that there is further analysis being submitted to the Productivity Commission from the Gilmore Group of experts that is looking at this issue and it's a very detailed analysis.

DR BYRON: I haven't heard anything about that yet. I'll look forward to it.

MS NOBLE: Yes, it's being developed. In particular, they argue that the weight given to Dr Terry Williamson's report needs to be further examined.

DR BYRON: Yes. They seemed to have a hang-up on that. They seemed to think that we attached a great deal of weight to that, but I thought it was little more than a footnote - sorry.

MS NOBLE: Perhaps. It is mentioned quite a few times throughout the report whereas other information that was submitted to the commission was not. So that's the basis for our concerns. In relation to the recommendation about full regulatory impact statements, once again we're very supportive of this approach. We think it's good policy-making. The more rigorous the better, because we think that the figures and the economics actually stack up in terms of delivering energy efficiency outcomes. So we would support that approach and they're really the comments that I'd like to make at this stage, and I'll follow up with the written analysis.

DR BYRON: Thanks very much. Can I just respond with a couple of comments and a couple of questions. You're not the first to raise the issue of the terms of reference but they are what they are. We have tried to explain in the draft report why we think the government particularly asked us to look at the extent of measures that are privately cost-effective, because I think there was an apprehension that the scope of privately cost-effective energy efficiency improvements may have been exaggerated.

But the more interesting question is, given that there are some, perhaps many, privately cost-effective energy efficiency improvements, why aren't they being

adopted already? We did try to state clearly and repeatedly that we think that there is a whole other universe of policy measures that would pass a net social benefit test that are in the social interest when you take into account all the environmental, economic and social benefits. But we weren't asked specifically to look at all of those. The submission we received from the Victorian government basically makes the same point as you have made, that governments make decisions based on their assessment of what's in the best long-term interest for the whole community and the fact that some measures may or may not be privately cost-effective is very much a second-audit consideration.

Another possible interpretation of our terms of reference is that if we look at all measures that would pass a net social benefit test and then observe that some of them aren't at the moment privately cost-effective, you could say what sort of measures, for example, would make those measures privately attractive, because that would then facilitate their rapid and widespread adoption. That's not the interpretation that we've taken in the draft report, but it's one that we can look at again.

Just on the point about our concerns about rolling out and ratcheting up the NFEE measures without them having been apparently evaluated yet, the general proposition that we would make, that before any regulation in any area was brought in, one should have made some very basic checks that (a) it will work, that it is effective; (b) that it won't produce perverse or counterproductive side effects; and (c) that it will be reasonably cost-effective. The requirement in the regulation impact statements is also to ask the question: are there other ways of achieving the same outcomes without requiring a regulation? It seemed to us at the time of writing the draft report that many of these NFEE measures hadn't been subjected to any of that scrutiny.

What you and a number of others have suggested to us in the hearing is, "Let's roll them out anyway and then, through a process of continuous improvement, adaptive management, we will fine-tune them." Yes, that's a possibility, but I for one would like to have a little bit more confidence, before bringing the regulation in place that they will work and they won't be perverse, because we have seen some other examples of well-intentioned measures that were brought in even 10 years ago that have actually had some very perverse and unintended side effects. I'm thinking of the proliferation of McMansion in New South Wales, which is the exact opposite of what the regulations were intended to achieve. That's just the basis for our concern about rolling out untested measures.

MS NOBLE: My response would be that we would fully support that approach but we would see it conducted as part of the RIS process. There is significant economic analysis that goes into the RIS process that is directed to the Office of Regulation Review to ensure that there isn't a better way of approaching the problem, and much of the analysis that does go into the RIS is very conservative, and it's very

conservative by an order of magnitude. For example, the commercial building requirements that are currently exhibited show a benefit to cost ratio of 4.6:1, and that's on very conservative estimates that don't even take into account the cost of carbon or the future cost of climate change. So we would argue that it's true, there does need to be an evaluation of whether there is a better approach or a cost-benefit analysis or the effectiveness of the regulation, but that through the RIS process that's already established that is in place.

In relation to the New South Wales regulations that have had a perverse effect, I'd like to ask which regulations were those that led to the McMansions. Are you talking about BASIX or another - - -

DR BYRON: Before that. BASIX, as the New South Wales state government told us, was designed to counter the problems that their previous approach had unintentionally created. But that's in the information that they've provided to us.

MS NOBLE: Your concerns around that there might be mistakes made are founded in terms of history showing us that sometimes we do make mistakes in public policy and that it is important to have that feedback loop to better tune and better design public policy responses. But the extent of the problem we're facing in terms of energy efficiency and the amount of evidence that does show, for example, something that was dismissed in the draft report was that simulation based and design based approaches to building regulation don't deliver a performance based outcome. I understand that there's more evidence being submitted to the contrary on that particular point. So you're right that that's the issue to have concern about, but then there needs to be a full analysis of the evidence on both sides as to whether these policies and regulatory approaches will deliver an environmental outcome.

DR BYRON: My concern, particularly when it comes to things like rating software simulations, is that we're now being told that the latest version, AccuRate, is much more reliable than the previous versions that were admittedly defective in a number of areas. That's why we've moved on. Yet a number of people have been affected, constrained, inhibited, perhaps unnecessarily, over the past couple of years through the use of simulation based measures which everybody now concedes were defective. They worked very well on a conventional box in Victoria or Tasmania, but they were totally hopeless in looking at anything that was unconventional in design or in different climates like North Queensland.

MS NOBLE: Commissioner, with respect, that evidence is based on Dr Terry Williamson's paper that is disputed evidence.

DR BYRON: Sorry, let me tell you what we've based the evidence on. Like the BCSE yesterday, you think we've based everything on Williamson. We've got evidence from at least eight, nine different organisations and individuals all making

the same point. Williamson is one of many; he's not the only one. We may have cited him more than the others in the draft report, but please don't think that the whole thing is based on just one submission, because it's not. Thanks.

Can I move on to the question that Don raised, the use of different policy instruments. I've been asking a lot of people who have appeared in the hearings whether they'd agree with the proposition that the energy efficiency outcome depends on both the hardware - by which I mean the design, construction and implementation of the house, the commercial building, the car, the appliance, the lift motor or whatever, and also how it's used - the behaviour of the occupants. The impression that we have is that a great deal of effort over the last 10, 15 years has gone into improving the design and improving the specifications of the building, of the appliance, of the motor, of the compressors et cetera, and regulation is actually quite effective in dealing with those sorts of hardware issues.

Regulation seems to be much less effective in dealing with the psychology and behaviour of the user, and yet there's a lot of evidence that suggests that the behaviour of the user can have a huge effect in some circumstances compared to what's built into the appliance or the building. Do you think that there is scope for bringing in complementary policy instruments that would better address the user behaviour side of it, not instead of the regulation of the hardware but to complement that? Has there been an imbalance in effort?

MS NOBLE: We would support cost-effective pricing and other mechanisms to address the behaviour aspect of the way people use energy in their homes and workplaces. It's important that there be arrangements for the distributional effects. Something that was also left out of the draft report was the rental market. In the rental market, which I understand is about 30 per cent of dwellings in Australia, there's a certain amount where even very energy-efficient practices by the occupants, if the building isn't efficient, is not going to deliver an outcome. So we agree with you that they are complementary approaches.

Sometimes when they're not presented as complementary approaches, you get the situation where someone is arguing that, because of occupant behaviour, it doesn't really matter what you do to the building fabric or appliances because people are going to waste energy anyway. The reason we dispute that - I'm just putting this on the record - is that basically energy-wasting behaviours in a well-designed building compared to in a badly-designed building are going to be a lot more. So it is a complementary approach.

MR HENRY: But I think generally - sorry, I don't have the level of specificity that Kate has - either in regulation or in information coming back to the marketplace, as far as possible one wants to ensure it's performance based. We have issues on some of the voluntary mechanisms out there with buildings that aren't performance based,

and that picks up your point, because one thing is how the hardware is there; another thing is how the hardware and the people using it actually deliver at the end of the day.

DR BYRON: One of the issues that stuck in my mind is that the people from Family and Community Services in South Australia were explaining to us that welfare recipients in public housing would go and buy a \$9.99 bar heater at Kmart, which is probably the most expensive and inefficient form of heating that you can think of, because they can't afford an efficient \$200 heater. Just a few months ago, actually the week after our draft report came out, the ABS published some very interesting work on energy consumption in South Australia and pointed out that energy consumption for heating in rented housing is much higher than it is in owner-occupied housing, but energy consumption for heating in state-owned welfare accommodation is about double that. The reason that they give is that most of the South Australian state-owned welfare housing apparently doesn't have insulation.

The state government is mailing out cheques to welfare recipients to help them pay their electricity bills, but one would wonder whether it mightn't be a little bit smarter to insulate the houses that they put these people in - a whole of government approach.

MR HENRY: I'd just strongly come in on that. That's where once again one may have different views on how to achieve the end goal here, but we'd argue a mix of government leadership, a regulatory base that requires certain standards, and then getting at some of the systemic issues, and you have touched on some of them in the report. For instance, I think some of the issues you're highlighting on disincentives for investment in demand-side management are really important and shouldn't be underestimated and really could do with some very innovative thinking on how to ensure - that is at a broader level - the marketplace deal with those.

DR BYRON: One of the things that keeps coming up - and you mentioned it too - is the metering. If people only get a bill once every three months, there's a complete disconnect between when the energy is consumed and when they get the bill some months later. People cannot relate the behaviours with the size of the bill. So it's been suggested that, for a relatively small amount, people could have far more informative meters.

There's been a very interesting experiment, a pilot program, in Tasmania, where people have sort of pay-as-go you meters with a swipe card. People originally thought that you'd put in \$5 and that would keep you going for two or three days. They now find that if they manage their electricity a little bit more, it can keep them going for five days instead of two days. I think part of that is the information that's provided by the metering and the immediate feedback between occupant behaviour and what's on your bill. The flip side of that is that if you don't know, even if you

want to you can't really manage energy consumption.

MR HENRY: We're strong supporters of that, by the way. We're aware of some of the early work on that in Australia and overseas, and it does seem to have some benefits is what we're picking up. Just one extra point, if I may: it's a little more broad, but I can see the commission's there on say the suite of measures that governments are looking at on energy efficiency and a concern that there may be perverse outcomes.

I think it's worth reflecting - you know, is the market working perfectly out there at the moment? Not at all. Are there perverse outcomes happening now? Absolutely. If you look at, for example - and you've picked it up. It may well be that at the moment the marketplace and governments would be persuaded to grossly over-invest in base load power generation when there's a dimension out there that's a peak load need, and the perverse outcome of that in a dollars term is massive. And that's going on in the marketplace right now, we'd suggest.

I'd give one extra emphasis to that. I don't think you can have this discussion just in the hearing now. I think, for instance, the electricity generators, if you look at a company like Origin who are arguing this, where we're making investments in hardware now that are going to still be existing in the world of 2020 and perhaps even 2050, and I don't think anyone is going to sit in front of you from any governments in Australia and say that it's not going to be a more carbon constrained world and that it's not going to require much more effective performance in cutting greenhouse emissions. So, if you go out to look at how the public and private investments are going to have to perform then, you could argue very strongly that there's massive perverse outcomes being built in for a considerable amount of time.

DR BYRON: I thought you were arguing before that people in business are already anticipating that carbon price signal and making decisions based on that. If somebody is going to spend hundreds of millions of dollars putting up a building like this, and they're thinking that, "Well, in 20 years' time if energy prices have gone through the roof, I'm not going to be able to rent it. Shouldn't I therefore start thinking about a building that is going to have a buyable lifetime." I'm not at all convinced that everybody making investment decisions thinks only of what the price is today. I would expect that they're looking towards what's going to happen over the life of that asset and factoring in. As you argued before, everybody is expecting that there will be some sort of carbon price signal and energy prices are more likely to go up than down. Whether you're investing in a 50-year building or house that's going to last 20 years or an appliance that's going to last five, you'd be very foolish if you didn't build in something like that.

MR HENRY: You'd hope so but there's a hell of a lot of free-riding going on out there in the marketplace. Thus a regulatory floor in our view is important plus the

vigorous incentives.

MS NOBLE: Could I must mention, that's also where the - I mean, the split incentive isn't just about different operating budgets; it's about there really is short-term drivers and long-term drivers, and that comes into play on that issue all the time. Just another option on the landlord-tenant split is also to find some of those incentives and disincentives for landlords in relation to the disclosure of energy performance at the point of lease and point of sale. I think more of that could be built in to the ACT system. I think that a review of that, if that was to be the model applied, by governments to a mandatory disclosure approach, which it doesn't have to be; there are other approaches. But we would support that.

DR BYRON: Well, I mean, one of the interesting empirical questions is to what extent does the information, once disclosed, actually influence people's decisions at all? I think you may well find that tenants will still take the cheapest one, even though the slightly more expensive one to rent but much lower operating costs - you know, you can't prevent some people from making decisions that may not in the long term be in their own best interest.

Can I, with an eye to the time, take you - I like particularly the criticism that you made that we should have been more forward-looking and thinking more about the future. How do we go forward rather than criticising what's in the moment? One of the areas that I think you've suggested for us is that some government leadership - and others have said to us that if all governments were to say, "We are going to capitalise on any energy efficiency improvement which we think has a return of X per cent, 15 or 20, pick a number," that not only would that demonstrate what's possible but it would also create a pool of expertise of people in the energy performance contracting area that presumably the private sector, who we observe, are generally fairly sceptical of these claims of vast amounts of low-hanging fruit. They may become less sceptical in the future. Is that one of the - - -

MR HENRY: Absolutely. We'd strongly urge that. If I may just - - -

DR BYRON: Sorry, I didn't mean to put words in your mouth.

MR HENRY: No. And let me give a practical example, if I may take 30 seconds. We've been involved in the design of a building at 60 Leicester Street, Carlton - it's actually where we're also based - where it tried to within the existing commercial band deliver the best possible environmental outcomes. For us we've been absolutely delighted with the environmental outcomes of the building. It's half new and half retro-fitted and it's cutting energy use by 60 per cent within the normal commercial band today. Kate, how much of that would be with efficiency measures versus the solar bricks on the roof?

MS NOBLE: Compared to an ordinary commercial building, it's about a two-thirds saving from energy efficiency alone. The remainder of the energy is from solar panels and green power. So we get it to zero greenhouse.

MR HENRY: So here's a conservation organisation, and we're saving on our electricity bills but what we've found to our pleasant surprise as well is that we've got over a 10 per cent productivity improvement across our workforce, and it's because there's a happy coincidence of many of the energy efficiency features lead to a very healthy workplace. Now, you can say, "Why weren't we doing this five or 10 years ago?" This is a good test. I'm holding up the mirror to our marketplace failure. And we went through the process, and you can say, well, that can be achieved right now within the commercial band for the commercial building stock in Australia, in a generality. I mean, there's differences with different climates and styles of building but the scale is there. When I reflect on it, the information on how to do this was in umpteen different places.

DR BYRON: It's been around for 30 years.

MR HENRY: It was time-consuming to pull it all together. It was all there but it was time-consuming to pull it together. As a senior manager my focus was elsewhere because the time cost opportunity in it was very challenging. The knowledge base and the skill and the capital out there in the marketplace to actually put it into place was weak. We had to do a lot of work which you'd expect a mature market to be doing in its own right. So it highlighted on hindsight - and some of the planning regulations were perverse, made it quite difficult. So in hindsight, when I reflect on it, if there had been a strong regulatory standard in place, if we'd had better information better packaged, if the marketplace had been more mature - that's my biologist language, so please excuse me if it's not right. But if the marketplace had the expertise and the capital and the information behind it and if some of the institutional barriers had been addressed - there is that split barrier there - it would have been 10 times easier.

But it can be done. It makes economic sense when you look at the bottom line, absolute economic sense, but there is a hunk of barriers and failures that actually make it very hard at the moment. So it's just a very practical example of - - -

DR BYRON: It's a beautiful example.

MR HENRY: We can do this as a nation but it does require - one can't just sit back and say, "Well, it should be happening now," because it doesn't.

DR BYRON: Well, that was going to be the next question. How many replications of this, now that you've shown (a) that it can be done, and (b) that it pays off, not to mention the productivity and staff satisfaction pay-offs - now that you've broken

through, you would expect to see more of these popping up all over. Are they?

MS NOBLE: Well, I mean, there are at least a small handful of iconic green buildings on the cards, but it's interesting that almost all of them are demand-driven models. They all have to come from the solid commitment from the owner occupier to actually derive the design process, and the big challenge is that most of the industry sector is not a demand-driven model. Most of it is subject to the developer and the owner.

DR BYRON: Yes.

MR HENRY: And I think the key replication that we have to achieve - and we take this on board as an organisation - is some of the regulatory framework, some of the institutional barriers. So if you ask us how well it's being replicated there, I know that we're working on some of those underlying issues, and where we're starting to get some change, at Melbourne City Council or Sydney City Council or North Sydney Council, it's creating the ability for these to be looked at much more easily. So I think just the marketplace by itself, even with the information of that building, there are still those barriers there that probably mean it's a serious uphill push.

DR BYRON: Well, sort of related to that but partly going off in the area of industrial energy efficiency, we've got a large number of experts in energy performance contracts and so on who can see a tremendous number of opportunities to improve the bottom line of manufacturing enterprises substantially, and for whatever reasons the manufacturer is either too busy doing something else or doesn't think it's sufficiently important. There's all these problems in getting contractual relationships or mutual trust and sharing the risk and reward of doing this, and I think the same thing applies to somebody who might be a developer who's thinking of putting up a green building.

Now, the question is - up to now we've been saying, well, we're going to deal with this through regulation, through trying to either require them to adopt energy efficiency audits or regulations in the Building Code and so on. But I'm trying to sort of think laterally, as the RIS requires. Is there any other non-regulatory way of encouraging much greater capture of these gains which the experts are certain are there that managers don't believe are there?

One possibility, which I think - when, Don, you were talking about the pooled investment funds I was thinking of a certain large investment bank who's name starts with M, as an investment fund. If there are all these opportunities out there that have 20, 30, 50 per cent rate of return and very short payback periods and all that's required is somebody to broker or arbitrate to bring together the people with the problem and the people who have got the technical expertise to solve the problem and at the same time that broker would make sure that they filtered out the really

good experts - so you wouldn't have to have a government-run accreditation scheme - they would presumably arrange through some sort of insurance that the results will be delivered and that reduces the risk for the manufacturer, et cetera.

You know, have you got any more ideas on a way a business might emerge to achieve the realisation of these energy efficiency improvements? And that would be a way that is commercially sustainable that doesn't rely on government trying to force an unwilling industry to do what the government thinks is best for them.

MR HENRY: Let me make a couple of quick comments. I'd still maintain very strongly you have to do both. There has to be push and pull for this to happen. So the regulatory base, as we've explained, a diversity of approaches, learning as you go, we think is still essential for a whole range of reasons, and I hope we've picked up on those. But I also agree I think there can be much more done to pull. We don't have the economic expertise but we have been attracted to initiatives like pooled investment funds. Where you've got environment externalities that are also linked to high transaction cost in the marketplace - are dealing with them. And that's partly what we're dealing with here. I mean, as I explained with 60 Leicester Street, there was a high amount of management time required to deliver that, just because of the immaturity other marketplace, as we put it.

If there are ways of - you know, a pooled investment fund or bonds or whatever is the right machinery there, if there are ways of helping to ensure that there's stronger, more coherent drivers out there in the marketplace that would certainly help because there is an issue here on transaction costs. The other thing I would say is that the cultural framework of this is very important, and this is where I think the environment benefits need to be emphasised and the longer-term vision needs to be emphasised. I know this is not an economic answer, but I think the awareness and the emphasis put on environment benefits can create a culture for behaviour change where people will elevate the attention they give to something that normally would have a high transaction cost to say, "No, we should be doing this," and you can just look at the uptake of corporate social responsibility across the business sector as a very good example of that.

So I would urge the push for a regulatory base. I would urge innovation in pull, including things like pooled investment funds. For instance, there's the Low Emissions Technology Fund of \$500,000. The government has been talking about hopefully delivery significant outcomes of energy efficiency. Perhaps 100 or 200 million of that or from another source could prime the pump through pooled investment funds - but then on top of that a serious emphasis on environmental benefits round climate change so that that can be more strongly linked into what is considerable momentum behind corporate and social responsibility. I think all of those are important to behaviour change at the end of the day.

MS NOBLE: Just two quick points. One is that regulation as we have seen it here, but also in other places, just bring about the economies of scale. I'm thinking of California, where double glazing is actually cheaper than ordinary glass now. Similarly in Victoria, the cost of solar hot water systems has come down with the introduction of requirements. The other point is that industry associations, while they are concerned about regulatory approaches, seem to be most concerned about the lack of certainty and wanting a national consistency. The argument that if I had the opportunity I would put to them is that, unless they support nationally consistent energy efficiency measures that are mandatory, there's going to be this continual proliferation of mandatory measures at the local government and the state level, and that's the political reality. So if they do want more consistency and certainty, they would be better off pushing for effective and useful national regulation.

DR BYRON: That sounds like a very good summary, and it's probably a good place to leave it, unless either of you have got any concluding remarks.

MR HENRY: No. We very much appreciate your time today.

DR BYRON: No, I appreciate the time and all the thought that's gone into the very constructive feedback. Thank you both very much for coming.

MS NOBLE: Thank you.

MR HENRY: Thank you kindly.

DR BYRON: We should move straight on. Next we've got Mr Alan Parker.

MR PARKER: Good morning.

DR BYRON: Welcome back. Thanks for coming back, Mr Parker. I think you talked to us here last time, didn't you?

MR PARKER: Yes, that's right.

DR BYRON: Thanks for your submission.

MR PARKER: I take it you've got a copy of my second submission there.

DR BYRON: I have, yes.

MR PARKER: There's a very important couple of graphs and tables in there I'd like to refer to. In my first submission I just focused on transport, because I saw this as being the weak link in the chain, and the previous energy studies that had been done by the Parer report and other government reports had been very neglectful: they totally ignored the transport sector and they completely ignored what's actually going on with the international energy agencies mostly based in Europe, like the International Energy Agency, the Atomic Energy Agency and the other groups, that have started to look at energy efficiency in a more rational, scientific manner.

Even the economists' analysis I find quite intriguing. They take a 20, 30-year time span and they analyse their positive externalities and the negative externalities and try to come up with hard data. What they do not do is just take direct costs as meaning anything at all. They kind of reject that. They've now developed about four methods of assessing energy efficiency with regard to transport fuels, with regard to the transport system, with regard to transport vehicles. All of these different methods have taken into account greenhouse gas emissions, which they cost, or air pollution or anything else.

There are basically four types. You've got the energy return on energy invested, which takes us back to the father of ecology, Odum, and his works there. As you know, scientists at the CSIRO have - in my first paper and in my second paper here, on the second page they talk about energy return on energy invested. All the other methods that they use in Europe now, especially some of the papers I've got that have come out of the International Energy Agency in the last six weeks, believe it or not, look at cradle to the grave analysis. They look at all the energy costs that run right the way through. If you take a motor car, you take the energy, not just the fuel that you use in it. You've got to look at the fuel that's used to make all the materials that go into the manufacture of the car, the manufacture of the whole thing, and you take it right back. When they look at the fuel, they go right the way back to

the oil refinery and take it right the way through.

I'd just like to repeat what Foran and Poldy did in their report for the parliament. I find that your report understates this, or it doesn't recognise it at all, actually. What they say here is:

The critical importance of energy use to the maintenance and growth of our economic system is not properly acknowledged in most national analysis. They all have a short-term focus -

which you actually referred to earlier on today.

Longer analysis suggests that energy use is responsible for 50 per cent of reduction in a modern economy but represents only 5 to 10 per cent of the cost. This tension between physical and economic realities effectively blocks the transition to a physical economy with low carbon energy sources.

The thing that I've got a particular problem with is, if you have a look at the graph on the front page of the submission, what I'm actually showing there with the hobbit curve is that, among the various means that we've got to service the international transport market with conventional oil supplies, what's known as conventional oil is what we'd call cheap oil or affordable oil. It's the kind of standard stuff that you get out of an oil refinery. If you look at that graph, you also see superimposed on the top of it heavy oil, deep water and polar, natural gas liquids.

Some of these will imply a much higher level of greenhouse gas emissions, heavy oil in particular, deep water and polar, for obvious reasons. However, the point that I'm making here is that is a fairly objective analysis based on the Association for the Study of Peak Oil. Other international organisations like the IEA and the US Government Survey say, "Yes, there's a lot more oil available," and indeed there is, from tar sands. You'll find my submission lists all the other sources. You've got tar sands, you've got shale oil, you've got all the rest of it. But what have all these alternatives got in common? A massive increase in greenhouse gas emissions if you look at the whole fuel efficiency chain. Tar sands in particular are incredible. You can guarantee some small regular supply of that if you've got the kind of tiny gas fields stuck up in the north of Saskatchewan in Canada that are hundreds of miles from any city, the kind of tiny little gas fields that you couldn't possibly use for anything else. You take the gas from that to the nearby tar sands, you cook the stuff to 500 degrees and then you go through a chemical process to produce your oil.

Now, it's true that in the long term that might get more efficient, but in fact the actual pollution outcome and the greenhouse gas emissions, if you look over the

whole fuel analysis, the whole cycle - there's a huge increase there. What I found with the latest papers I've got from the International Energy Agency is they take this into account. Two things that have happened as well as part of an international debate that's been going on between some veteran geologists on the one hand and some neo-conservative economists on the other - it's a debate that's been going on for about 10 years about how much oil we've got.

As a result of two or three international conferences in which these two groups were brought together - this is the Association for the Study of Peak Oil. They had a conference in Paris which the French Academy of Sciences and the American CIA funded, the last one was in Portugal, in Lisbon - that's this year - and then there was one the previous year. The outcome of that was a consensus between these two groups, and the consensus between the neoconservative economic rationalists, for lack of a better term, and the kind of veteran geologists who have been around for a long time who formed this group and ran these conferences is, "We need more hard data." The data that we've got is pretty useless, and the interesting thing about it is that the Department of Transport has just produced a report which reviews this. It's only been out two or three weeks. It's called *Is the World Running out of Oil: A Review of the Debate*. It's quite a long paper, and at the end it makes it very, very clear: there are now three organisations at an international level trying to resolve the problem of getting hard data that is accurate about oil reserves and what you can do with it.

I've been tapping into some of the reports that have been prepared to kind of nut that whole question out, and the way it's shaping up is this: both sides are right. There is a huge amount of more oil. However, the position that's coming out of the IEA documents is worldwide now we have a policy position where we're not just interested in having more energy-efficient oil - or not just having more oil - we've also got to deal with the climate change problem, we've got to reduce those greenhouse gas emissions. The central point that they're focusing on is - well, this is the real catch-22 situation - "If you want more oil, yes, there's loads more, more than what's shown on that graph there, but if you do you will triple or double the amount of greenhouse gas emissions that you'll get from the oil that you produce." And there is absolutely no way in the world you can avoid that.

What I found very difficult to cope with, with your report, is you've got no rational science base measure of energy efficiency at all. If you look at what's coming out of the IEA, the latest technical reports, they've got these different methods of looking at the long-term energy efficiency problem, and the graph that was produced by Foran and Poldy in their report for the prime minister and the future of energy is the only technical report that's been produced in Australia that takes the same approach. That's in the very first submission that I did.

So the point that I'm making here is that if you're going to achieve energy

efficiency and you're going to deal with the two main problems facing the Western world at the moment - which is, we're not running out of oil, what we're running out of is the cheap, good stuff - you know, most of the biggest oil fields in the world were discovered 40, 50, 60, 70 years ago, and what's coming out of them now is not the lovely, light, sweet crude that pumped itself out of the ground. In the big ones, right, like in Saudi Arabia, they're stuffing sea water down them, billions of gallons of the stuff, and what you're getting is the oil is getting sourer. The American refineries, because they've never upgraded their infrastructure, never anticipated this, can't cope with it because about a third of the US refineries can't refine the sourer grades of oil that are coming out. There's more contaminants, there's more sulfur and they can't handle it. This has been one of the problems.

Now, Foran and Poldy produce this graph that's in the first inquiry. I think it's figure 1. Yes, first submission that I did. It shows quite clearly that if you look at the energy return on energy invested, even for oil coming out of conventional oil fields, normal oil fields, when they go over their peak the oil starts to get sourer. Usually you only get about 50 per cent of the oil out of an oil field. The rest of it gets left behind and what gets left behind is what they call heavy oil. The real goo is called very heavy oil. Once you really start hitting the bottom of the barrel, about 10 years from now, you're going to find that the energy return on energy invested in extracting oil makes oil relative to gas far less competitive, far less competitive compared to coal. Now, the interesting thing about the European analysis that's now coming out under organisations like the International Energy Agency, they take all this into account.

The way I worded it in my report is, achieving energy efficiency requires that many actions be taken by individuals, companies and the governments who can encourage and discourage energy efficiency in many ways. Achieving energy efficiency is a change process that can be very costly, and the resources available for doing that are limited. So it's necessary to identify those improvements to energy efficiency which are crucial to the energy security of the nation. Then it's necessary to consider the options available and what can be done. The draft report fails to do that. The greatest threat to energy security comes from the failure to control the growth or oil dependence when world demand for oil is increasing at a rate that has and will in a few years exceed world production capacity. Now, it won't exceed the capacity to produce any old oil, and particularly bad oil which has got a very high greenhouse content in its extraction. What we're saying here and what the ASPO data shows in that graph is we'll be exceeding the capacity to produce the good oil.

Now, it seems to me that there's no definitions in there, there's no science based definition of what energy efficiency is in relationship to the whole fuel mix, and in terms of what you need for energy security. So you've got a balance in your fuel supply problem so you don't get into trouble. The only really positive thing that I can see on the horizon that's looking at that - and my paper deals with it - is the

emergence of electricity based transportation systems. I mean, we've already got it with electric trains. The Chinese are now producing six million electric bicycles a year, or they will be this year; they've built that up from Japanese initiatives. You're looking at electric suburban trains but, more importantly, that wonderful development, the hybrid petrol-electric car.

They've sold 80,000 of them in America and there's about 1000 enthusiasts over there who are playing with their little button behind the dashboard - there's some electronic control gear in there and you can actually put extra batteries in. And what they're finding is that there's thousands of retired Americans - they only want to go around about 10 or 15 miles a day, and what they're doing is they're rewiring from this gear that's sealed off. If you want to buy a Honda Prius it's sealed off in Australia and it's sealed off in America but the back of the dashboard, all the gears are there, and you actually wire it. And they're finding in the middle of the night they're recharging the battery on this thing. And you're not getting - the standard fuel efficiency for a Honda Prius and the other petrol-electric hybrid is five litres per hundred kilometres. They are getting one litre per hundred kilometres because, even though they only do about 20 kilometres a day at the very most, there are days when they need to switch the little petrol engine on and do the rest of it.

Now, a couple of these machines have actually been already taken back to laboratories in Japan. As it turns out, in the reports that I've seen, the switch at the back of the dashboard has been used for mains charging in Japan quite commonly. It's just something that's done. They were reproducing another generation of these hybrid petrol-electric cars. What's interesting about this is the moment George Bush at a recent conference got presented with all this information, and as I state in the report, his first reaction was, "Well, we better give them three or four thousand dollars tax credit to buy these things." General Motors at this moment in time is in negotiations with Toyota to build petrol-electric hybrid factories in America, and it looks as if they're going to get away with it in a couple of states.

And, as you know, the Terminator, the government of California, I mean, that's the first thing he did when he went to Tokyo. He said, "Look, here we've got all the legislation in place for energy efficient vehicles and what we want you to do is we want you to build factories to build these petrol-electric hybrids." Now, what I find is in your report you make no reference to this, you make no recommendation that we need a factory in Australia producing these in our own national interest. I mean, the car companies can be got together on a partnership arrangement to produce all the bits separately, but what could happen to the Australian car industry if this oil price increase really gets out of hand is what's happening with two American companies at the moment. General Motors, I believe - Standard and Poor - have given their shares a junk bond status.

DR BYRON: Yes.

MR PARKER: So, you know, that's - - -

DR BYRON: But, I mean, we did speak to people in the automotive industry in Australia and, I mean, they're observing this. They're not assuming that oil is going to stay at the same price forever and they have contingency plans. They are looking towards new generation - not just hybrids but gas fuel cells. All sorts of things are on the horizon. Holden here are quite proud of the fact that their Holden engine is the most energy efficient one that they've ever produced, and they're exporting it around the world, et cetera. But, you know, I don't think that the international automobile needs someone like me to tell them that they should be thinking about future oil supplies. Do you think they do?

MR PARKER: Think they do? When this organisation was called the Industry Commission I made a presentation of Al Gore's negotiations with the American car industry. This was about 1987, right, and my submission said, "Look, Al Gore has just negotiated with the big three. They're supposed to be producing a family saloon. They've agreed to it. By 2003 they'll have a family saloon doing three litres per hundred kilometres." Now, we all knew it was a pack of lies. Right? I mean, anybody who knows anything about the way business treats government in American - I mean, I've met regulators from the US Environmental Protection Agency over here and they say, "We love your manufacturing people. They really want to know. You know, we're just treated like garbage back home."

So what I'm saying is, General Motors, forget it. If you want to talk about Japanese car manufacturers, yes. If you want to talk about Mercedes Benz, you want to talk about the elite of Europe and Volvo, yes, they know what the overall problem is. There's no question about it. But the big American manufacturers, no.

DR BYRON: Okay.

MR PARKER: There was just one little quote I need to draw your attention to about the - yes. On that particular graph there you'll find that I show a decline - and I talk about this 2.2 per cent reduction in demand - - -

DR BYRON: To reduce CO₂ emissions.

MR PARKER: Right. Now, if you look at the figures there I've calculated them out. It works out between 2005 and 2040 an average of about 600 million barrels a year. Now, if you look at the latest report from the IEA, looking at emergency measures to cope with a disruption in oil supply, on table 1 in the report there.

DR BYRON: Yes.

MR PARKER: This is a summary of oil savings of demand constraint policies for passenger transport across all signatories to the International Energy Agency agreement. That will be basically everybody in the OECD. Okay? What they've done is they've calculated the savings. I've converted it from litres - and you can see that in the first category, very large, you could reduce the demand for oil by 370 million barrels a year, which is about half you'd require just with the first set of measures without doing anything else. It's feasible.

Now, I notice that car pooling, the way they designate it, a large program to designate emergency car pool lanes along all motorways, designate park and ride lots, inform the public with computer matching et cetera, et cetera, speed limits 90 kilometres an hour maximum on your highways and your freeways.

It's all calculated out. That's a very, very good report. It's about 100 pages long and we even had an Australian making a big contribution to Dr Peter Newman and his team with their millennium study of - what was it - 45 large rural cities and looking at the various costings. Anyway they've melded this whole lot together and this is what the energy have come up with. I've kind of just done that as a summary statement, just to show there are hard measures. The real problem in this country is that they don't really believe, right, that there's going to be a real oil crisis which could come in as early as 2010.

I mean, as you know - let's put it this way. If Shell doesn't know what the world's reserves of oil are - this was quoted in this particular report here. I thought it was a rather blunt statement but actually a rather good one. If Shell doesn't know how much oil is left, who the hell does? But what I can confidently predict from this pile of papers I've picked up from the IEA, they're working papers in process, some of them, you're going to have a much more firmer idea and from what I can see, it would be a very foolish government indeed that wasn't prepared to severely cut back motor car usage, petrol powered motor car usage by the year 2010, not unless your grandkids want to tell you, "Listen, dad, you're guilty of treason," because that's the way it is going, definitely.

DR BYRON: Okay. We will think about all the things that you've raised when we're making the revisions to the draft report and we'll see what's within our terms of reference that we can do.

MR PARKER: Are you interested in any of the IEA reports, some of the new ones that are in process?

DR BYRON: We can get them off the web site, can't we?

MR PARKER: Yes.

DR BYRON: So we check that regularly and I was surprised that I hadn't picked those up yet. But no, we'll do that straightaway.

MR PARKER: Yes, thanks.

DR BYRON: We'll also get a copy of that Department of Transport and Regional Services one on running out of oil.

MR PARKER: Yes, okay. Thank you.

DR BYRON: Thank you very much. Yes, we'll just take five minutes or so for a cup of tea and then we'll resume with Electricity Markets Research Institute. It will give us time to set up the laptop too, thanks.

DR BYRON: Thank you very much, Mr Perera. If you'd just like to introduce yourself for the transcript and then take us through the presentation that you prepared there, summarising the main points in your written submission. Thank you very much for that written submission, by the way. It has been very interesting and helpful.

MR PERERA: Thank you. My name is Lasantha Perera. I'm the director of Electricity Markets Research Institute. Electricity Markets Research Institute is a private organisation that does research into electricity markets and that stems from my past experience in the restructuring that happened in Victoria, because I was also involved very deeply into the national electricity market developments and also I have been in Tasmania trying to help the regulator there to get ready for entering the national electricity market, which they have done very recently.

My presentation today is actually looking at some of the points in that written submission, so I won't necessarily cover anything that was there in the written submission because I tried to put it in plain English and I tried to make it understandable. But my presentation I hope will sort of take up some points which I think is worth elaborating and also maybe introduce some variations to give you an appreciation of how things can be today.

I've been looking in the presentation at the terms of reference and scope of the inquiry because I think the commission would be missing an opportunity to make its mark, as it was, by this inquiry if they do not actually put up a frame of reference. It's very necessary that you have a comprehensive frame of reference. In a sense - when I go into the details I will talk about it, but a lot of the discussions that we had this morning sort of meant that they were sort of, in a sense, questioning the terms of reference: some things were not included, other things were not stressed enough, and so on.

So I think the terms of reference is a very important starting point and I will also touch on the outcomes that was mentioned in the terms of reference. So stemming from that, in a sense I'm suggesting that there should be the objectives and quality measures which should be, in a sense, the target outcome of the inquiry then. I surveyed a case study of brown coal in Victoria because I think it is worthwhile to spend a few minutes on that, because brown coal is a very important source of energy that we have here in Australia, especially in Victoria, and has sustained us and provided us much returns in the past.

I looked briefly at market reforms and trying to explain certain other terms et cetera that need to be taken into account. I look a little bit into renewable energy because there are a number of measures already in place for renewable energy, and then I will come to energy efficiency per se as opposed to a general concept of energy efficiency, and I would sort of take up the demands. I address one aspect

because I think that's a very important step in the development of the electricity markets and it's more summing up.

Coming to the terms of reference, I am now quoting here from the terms of reference as given to you and it talks about economic and environmental potential. It's not just economic and environmental effects but it's also the potential offered. So in a sense it is also looking at the futuristic aspect of the sort of situation and it goes on to say its reference should be looking at things which are energy efficient, cost-effective for individual producers and consumers. But it also goes beyond that and says "including through the consideration of the economic and environmental cross-benefits."

Now, actually I don't want to sort of go into this but sort of the commission has plenty of economics and they sort of know the social cost-benefit analysis processes quite well. So in a sense it sort of gives the commission the opportunity then to use the social cost-benefit analysis aspects in their inquiry. So that's the social cost-benefit aspects that are arising from the energy efficiency improvements.

Going through the scope of the inquiry, the terms of reference, there is one, two, three, four points and I'm now coming to the fourth point there which says the potential for energy efficiency improvements which are cost-effective for this. So, again the second time the word "potential" coming up. And it says "arising from actions, including energy market reform". So at least all those things which also include new and improved technologies and financial incentives. So those are things which actually are there in the present as well as what is for the future.

So we talk of energy efficiency there, defining the terms of reference to say "useful output or outcome". It's not necessarily output in terms of energy but the two words there say "output or outcome". So therefore you get outcomes, as well we considered, and that's what is there normally as social cost-benefit analysis, and it encompasses both supply side and demand side. So it's the full gamut of the industry then. It goes on further to say that you should look at policy options for energy efficiency. So that's the framework, I think, that you should put together rather than sort of just talk about what actually is happening only and not go into the framework. So the framework needs to put all those things into context.

So that's the reason I sort of got, in a sense, you might say, excited because when I looked at your report and we saw within that it says, "The scope for policy intervention to encourage the rate of uptake of cost-effective energy efficiency improvements is the focus of this inquiry," I thought, "It sort of seems to be okay," but when I looked at the next quote it says, "Examination of measures that engender net public benefits, despite not being privately cost-effectively, is beyond the scope of this inquiry," I said, "Hey, you need to think again, sort of, on that," because we talk of public net benefit. If there's public net benefit then of course it's something

that we should be looking at, and you shouldn't then say it's beyond the scope of this inquiry because, as I said, the framework should be encompassing those things.

So good policy intervention is based on the analysis of social costs and benefits, the private cost-effectiveness of desirable social outcomes and the necessary level of intervention to align private cost-effectiveness with social outcomes that demonstrate net social benefit. We may talk of above a given threshold. You sort of want to say about the very nitty-gritty sort of small things.

Then the next thing would be, narrowing the inquiry to energy efficiency potential that is already cost-effective for individual producers and consumers does not address that half of the mandate to inquire into the potential for policy intervention to make other energy efficiency improvements deemed to have a net public benefit, also cost-effective, because by taking that action, the policy intervention, you make those things also cost-effective to individual producers and consumers. And that aspect is because you don't have compulsion in the market but you have free market. So therefore you make it cost-effective to the producers and the consumers for them to go and do their work.

The background of the terms of reference are also worth looking at because there they talk of Australia's access to low-cost energy advantage. The low-cost energy in terms of - I talked of brown coal. We have black coal, we have natural gas, we have plenty of raw materials. So it gives us a historic energy - the country advantage that we have enjoyed. Then they go on to talk about the historic energy efficiency performance as what we think in comparison to other OECD countries. Of course, different materials have different ways to exploit them. So it's not comparable to compare brown coal here that we have effectively used with the lack of sort of such a thing in OECD countries. There should be the trade-offs.

So the terms of reference talks about the improvements in the energy use which are cost-effective for these things and the potential to enhance economic prosperity. We talk of economic prosperity again, coming back to this concept of the social cost-benefit analysis and to lower greenhouse signature. So giving that mandate to the commission has sort of had in mind this question about the greenhouse signature. Of course, that, you might say, is part of the social cost-benefit analysis in that it looks at the externalities of the equation as such. Then you look at the useful output, outcome. There is also talking of the potential economic - they talk about the potential - so in terms of the future - economic prosperity and greenhouse signature, the two things that sort of stand out there.

Within the framework of us talking of - you would need to have clear objectives, and I'm taking now the loss of economic efficiency that you have well documented in your report but also sort of putting some points to that. We looked at technical efficiency. We talk of energy production, conservation, conversion and

then we talk of energy transport. Before I come to transport energy but we talk of energy transport and energy use. Then we have improved electricity efficiency, constant community values, generous most national income, contributes most to community well being, contributes mostly improvement in living standards. So things like fuel power also come into - sort of in a sense within that ambit.

Talking of dynamic efficiency we think in terms of sustainability to the long term, to the future. In the morning we heard about this question about petroleum effects. You also have a great and timely investment, very important things to improve the dynamic efficiency. And I'm talking there again of sustained innovation because that's again an important thing, so that you need to keep on developing and improving, as it were, long. So if you had the sort of clear objectives then you can look at, "Okay, what are the measures against those objectives?" Then you have a sort of framework.

So well targeted policy measures that we've all sort of been thinking of could cover things like the coarser beneficial repay principles there. And it's sort of looking at its best position to take corrective action and then has the most incentive to take action. If you looked at effective markets and - electricity supply and consumption which is linked in real time, and that's something people seem to sort of not appreciate because the electricity that is consumed at the moment is consumed as transport and it's also used. So it's something very special industry, that it sort of happens at the same time, and if you want to have some demand side response it has to be in that period of time framework.

That's the only way the country will supply power, in a sense. And when you talk of supplier power, it's important to realise that in Australia we have a few generators whereas in Europe and America and so on there's a large number of generators. So you have market power because the residual demand that is one generator shutting down all the equipment can provide a lot of impact on the price within the market. So the residual power is very strong in Australia. So in a sense demand side response, you can't immediately have it but you need to built it over time. It's sort of a question of time. You need to have equal bargaining power to supply and demand side and you need the equal access to information.

We looked at regulatory oversight. When I talk of regulatory oversight, I'm looking more what you would call industry funding model sort of use as opposed to where you have money from the public purse, because I take it that's under the government intervention. So in a sense the regulatory oversight looks at similar market operations and outcomes, so that the markets were properly and - you design the markets to operate properly sort of. It might need incentives and penalties to align private cost-effectiveness with net public benefit.

Coming to sustained innovation, innovation can be in products and practices,

and it has to be sustained, because if you do it in fits and starts people get discouraged. They sort of fall by the wayside. People don't see a return on their investments. So unless you have a sort of framework and have sustained - and guarantees, as it were, things won't happen. There is also inertia, and there are also people who have vested interests and fight hard the changes the happen. So it needs a sustained effort.

You looked at government intervention, which can be from the public purse. Here I'm thinking of things like energy winter concessions for people who are on low incomes, because the governments have a responsibility to sort of look after the people who have difficulty looking after themselves. Therefore it comes from the public purse. It's more appropriate to come from the public purse. There are other sorts of situations where it's a public benefit which is to be safeguarded and you don't want to burden the production which is coming into good like electricity, because electricity is used in industry. It's sort an input to industry, therefore if you price it too high you're going to have an impact on the whole economy. Therefore it's better to do it through the public purse. So those are the situations where you look at the framework. As I say, some things need to be done through industry funding, some things need to be done through the public purse. So the framework has to look at that.

Then things like promoting technology innovation and the diffusion aspect could be partly through the industrial funding, partly through the government, because the government is in the process of trying to encourage this thing and increased job opportunities and various other things like that. So there are certain reasons why governments should be funding innovation and diffusion.

I want to look at brown coal in Victoria because I think it is a very special case. I don't know whether the commission is aware in terms of what happened about 60, 70 years ago, when Sir Monash was asked by the government to get together the electricity generating companies that were there and in a sense formulate a program so that Victoria could improve its status, as it were, by having a good electricity plan. Something that sort of struck me when I was reading some old literature was the plan that Stalin had to develop Russia. He said, "First we must have electricity." Electricity was a driver, a spearhead, as it were, for development.

Sir Monash was commissioned to, as it were, bring together and set up the electricity industry, and I think at that time the Victorian government gave him \$100 million to go and do it. That money was used to set up the industry as it was in the Latrobe Valley. When finally the Victorian government decided to sell the electricity industry, they realised \$425 billion from that \$100 million that was invested, and that's a very good investment. It brought prosperity to Victoria.

So I just want to touch on brown coal. It has advantages. It's a significantly

large coal deposit with low sulphur. Sulphur is a very important thing, because when they're talking about all this sour food in the US and so on, it's a lot to do with sulphur. We have significantly low sulphur here. It's almost on the surface and at the doorstep of the electricity generation facilities. So it has the lowest short-term marginal cost for generating base load electricity.

I began to understand when we were first connecting up with New South Wales and we had our water rates set up at the short-term marginal cost, because the short-term marginal cost for brown coal generation was less than half a per cent. We had the rates at about 1 cent, and that was the cheapest off peak in Australia. The New South Wales generators were sort of complaining and saying we were undercutting. We said, "No, but our short-term marginal cost is half a cent, so you want to make use of that benefit."

There are disadvantages of course. High moisture and low calorific value give the highest greenhouse emissions per unit of generation. Those two combine to give - we want to then burn more coal and therefore we send out more emissions. It has a slightly higher capital cost because of the low calorific value and the water content. You need bigger boilers, as it were, in terms of size, therefore a higher capital cost. It's interesting, because when Sir Monash's team was developing the industry there and they looked round for people to build the power stations, there was nobody capable of building them. Nobody was using brown coal at that time. So essentially they had to design and do it themselves, and that was quite an investment at that time. So it has a higher capital cost, somewhat distant from both centres but relatively, yes, because Latrobe Valley is sort of 100 kilometres from Melbourne.

It has competition from things like black coal, because in New South Wales you get plenty of black coal. If you had the greenhouse gas penalties applying to such an extent, then the black coal becomes competitive. The competition also comes from natural gas. You'd have heard the words "dash for gas" which started in the UK and went on to the US. I'll come back to that later, because they're both now net importers of gas. They've gone from using natural gas heavily to becoming importers now. So natural gas - reducing costs and increasing efficiency, gas turbines have helped, because when that dash for gas came about there was a lot of development and a lot of demand for gas turbines. With the opportunity to provide these gas turbines the cost came down and their efficiency increased. So that was the competition that was there for brown coal.

But there are recent developments that are impacting on this competitive position. With international demand for natural gas, for example, LNG - because if you are exporting you need to liquefy it - rising due to significant imports from Japan, Korea, Taiwan, China, et cetera, UK and the USA also now have to import natural gas. Natural gas prices in the US have risen about twofold in the last five years - a twofold increase, strong export demand, and so prices of black coal have

risen substantially in the past one year: big changes. At the moment they are having contracts for supplying the power stations, but once those contracts come up for renewal there are going to be some changes. No external price pressure on brown coal. It's a bit of dirt on the ground that nobody wants, so therefore it's not suited for export.

DR BYRON: Combustible mud.

MR PERERA: So it has an advantage, in a sense. At the moment people consider it disadvantaged as much as Sir Monash found it at the time when he started. Policy measures to reduce greenhouse gases need to be targeted to those in the best position to reduce those emissions. That's a funny thing. I remember when I was in the National Retailers Forum we argued very strongly that it should be on the generators. But the generators' but the generators' lobby was too strong. They put it off, and naturally those things fell onto the retailers. It's all wrong, because we need to target the person who is in the best position to reduce such emissions, which are the generators. Otherwise, you will have the situation that when you come to the market and they put it into the market, there's no differentiation between the production which is coming from brown coal and black coal. So in a sense to be effective it has to be the people who generate the emissions.

Government grant subsidies towards research and development for technologies for clean coal burning may be necessary. That's a necessary thing which governments should do, because after all it looks after a huge chunk of the raw material that is available in the country. AMRAD fails to resolve the issue whether we should have more black coal power stations or brown coal power stations, because AMRAD falls onto the retailer. So what is there to say whether you should have a brown coal power station or a black coal power station, because the generators are not faced with those things? Brown coal may yet have the cheapest short-term marginal cost for electricity generation.

One of the things that can happen is that if you would think in terms of carbon trading and you have a market for that. Then there's an opportunity to discover the cost of this actually. Within the framework, if you have a capacity to work out what the costs are, then you can plan in confidence. But without having a plan, you can't have confidence to do your investment.

I'll look at renewal energy now, touching on wind power, because the wind power situation is that the capital costs are much higher. It becomes viable only with subsidies. That's the AMRAD scheme then. Without AMRAD no wind power would come up. We need new long transmission connections, because it's all on the coastline, and the way the transmissions systems operated after they'd been developed was to service the load within the centre. Therefore to connect up to the wind areas you need new lines, and they're fairly long. Then also the problem with

wind power is that they have intermittent output so require other back-up. You can't have 200 megawatts of wind power suddenly stopping so that another 200 megawatts supply has to be on reserve to take up that slack.

Looking at photovoltaic cells, there are significantly higher capital costs and they are only viable with subsidies. Although Prof Green in New South Wales has been doing work to improve efficiency up to about 28 per cent or something, the cost is still far higher than what is in a sense commercially viable.

New hydropower: the problem with hydropower, of course, is that the most economical locations are already utilised. So if you're thinking in terms of a significant contribution from hydropower, forget it. Again we have a problem with hydropower in that reliable output is limited by weather patterns, and this is very acutely felt in Tasmania. The difference of course between the Tasmanian Hydro and the Snowy Mountains scheme is the Snow Mountains is a balancing scheme, whereas Hydro Tasmania is to generate electricity for everyday use. That's a problem that was California's, because in California the Tennessee Valley was the one which gave a lot of the energy, and when drought meant Tennessee Valley was not able to give that amount of energy, there wasn't enough capacity.

So if you think in terms of hydro, you have to think in terms of reliable output limited by weather patterns. In the hydro systems they're called the sustainable level at which you plan, which is a once in a hundred years drought. You have to plan for that and keep ready some reserve in case that happens.

The next item I want to touch on is solar water heating. Solar water heating is a most cost-effective renewable energy source, and it's not tapped enough. In Europe they're now talking of green energy, because when they're talking of power, the power concept came on the basis of, "Okay, you are to generate electricity." But they talk now of green energy, because what you're talking of is energy, not necessarily power. If you can increase your renewable energy by having solar water heating - that's renewable energy.

I want to touch a little on energy efficiency, electricity generation and transport, because we are talking of the different types of generation. Here I want to introduce distributed generation, which is the thing that's now sort of catching the attention of many companies. Distributed generation is where, localising and having large generation capacity, you have it in the place where it's being used. One form of distributed generation is cogeneration. I'll touch a little bit on that. Distributed generation would mean that you reduce drastically the line losses. I have another graph where I talk about the line losses, where I come to the size of that.

Distributed generation enables deferral of network augmentation. I don't know whether you are aware of the figures, but I had occasion recently to look at what the

regulators have provided for in terms of capital investment for the next five years in their pricing reviews for the different states, including Queensland, New South Wales, ACT, Victoria, South Australia and Tasmania, and the figure was - I can't remember exactly but I think it's about \$12 billion. That's a huge amount of money, considering that it's actually about half of their capital base and those numbers are significant. Now, here we are talking about distribution generation which can differ or sort of almost, say, a different augmentation.

Then there's the losses in the economical scale advantage because previously sort of generation units became bigger and bigger in terms of saying that there's economical scale advantage. So they were looking at the capital cost per unit of output or the measure. So if you looked at a place like Loy Yang Air it was very capital efficient in that sense because per unit of output was very small. But things are changing because now you have small generator units coming onto the market and those small generator units in a sense make the capital cost about half of a normal generator station. I'm talking of stand-by generator sets which can be diesel and the new thing that's coming on is gas driven stand-by generators.

Now, those internal combustion engines, they can be Australian engines or sort of more advanced engines but they have a significant capital cost advantage and the problem of course there is that if you look at it in terms of the cost to run those type of engines you need some fuel and if you think in terms of natural gas you're now thinking of the fuel input is high because it's a retail cost. But if you look at the public benefit, once you have the network, the pipe plants, in place the incremental energy cost is small. So that's a challenge that you have, in that we can improve this generation if we can give a good price for the fuel.

That's a positive decision which has to be sort of looked at into the future, but I'm saying that that's the type of study we needed to sort of look at or sort of point to, if you don't sort of - I'm not saying the commission should do a study but the commission should point to those type of situations. The important thing about distribution generation is that with coal generation you significantly improve the efficiency of conversion because you can capture some of the heat losses and you can have efficiencies of 80, 90 per cent whereas in the best power station you will have mostly about 60 per cent.

The fuel cells is into the future, there you have marginal increase in overall efficiency and it has reduced emission of greenhouse gases. But to my mind, sort of, you don't have to wait till that because you have much more opportunity now in terms of the small size distribution generation. In this picture I am trying to sort of give you a visual presentation of what happens in the industry, because we talked of generation and the footprint there shows that generation costs about 40 per cent of the electricity supply and transmission costs about 8 per cent of the supply system, distribution about 45 per cent. These are on average figures, retail about 7 per cent,

so the sort of cost to the customer.

The yellow part on top is a model, a reserve that you need to keep, and if you have actually reserve in terms of hydro you need to keep more, sort of, for that one in 100 years sort of drought situation. So that means 15 per cent of generation capacity is actually an extra, you might say. In transmission you have redundancy because I know you have heard the word, the term, "N minus 1 reliability". That means in Australia just having one line or two lines and both are individually capable of servicing the requirement. So if one fails the other is already on line, it's there. So it's like Sydney when Energy Australia was sort of putting up proposals to augment supply to Sydney, they're talking of N minus 3.

So you can have three lines failing but still supply to Sydney will not be affected. So you can see the redundancy level in transmission is very high; it's about 80 per cent. We looked at a lot of the transmission lines and they're almost - the sort of transmission lines that NEMMCO controlled, they always say they must have at least two. So there are some lines which may have one sort of redundancy at least about 80 per cent. In distribution similarly the redundancy level is quite high; it's about 70 per cent. It's only rare that you'll have sort of lines which are single lines per lines.

In retail we have what I call HC and H 30 per cent. C stands for customer churn and H stands for hedging and that's about 30 per cent. Now, that's actually not 30 per cent of the 7 per cent; it's more than that. But what actually happens there is that hedging is because of price volatility in the pool market. Now, that volatility was not there when we had old systems so it's a market phenomenon which we have deliberately introduced and unless we have measures to properly control it and reduce it, we are not doing a service to the customer because that volatility is costing a lot of money.

Now, on the right-hand side I have residential customers account for what, 35 per cent of the energy use, commercial customers were 35, industrial about 25 and farm about 5 per cent. I want to look at the second line, also on the line which is the losses. The losses in generation is about 45 per cent. That's a full conversion loss, sort of. Of course, if your coal is cheap the cost in terms of the cost is not very much. The losses in transmission are about 4 per cent, in distribution is about 8 per cent, and have .5 per cent for retail which is actually the losses in terms of theft.

The bottom line is the one that I want you to concentrate on now and there I'm talking of the minutes of supply. That's where I'm talking of reliability in the system. So NEMMCO works on a target of .001 per cent reliability level and that translates to a target of about 10 minutes of supply for the year. Now, that's a hard call. You spend a lot of money and you sort of have a lot of stand-by generation to maintain that, whereas the distribution, if you look at CitiPower their report in 2003 said that

average means of supply was 30. Now, CitiPower is - this building also is CitiPower, sort of, in terms of distribution.

You have quite a lot of the supplies is underground. It's a bit expensive but sort of reliability is much better and you have a number of the stations have two or three lines at least coming into each station. So they have managed to give 30 minutes of supply for the year whereas TXU on average is 289 and actually in that 289, in remote areas, in the rural areas of TXU it is significantly higher because TXU covers areas like Ringwood and so on, where it is more urban than rural. But they have also fairly rural areas like Mallacoota and so on.

So what that means is that the money you spend on maintaining .001 per cent reliability in the generation and transmission doesn't make much sense to a rural customer who has 289 minutes of supply. That's the dilemma which, in a sense, has escaped a lot of, I would suggest, all planners until now, that they considered reliability as something which you can't divide among customers. So there are two customers down the street, you can't give one customer better reliability than the other customer.

It's interesting to note what the value of loss load each customer places on the loss load. Now, this is a study that was done by Monash University. I have confidence in that study because I was also part of the process in that when I was at the Australian Energy I provided them the contacts to the customers because I think they pooled about 5000 customers and we provided the information in terms of what the annual consumption through their bill system was, so that they could make the assessments. They chose that residential customers give the lowest value for loss load and it's within a cent. Sorry, it's .7 dollars per kilowatt. For commercial customers it is 35.9 dollars per kilowatt - sorry, I think it should be cents, my mistake.

Agricultural is 96 and industrial, it is 11.19. Now, the important thing to note there is the ratio between the residential and customers, which is about 100 times. Of course you might say that okay, we don't give the opportunity to the customers to do that. But actually the opportunity is given because if you looked at what the letters require from the networks when they put up network augmentation proposals is that in the rural areas they must maintain a lower reliability level than in urban areas. So you might find some very rural areas, that's only one line servicing them, as compared to two or three lines servicing people in urban areas or in city areas.

So in a sense it's factored to some extent, but what is not factored is the question that comes from the pool and from the transmission systems and that's that - I told you - the .001 reliability level for what - as I said, NEMMCO control, as it was with others. This picture is, I think, a very interesting picture because it gives where extreme prices happen in the pool. What I have at the bottom is the full year data

and I have in light blue the demand for the system which is given on the left-hand side chart, left-hand side scale, and the price which is given on the right-hand side scale, and you can notice that the highest demand is actually during the summer months in the January period so it's the highest is somewhere there.

But you will notice that the prices have all been quite small. Of course this year - the data I have done was for a particular study in the 2002. So some years we had problems in summer period as well. But if you think in terms of consistently high loads that happens in the winter period and then again the prices have shot up, not at the times when the load is very high. Now, this graph is very important when you think in terms of time of use studies because at SECV we started the first time a fuel study for domestic customers in the world. We had to win our tariff and that was correct in that we were looking at the power system, total power system.

So we were looking at the short-term margin of costing in the Latrobe Valley and we wanted to make it into the brown coal power stations that we had there and we were having a differential between peak and off-peak which is about five times. So, say, for industrial, if the energy charge was about 4 cents or 5 cents peak period, their off-peak period was about 1 cent. So for domestic the differentials, off-peak was about 3 cents and their peak was about 15 cents. So we had a good time of use differentials. But the time of use differentials we would put there was actually looking at where we want users - the off-peak was looking at the marginal cost in running the brown coal stations at certain times.

But with the pool prices not following exactly the demand you can't do that; it won't work properly. I'm sort of showing this, these sort of things will probably be quite - you would have seen a number of them, but most of them is actually the demand duration curve. I'm showing you the price duration curve and you can see there that the prices have been - over 100 there is quite a smaller number and very high prices there.

Interestingly the next one is looking at the revenue curve where you can see that 85 per cent of the revenue - sorry, 15 per cent of the revenue comes from those very high price periods. Now, behind that is the generator bid stack. Now, generator bid stack shows what the generators have bid and you can see that it's vertical section here and that is possible because for load because not responsive, you are a tight customer, so that supply curve - the demand curve you can say is almost straight there and the next one is the famous curve and we say okay, fuel demand response, and you were going to incline that curve, you'll get a significant reduction in the price then pool. So your price for working the pool can come down considerably.

The imperatives for demand and response was because the studies are done by EPRI which said that 2 per cent response is enough to deliver 20 per cent price reduction. So you need to bring in the customer who is actually the other side of the

physical - the counterparty, because in a transaction there are two counterparties, then you go to hedge a transaction. So you can get it from the supply side or you can get it from the demand side. So you need to sort of look at both sides, response needed to be directly driven by the customer.

The customer has to have control over it because a lot of people sort of - now in the US demand side response goes by having centrally controlled airconditioner set points, sort of. But industrial doesn't want to do that because they say, "Our business is to sort of make money by running a business. We don't want you to be controlling our load for us, you see."

So it has to be done by the customer, and necessary to have this option to avoid negative consumer surplus. And there what I mean by "negative consumer surplus" is the customer normally would give his money and buy a good because he sees more value in that good compared to the money he gives over. But electricity, as we have shown in the previous rights, the customer is paying for reliability which he doesn't value. So he's paying more than what he feels he should be paying, and he can't help it. And that's where the negative comes in, because he's not having positive consumer surplus; he's having negative.

Must be able to respond to high pool price and to network constraints. There are two parts of it because high pool prices is one thing, and also network constraints are sometimes not reflected in the pool price. So demand side response actually has to do both. Now, this diagram here tries to work on the basis that if you had the time of use prices it doesn't give you too much leeway to respond to demand to price surges that I showed there, you see. So there's no demand response. So what happens in the pool market is there's constraints applied, and that increases price volatility. So we have more price volatility. Therefore people go and hedge. There's more need for hedging then. So you have higher hedge cover. If you have higher hedge cover people say, "Why bother, because I'm hedged." So it becomes a vicious circle and to break that vicious circle we can change in time if you can have containment rates. So if you have containment rates you get some demand response.

But, still, it doesn't move enough because, for one thing, it's a bit sluggish and demand is small. You'd sort of need special arrangements and so on. And you can do it now. At the moment a few companies do it by phoning some of their customers who have arrangements with them. So they take the phone and say, "Can you drop 10 megawatts of load," you see. But they can't do that then for a few number of customers. So it becomes sluggish and it's quite small.

The next one to have would be to have an auto response system. You then have immediate response and then you have, in a sense, effectively sort of controlling the pool market price surges and therefore you have less supply constraints and price volatility sort of comes down. With less volatility there is less

need for hedging. So you have lower hedges. So that in a sense keeps on improving over time as the auto response sort of capacity gets put in.

DR BYRON: Are you talking about major users having the ability to bid into the national electricity market for megawatts, as the Americans - - -

MR PERERA: No. Actually, no, because what I am talking of here is a pseudo market where you have automatic response capability now put in and the customers set, as it was, at what points they will drop load, at what set points. Also, it goes both the retailer and the network an opportunity to add premiums. So we go to the system something like what you have in the network, the option - the overbooking case in the airlines and how they auction the capacity. So when the capacity was required they just keep on increasing the price until enough response is there.

DR BYRON: But the threshold would be preset by negotiation?

MR PERERA: No. The customers, that's it. And the retailer and the network can just offer the premium, and if that premium sets this it triggers it. So it's an automatic thing. It's outside the market. It doesn't have to interfere with the market at all. This is a pseudo market then.

DR BYRON: But if the customer decides what level the threshold is set when he sees the - - -

MR PERERA: He can have multiple thresholds.

DR BYRON: Yes.

MR PERERA: And each can be at different price levels, and when he reaches the price, automatically that part of the load can get knocked off. And one of the things it can be also, that it might mean that you bring in the stand-by generator set.

DR BYRON: Yes.

MR PERERA: So the system arranges for that so that you can have automatic response, even to the extent of putting in your 10-megawatt stand-by generator. So it doesn't interfere with the pool market at all.

DR BYRON: Okay.

MR PERERA: And it's one platform that can apply both to the retailer and to the network. So auto response situation is very necessary in this sort of situation. The enablers for such demand side response is that we are now seeing - reducing the cost of smart meters. They are becoming very cost effective and people have in a sense

mandated some areas to have very smart meters.

Reducing cost of communication options, because I think with ABSL being put in, I think there's, what, 1.5 million households today in Australia which have permanently owned communication facilities. So it's easy. Convergence of computing controls and communications can deliver real-time systems. So we are now having the capability to do this, and the package that I'm talking of, there is an Australian patent which is 748800 and able to give automated demand response according to customers wishes. Demand side package offered by the patent is real-time response to pool prices; able to offer very high price incentives; includes measures to contain risk to customer; can also respond to network constraints; and customer constantly informed and always in control; and enhances the benefit with coal generation or stand-by generation.

Future benefits also in terms of - because, as I said, distributor generation is now sort of taking hold. Therefore, it provides something for the future. So distributor generation to microturbines and fuel cells. Within the next five years you can see a lot of them happening. Synergy combined with water space heating, because water and space heating together constituted almost - in some place like Victoria could be about 75 per cent of the domestic load. And you can reduce initial cost, increase efficiency and reduce line losses, reduce emissions. All of that can be done with that then. Could qualify for carbon renewal credits also, and these units can usually expose or potentially increase output on demand. That's the beauty of it because some of these things, when you have, say, a stand-by generator you can have it a little bit higher capacity so you can have full output at the time that it's required.

Significant improvement in the operation of the pool market. So one of the reasons we sort of had the pool market is to give a better price to the customer and to have - but if the market can be improved, that itself is an objective achieved.

Just to sum up, restructuring objectives require self-adjusting market mechanisms and less regulation. That should be the sort of objective that we have, as it were. Need to provide benefits to customers through lower prices and less price volatility, because price volatility is not an economic gain. Price component for reliability must not be higher than the value placed by the customer, and that's the beauty of it because the negative that we talk of - the negative consumer surplus - the customer now has the ability to respond. Therefore it is no longer negative, you see.

Price volatility impact containment mechanisms, must attend to both physical counterparties. So it's not correct to say only generators can build in and sort of - really the position and get a high price, but it shall be both parties. Demand side incentives must be better than for the supply side to compensate for lost opportunity, because demand side, what they say is, "We are not actually making money out of generating or sort of using. We are making money out of our business." So in a

sense they must be better compensated. And that is why in the case of the air travel, the overbooking situation, they have to pay a higher amount otherwise that incentive won't work.

Just a little bit about the Electricity Markets Research Institute. The mission that we have is to provide a holistic assessment of the design and operation of electricity markets with a view to promoting their efficiency, enhance the public benefit and progressing the satisfactory resolution of equity issues. So that's sort of our contribution that we hope to make. Thank you.

DR BYRON: Thank you very much. That's been very wide ranging and very thought provoking. I had prepared a couple of questions from the written submission but I think most of them you've already answered in your presentation there. If I can just come back to the written presentation, on page 5, the bit that I was going to ask you for further elaboration was - you've said, "Transport of energy to the place of energy use is another element of the value chain. So the efficiency of energy transport is an important part of the current inquiry. Unfortunately, the commission's draft report seems to have missed this important aspect of the brief." Can you elaborate a bit more on what we should be doing to improve the draft report when it comes to the efficiency of energy transport?

MR PERERA: I didn't see a section talking of energy transport itself, in that energy transport, as what I've shown there, was electricity energy transport. But you would think in terms of other energies, and we talked about brown coal power station in the Latrobe Valley. Now, we talked about energy transport in terms of the North West Shelf, and we have plenty of natural gas there. Now, North West Shelf has rough contracts and they're trying to get more contracts for its coal. Of course, the coal price is higher but then it's higher because it has to be liquefied.

Now, if you had a pipeline - this has been mooted some time ago; it's not the first time that it has been mooted. But what you need to then think in terms of, "Is there a public benefit in a pipeline?" If you said steel is manufactured here in Australia and somebody who produces steel cans comes to the party and says, "Look, we are prepared to quote a little bit at a lower cost because we see significant advantage in giving that large amount of steel." We have shortage of jobs here and that creates a huge opportunity for creating jobs.

And we talk of a corridor then which can be - not on the pipeline but you can have the state - because in between reading the stations to re-energise or to put the pressure up, and you can have electricity being generated at those stations, and you have townships there, because you can have water also there. So you looked at a national plan, you can say, "Hey, it's an opportunity because we need to transport. We need - all these rough markets want this gas and therefore there's a way." But the other thing also is that if you had a lot of brown coal and you can convert the brown

coal into gas and feed the pipeline system, that transport and conversion efficiencies can in a sense be compensated by the public benefit from those things.

DR BYRON: Yes. Changing the subject completely, in the slide that you had on renewable energy technologies, I was interested in the comment about both hydro and wind power. Could I have your reaction to the proposal that wind power seems to work very well when it's linked with hydro where - and it's been said to me this is the proposal for the Bass Link, that Tasmania basically becomes a battery, that during the day it sells into the national grid at high prices and during the night the power goes the opposite direction back to Tasmania and you pump the water back up the hill. So you've just got a perpetual battery that's recharged every night. Apparently, this is what happens in British Columbia in Canada and also between Norway and Denmark. The Danish windmills are used to - you know, when the wind blows very strongly there's very little demand for electricity. The surplus electricity goes to Denmark to pump the water back up into the hydro dams.

MR PERERA: Yes.

DR BYRON: Is that a possibility? Does it get over the limitation of wind that the wind blows strongest at 3 o'clock in the morning when there is least demand?

MR PERERA: Hydro, you must look at it in terms of Tasmania because what happens is, if you have a network which is a loop, a sort of close entity, there is certain things we call stability to the system. As I said, I've mentioned before, if you have a large amount of wind in Tasmania and the system is small, it makes the unstable.

DR BYRON: Yes.

MR PERERA: So there were studies done in Tasmania and they said that only - although Hydro Tasmania said, "We can put in 2000 megawatts of wind," they said, "Hey, buddy, if you were to do that then you have to have some other mechanisms to enable us to keep the stability of the system." So what they worked out was that maybe only you can have 600 or something at the moment, with the way things are. The link is more or less like what we have in Snowy; that's our measure. You don't have to go very far because Snowy is an ideal situation because it has also the pumping capacity. So it has the connections between the two big markets in New South Wales and Victoria, and is able to give, as it was, the balance. Now, Tasmania will give a further improvement in the balancing possibilities then. But there is a difficulty in Tasmania in that Tasmania - it needs to be resolved as a market issue but there's only one generator.

DR BYRON: I notice from frequently looking at the web site for the national grid that the amount of power that the Snowy exports to New South Wales and Victoria

obviously varies greatly, depending on what the prices are. I was just wondering if it is sometimes a purchaser of power from New South Wales or Victoria at times when there's sort of surplus base load in those states and electricity is available very cheap, and whether they use that for pumping in water - - -

MR PERERA: Yes, they do. They have pumps there and that's the scheduled - what they call a scheduled load, so it's in the market as such. But it comes on when the price is low, it will come on and pump up the water. It's pump storage, they call it.

DR BYRON: Yes. I think you've answered all the things I was going to ask you to elaborate on a bit further from the written submission and likewise the method of real time auctioning of capacity in the electricity network was the thing that intrigued me. But you've explained about your patent there. So what you're suggesting to us is that that's a fairly effective way of dealing with the peaks, the peak loads and the spikes in prices.

MR PERERA: Yes. That's really effective, you see, and especially if you sort of consider that we can target the domestic customers who pay the least or place the least value on lost load and if you think in terms of Australia, in terms of accessing new developments, Australia has a sort of a record and anything like the plasma screen which has come recently and I think international sort of sales figures show that Australia in terms of per capita has been one of the most innovative in terms of using up, you see - - -

DR BYRON: Yes, rapid technology adopters.

MR PERERA: The other thing of course is, if you have a good incentive at the beginning then more people take it up and now sort of things like ADSL, ADSL 1.5 million, very quickly got through that 1 million target that they put because they put in effort into that. So there is a benefit and there is definitely a benefit in doing this. The only thing is to sort of align the - people do manufacture the product and then put into the market, so that's one of the things that Australia is not very good at. Okay, you have plant manufacturers according to foreign specifications for the kind of industry.

But when you go to think in terms of from scratch you put up a model and then sort of putting it together and sort of this knit and that's where a garment assistance is required to sustain and sort of have that, and one of the things I find, sort of, I approach a number of garment bodies to sort of try and get some assistance to get this off the ground as it goes to manufacture. But they are more geared to servicing big customers and in terms of consignments. The single person is more a person to help, to get some help and you need to hire consultants. So that's a difficulty there, you see.

DR BYRON: Yes, okay. Well, I think we're going to have it there, but thank you very much for all the thought and effort you've got into preparing that. I think we've got the Urban Ecology Institute.

MR PERERA: Thank you for the opportunity.

DR BYRON: I was just going to say is there any final wrap up, concluding summary or you have it there?

MR PERERA: Yes. My sort of main mission is that I hope the report, in a sense, gives us a frame of reference and put together, as it was, that these things need to be done because it is not for you to do those things but to draw attention to that, because one example is this question about hot-water rebates. I don't know if you are aware that if you look at the rebate schedule, you can see that some things are done by the federal government through the AMRAD scheme and some things are done by the state governments, because state governments realise that the scheme doesn't work.

In terms of, as you said, renewable energy - AMRAD is for renewable energy - and solar water heating is renewable, whether it displaces gas electricity or coal electricity, whatever electricity. If you said for emission purposes, then it's not correct, but if you said for renewable purposes, it should cover both. So hot water has two aspects. It cuts into the renewable energy as well as reducing the greenhouse gases, you see. Thank you.

DR BYRON: Okay. Thank you very much, Mr Perera. We'll just stop for a couple of minutes while we get the video-conference set up. Thanks.

DR BYRON: Thanks very much for your submission. I'm sitting here in our public hearing room with a Hansard reporter for doing the transcription of this conversation. There are five Productivity Commission staff in the room and one previous witness from this morning. What we normally try and do in these hearings is ask people to summarise the main points in their written submission, and then we can have some discussion of that. Is that okay with you?

MR ROBERTSON: Yes, that's fine. I can get stuck into it.

DR BYRON: Apologies for the delay, by the way. It took us a while to set up the equipment, and I'd just like to check with the recorder that your volume is coming through okay. He says it is, okay. Michael, would you like to summarise the main points of your submission, please.

MR ROBERTSON: Okay. I was looking at ways to reduce the energy use in Australia with the prospect of increasing energy prices in the future. Part of that is the apparent need to reduce her greenhouse gas output and the prospect of having to pay a greenhouse gas levy perhaps to purchase greenhouse permits from overseas. The current cost of energy doesn't give the right signal to what's likely to come in the future, and until we put a reasonably hefty greenhouse gas levy, we won't be sure what we're going to pay in the future. What we need is a greenhouse gas levy that progressively rises.

DR BYRON: A strong carbon price signal?

MR ROBERTSON: Yes, and one that you can see how it's going in the future, some sort of schedule. I don't want to argue the merits between a carbon tax and carbon trading, except that either way hopefully you'll get some idea of what's coming without too many fluctuations or uncertainties.

We accept the idea that people should be allowed to choose their own solutions to deal with rising energy prices. It's important to give them some fluidity in that choice. I was looking at car use versus public transport and the cost of car use, and there are two points there. If you decide you want to use your car less and rely on public transport or cycling more, you face certain difficulties. The public transport system, at least in Adelaide, is not very good. Ideally you want to just be able to trade off money for time. You say, "Okay, I'm going to save the money by leaving the car at home and I'll accrue some more time," because public transport is generally slower, but the current public transport system is very patchy and it's hard to predict how long you're going to take to get anywhere. You have to study the timetables very carefully and see how things link up.

If only you could say, "I'm going to have an average journey time of say 10 kilometres per hour door-to-door in any direction," then it would make it easy to

calculate your time, but if you go in some directions you might have a fast travel time and in some other directions you might be stuck waiting for an hour for a bus to link up. That was an argument for having a much more fluid and much more user-friendly system where you didn't need to exercise your mind on the transport schedules to figure out what you were doing. We need a transport system where you can just walk out to the bus stop or wherever and expect a bus will come soon, and know that when you need to change to another bus or a train, that will come soon; you just go out there and start using it the way that you do with a car - you go out there and drive to where you want to go.

DR BYRON: So you're saying that the absence of that sort of service and system to a large extent explains the proliferation of the private motor vehicle and gas guzzlers and so on?

MR ROBERTSON: Yes, I think so. If you decide to rely on the public transport system, especially in outer suburban areas, there are all sorts of difficulties. You can work to overcome that with careful study, I suppose, but even then you might be confronted with difficulties that just push you back into your car - it's not worth it. You can study the outer suburbs of Adelaide and its transport system to get an idea of how badly things are done.

DR BYRON: I had a brief experience of that in Elizabeth a couple of years ago and, yes, it wasn't terribly impressive.

MR ROBERTSON: Yes. On another issue, suppose you want to use your car less and use other forms of transport more, you're still faced with the fixed costs of car use. I'm in that situation. I've got a car. I have to pay perhaps between 500 and 1000 dollars just to have it on the road.

DR BYRON: Irrespective of how little you use it.

MR ROBERTSON: That's right, yes. The costs are not proportional to the car use, and that includes the rego and the insurance and the RAA membership.

DR BYRON: I thought that was a very interesting idea. Do you know if it's been tried anywhere, and can you see any possible drawbacks in it?

MR ROBERTSON: I'm not sure. I guess the drawbacks are the administrative costs. How, for example, do you get the RAA to recoup their money from say a petrol tax? The difficulties there might be people trying to cheat. If the petrol is going into a particular car pays for its RAA membership, than that might be all right unless rorts are possible. That's the difficulty I saw. Then you would have the somewhat more public system for paying RAA membership, so the RAA would be paid by the government from levies on petrol rather than through individuals. That

might be an administrative saving. But I haven't looked as carefully as I need to at that perhaps.

DR BYRON: Okay. Just going back to your earlier comment about the go anywhere any time sort of service, I think that the ACT tried that a couple of years ago and found that they had a large number of empty buses running around all the time.

MR ROBERTSON: That's right.

DR BYRON: It not only became an expense, but in some ways it was almost a bit of a laughing stock and people were saying, "Why are we paying to have all these empty buses running around?"

MR ROBERTSON: Yes, that's right, and I guess it depends how large the buses are. I was looking at something small.

DR BYRON: Yes, you mentioned little people movers.

MR ROBERTSON: You could go in that direction, or that would alleviate the problem of having empty buses around, because you'd have perhaps not quite so empty people movers wandering around everywhere. But I was thinking perhaps a 20-seater bus might be better, because at the moment there are always a few people wanting a ride on a bus. The hope is if you have these buses going everywhere say at 10-minute intervals at least through the day, you'll get a lot more patronage. The idea was to put the system in place as cheaply as possible and then allow people to take it up, especially when energy prices, or petrol prices, tended to grow.

There's another issue on that, and that's trying to cost in for externalities. A bit externality there is the loss of urban amenity because of cars driving around everywhere. The pedestrian and the cyclist are inconvenienced and find it hard to breathe, and are at risk, and I'm not quite sure - the sums on that, when you look at the petrol levy, which is not insignificant, it seems to me there might be more scope for, let's say, extracting money out of car drivers and maybe putting it into public transport. I noticed the draft report was talking about congestion charges, which might be a way of getting some money. I was also looking at the idea of reducing road space as a fast way of reducing the amount of cars using the road network, which would be I suppose a painful way of forcing people into alternatives.

DR BYRON: Your submission does a very good job of pointing out the costs of - you can't really call it a system - the widespread use of private motor vehicles. One of the reasons that it seems to have exploded over the last 30 years or so is that, apart from all the costs, the loss of amenity and the environmental pollution, et cetera, a lot of households also see benefits in that. So whereas 30 years ago every second family

had one car, now you've got almost every family with two, sort of thing, and using them more.

MR ROBERTSON: Yes.

DR BYRON: That presumably is because people see benefits in the mobility and the flexibility that they get from private motor vehicles that they don't get unless we have your sort of go anywhere any time public transport system.

MR ROBERTSON: Yes. I'm just looking at ways to change the choice. Because we have had such a bad public transport system for so long, people don't really have any choice about whether to use a car. They need a second car, especially if they are in the outer suburbs. The other point is if you were trying to trade off urban amenity for the pedestrian against the convenience of car use, people aren't really given that choice. I mean, their cities are just the way they are, and they don't seem to have much, or are not invited to have, much input, so at least they can take advantage of the very pro-car urban policies and use their own car. In a sense for the average passenger to try and use the system to benefit themselves, they are compelled to use their car more.

DR BYRON: But reading through your submission I was reminded of many things actually I wrote myself 30 years ago about the benefits of all these sorts of improved urban design and improved cycle paths, public transport and user fees on cars. Would you agree that people have been talking about these things for at least 30 years - we've been aware of the problems - but we don't seem to have done very much as a result?

MR ROBERTSON: No, and I don't think we've had a big political discussion about it. I think the issue of greenhouse gases and the possibility of energy price rises may hopefully accelerate the discussion. We might reach a point where people can sit down and collectively design what they want their cities to be like, which doesn't seem to happen much at the moment. There are forms by urban transport government departments, but they're not putting forward that choice of a radical wholesale redesign of cities, and not much research seems to be done in the benefits of more local urban centres with more jobs and services in it versus the highly centralised cities we have at the moment, where to go anywhere interesting you have to get in your car.

DR BYRON: Yes. I think in the early 70s there was a federal Department of Urban and Regional Development that was putting a lot of effort into all these sorts of things that are in your submission, but I don't know that we got any further.

MR ROBERTSON: Yes, and the Better Cities Program, I think in the early 90s, was making some progress too. I think it's a policy lack. I don't think enough has

been done on redesigning our cities. Anyway, that's a political matter. But I can just put into that point the need for better cycling, but that's been dealt with because of the immense potential for cycling to save money. The cost of buses is perhaps less than cars but not hugely less, whereas the cost of bicycling is much less and the health benefits are also significant. But if you want to take the bicycle out onto Adelaide Road - and I don't know what it's like on Sydney roads but it's really pushing it a bit.

DR BYRON: You're risking your life.

MR ROBERTSON: That's right. I mean, it's not too bad but the people who take their bicycles out on the road are typically lycra-clad enthusiasts, committed cyclists, rather than ordinary people who are just doing it for the convenience or their health.

DR BYRON: Yes.

MR ROBERTSON: Looking at passenger transport, the other issue I was looking at was energy efficiency in building - and industry I suppose - and I was looking at the need for regulation to ensure that we will have a building stock that is not going to require the usual expense of refits when energy prices do start to rise - you know, at least regulations on new building because I think the cost savings on having the energy efficiency features installed in the new house as against retro fitting is quite significant.

Now, without wanting to compromise people's choice about their buildings too much I think there's a fair amount of research on different possibilities for energy efficiency and it shouldn't hamper, let's say, the design process too much.

DR BYRON: Well, you might be interested, if you've got time. We had a very interesting discussion with Don Henry from the Australian Conservation Foundation this morning about the extent to which people who are planning to build, for example, a new high-rise building are thinking ahead to a more carbon constrained future and, you know, if a building is going to be unusable or unlettable - you know, you won't be able to find tenants because it's too efficiency intensive.

MR ROBERTSON: That's right.

DR BYRON: Then it's not going to be a good investment for them. So we had some discussion about the extent to which major investors or even people building factories or whatever are not just assuming that the energy prices in 20 years' time are going to be what they are today.

MR ROBERTSON: Yes.

DR BYRON: They're already factoring in something. Now, I think your opening point was that maybe the government should lay out a schedule of greenhouse charges so that rather than people guessing that they might increase over the next 20 years it's sort of publicly announced, "And here's a schedule of the rate at which they're going to increase." Was that what you had in mind?

MR ROBERTSON: That's right, yes, so you can make better decisions about what returns you're going to get on energy efficiency investment.

DR BYRON: So it's explicit.

MR ROBERTSON: And say, "Well, you know, I can see that I'm going to make this amount of savings on the electricity bill by putting this investment in," and it's looking as good as an investment in the share market.

DR BYRON: Well, yes. I must say that when I put in my own solar hot water system at home five years ago I wasn't looking at the current gas and electricity prices. I was thinking of what they were likely to be over the next 20 years, and I imagine people who were making much bigger investments than a couple of thousand dollars also think ahead a bit.

MR ROBERTSON: Yes, but they're not quite sure. There's a lot of people at the margin not sure whether to invest or not and they notice that their off-peak electricity prices are fairly low so they wonder how - well, they can see it's going to take perhaps a few years to pay off their solar hot water system at current prices.

DR BYRON: Yes, sure.

MR ROBERTSON: But of course that can all change. I was looking at this issue, this idea of encouraging people to invest money into energy efficiency. Now, there's perhaps no reason why they have to be confined to their own house. They might get better returns if they invested in energy efficiency in some other building.

DR BYRON: That's another thing that we spoke with Don Henry about this morning and he was talking about pooled investment funds and so on.

MR ROBERTSON: Yes.

DR BYRON: That if we really believe that there are large amounts of unrealised savings out there, somebody should set up a system to actually start to capture some of those.

MR ROBERTSON: That's right.

DR BYRON: And say, "Why invest in my own solar hot water system and save 7 per cent when I can invest in an industrial one that would save 25 per cent."

MR ROBERTSON: Yes, that's right. Yes, because they've tried to seek out all the low-lying fruit, so-called, to start with and then maybe we'll start concentrating on putting in solar hot water systems in houses a bit later on, because there are massive energy savings to be made on a factory.

DR BYRON: Yes. But that suggests that one of the things that we maybe haven't worked through as carefully as we might have is prioritising where the biggest low-hanging fruit are.

MR ROBERTSON: Yes.

DR BYRON: Where we can get sort of maximum bang for the buck, so to speak and go for them first, rather worrying about some of the very small and rather bitter fruit that are a bit high up.

MR ROBERTSON: That's right.

DR BYRON: But we really need to have that prioritisation to see where emission reductions or whatever, or energy savings, can be achieved at the lowest cost.

MR ROBERTSON: Yes.

DR BYRON: Have you got any thoughts or evidence that you could give us on that sort of prioritisation.

MR ROBERTSON: You mean how would I make a list of the various opportunities available?

DR BYRON: Yes, or where would you start looking, or have you seen a list that somebody else has produced that you thought was highly credible?

MR ROBERTSON: I think I've seen those lists but I can't recall it at the moment.

DR BYRON: If you happen to come across something like that, we'd love it if you could send it to us.

MR ROBERTSON: Yes, and I guess I was looking at an interstitial solution of allowing people to invest, pool their money in institutions that had a lot of intellectual capacity, you know, clever people able to search out the solution and do it on a large scale and to reduce transaction costs. So if it happened that putting solar hot water in households or insulation in households is going to be a good savings,

then there should be some very, I suppose, efficient way of doing that and I'm thinking rather than sending people brochures telling them the benefits of putting it in their own house having a company come around and say, "We'd like to invest in your house and you can share in some of the profits. We'll come and install it and you don't have to worry about it and you'll get the benefits. We'll share the benefits."

DR BYRON: Yes, that's a creative solution.

MR ROBERTSON: Yes. But in terms of looking, how would you start to look for the energy savings, that is, to bypass all the hard work of a careful analysis, I'm not sure, although we're always looking at the latest CSIRO - what is it - Balancing Act I think, that publication. It was rating various industries on how much the greenhouse gas emissions per dollar of value they were making and that might have some clues, and I was thinking - - -

DR BYRON: That's the report by Barney Foran in CSIRO.

MR ROBERTSON: Yes, that's right. My thinking there was to seek energy savings by investing in the low greenhouse gas emitters and starting to close down the high greenhouse gas emitters, and one assumption there is, the high greenhouse gas emitters might have already exhausted their possibilities for energy efficiency. But then that may not be true. So this is energy efficiency in terms of closing down industrial sectors or the worst performing parts of industrial sectors and investing in the good performers.

DR BYRON: Yes.

MR ROBERTSON: You know, evaluating to energy. The point there was a list put out by CSIRO differentiating between the different sectors. But I'm not quite sure how that would be put into a list that you want.

DR BYRON: Well, yes, we'll see. But it's an interesting idea to think about and see how far we can get with that.

MR ROBERTSON: Yes.

DR BYRON: That sort of exhausts my list of questions that I was going to ask you, based on the submission. Was there anything else that you wanted to say?

MR ROBERTSON: I guess I want to say that we should get on with it and not do careful studies into the finer points of how to have optimal energy efficiency investments, but to get out there and try things out and invest money and be prepared to have failures as well as successes, but just get change happening because I think energy prices will go up soon, due to greenhouse, just looking at the problems that

are coming. That is a political issue, an international political issue of how - whether Australia wants to be a good performer on the world scene and not consume its international political capital by being slow on this issue.

DR BYRON: Okay. That, I think, is a pretty good summary, a good point to leave it on.

MR ROBERTSON: Okay.

DR BYRON: Can I thank you very much for your submission and for your participation today.

MR ROBERTSON: All right, yes.

DR BYRON: And thank you, goodbye.

MR ROBERTSON: Goodbye.

DR BYRON: Okay, ladies and gentlemen. I think that concludes the proceedings for today and for the inquiry. Thanks, everybody, for their participation and we'll go back to revising the draft report. Thank you very much.

AT 12.21 PM THE INQUIRY WAS ADJOURNED ACCORDINGLY

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