



**TRANSCRIPT  
OF PROCEEDINGS**

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**PRODUCTIVITY COMMISSION**

**DRAFT REPORT ON ENERGY EFFICIENCY**

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

**TRANSCRIPT OF PROCEEDINGS**

**AT BRISBANE ON MONDAY, 30 MAY 2005, AT 10.02 AM**

**Continued from 25/11/04 in Melbourne**

**DR BYRON:** Welcome to the public hearings of the Productivity Commission's inquiry into improving energy efficiency, following the release of our draft report in April. My name is Neil Byron and I'm the presiding commissioner for this inquiry, and my fellow commissioner is Mike Woods.

This inquiry started with a reference from the Australian government on 31 August last year, and covers the potential economic and environmental benefits offered by measures to enhance energy efficiency that are cost-effective for individual producers and consumers. I would like to put on record how grateful we are to the many organisations and individuals who have already participated in this inquiry.

The purpose of this inquiry is to facilitate public scrutiny of the commission's work and to get feedback and comment on this large draft report. So following these hearings today, we will be in Sydney tomorrow, Canberra on Friday and Melbourne next Monday, and will then be comparing a final report that has to be with the Australian government by the end of August, having considered all of the evidence that has been presented in the hearings and in submissions and whatever other relevant information we can find. All participants in the inquiry will automatically receive a copy of the final report once it has been released by the government, which is usually up to parliamentary sitting days after the completion of the inquiry.

We always like to conduct these hearings in a reasonably informal manner but because we are taking a full transcript for the record, comments from the floor are not helpful. But at the end of the proceedings each day I always provide an opportunity for anybody in the room, who wishes to do so, to come forward and make a brief presentation on the record. Anyone who wants to respond to something that someone else has said during the day, or people who have earlier given us evidence who forgot to say something and want to come back and add to it - so there will be opportunities for people in the room to participate later.

The transcript will be made available to participants and then will be on the commission's web site as soon as possible, usually within a couple of days of each hearing, and they can be purchased also - a hard copy. The order forms are available out the front, from the staff here today. All the submissions that we have received are available on the web site or by the order form.

To comply with the Commonwealth occupational health and safety legislation, I have to draw your attention to the fire exits, evacuation procedures and the assembly points. In the most unlikely even of fire, straight out the door and through the doors opposite, out onto the laneways and assembly point, or the emergency doors just to the right-hand side. The other possible emergency procedure - the toilets are right along the corridor. Follow the carpet right round there; not the tiles,

the carpet. A final piece of housekeeping: I'd like to ask anybody who has a mobile phone in the room to either turn it off or turn it onto silent mode. That's the housekeeping.

I would now like to start today's formal proceedings by welcoming Stephanie Long from Friends of the Earth Australia. Thank you very much, Stephanie. I think you've given evidence in the first round of hearings, so it's the same sort of procedure. If you would like to summarise the main points you want to make, and your feedback and criticism on the draft, and then we would like to talk about it with you.

**MS LONG:** Okay. Friends of the Earth's main concerns with the draft report is the narrowness of the terms of reference and also the interpretation of those terms of reference. Fundamentally we think that it is inappropriate to run an inquiry on energy efficiency without considering the broad range of environmental and economic consequences of not increasing uptake of energy efficiency in relation to the impacts of climate change, and also that particularly - whilst the Productivity Commission in the draft report has acknowledged that the private costs of energy efficiency are high, it has made no attempt that I can perceive to acknowledge and assess the private costs of climate change to individual citizens of Australia.

In considering the broader range of effects that climate change is predicted to have across social, health, economic and environmental aspects of our lives, this is a really fundamental shortcoming. To that effect, Friends of the Earth believes that the influence that this report would have on future energy efficiency policy would render it relatively irrelevant. The recommendations of the draft report would be irrelevant in that context, of not having assessed the private costs of climate change, and at worst would regress the energy efficiency policies that are being considered to date and the likelihood that these policies would reduce the greenhouse gases that Australia emits domestically.

That's in light of particularly just last week, the Australian Greenhouse Office released the most recent national greenhouse inventory, which stated that in the period between 1990 and 2003 the emissions from the stationary energy sector have increased by 37.2 per cent, making it our absolutely greatest source of greenhouse gas emissions and therefore should be the absolute priority in terms of strategies to reduce greenhouse gas emissions. Energy efficiency has a direct application to stationary electricity emissions, and any steps to delay programs to increase energy efficiency uptake in Australia would regress our attempts to mitigate climate change.

I've got quite a detailed list of examples about how climate change affects individual people. The most striking one I wanted to point out was that in France in 2003, 11,500 people died from a 14-day heatwave, and France has the best health

system in the world according to the World Health Organisation. France with its existing health system was unable to cope with that 14-day heatwave. Admittedly 14 days is an exceptionally rare event - to be reaching over 40 degrees over a 14-day period. However, that's the kind of scenarios that we need to look at to be able to assess the costs of climate change on individuals.

A more closer to home example is that in a four-day heatwave in south-east Queensland in January 2000, 22 people died. In February 2004, of two consecutive days of heat over 40 degrees, 12 people died and 221 people were hospitalised on heat-related grounds. I've got a number of other examples which I've left with you as well. Given this perspective, I would actually like to ask the commissioners what would constitute a private environmental benefit under the analysis which you've taken for the draft report.

**DR BYRON:** Sorry, I'm not sure - - -

**MS LONG:** Well, there's quite a lot of detail in the draft report of the private costs of energy efficiency, but as far as I can see there's not any indication of what is a private environmental benefit. If the terms of reference are to assess the costs and benefit of energy efficiency on individual citizens within Australia, how do we make a level playing field of this assessment?

**DR BYRON:** As we tried to explain in the draft report - I mean, you're right, this is a key part of the terms of reference. We're asked to look at the economic and environmental benefits of measures - not all possible measures that could be taken to improve energy efficiency but only a subset of those measures, meaning the ones which are privately cost-effective or, rephrasing that, financially worthwhile from the point of view of the person making the decision.

So what we've said in the draft report is yes, we recognise that there's a whole raft of other measures which would produce environmental and economic society-wide benefits, but we have been asked to look at the smaller subset of those: the ones which are privately profitable. My understanding of why we were asked to do this inquiry is not - you know, it's not our job to try and develop a global system for reducing greenhouse gas emissions. It's a much, much more modest task, in that - but hopefully a small step in the right direction - that there are many people telling Australian governments that there are a whole raft of measures that would have economic and environmental benefits and they are already privately cost-effective. These are things which are the zero cost, the win-win options.

The problem is, if governments cannot even get people to adopt these energy efficiency measures which are costless - in fact they're money-making - how on earth are we going to get them to adopt other measures which do have a cost. So what

we've been particularly asked to look at is - just with these first round of energy efficiency measures - the ones that should be the easiest to get off the ground because they will actually save people money. Why aren't those getting up?

If we can find out what the barriers and impediments there are, then we can look at the much larger set of measures which are worth doing from a whole society, environmental point of view, even though they may actually cost people. But we've got to be able to answer the first question with what should be the easier, obvious measures, before we move on to the more painful steps, if you like. That's actually what we're grappling with: why won't people adopt energy efficiency measures that appear to be in their own hip pocket self-interest, let alone the ones that they have to pay for. That's the much smaller question, I think, that we've been asked to look at. Does that answer your question at all?

**MS LONG:** It doesn't really.

**DR BYRON:** Okay. I tried.

**MS LONG:** My concern is that even within that perspective, how can we have a level equal assessment of the costs and the benefit if there are no indicators available for assessing the costs of not introducing energy efficiency to the private citizen?

**PROF WOODS:** Okay, can I rephrase - your question then is saying, how can you measure benefits to individual producers or consumers, to use the terminology of the terms of reference - indicators of benefit that arise from reducing greenhouse gases. So is there some measurable increment that me, by chasing behind the kids and turning off the light switches, I will gain some environmental good from.

**MS LONG:** Yes, as a private person.

**PROF WOODS:** To your knowledge - because we certainly didn't fall across such calculations. I mean, is there anything that would tangibly add or materially add to the conclusions that we've reached? Some of the conclusions that we drew is that if energy is such a small proportion of household - less than is spent on alcohol per week and only a bit more than is spend on tobacco - that people are not prepared to go to the extra effort to close the curtains or shut the doors when the airconditioner is on or turn the lights off or things, because the cost is such that the effort incurred doesn't reap them significant gain.

Now, that's on the dollar side. One could surmise that the marginal environmental benefit might even be a smaller - at the individual level - component of that. So would it materially affect our conclusions, and is there evidence that we haven't come across - and we've done our research and pursued what we can - but

that you can bring to bear to our considerations?

**MS LONG:** I haven't come across anything that has, in such finite detail - - -

**PROF WOODS:** Our problem, precisely.

**MS LONG:** But wouldn't it then stand to reason that you should at least recommend that such an inquiry is necessary, to adequately put forth the recommendations which you have?

**PROF WOODS:** If it was to have a material bearing on our conclusions, then that would be relevant. We haven't seen the evidence that suggests it would materially affect the conclusions we've reached. But again, I mean, the purpose of this draft hearing is to bring forward reactions to the draft, and if there is material that we're not across that you can make us aware of, we're open to that.

**MS LONG:** Okay. It's hard to have a more detailed comment on the individual aspects of the report when, from Friends of the Earth's perspective, the terms of reference render it such a difficult exercise to take. From my non-economic point of view, it's incredibly difficult for me to think and to analyse the recommendations within the draft report in a way that has some meaning and some use for what Friends of the Earth would prioritise as being environmental sustainability and a socially just outcome.

**PROF WOODS:** Right, but perhaps, just to help the discussion, if we can go through some of the issues. I mean, on the question of labelling, the commission in the draft has come to the view - Neil and I have come to the view as signatories on behalf of the commission that - you know, labelling can have some value in the sense that it adds to the education of the individuals, and about the fifth order of decision-making can help people come to a decision on which appliance to use.

So firstly going for things like size, price, quality, but then down the track once they've made those selections, if it's a choice between products then labelling might affect the decision they make. So to that extent there's a positive to it, and that's fine for things like appliances where a fridge can work within a tolerance range reasonably predictably. But in something like housing there seems to be considerable doubt as to whether the current softwares that measure performance are in fact achieving the desired outcomes. From your point of view are we mistaken in saying that labelling is a good thing but really a fifth order decision-maker; it doesn't drive people: they don't first walk into the store and look for the most stars, they walk in and look for the size and the quality and that? Would that be consistent with your own thinking, and does Friends of the Earth have any view on the more vexed question of energy efficiency rating systems for housing? That's a bit different from

the question of whether solar-passive housing design is a good thing, but whether the current systems actually capture that effectively.

**MS LONG:** I would think that on the issue of appliance labelling, given that labelling hasn't been applied broadly to a lot of appliances within Australia - some major whitegoods it's been applied to and then is rolling out to additional appliances - is still a relatively new concept in the way that the consumer makes decisions about products. I would think, though, that as opposed to larger things such as houses, the fact that the labelling system is administered by what would be considered as an independent body - it's not a private entity in itself, it's not BP telling you that it's beyond petroleum, it is the labelling administrator making an assessment of the quality of the goods. I think that over time people would prioritise that more so than what they do about size and colour and the factors that you've mentioned.

But that will only work, in my opinion, if people have information that they're exposed to before they walk into the store. So if we're waiting until people come into a Harvey Norman or whoever to buy their appliance and there's some information near the products about the labelling system and how it works, I think that is too late in somebody's decision-making process about what product they're going to buy. Really for the labelling schemes to have greater effect, we need to have a much broader multimedia based campaign around why people should buy more energy efficient goods and the way in which the labelling system is administered. I think that people by and large are increasingly sceptical about what is labelled as a green appliance, because of the history of green washing where the private sector has taken up marketing its products as green when they might not necessarily be so.

So I think that's a significant hurdle to get over, to distinguish the labelling system from a green marketing campaign that people are exposed to just about every day and, probably to a great degree, have reached a level of tolerance over, that they're quite immune to that form of marketing.

**DR BYRON:** That's been very helpful. I think I'm starting to see where the differences in approach between Friends of the Earth and the line that we've taken in the draft report, in that, if I understand the submissions and what you've told us today correctly, basically Friends of the Earth is in favour of any measure, every measure, that will reduce green house emissions. What we're doing is asking a slightly different question about how to make emissions reductions in the most effective and cost-effective way. So we haven't just said, "Look, anything that could possibly reduce greenhouse emissions or improve energy efficiency is a good thing, tick." We're trying to rank them in order from things which are very, very low cost and worth doing immediately through to things which are perhaps unlikely to be effective or might be incredibly expensive to pursue. Is that sort of a difference in starting

point between our two organisations?

**MS LONG:** I'm not sure that it is. The conceptual thinking that we would use to assess what is the priority and what is not is probably quite different.

**DR BYRON:** Just from what you were saying before, it seems to me that you're saying that you'd like people to have greenhouse emissions, energy consumption sort of front and centre in their brain all the time in terms of where and how they live, what sort of appliances they buy and how they use them, what sort of car, if they own a car or why haven't they got a bicycle instead. People should be conscious of those things, and the environmental consequences through greenhouse of all those behavioural and purchasing decisions, and what we're finding, because the cost of electricity particularly has been relatively low, people don't have those sorts of considerations in their mind all the time and they go and buy things without even realising, "Do I need a new clothes dryer or can I just hang them out on the clothes line?" et cetera.

So you're saying that you think the world would be a better place if people did think more about the environmental consequences of their purchases and their behaviours, but what we're observing is that they don't. Does that sort of connect?

**MS LONG:** Yes, and I think that what's important to acknowledge is that the majority of people in Australia say that they are very concerned about the environment and that most people identify climate change as the most significant environment issue that we have to deal with. What people don't have is an understanding of what they can do as individuals to make some effect around climate change and greenhouse gas mitigation options, and they also don't have an understanding of broader policy steps that we're needing to undertake as a nation. That is something that, both the government and the non-government sector have a role in working on, and it's definitely a good proportion of the campaign work that we do at Friends of the Earth. So it's about making opportunities for which people can understand what actions are available to them.

Most people that I speak to say that climate change is too big for them to deal with, that it's such an enormous issue and it's incredibly overwhelming, and they don't know what we can do other than asking Australia to ratify the Kyoto Protocol, which of course this current government is not going to do. People feel incredibly powerless about climate change, but there are a handful of people that understand lifestyle emissions and residential emissions and transport emissions as something that they can have a direct impact on. But that proportion of the Australian population is incredibly small, so it's about providing opportunities for the rest of the Australian population to understand how in their daily lives they can have an impact on Australia's greenhouse gas emissions. Then, of course, Friends of the Earth

would like them also to be active citizens and do the other half of the work as well.

But the value in energy efficiency is that it provides people with that opportunity so that they can take steps themselves and feel like they're contributing and doing something. However, there are so many options that people are faced with that I agree with you: it's really important to prioritise the most effective and efficient measures that people can take up. But I think basing them on an economic analysis alone is really limiting - to use that to prioritise the effectiveness of a strategy as to how economically viable it is.

**DR BYRON:** But many of those people who was say in a survey that, yes, they're concerned about greenhouse statistically are going out and buying big new airconditioners, they're buying TV sets and DVDs that have standby functions that are on day and night; they have a computer in the house and everything is on.

**PROF WOODS:** They drive four-wheel drive vehicles.

**DR BYRON:** Some of them, yes. People will go and shop around for, to deliberately exaggerate, an energy-efficient toaster. That's basically three-fifths of five-eighths of a negligible amount.

**MS LONG:** Yes.

**DR BYRON:** But the same people who will look for a five-star appliance might completely overlook the fact that in something else they're doing during the day they're going to burn up 10 times as much energy as they've saved somewhere else. So I think we're probably in heated agreement that if you're going to get lower emissions through greater energy efficiency, there has to be a big change in consumer behaviour. I'm not sure that just making certain types of technologies compulsory and banning other types of technologies is necessarily going to get there. You'll need the sort of educational process that you're talking about.

**MS LONG:** I would actually think that we would need both, because - - -

**PROF WOODS:** Yes, as well.

**MS LONG:** - - - then it takes the poor performers out of the marketplace altogether. I don't believe that instigating an energy efficiency target or a mandatory standard scheme then in some way overrides the rights of consumer sovereignty. I think people expect government intervention when the market does not provide socially and environmentally desirable outcomes. I think that's a basic tenet of democracy. Therefore regulating a scheme whereby the poor performers are taken out of the market and definitely prioritising the really high energy use appliances,

like hot water systems, washing machines and so on, and fridges, is a really important first step to doing that.

As far as I'm aware, there's significant evidence that overseas this has been a really remarkably successful strategy for reducing greenhouse gas emissions, particularly in Europe. Again I've read in the report that the problem with using that analysis is that energy is much more expensive in Europe, so people pay more and therefore are much more responsive to the potential benefits of energy efficiency. I would agree that our current energy prices don't reflect at all the social and environmental costs of energy production in Australia.

However, I also notice that there's no acknowledgment here of the amount of subsidies that go to the fossil fuel industry to produce energy in Australia. For the large users, particularly the aluminium smelters, to consume coal to produce aluminium at the quantities that they do - and again if we're going to have a level playing field, a really good assessment of the costs and benefits of energy efficiency, we need to acknowledge the subsidies that are in place that make energy so cheap in Australia. This might again be what you consider to be beyond your terms of reference but it's probably worth a mention.

**DR BYRON:** But I mean, your point before about how large increases in stationary emissions - you know, 37 per cent over the last 13 years, et cetera. The way economists approach prioritising emissions reduction in terms of where do you get the greatest impact from the measures - I mean, to worry about more energy efficiency washing machines or clothes dryers may be literally rearranging the deck chairs on the Titanic, compared to the amount of emissions reduction that you would get by looking either at power stations themselves or aluminium refineries or cement works or a few other places.

**MS LONG:** That's right.

**DR BYRON:** So I think there needs to be a prioritisation - that I think we're trying to do - of, if Australia is serious about trying to make greenhouse gas emission reductions, out of the whole raft of things you can do, where can you get the greatest impact for the least pain, the least dislocation or whatever. It's not obvious to me that taking certain brands of washing machine or dishwasher off the market is a really high priority or useful thing to do.

One of the concerns I have about the mandatory energy efficiency is if somebody was buying a clothes dryer for example that they were only going to use four or five times a year when it was too wet to hang clothes out on the clothesline, it may actually be perfectly sensible for that person to get one which is very cheap but very efficient. You would be crazy to use it every day of the year, but if you were

only going to use it a handful of times each year it might be the right machine for that job, and yet a committee of public servants, who we don't know the composition of, basically says, "No, that can't be sold in Australia." So people don't even know that there is a model that might have been just what they needed for that context, because somebody said, "On average, these aren't good enough."

So the idea of not allowing people to decide - in my hypothetical example then, the consumer would be told, "Look, this model is very cheap but it's very expensive to run, but if you want one that you're only going to use four times a year it might actually be less cost than buying this very expensive five-star European model which is highly efficient. If you're going to use one every day of the week, go for that one." So consumers are denied the opportunity to make a choice, when the committee sort of arbitrarily truncates it somewhere.

**MS LONG:** Hypothetically, I agree with you.

**DR BYRON:** Sorry, I didn't mean to rehearse that argument on you.

**MS LONG:** No.

**PROF WOODS:** I mean, there's a much longer debate we could have about behaviour. We talk about education and information and how that can help people make choices, but ultimately if you're a small shop owner making small margins and just able to pay your rent to your landlord, and your refrigeration unit you know is old, outdated, inefficient, is costing you in your quarterly electricity bill but there's just no way you can pull the money together to replace it for the next four or five years, then you may be perfectly conscious that you're not being efficient or environmentally sound or anything else but they've got so many other priorities, like doing their daily ordering and keeping the landlord off their back and trying to get some customers in the door and finding some staff to hire and things, that the fridge just sits there.

Sure, they might be conscious of it, they might have had evidence and bulletins and information and media campaigns and they know that it's destroying a small quantum of the environment, but they're not going to do anything about it. I mean, it's just there and it's a problem, but how do you change their behaviour? I think it's a really difficult question for a lot of individuals, to be able to bring that issue to become their number 1 priority. When it ultimately breaks down, they'll scratch around and they'll the money and put in a new one and hopefully it will be a more efficient refrigeration unit. But until then, there's not a lot that you're going to be able to do to change their behaviour.

I think that's just a fact of life that needs to be acknowledged, but that doesn't

mean you don't provide them with the information so that they're at least conscious of what it's doing, and you provide the appropriate metering so they have good information on what the costs are. So I think allow them sufficient information to make the choice, but you have to acknowledge that they're not always going to be at the frontier of energy efficiency.

**MS LONG:** I think that there definitely needs to be special consideration for small business and people in low income households, and particularly in Victoria I think and South Australia there has been some significant gains made where environmental organisations have teamed up with welfare organisations and provided a tailored service for people in low income households to reduce their energy and their electricity bill. Even for small businesses, the Moreland Energy Foundation has a fantastic program where they get old refrigerators, they recondition them with apprentices and they distribute them through the Brotherhood of St Laurence. Those kind of pioneering projects are really important for dealing with the people that have the least amount of options, on a whole range of levels, because of the enormous range of pressures on their lives. However, I think - - -

**PROF WOODS:** We have read those and we have reflected them in our draft report.

**MS LONG:** Yes. I think that it's really significant then to focus on the large energy users in the industries in Australia that produce a substantial amount of greenhouse gases, and look at energy efficiency programs specifically tailored for that particular sector of Australia, and I don't believe that it's possible within the narrow terms of reference again to have a good assessment of the private benefits of that when the private entity is so huge. Therefore, how do you make an adequate assessment of the environmental costs and benefits and the economic costs and benefits within those situations in the context of energy being so cheap?

So my thought is that, as good intentioned as this inquiry may be, all of the competing factors mean that the outcomes might be quite irrelevant because it's making an assessment of a situation, removing it from the range of factors they interplay in why energy efficiency is and is not used to its maximum potential in Australia.

**PROF WOODS:** I think that is a contextual comment from you in any follow-up bit of paper would be quite useful to put your views.

**MS LONG:** Okay. The other thing that I wanted to mention is that the Australian Greenhouse Office over the last couple of years has come under a considerable amount of scrutiny about its effectiveness, and the energy efficiency programs run by the Australian Greenhouse Office are flagged as the most successful program that

they run. The other voluntary programs have been criticised quite widely, and I think with a great deal of appropriateness, because of their inability to reach their greenhouse gas mitigation objectives that they were set up to do. I'm greatly concerned that the recommendations here are in such contradiction with those kind of statements and with the Minerals Council's National Framework for Energy Efficiency process as well, which took a really broad consultation process.

In putting this inquiry alongside those other processes, I'm very concerned that the impact is going to be detrimental towards rolling out energy efficiency as a key greenhouse gas mitigation strategy in Australia, and I know that I've made that point several times. However, I would think it would be beneficial if that was much more explicit in the final report, because I think the implications are very serious.

**PROF WOODS:** Yes, I think that's well understood.

**DR BYRON:** I think that's a very good summary. Unless there's anything else you want to say, I think that's probably a very good point to end on. Thank you very much for making it so articulately.

**MS LONG:** Thank you.

**DR BYRON:** Next on the program is Mr Jeff Beal. Thanks for coming, Mr Beal. If you'd just like to introduce yourself and tell us a little bit about your background for the transcript and then if you'd like to summarise the main points. We've read both your submissions. I'd like to thank you very much for them. I found them both extremely interesting and informative. We've got a couple of questions we'd like to get some elaboration on. Thanks for coming.

**MR BEAL:** Thank you for the opportunity to speak to this inquiry. My name is Jeff Beal. I'm a residential electricity customer, and the reason I'm here is that I want to tell you about my experiences over the last six months since I started paying attention to my electricity consumption. I just want to quote you a couple of figures. I've cut my energy usage by 1188 kilowatt hours. I've save \$138.80 on my electricity bills, I've stopped 1.25 tonnes of CO2 from going into the atmosphere, and I've kept about 475 kilograms of coal in the ground.

**PROF WOODS:** Is that an annual - - -

**MR BEAL:** No, those are in the last six months. I've done this by focusing on the nearly 25 per cent of my energy consumption that represents just plain waste. There's been no noticeable change in the services that I get from electricity. But it hasn't been an easy task, I can tell you, because there's no very much information that I can get that will actually help me in this process, and that's what I want to talk to you about today.

With just three extra quantities displayed on electricity meters, this task would be an awful lot easier, and you too, every one of you who is an electricity customer, can start to make some significant savings as well. The technology actually exists, it's my view that the customer need exists and, frankly, the management know-how is not very complicated. What we do need, though, is governments and regulators to push utilities to buy these meters. The meters that they hang on my house and read every three months currently do not display the kind of information that is actually helpful to me at all.

I can talk to you about the costs and so forth. It's actually quite small, about 10 to 15 dollars, the cost for the additional information on these meters. I have a prototype one hanging on my house. It's been there for about two weeks, or a little bit longer than that, and frankly that sort of money, 10 to 15 dollars, as a subsidy paid to electricity utilities is a very, very small quantity to generate the kinds of savings that I've seen. If I just look at my summer savings alone, that \$15 would have paid for itself in 19 days, and that's despite all of the other external benefits that the former speaker was talking about.

How do I know this stuff? I actually work for an electricity utility. I'm a

professional engineer in the electricity supply industry. I have nearly 30 years' experience in the area. For about eight years I've been working in the area of contestable metering, mostly with commercial and industrial customers, and I've had large responsibilities in rolling out this metering throughout eastern Australia and also developing new products and services based on those meters. What I find is that the needs of the commercial and industrial segment are actually reflected in the residential segment as well. The solutions take a different format, but they're not very much different in concept.

I want to add one more point that I'm sure the gentlemen in the commission here will come back to later, and that is that some information which I put together partly in response to what's contained in the inquiry document suggests to me that if we don't start taking action about this very soon, then in the not-too-distant future we will look back on what we're doing now with some dismay and blame for the terrible state of affairs that I think we could possibly find ourselves in at that point in time. I'm sure you guys would like to ask some questions about that.

**DR BYRON:** That's your opening comment?

**MR BEAL:** Yes.

**DR BYRON:** Great, thank you. Lots of comments, but one of the things that struck me reading both your submissions, I hadn't thought about it before but basically the electricity meter has been put there by the electricity supplier to meet their needs, being able to send a bill every three months. It was never intended to provide any information to the consumer. The consumer was assumed to be someone who would just go round plugging things in and switching them on, and then every three months they'd get a bill which they'd complain about and pay. So you're actually turning the whole sort of paradigm on its head and saying that the meter should be there to actually inform the consumer so that they can make sensible decisions about what they buy and how they use it?

**MR BEAL:** Yes, that's correct, Neil.

**DR BYRON:** That's pretty radical, isn't it?

**MR BEAL:** I don't think it's all that radical. There's no doubt that the initial purpose for an electricity meter is to support billing of customer for their usage - nothing unusual about that. What's happened in recent times, though, is that the technology has enabled a secondary purpose of providing additional information, and that purpose I don't believe is adequately being addressed through either utilities or through government regulatory channels. What I'm trying to do is suggest that we're at a point in time now where that is not very hard to do; let's do it.

The three quantities that I'm really talking about being displayed on the meter, just for the benefit of people in the audience, is the current bill - that is, how much you would be expected to pay based on your consumption since the last meter read - secondly, yesterday's daily consumption, because a day is a very convenient unit of measure that is quite repeatable for many residential customers; and the third one is the power that's being used right now, because if you turn appliances on and off, you can see on the meter what the effect is. It's not very hard to see that, if you turn off your swimming pool pump or your airconditioner, the power shown on the meter changes enormously. It's really easy then to associate that device and the time of use of that device with your bill and with your consumption. If I were to ask people in this audience how many people here could quote or give me an idea of their average daily consumption of electricity, anybody? No idea. Yet I bet you if I ask you what your litres per hundred kilometres is for your car, you would probably have some idea.

Part of the problem that we have is that simple measures that can add meaning to people's decisions, right, and their costs, aren't in our environment. Now, that's crazy, because in fact if I look at my electricity bills, I've kept them back to about 1990 or 1991 and I've had average daily consumption figures or their equivalents reported for that whole time, yet when I talk to a lot of people and ask them about this simple figure, nobody recalls. It's there on the bill every quarter. Nobody relates it to anything that they do.

I went into the shop yesterday to look for a clothes dryer and I find a 206 kilowatt hours per annum figure and I think, "That's very nice, what does that mean?" Well, if you turn it back to an average daily consumption figure it turns out to be about .6 of a kilowatt hour. Since my present average daily consumption is around 20, .6 in 20 is not a big number but what's my current dryer? Don't know. If I did know, I might be able to relate that purchase decision a little better to my current usage. Have I answered your question?

**PROF WOODS:** Can I follow up on that. You're saying 10, 15 dollars in six months is, what, 138 or something - - -

**MR BEAL:** Correct.

**PROF WOODS:** - - - as I recall the figure you gave us. You said there's a customer need. I think what we need is a customer demand. Why isn't it translated into a customer demand and why aren't customers saying, "Give me a meter that does this, because I want to save \$138 every six months, assuming I'm an average householder living here in Brisbane, doing the things that you do."

**MR BEAL:** That's a good question.

**DR BYRON:** In fact I was going to ask the same question. You know, can I buy one and would I use it, how would I use it, how often would I use it or would I get bored with it after two weeks - yes, those sorts of questions.

**MR BEAL:** Yes, they're very good questions. The short answer is, can you buy one? Can you, as a residential customer, buy one of these meters now? No. Does the electricity utility buy one on your behalf? No. They're locked into a lowest cost purchasing regime which satisfies their needs, which is billing. If we want to have the information needs of customers included in the specifications of these meters, then we need to push the utilities to have that included. I don't think that they will do it of their own accord.

**PROF WOODS:** If you've got contestability at the retail end, why wouldn't some clever little utility think, "I can help customers save \$138 every six months and I'll charge them a one-off fee of \$15 and I'll promote that, I'll market that and they'll all then come flocking to me as their preferred supplier or preferred sales retail end of the electricity chain"?

**MR BEAL:** Again a good question. I'd suggest to you that few networks who provide meters and few retailers who request networks or - there's a group called meter providers, to provide meters - are aware of what can be done. I mean, this is technology which I've been trying for a year and a half to get meter manufacturers to do this, because it is so patently obvious that this is a value to customers. With a relatively small cost - because we're not talking about changing the meter, all we're talking about is changing the program in the meter. It's like putting a different piece of software on your computer.

**PROF WOODS:** Plus a display panel, presumably.

**MR BEAL:** The display panel is no different to the current panel that's on the meter already. The one that I have hanging on my house is a production meter produced by an Australian metering supplier. All I've got them to do is to add a couple of bits of software code that displays these extra quantities. In the document that I gave you, I showed you some images of the display.

**PROF WOODS:** Yes.

**MR BEAL:** Not quite right just yet but it's getting pretty close. Now, if the average person is not aware that these things exist, then they're hardly likely to ask the utilities to provide them. Utilities, I have found, are generally unwilling to pursue these types of approaches. They're not completely unaware of them but they just

hide behind lowest cost purchasing rules and state purchasing guidelines. Frankly, you know, it's not really in utilities' interests to cannibalise their own revenue streams, just the same as it's not really in governments' interests to cannibalise the dividend streams that they get from the utility industry.

**PROF WOODS:** You made the point that customers aren't aware - and sure, they're not going to be aware of that particular technological item that could assist with energy efficiency - but they are aware of various behavioural changes they could make to improve their energy efficiency. They're aware that if you do shut your drapes in the middle of the day and stop the sun coming in and you can do something and you can be more frugal in your airconditioner and set the thermostat down a degree and all those things. They know all those things but they're still not even doing those, and they're known and available and you don't need a meter to work out that that's in their interests. So where is the meter going to actually add extra value to their decision-making and change their behaviour, or in a fortnight's time, after rushing in and out of the meter box and getting all excited about it, are they going to say, "Well, yeah, we know that," and revert to type.

**MR BEAL:** Sure. I'd put it to you that people might know on an intellectual level that these things can produce savings. But my observation is that people act as though they don't have any control over their electricity consumption. I put that down in large part to the fact that they have no useful, timely, independent measures of that usage. They can't relate their actions to a benefit.

It's funny, because in the psychology world, psychologists talk about behaviour modification through positive reinforcement, positive feedback. That's what I'm talking about providing here. An electricity bill that's delivered three months in arrears, where you can no longer connect your behaviour with the bill, right, is a pointless exercise. It's designed as a system to not work. So what we need to do is we need to change some of those things. As far as customers using this kind of device, I agree with you. People are not going to go out and have a look at their electricity meter and get excited about the numbers that are shown on it.

**PROF WOODS:** Well, they will for the first week or two.

**MR BEAL:** You're right, they will for the first week or so, because it will be topical and informative at that point in time. That doesn't matter too much to me. One of the things that's really important about yesterday's energy consumption is being able to relate that to the average daily consumption that appears on the bill, because now you can connect what you did or are doing on a daily basis with how you're being billed for it.

I'm reminded of a comment that a gentleman made to me the other day when I

asked him about how many litres per hundred kilometres he was getting out of his car. He quoted a number and said, "But you know, I wouldn't have known if it hadn't been for the fact that I've got a little computer display that's now putting it there and I've learned that if I drive at 80 kilometres an hour rather than a hundred kilometres an hour I can get that figure down." That's an important point. When you give people measures, you give them a basis for control. That is a self-reinforcing thing. What you don't measure, you can't manage and you don't value.

I'm arguing for a small contribution towards the cost of an informative measure for residential customers, because I believe that many people will change their habits and put into place some measures which do produce long-term benefits; benefits that they can see because the numbers showing on the meter are lower than what they were previously.

**DR BYRON:** You're reminding me of another submission that we received - Tasmania, with the pay-as-you-go meters. People would put in \$5 worth and think that that would last them for two or three days, and then they found that if they do different things in the house the \$5 worth might actually last them for a whole week.

**MR BEAL:** Yes.

**DR BYRON:** But it's the same point that you're making: the connection between when you pay and what you do. I mean, if we got one bill for petrol at the end of three months, people wouldn't be able to connect whether they're driving with their foot down or towing a trailer or whatever else it was. So I think that point of the disconnect between when you incur the expenditure and when you get the bill probably contributes to this general perception that our electricity bills are something that you just complain about and pay, and not something that people can actually manage themselves.

**MR BEAL:** It's interesting that I've had the good fortune in recent times, through my job, to speak to several hundred customers. One of the reasons why I am here now is because I have found that there is an untapped interest in this stuff. People have never been given information before that they could utilise. They can't connect the ideas of turning your airconditioner up or down a degree or so - they can't connect with the ideas of purchasing a four-star rated appliance. You need to have some contextual background for that in order for people to make those connections.

I'm not going to suggest to you that everybody is going to do this. I'm not going to suggest to you that even those who do do this are going to start doing it straightaway. This is something that will build over time. But I have found fairly consistently that people who do start to pay attention to their electricity consumption, for whatever incentive or whatever reason, can typically make 10 per cent savings on

their energy bills. That's 10 per cent less carbon dioxide going into the atmosphere and 10 per cent coal left in the ground and all the rest of it.

**DR BYRON:** One of the arguments that we put in the draft report is the suggestion that many people know that they could do things - both households and businesses - they could do things to reduce their energy consumption, but when energy is still relatively cheap it doesn't matter. So that suggests to me that if people want to manage their energy consumption, yes, as you say, they need to have information and the means to do it, but as long as energy is still only 2 per cent of household expenditure, will they do it even if they have the meter? That's the question. They will have the means to do it if they want to, which they wouldn't have now, but are people not really going to get serious about this until prices go up, for example?

**MR BEAL:** Interestingly - I'm not an economist, but I have done economics 101 so I know a little bit about some of the terminology. People talk about price elasticity, or they talk about elasticity of demand and inelasticity of demand in the electricity supply area. I remember my lecturer describing it quite differently. He said that it was elasticity of demand with respect to price. I asked myself the question, what is the elasticity of demand with respect to information; what is the elasticity of demand with respect to control, particularly automated controls, because frankly I don't see anybody publishing anything in these areas.

The reality of it is that price by itself is a fairly crude and relatively ineffective way of making change and making changes in demand, unless there are very large price differentials. That's what the theory would tell you. I suspect, though, that when you look at some of the studies that have produced some more sustainable results in the area of energy reduction and demand reduction - that's peak electricity demand - that what you find is that those experiments have had more than one factor in operation. They haven't just relied upon something like a time of use price signal that had a component of education as well, that had improved feedback to customers. The better ones have generally had some form of automated control system in place, or assigned control.

In south-east Queensland here, we operate probably the most effective demand side management program in the country, and we call it residential hot water heating. I know that the figures are something like 600 megawatts, right, is available under that controlled load regime. More so, Victorians basically don't have too much in this area. New South Wales does. But here in south-east Queensland, in Brisbane where this system was first put into place some 50 years ago, if you go around houses - not units - if you go around houses you will find about four in five have got automated load control systems in place, and nobody gives it a second thought. This is simple stuff. Everybody is comfortable with it.

It's coming under threat, though, because the various environmental movements and local councils are pushing for the banning of electronic hot water systems, and substitution of gas and solar. Now, I'm not about to make any policy comment on that; simply that that substitution is going to have an effect on the total energy revenues which are available to electricity utilities. It will have some minor effect on demand - picking demand of electricity utilities as well.

I'm just concerned that as a residential customer if we start to look at things like fuel substitution and the energy efficiency figures which are in your report and a customer response, when you start to add all of these things up, my projections into the future indicate that they overshadow population growth and even the tail-end effects of their conditioning growth. So one of the things that I was surprised to find when I did some simple analyses - and this is a very crude model - was that unlike what all of my colleagues expect, which is that electricity demand will continue to rise far into the future, that is not what I saw in doing some very simple modelling. It shows instead that it's more likely to peak and then decline.

So the present "build more network at all cost", which has come out of the problems that the electricity industry was reported to have had in Queensland last year - to me we are heading down a path that is more likely to lead to surplus capacity, and as a residential customer the most likely result of that is rapidly rising prices to retain the funding necessary to service these assets which are built on a declining revenue base.

**PROF WOODS:** What are the drivers for a decline in - presuming that's a decline in per capita consumption, not decline in absolute consumption.

**MR BEAL:** Per premise consumption is how I looked at it, yes.

**PROF WOODS:** Yes, per household, per premise, however.

**MR BEAL:** Yes.

**PROF WOODS:** What are the drivers for that?

**MR BEAL:** The drivers pushing it up pretty obviously - - -

**PROF WOODS:** No, what are the drivers that - - -

**MR BEAL:** Pushing it down?

**PROF WOODS:** Yes.

**MR BEAL:** Energy efficiency improvements above and beyond what is already being achieved.

**PROF WOODS:** Through changing behaviour or through natural - well, through progressive improvements in the invented technology in the devices?

**MR BEAL:** I am separating the downward pressures into three components, if you like, one being a customer response component, which is your behaviour changes; implementing automated control systems for example. The second is simple fuel substitution, using gas and solar as opposed to electricity. The third, energy efficiency, is that as particularly energy hungry appliances are replaced, then they generally are benefiting from about 20 per cent improvements in efficiency over the lifetime of that appliance. So we're seeing about 1.5 per cent per annum general improvement in energy efficiency of appliances.

**PROF WOODS:** But aren't we getting more and more energy intensive appliances, the plasma screens and all the rest of it, that are actually then - there is this progression of new products. Sure, each generation of a product might - not always - but might become more efficient, but there are new products and new opportunities to consume power.

**MR BEAL:** You could be right. In my household it doesn't seem to have proven the case. I've replaced an old, inefficient TV, with a projection TV system. The net energy is about the same. So I haven't had a net increase because I've added these things. I have actually retired an old television set. Now, I won't say that everybody is going to do that, because one of the worst things you find is that the old refrigerator with 30-year-old - - -

**PROF WOODS:** It's now the drink fridge.

**MR BEAL:** - - - insulation becomes the bar fridge and it's just left on all the time.

**PROF WOODS:** Yes, and it's in the garage where the heat load is higher and - - -

**MR BEAL:** True. So some smarter approaches for utilities and for government that might be wanting to implement energy efficiency improvement is to subsidise replacements on the basis that you actually get rid of the old unit.

**PROF WOODS:** You retire it.

**MR BEAL:** You retire it.

**PROF WOODS:** It's not happening though.

**MR BEAL:** Agreed, it's not happening.

**PROF WOODS:** There's a lot of drink fridges in the garage.

**DR BYRON:** Yes. Some of them have got \$2 worth of bait in them for about six months.

**MR BEAL:** True.

**DR BYRON:** And it's costing them dollars a week to run them to keep \$2 worth of bait cold.

**MR BEAL:** Yes.

**DR BYRON:** I guess one of the things that we're sort of coming back to is if this information could be made available so cheaply - you know, you said in your submission that governments could subsidise this because 10 or 15 dollars per household is pretty small compared to the subsidy that they're making for solar hot water systems for example. But I mean, if the pay-off is so quick, so immediate and so large, I would have thought most people would put their hand up and be demanding that they be supplied with one - quite happy to pay 15 or 20 dollars to get one - if it's going to deliver those sorts of savings.

**PROF WOODS:** Yes. \$15 one-off, \$138 every six months - sounds good.

**MR BEAL:** Most people wouldn't make the level of savings that I've made but I don't think - - -

**PROF WOODS:** 100 bucks.

**MR BEAL:** I don't think 80 to a hundred dollars a year, which is 10 per cent off an average electricity bill, is unreasonable at all. As to why they aren't putting their hands up: frankly, nobody knows about it. This is relatively new technology. It has been made available because the push towards production of interval meters has created in essence a meter which is an industrial grade computer that can do pretty much whatever you want depending upon how you program it. The problem is that our regulators, I believe, are unreasonably focused on the value of interval energy readings. As a practising professional in this area and as a residential customer, I make two comments about it: as a professional, it adds an awful lot of cost to process this data and it is frankly a pain in the butt doing so, for what I consider to be marginal benefit. I hear the arguments; I'm far from convinced of it, and so are most of my colleagues.

From a residential electricity customer's point of view, have you ever had a view at a residential low profile? The variability will probably surprise you. I know it surprises everybody who I show these profiles to, and I have looked at several hundred of them. It is only when you start to average highly over customers and time that you start to get patterns of behaviour which are relatively repeatable. Now, in reality, you will find in my submission I've argued for time-of-use tariffs. I do believe that time-of-use tariffs address many of the cost reflectivity issues that you talk about in your inquiry report. I do believe that it's possible to have not just a two or three-rate time-of-year tariff, but rather program meters to have something like an eight or 12 time-of-use data collection; still bill customers on a two or three-rate tariff, but have the additional information available for the use of the utilities, the networks and the retailers. I think that that will be an enormously cheaper option.

I remember a Victorian colleague telling me that the cost to process interval data, to read it, store it, validate it, process it and do stuff with it was about equal to the cost of the purchase of the metering equipment. But the cost of doing the reading and collecting and all the rest of it is a per annum charge. It is, by and large, the greatest cost that's involved. If you look at some of the computing systems that have been put in place to handle this stuff, it's frightening. So I seriously question the approach that's being given. I do not have a problem with putting interval meters in place, I have a problem with reading that data out and being forced to read that data out. I think that that should be a cost-benefit decision for networks and retailers to make as they see fit.

Now, that meter has the capability to do the information displayed that I'm talking about. The display is in place, the programming is trivial, the quantities are accurate, they're independent, they give you a whole-of-house picture of your energy consumption. The data that you get can provide very useful information for people to compare against their own usage, against that of their friends and neighbours and relatives, against published benchmarks. It could also be the basis for providing government rewards for improved energy efficiency, "You could get your average daily consumption down into the 12 to 14 band when you were previously operating in the 14 to 16-kilowatt an hour band. We'll rebate a dollar per month off your electricity bill." You have a target that becomes meaningful for people to work to.

**DR BYRON:** You just reminded me, I think there is a trial in New South Wales - I think it's Country Energy that's doing it around the Southern Tablelands, Queanbeyan or whatever - with different prices and having an off-peak shoulder and prices.

**MR BEAL:** Yes.

**DR BYRON:** The first question: are you aware of that sort of thing being tried

anywhere else in Australia and is that one of the things that you would propose be piloted in South-East Queensland or do you think it's even necessary to do the pilot and just go straight into roll-out?

**MR BEAL:** I have to be a little careful in what I say because I'm not authorised to release information from my employer, so I'll tell you what is publicly available, some of which has only been made publicly available for about a week since an electricity metering conference was held in Sydney last week. There have been a number of trials conducted in Australia. The Country Energy trial that you're referring to is testing a time-of-use tariff, but it has two important differentiators about it compared to previous trials; one is that it has a critical peak pricing component in the trial, the idea being that on a few days of the year, in a few hours of the day when market prices go through the roof, the electricity utility sends a signal to a customer and the customer voluntarily reduces their consumption and effectively avoids a much higher price for that period; I think it's about three times the price.

The second aspect of that trial is that they are incorporating in the trial an in-home customer information display. My observation is about it - and I generally think that this is worth doing, but I would suggest that if we have tried to do the same thing in South-East Queensland, we would take quite a different approach to it. We would utilise the existing infrastructure that we have in place to provide the signalling to customers using different methodology. So I am aware of it. I do think that there's value in pursuing it. I think that South-East Queensland is probably better placed than nearly any other place in the country to conduct a trial using our existing load control infrastructure and the customer information display on the meter and to couple that with some improved information programs that are centred these few basic concepts of yesterday's daily energy consumption and how you use that as an individual to make changes to your operating behaviour. This is simply that in my opinion, if it were given the go-ahead from government, could begin to be achieved within as little as three months, probably closer to six months, but certainly before this coming summer period.

I would really encourage anybody from the Queensland government to speak to me about this. I know it's quite common for people to have questions and also contrary views. I would like to talk to you about it because I'm trying to sharpen the arguments a little bit better to get through some of what I think are misconceptions about the way metering can assist and about how these things can be made in reality within existing regulatory frameworks fairly simply.

**DR BYRON:** Just one last point: most of the public discussion about the case for greater energy efficiency is related to either the direct financial savings to the customer or to the environmental benefits, but governments also frequently see a benefit in energy efficiency or demand-side management more generally in terms of

deferring of capital expenditure for major new-generation transmission distribution. So is part of your argument that if an increasing number of households could get a 10 per cent efficiency gain, then that would defer major new capital expenditures on power facilities?

**MR BEAL:** Yes, that is a component of my argument. I tried to refer to that in the diagram in the submission I made, showing that the simple model is indicating a peaking and then declining network demand. That has significant consequences for us now because it means that if we build a system which has capacity that will only be used for a couple of years but has a life of 25, 35 years, then we've got some substantial problems in paying for it later on.

I would also point you to a wide-ranging inquiry that was conducted by the Electric Power Research Institute in the United States about two years ago. Within that document, there were three references that they cited where the value of advanced metering to an economy was in the order of 1 per cent of GDP. Now, if you just apply those figures to South-East Queensland's gross state product, you get some ridiculously high figures. It's hard to believe; it's \$640 million a year, in rough numbers. To be honest, I can't see that value. I can't see where it comes from. But these are credible studies that were done. Again, your positions and numbers are like that alongside \$15 per 1 million customers in South-East Queensland. It's such a pittance. Let's look seriously at it.

**DR BYRON:** Okay. Again, that seems like a very good summary of your position. Is there anything else you wanted to say in closing?

**MR BEAL:** No, I think that's it, Neil. Thank you.

**DR BYRON:** Thank you very much for coming, Jeff. It's time for a cup of tea. Thank you very much, ladies and gentlemen, we will adjourn at 11.30 with Mr Craig Robertson.

**DR BYRON:** Thanks, ladies and gentlemen. If we can resume with the gentlemen from Evasave. If you could each introduce yourselves for the transcript so that they can recognise whose voice is which, and then take us through the main points of your submission and we can have some questions.

**MR ROBERTSON:** My name is Craig Robertson.

**MR ABBOTT:** My name is Graham Abbott.

**MR ROBERTSON:** Our submission is based around reducing energy consumption, of course CO2 emissions and energy costs, and also improving motor efficiency. Our subject was domestic refrigeration, airconditioning and motors. As we all know, a large amount of energy is consumed by domestic refrigeration and airconditioners every year in the home and also in small business. Every home has at least one refrigerator and many have two or more. The use of airconditioning at homes and businesses is increasing at a rapid rate. More and more homes are installing airconditioning, whether they be split type or ducted airconditioning, throughout Australia and they're becoming commonplace with of course most businesses having airconditioning and cars now are coming standard with airconditioning. The move towards airconditioning is increasing.

Currently refrigeration and airconditioning equipment has to meet the requirements of MEPS. For those that don't know, MEPS is the minimum energy performance standard. However, these standards are based on temperature testing of 35 degrees and airconditioning that applies to - 35 degrees applies to the temperature that the outdoor unit is subjected to during the test. The same applies to refrigeration: the domestic refrigerator is tested in a room at 35 degrees without product, I understand, and the door sealed.

What we're suggesting and recommending is some changes to these tests. I'll expand a little bit further on the testing. With airconditioning, as most of us know, 35 degrees doesn't occur year round and doesn't occur 24 hours a day; it's only a very small percentage of the time. The test also includes the air temperature being at 27 degrees air on to the indoor unit. Now, most of you would know what a split system looks like. It's a wall-mounted unit inside and there's an outside unit. That inside unit draws air into it and the temperature test for that is 27 degrees while the outside temperature test is 35 degrees and we're suggesting that these be altered because this is more of an extreme test rather than the norm.

Results that test at 35 can still be used for MEPS. However, results of energy consumed at, say, 30 degrees for airconditioning and 25 degrees for refrigeration is also required as these temperatures or lower are more than normal situation. The energy consumption of refrigeration and airconditioning at temperatures of 30

degrees airconditioning and 25 degrees for refrigeration should form part of the updated - we're suggesting updated - and new MEPS regulation, for it's at these temperatures that energy can be massively reduced, of course with a reduction of CO2 emissions at the same time.

The energy reduction can be achieved with the inclusion of motor optimising technology. It doesn't have to be a requirement to meet certain criteria. Airconditioners and refrigerators fitted with a motor optimiser will reduce energy and CO2 emissions. The government needs to seriously take note and move quickly to implement mandatory requirements with this proven energy-saving technology. In the meantime energy labelling could be introduced, showing in addition to current standards the energy usage rate, that's by refrigerators and airconditioners, at normal, more realistic operating temperatures.

So I guess to sum that up, we really would like to see the energy burn of a refrigerator or an airconditioner at more normal operating temperatures. I think that's a sensible solution. The star rating on refrigerators is reflected by the energy used during tests and the star rating on airconditioners also reflects the energy used under the test conditions. It doesn't reflect the energy used under normal operating conditions.

**MR ABBOTT:** We carried out a field trial on a domestic refrigerator through Christmas and New Year of 2003 and were able to get 30 per cent reduction on the refrigerator. I took those tests to a well-known manufacturer and they got the same refrigerator and we put it into their test laboratory. This is the standards that are running just now, and they put the refrigerator in the room and set that room at 35 degrees - take the doors up, nothing in the refrigerator, turn up the thermostat, put their sensors on each shelf of the refrigerator and run it for 24 hours at 35 degrees, and log how many kilowatt hours it used. We then put our device on it and did the same job.

Now, we know that if a compressor is running at 35 degrees and a full load then there's not a lot to be saved unless the compressor is oversized. We still got a small saving but I don't know of any refrigerator in Australia that runs 24 hours a day, seven days a week, at 35 degrees with nothing in it. You know, once you put stock inside a refrigerator you've got a mass. Once that mass has cooled down it helps the compressor anyway, and their argument was, "Well, that's the standards. If you can get the standards changed we'll look at your product." Well, we've done tests. We know we can save millions of kilowatt hours and we can save thousands of tonnes of CO2 emissions, just with the humble domestic refrigerator, but not under these circumstances.

**MR ROBERTSON:** So we know that we can save energy. Once a motor comes

off load, once it's not fully loaded, in effect, that's where energy savings can be made with optimisation technology. So we'll come back on that, but I'll just move on to airconditioning starters. In Australia there's a requirement for airconditioning units at two and a half horsepower and above to be fitted with starters to reduce the current or - currently there's a requirement and I'll just read out what I have here:

Currently there is a requirement for airconditioners in relation to the amount of current drawn.

That's the amp, the amount of energy required to start the unit:

To meet these requirements most manufacturers or importers of airconditioners have fitted soft starters.

I'll try and explain this to you in laymen's terms. A two and a half horsepower motor is a reasonable size motor and that's what many airconditioners have in them to aircondition, say, a lounge, dining and kitchen area in a home in a split-type unit. Ducted units are often five or six or seven horsepower, in that sort of range, it's in the horsepower scale, or about six or seven kilowatt output of performance. Now, when an airconditioner starts, initially starts, each time the thermostat calls for cooling. When it starts it requires quite a large amount of energy to start, to actually make the motor turn over.

Because of this start amperage, it can cause lights to flick and it causes load on the actual system, energy system, electrical energy system. So there is a requirement for the manufacturers to have some device or some way of preventing the airconditioning from drawing too much current. So manufacturers are fitted with soft starters. Now, the reason for me elaborating on that is there are now devices available that will not only soft start the airconditioner but also reduce energy when it's running, combination unit. The manufacturers are already having to fit a self-starter, and if a combination unit is available at similar cost, what I'm saying is that, because it's a mandatory requirement to fit a self-starter or some device to stop the airconditioning from drawing too much current, then the same can apply to an energy saving device combination. This energy saving device actually cuts in as the load comes off the airconditioner. After it's started and after the load falls, energy saving is available. So we see it as not an added cost; it's already a cost at the point of manufacture.

These devices are supplied with fixed-speed compressors used on all airconditioners installed in homes and businesses. It doesn't apply to inverter types where the motor speed is varied. "Inverter" is a little bit of a catch cry amongst the manufacturers and it does work. They vary the speed to enable energy saving and other forms of temperature control. However, the majority of airconditioning sold in

Australia and throughout the world is a fixed-speed type where the load varies. The speed of the compressor stays the same, and this is where energy can be saved.

The same proposed dual modified energy labelling and MEPS registration figures that we're advocating for, at the more realistic temperatures that we've mentioned before of 30 degrees for airconditioning and 25 - it doesn't have to be exactly that but somewhere around that - could apply to all airconditioning, including inverters. That way, the purchaser could see what energy that appliance burns when they're running it at normal operating temperatures, whether it be an inverter or whether it be a fixed-speed compressor, it doesn't matter. I think the consumer should know when they're purchasing something some comparison between products and see exactly how much energy that burns under normal operating conditions.

Refrigerators, airconditioners and motors, just single-phase and three-phase and general information: you may not be aware that there are two types of airconditioning available. The smaller units run on single phase, which is one incoming power supply into the home, and the larger ones require three-phase. That means three incoming power sources into the house. Energy saving devices are available for domestic and larger commercial refrigerators. Energy saving devices are available for home and commercial, industrial airconditioning systems. Energy saving devices are available for machinery and electric motors, any motors that run at fixed speed and a variable load, including industry, manufacturing, mining.

The government already has MEPS and energy labelling requirements for airconditioners and refrigerators used in homes and businesses. By introducing changes - that is, dual figures - to labelling and MEPS registration requirements, this could be the first step. The second step, energy saving technology devices available for retrofit; OEMs, which is an original equipment manufacturer, in Australia or overseas; importers of refrigerators or airconditioners, and there's no excuse for equipment not to meet the requirements of energy saving in the future, as the technology is now available. The government must look at introducing changes to ensure that this technology is applied during manufacture to keep costs down and before distribution throughout Australia.

We have some details demonstrating positive energy savings and CO<sub>2</sub> reduction with the technology that's now available. We've done tests on domestic refrigerators just recently and we carried out tests in 2003. The tests carried out in 2003 show there's approximately a 30 per cent saving. As Graham said, that was carried out over the hottest time of the year.

We've done tests on airconditioning. We did a test on it recently, on 11 May, on a two and a half horsepower airconditioning unit, quite a common size, sold throughout Australia, domestic split-type, one of the leading brands. We've done

more than one brand. We've done numerous tests. But tested it at 30 degrees on the outside unit. We tested it with and without optimisation technology, and without optimisation the energy requirement increased. The test results are here. Graham will explain to you exactly what - - -

**MR ABBOTT:** We've got copies here, but that's our analoger on the compressor, running with optimisation. We were running on average of about 1.9 kilowatts and as soon we took it off optimisation we were saving 220 watts power on a two and a half horsepower compressor instantly, under the same load conditions. It's looking at the compressor every one-hundredth of a second, so it's marrying the load of the input of the compressor to its torque, to its power requirements every cycle. So it's constantly monitoring the compressor. By doing that, by reducing the amperage and removing the reactive load inside the compressor, we're also reducing the running temperatures, and by reducing the running temperatures we're then lifting the coefficient of performance, which is the efficiency of the airconditioning system, and it runs cooler. The compressor runs cooler, the condensing, and the outdoor temperature runs cooler. It gets down the temperature quicker and then cuts out on thermostat. So if you get it out on thermostat, then it's zero energy costs because it's cut out.

So this is all the technology we've been doing over the last year or so, which is now available, or OEMs. We've been doing work on conveyors, crushers, large industrial equipment, large airconditioning systems.

**PROF WOODS:** Can we focus then - and my first question would be that presumably you've challenged this 35-degree constant temperature. What responses are you getting?

**MR ROBERTSON:** No, we haven't.

**MR ABBOTT:** We've been told that's the standard and - - -

**MR ROBERTSON:** We haven't done anything about this yet, Mike.

**PROF WOODS:** But if it's producing perverse results and they're results that are inhibiting your opportunities for improving energy efficiency, you haven't then gone to the standard-setting authorities and said, "This is producing perverse" - I mean, you've got results back to 2003, so they're two years old.

**MR ABBOTT:** Yes.

**PROF WOODS:** But you haven't yet raised it with the standard-setting authorities?

**MR ABBOTT:** We were told that's set in stone.

**PROF WOODS:** Told by the manufacturers, but there's another party in this process. It's called those who set the standards.

**MR ROBERTSON:** Yes, we should have done something before now. I guess we've been focused more on proving the information, and most of that time has been spent involved with airconditioning, and we have spent time with compressor manufacturers. Because there's going to be difficulty in having the standard changed, I think we will talk to the compressor manufacturer direct and see what the reaction is. We've talked to two large airconditioning and refrigeration compressor manufacturer, or relatively, one around 12 million compressors per year and the other around 2 million compressors per year. We talked to the managing director of one of those companies and he was extremely interested, and they're already sent parts of compressors and we're doing some tests with them.

Another manufacturer is doing 12 million, and on demonstration they want more information, because if we can have the manufacturers fit energy-saving devices at the source, then irrespective of whether the MEPS registration changes or whatever, we have a product going into the Australian market, or the world market - it doesn't really apply just to Australia - that will save energy and reduce greenhouse gas emission. I guess we've been more focused on making sure that the technology is right, proven, ready to go - - -

**PROF WOODS:** So in your research and development cycle you're still proving up the technology and convincing the manufacturer?

**MR ROBERTSON:** No, we've finished that.

**PROF WOODS:** All right, you're past that bit but you now - - -

**MR ROBERTSON:** Yes, we've got to that. It's only recently, Mike, that we've really got - I think it's like being sure and convinced yourself that what you're doing is a hundred per cent. Even doing a test sometimes - you know, are these results correct, have we done everything we can to make sure that they're right, is it real, have we used the right testing information and equipment - that sort of thing.

**PROF WOODS:** Sure.

**MR ROBERTSON:** The next step was to go through, you know, calorimeter rooms in - there's a couple in Australia. We can do that with airconditioning, prove our results at the same or similar temperature and things like that. Some of those things are still yet to be done.

**DR BYRON:** I thought what you were saying was that the way the maps are written at the moment is actually stopping the uptake of this technology. But then what I thought you were saying is that in a sense you can go round it, because if the compressor manufacturers and the appliance manufacturers are convinced that it's going to give them a superior product in the marketplace, it doesn't really matter what the standard is. Is that where you're at now?

**MR ROBERTSON:** Yes, there's two arguments. You're dead right there. We would like to see the standards changed, because that will force the issue. I mean, the net standard could change without making it - it doesn't have to become a requirement. The manufacturers are testing product anyway. With airconditioning, they have to do test simulations or they have to do calorimeter tests, and they have to show what energy that appliance burns at the test results. It's very easy for the testing authority to say, "We need two points, we need test results at two points and you have to publish what they are."

But at the moment you can go onto the web site and you can get information on what an airconditioning unit burns, what energy it burns, but only at the test figures. What we want is a second figure in there, and that should be on the web site and also the manufacturer should have to print that information. It could be a star rating on an airconditioner or refrigerator. They should have to show that - what energy the appliance burns at the lower temperatures - and that will force the issue.

**PROF WOODS:** So on that point, there is a MEPS implication - well, not so much a MEPS one but an energy efficiency rating implication - in the sense that you would get relatively more stars for your product if the test conditions were, as you put them, more normal, than you will get relative to other products at the 35 degrees?

**MR ROBERTSON:** That's right.

**PROF WOODS:** So that would create a market differential - - -

**MR ROBERTSON:** Sure would.

**PROF WOODS:** - - - under the current standards. I mean, you would still pass the barriers but you would be more favourably advantaged by a change to, as you describe it - - -

**MR ROBERTSON:** Maybe in future, like the MEPS registration test results for airconditioning and refrigeration should be lowered. In other words, what energy do these appliances burn at normal operating temperatures, because that's when all the energy is burnt. It's not burnt at the high level because they're not there.

**PROF WOODS:** Presumably airconditioning is more often burnt at 35, whereas refrigeration is the full seasonal and diurnal - - -

**MR ROBERTSON:** Well, as we said, airconditioning - sure, it burns a lot of energy, more energy at 35 per cent - but most airconditioning doesn't sit at 35 degrees 24 hours a day, seven days a week, 365 days a year.

**PROF WOODS:** No.

**MR ROBERTSON:** So yes, it's the energy burning at the normal operating temperature that we're concerned about.

**DR BYRON:** But is there a problem that if some manufacturer picked up your technology and started advertising it as, "This is the most energy efficiency brand of fridge you can get," somebody is going to say, "Well, how can you prove it?" and when you point to the standards there isn't much difference because the standards are under these sort of unreal conditions?

**MR ROBERTSON:** Yes, that's right. That's exactly right. You've hit the nail right on the head there.

**PROF WOODS:** That suggests that you start writing a letter to the standard setting entities, once you've got through your R and D cycle, and I mean, go for it.

**MR ROBERTSON:** We just happen to be right on the apex right now. We found out about this happening - - -

**MR ABBOTT:** We thought this was the ideal opportunity to produce it to you people, so you could see what we're doing.

**PROF WOODS:** Yes.

**MR ABBOTT:** I mean, those figures at the back I've put here actually astounded me. I got a little bit of information through that Telstra weren't going to upgrade their - or lift the price of their 8 million residential lines. So that made me think, "Well, there's 8 million residential lines. There's going to be at least 8 million fridges." The small 135-watt domestic fridge we were doing some testings on, just as a quick run - you know, 28 degrees in the room - we're saving 15 watts an hour, but that doesn't sound a lot. But if you look at a 14-hour run a day at 15 watts and multiply that by 8 million, we're looking at 612 million kilowatt hours a year taken out of the system and 636,000 tonnes of CO<sub>2</sub>.

**MR ROBERTSON:** Yes, we might just go over this, because this is a projected energy saving, which you wouldn't have - people over here wouldn't have. Anyhow, projected energy savings, CO2 greenhouse gas reduction - this data is based on test results and estimates. One of these test results is 11 May, so it's fairly well hot off the press. Anyway, airconditioning equipment, domestic use, based on the tests we did - minimum saving 220 watts per hour, based on the test results we've got attached. The run hours - we used the ENERGEX consumer information calculations on their run hours, which by the way we think are fairly high but we used that in any case because that's something that was already published. That equalled 2420 watts per day saved.

Just going back to the 220 watts per hour, all the airconditioning is running. You could have four 50-watt-plus light bulbs burning or four bedrooms with lighting on them free of charge. That's the easiest way of putting it. That's the energy that can be saved. Now, savings worked out over an annual basis of 4743 kilowatt hours per annum saved, based on the test results and the ENERGEX figures. So the total quantity of models that we have estimated that may be around Australia in the two, two and a half and three-horsepower airconditioners - that's the common domestic split system - we estimated that there could be 500,000; half a million of these units installed in homes throughout Australia. The minimum saving based on the figures is 2.4 million kilowatt hours saved from the national grid; 2500 tonnes of CO2 greenhouse gas emissions removed per year. That's airconditioners.

With refrigerators, domestic, the figures are more dramatic. Minimum savings - it's only 15 watts per hour. Now, 15 watts is not much, like Graham said. It's only a small amount. But the refrigerator runs every day all day, 365 days a year. So 15 watts an hour based on test results and a 14-hour run time per day - now, we can vary that, sure. We don't know whether - some refrigerators run longer and some run less, but we've based it on 14 hours. So 220 watts per day saving. It still doesn't sound like much. But every home having a refrigerator and some with two or more, it adds up. This equals to 76.6 kilowatt hours per annum. That's for a refrigerator. It's still not a lot. But using an estimation of 8 million domestic refrigerators in Australia, it equates to 612 million kilowatt hours saved on the national grid.

The result of that would be removing 636,000 tonnes of CO2 greenhouse gas emissions per year. If anyone is not astounded with that figure I would be surprised. 636,000 tonnes of CO2, just by changing the energy burn of all the domestic refrigerators in Australia. This is not an impossible task. It could be easily done. It could be done as a retrofit. It should be introduced on any new refrigerator immediately.

**DR BYRON:** Could I just attempt to put some dollar signs on those numbers that you were giving us then. If we take refrigerators at 76.6 kilowatt hours per year

could be saved, approximately how much are we talking about there in terms of dollars saved per year for the household off the fridge? I'm just trying to get some figure of - and also, how much would it cost to have this technology installed? How much extra would it cost and how many dollars a year would it save? Have you looked at that?

**MR ROBERTSON:** It's a good question. This is something that - I'm glad you asked the question because it's something that - Graham and I have both been involved in industries where we've been exposed to energy burning equipment. I guess, being involved in energy burning equipment most of your working life, you still think about it. We're involved in something that is burning energy. It's not a good feeling. However, you put that to one side because that's your profession, that's your background. Now, in the last few years being involved in something that saves energy, we actually didn't even start thinking about the actual cost. What we thought about was: what can this do for the environment? We didn't even focus on cost. You don't think about the cost, we just thought about - so we started doing the numbers. We were just looking at saving energy, we didn't even think about the cost.

It's a bit like the soft starters for the airconditioners; I will go back on that. There's already a cost to put a soft starter in an airconditioner. To make the soft starter and energy-saving device, the cost is about the same, in fact it may even be less. We don't know what the final costs are because it will depend upon volume. We haven't even costed it. But on a refrigerator, dollars, some dollars. You might say, "Well, how many dollars?" It would depend on how many. The saving, \$9 per annum, and the device - maybe the device in that sort of range as well, but we're saying maybe double that, maybe \$20 for the item. That will give you an idea, \$20. Again, it all depends on volume. Obviously if someone said, "This is too important not to save 636,000 tonnes of CO<sub>2</sub> per year, we're going to fit these to every refrigerator in Australia," the actual item cost probably would be less than \$20.

**PROF WOODS:** The labour cost of fitting - - -

**MR ROBERTSON:** The labour cost of fitting, you would have a fit cost, yes.

**MR ABBOTT:** I just want to come in there. I didn't want to get too technical, but because we're only getting charged for kilowatt hours, that's what everybody thinks of, but where we're reducing 15 watts, for instance, per kilowatt hour, we're also reducing 30 VAs, which is kVA, which is losses within the system that the electricity authorities have to pay for, because electricity is getting generated at a generating point. By the time we get it, there's losses within the system and those losses within the system are not due to just refrigeration and airconditioning and motors, but there are losses in the system due to this. Where we're saving 15 watts, we can reduce a reactive load within the system by 30. So by taking 612 million kilowatts off the

grid, we're probably going to take twice that out of the losses out of the system, which means that every kilowatt that's produced from the power company, you're going to get more out the other end. It's like saying a six-inch water main is going through and you get six inches of water; as it corrodes up you're only getting four inches of water but you've still got a still got a six-inch pipe there. The more corrodes you can take out of the corrosion of the pipe you're going to get more water through for the same amount it costs you to produce it at the other end.

So the electricity authorities are going to get less heat build-up within the system within their transformers and within their lines and it's going to make everything run a lot smoother. So there's going to be a benefit there that we don't get charged for, you don't get charged for and there's a benefit to the government. If the government and the electricity authorities looked at this hard and said, "Well, that's what it's going to do," then maybe they should be coming to the fore with installing them on the fridges if we can manufacture them or they can be manufactured as a clip system into the existing refrigerator so it's just an easy installation.

**MR ROBERTSON:** We're not actually intending to manufacture these ourselves. In future we would like to see the refrigerator compressor manufacturer - that's the actual device that does the work and the same with the airconditioning - provide the compressors to the manufacturers of the refrigerators and airconditioners with these devices fitted to them because they already have to have some sort of start device for a refrigerator. They have a relay start device. So at the moment we are working on a new start device which starts the refrigerator and optimises the motor for energy efficiency and that's where we would like to see it.

But, of course, if the government intervenes it's a bit like okay - I believe that some areas of the Gold Coast now it's a \$20 - I know I digress, but just to give you an idea - but for \$20 they organise someone to come out, whether they're employed by the council or not I'm not sure, but they come out and they'll check all your tap washers and repair them if necessary and they fit water-saving shower heads and devices for \$20. I don't know if you know about that, but that's - - -

**PROF WOODS:** That's common through parts of the state.

**MR ROBERTSON:** It's common, is it? So someone is paying for the labour for people to come out and do this work, contracted or whatever it may be and this is to save water because it's a resource that we're trying to look after. Here we are really flooding CO2 gas emissions and we've got a motor saving device now available and quite rightly, Mike, you've asked what have we done about it and I guess we need a - - -

**PROF WOODS:** It's all right, I understand where you - - -

**MR ROBERTSON:** I've gone round full circle.

**PROF WOODS:** That's fine.

**MR ROBERTSON:** I don't mind you pushing us because we need to push along with this now. I would like some feedback from anyone that's here, any questions. I would like a reaction as to what people - based on what they've heard. Obviously you're not privy to seeing the test results and things like that, but based on the information we'd like to hear feedback, "Does it sound good? Does it sound positive? Does it sound like we should be moving in that direction and how does everyone feel about it?"

**PROF WOODS:** We'll talk to you and presumably you can leave your contact details and meet people outside after the hearing.

**MR ABBOTT:** Just quickly, Saturday's paper the Courier Mail was, "Lift your game, mining industry told." Most of the story was regarding infrastructure of moving coal into Mackay but the last paragraph says:

On the greenhouse front Mr McFarlane said the government's \$500 million low emission technology development fund will be calling for application by the end of the year.

We've got a \$500 million low emission technology development fund which we've already done a lot of work for. So if there's \$500 million there, half that could go to fitting things in every fridge for CO2 emissions.

**PROF WOODS:** Thank you.

**MR ROBERTSON:** We've already half spent half of that already.

**DR BYRON:** We'll have to leave it there.

**MR ROBERTSON:** Have to leave it? That's all right.

**DR BYRON:** I will give you the last word but we're going to have to keep on - - -

**MR ROBERTSON:** You've got to keep moving, okay. I will just reiterate a little bit on the technical side. All motors burn energy, as we know, and motors don't have any intelligence and we're talking about a normal fixed speed, either single phase or three-phase motor such as used in an airconditioning unit, unless it's inverter driven. So all common domestic refrigerators and the majority of airconditioners in home the

motors do not have any intelligence. If they're provided with a microprocessor and some intelligence, then the motor speed can remain the same but the torque can be adjusted to suit the load. In other words, the energy burnt is only what is required to do the load that is placed on the motor at that point in time. So that's really the easiest way to describe this. What we're proposing is all refrigerators and airconditioners have some form of intelligence to reduce energy costs and greenhouse gas emissions. Thank you very much.

**DR BYRON:** Thank you very much, Mr Robertson and Mr Abbott, that was a very good summary.

**DR BYRON:** To move right along, Master Builders Queensland. Thank you very much for coming and thank you for your written submissions, which we've read.

**MR OSTERHAGE:** Thank you.

**DR BYRON:** If you'd just like to take us through the main points.

**MR OSTERHAGE:** Thank you very much. My name is Peter Osterhage. I'm the director of housing with the Queensland Master Builders Association, representing 10,000 members in Queensland. We made two submissions. Our first submission primarily looked at the Australian building Codes Board's proposals to increase energy efficiency for housing. Our supplementary submission was our response to the Queensland government proposal to ban electric hot water systems. That supplementary submission was submitted primarily to highlight the impact on housing affordability which energy efficiency provisions make.

In 2003 energy efficiency provisions were introduced into the Building Code of Australia. These measures addressed roof insulation, wall insulation, glazing, ventilation and a range of other things. The objective of the Building Code of Australia is to reduce greenhouse gas emissions. That's the stated objective.

**PROF WOODS:** Sorry, that's one part of the objective of their code. Their safety is another.

**MR OSTERHAGE:** Yes, for the energy efficiency the objective is to reduce greenhouse gas emissions, and to meet this objective the performance requirement requires a building to have a level of thermal performance to facilitate the efficient use of energy for artificial heating and cooling, full stop. The impact of the requirements introduced in 2003 on reducing greenhouse gas emissions haven't been assessed or measured, so we don't know what those energy efficiency provisions have achieved since 2003. By not knowing this we believe that increasing the stringency in 2006 can't be justified. Our submission analysed the impact on greenhouse gas emissions which artificial heating and cooling in Queensland houses contributes. An ABS study in 2002 reported 38 per cent of homes in Queensland were airconditioned. Even if this figure were inflated to 50 per cent of all new homes built, it would contribute 0.005 per cent to total greenhouse gas emissions.

The commission's draft report has stated that, Australian wide, space heating and cooling accounts for 41 per cent of household energy use. The Queensland government says it's 10 per cent in Queensland, but the commission's report says 41 per cent of household energy use is for space heating and cooling, of which 40 per cent is for heating and 1.2 per cent for cooling. It could therefore be assumed that measures in the Building Code of Australia are to address heating, something

which is not common in tropical Queensland.

Yet the Australian Building Codes Board proposes to increase the stringency of energy efficiency provisions without taking into account measures or identifying what savings to greenhouse gas emissions have been made from the 2003 requirements. If the Australian Building Codes Board's proposals for 2006 are introduced, they'll have a significant impact upon housing affordability, especially in North Queensland, where 90 per cent of homes are built out of masonry block construction. To meet the proposed deemed to satisfy requirements for walls, they will have to be either shaded with an overhang of between 1200 and 1300 millimetres, or be insulated to meet an R1.4 requirement. Now, shading overhangs of that size in cyclonic North Queensland are totally impractical.

To insulate a block wall to meet R1.4, it will require battening of the inside of the wall with 64-mil channels, bulk insulation and then lining with plasterboard. Our costings in the submission indicate that that will be a capital up-front cost of around \$9000, or a 7.25 per cent increase in the contract price. The Building Codes Board's regulatory impact statement indicates that for North Queensland the overall cost impact will be \$478. In our view this is a gross underestimation of costs. This cost increase will impact more on more cheaper homes, and will therefore impact on those entry-level buyers who can least afford these cost increases.

**PROF WOODS:** Sorry, can I just clarify. The cost you mean as a proportion of the total costs of the home, not in terms of absolute costs - the increase?

**MR OSTERHAGE:** The proportion of increase in the original contract sum.

**PROF WOODS:** Yes, thank you.

**MR OSTERHAGE:** The impact on housing affordability can be gleaned from our supplementary submission. This was our submission to the Queensland government in response to their proposals to ban electric hot water systems in new homes, with the objective of reducing greenhouse gas emissions. Master Builders commissioned about 18 months ago Cordells or Reed Construction Data to conduct a housing affordability index. This is done each quarter and focuses only on construction costs. Land costs are excluded from the index. The reason why is that we really wanted to focus upon how the increase in construction costs was impacting upon housing affordability. That affordability graph is shown in the submission.

Just to highlight, the affordability graph was taken back to February 2000, and from the graph we can see the impact when GST was introduced. Housing affordability dropped quite substantially. It's had ups and downs, and as at March it was rapidly approaching the downward trend. By just banning electric hot water

systems and having the increased capital cost of solar, we can see that the affordability index actually approached levels of when GST was introduced. I'll point out this excludes the cost of land, and we all know what's happened with the cost of land.

It's interesting to note that, when you look at that affordability index and compare it to building approval starts - this graph goes back to 19878, but you can see here where GST impacted upon the building approvals in Queensland and then the ups and downs. That very closely resembles the housing affordability index. Just as an aside, I would like to point out that a lot of people think that the housing industry is in a boom, but if you look at that graph you can see the boom we had in 88, the boom we had in 1994, what we called the pre-GST boom, which wasn't really a boom, when GST hit, and this is where we are at the moment. We're nowhere near the 20-year average.

Introducing energy efficiency provisions in 2006 through the Building Code of Australia will also have a significant impact upon housing affordability. That concerns Master Builders. Without just focusing upon energy efficiency provisions, Master Builders looks at the whole range of areas which impact upon housing affordability, of which energy efficiency is only one. There are a whole lot of other issues impacting upon affordability.

As an alternative to the proposed deemed to satisfy requirements due to come in in 2006, houses can be rated to a five-star rating using an energy efficiency software program. AccuRate is touted to be the most advanced program. The house which we used in Cairns as a model as part of our study was built using the current Queensland deemed to satisfy requirements. It was rated under the AccuRate and came up to three and a half stars. Some small changes were done to the glazing requirements, and it easily achieved five stars. So there's therefore in our view a mismatch between the new software program and the deemed to satisfy requirements, or vice versa, and a study needs to be done to align the software to deem to satisfy, or deem to satisfy to the software, so we can closely align those two.

Master Builders therefore does not support increasing the stringency for energy efficiency measures through the Building Code of Australia in 2006, as the impact on reducing greenhouse gas emissions in our view is negligible, and the impact on affordability will be significant. The cost benefit in our view cannot be justified. I invite questions.

**DR BYRON:** Thank you very much. Your submissions sort of highlight the additional costs for North Queensland, and I realise that that's probably the strongest case. But is there any sort of information, even anecdotal, on similar problems for other regions of Queensland?

**MR OSTERHAGE:** The biggest impact will be in North Queensland, because historically the industry has evolved into block construction. Brick veneer or lightweight construction in North Queensland is very, very small. In south-east Queensland, increasing the energy provisions will have an impact, not as big as North Queensland. For example, the new requirements proposed will require bulk insulation in brick veneer homes. Where currently you can get away with reflective foil in homes, in zone 5, which is the Toowoomba area, that will have an impact because if you have a suspended floor you'll have to put R2.5 bulk insulation underneath the floor in Toowoomba; glazing will have an impact. There are quite complicated calculations to be done for glazing under the building code, or proposed building code, and that may necessitate really upping the performance of glazing, which will have a cost impact. So it will have an impact in south-east Queensland, which is predominantly brick veneer, but not as great as it will be in north Queensland.

**PROF WOODS:** Putting aside Toowoomba, which has also got the elevation issue, but just coming to metropolitan Brisbane, what calculations have you done on the dollar increase in construction costs.

**MR OSTERHAGE:** We've focused on north Queensland because that's where the biggest - - -

**PROF WOODS:** I understand why. We're interested in an across-the-board - - -

**MR OSTERHAGE:** Yes. We haven't done a detailed costing of the impact in south-east Queensland. You'll require to increase insulation in the roof - that might be 500 bucks - bulk insulation in brick veneer homes. I don't know, you could be looking, gut feel, at a 2 to 3 thousand dollar increase.

**PROF WOODS:** That's assuming they don't just insulate around the electricity cavity holes and to - - -

**MR OSTERHAGE:** Where the power points are, yes.

**PROF WOODS:** - - - demonstrate that it might have insulation.

**MR OSTERHAGE:** Yes.

**PROF WOODS:** That reduces the cost, doesn't it?

**MR OSTERHAGE:** Yes.

**DR BYRON:** Just on the subject of solar hot water, I would have thought, and I imagine that most people would have thought, that in the sunshine state a solar hot water system was such a self-evidently good idea that everybody would have thought it was bleeding obvious. So I'm really surprised to see the figures. I mean, the submission shows that there's not much, if any cost advantage of solar hot water systems.

**MR OSTERHAGE:** By abandoning electric hot water there will be an increase in up-front capital cost. That can't be denied. The ENERGEX Institute did a study, which we've put into our submission, which showed the insulation costs taking into account government rebates, and I point out that the Queensland government rebate for solar will cease on 1 July of this year. That shows the 10-year life cycle costings, running costs, and really the difference between say a storage electric tariff 31 of 2872 to say a Solarhart 302L series of 2666 is, as most people are saying, not that big.

**PROF WOODS:** And that's with the rebate built in which, as you say, terminates in July.

**MR OSTERHAGE:** Correct.

**PROF WOODS:** And the size of the rebate?

**MR OSTERHAGE:** It can go up to \$750, but on average it's about \$250.

**PROF WOODS:** Yes, which wipes out that difference. I've found that table quite interesting. Can I just go back to the AccuRate. You were talking about the three and a half stars and tweaking the glazing, moving up to five stars. Is your conclusion that the deemed to satisfy, as is, is sufficient if not slight overkill anyway, and that the problem is with the AccuRate software, or is it vice versa, that the AccuRate software is not bad but the deemed to satisfy has got some flaws in it? Where do you fit in that continuum?

**MR OSTERHAGE:** The 2003 energy efficiency requirements, deemed to satisfy, there was a Queensland amendment to that which reduced the wall insulation from R1.4 down to R1. There were some concessions for block construction as well. The home which was built in Cairns, which we took Building Codes Queensland to on 21 April, was built to the current Queensland deemed to satisfy. By just tweaking a little bit of the glazing, putting some shading on a couple of the windows, it came up to five-star, so to us that says that the current deemed to satisfy requirements are probably just about right. The proposed deemed to satisfy requirements are way over the top or, alternatively, AccuRate is incorrect. I suspect that the deemed to satisfy requirements are over the top.

**PROF WOODS:** Yes. So if you did things like some awnings on windows, west-facing in particular, I guess, but whatever, that's still with your 600 eaves, et cetera that you can get your five under AccuRate.

**MR OSTERHAGE:** Correct.

**PROF WOODS:** So AccuRate is not your problem in the sense of the current deemed to satisfy, subject to a bit of change in the deemed to satisfy. But what you're then saying is that to have to go further you're not going to get more than five stars anyway, so that the extra deemed to satisfy is where your concern is.

**MR OSTERHAGE:** Is overkill.

**PROF WOODS:** Is it particularly the eaves, the 900 eaves - and the battening and the insulation?

**MR OSTERHAGE:** And the wall insulation, yes. Increasing the roof insulation is neither here nor there, but it's mainly how you address the walls.

**PROF WOODS:** Having to do your batons and board and insulation.

**MR OSTERHAGE:** Correct.

**DR BYRON:** Most builders basically use the deemed to satisfy most of the time, don't they?

**MR OSTERHAGE:** The majority use deemed to satisfy. Building Codes Queensland hosted an energy efficiency workshop in Townsville earlier this year, I think in about February or March. They determined there that the majority of builders in Townsville use deemed to satisfy, because the current energy program which is predominantly used in Queensland, which is BERS, or even FirstRate, don't really accurately take into account ventilation, and in Queensland we rely a lot upon on ventilation. We believe that a lot of the energy efficiency provisions - - -

**PROF WOODS:** Does block construction allow too much ventilation?

**MR OSTERHAGE:** As long as you've got enough windows. But we think that a lot of the energy provisions, deemed to satisfy and perhaps even the software programs, have been developed to address heating in southern Australia. I mean, in Queensland we rely a lot on shading, we rely a lot on ventilation and, as the ABS study showed, only 38 per cent of homes in Queensland in 2002 were airconditioned.

**PROF WOODS:** I suspect that's a bit higher by now.

**MR OSTERHAGE:** It would be, but even so, if you look at the objective of the Building Code of Australia to reduce greenhouse gas emissions by efficiently artificially heating and cooling, using energy to artificially heat and cool, we believe it's probably overkill in Queensland. It may not be in southern states, but in Queensland we see a problem.

**DR BYRON:** But the guts of the computer simulation model, if I can put it like that, for NatHERS, AccuRate, FirstRate and so on, I understand were developed by CSIRO in Victoria.

**MR OSTERHAGE:** Correct.

**DR BYRON:** A number of people have said to us that, even if those rating systems are reasonable accurate for the sort of construction that they were designed and tested on, they don't deal very well with an unusual building or something that is different. I mean, they don't cope, even the classic Queenslander, particularly well with some pole house that an architect has designed in Darwin or something. So even if they're accurate in doing a typical Melbourne house, they're not pretty accurate when you take them outside of that range. Is that your observation?

**MR OSTERHAGE:** Yes, in North Queensland, in Townsville, where there are some builders and architects who design lightweight homes - good shading, good ventilation - anybody who lives in those homes will say they've been designed for climate, they are cool, but when you get them rated on the software program they'll fail - the current software programs. So that's why the majority of builders in Townsville, for example, build to the deemed to satisfy and don't go down the verification pathway.

**DR BYRON:** But that's why ratcheting up the deemed to satisfy is likely to have a major cost consequence.

**MR OSTERHAGE:** Correct.

**PROF WOODS:** What's the solution? We don't want just formula-driven housing, but energy efficiency has merit. Can you foresee a situation where the software, through a series of iterations, will be sufficiently flexible to cope with innovative design, or are you somewhat pessimistic as to the future of using these softwares?

**MR OSTERHAGE:** I'm quite sure that the way technology goes, software will be designed in the future to take into account these specific design houses. An emphasis seems to be placed on glazing. You will get a good result if you tackle the glazing,

which has merit.

In Queensland, for example in Cairns, a lot of the builders in Cairns build homes where all of the windows have security screens on the windows and the householders leave the windows open during the day. So it doesn't matter what high performance glass you put in there, it's going to have no impact whatsoever. They leave the windows open, except for the prevailing weather side. They come home to a cool house.

**DR BYRON:** That's one of the other things about - I guess the code doesn't seem to make allowances for the way people use their house, and also the micro climate or whether it's at the top of the hill or the bottom of the hill or exposed to strong winds or something. We've also been given examples of people who want to build a house to catch a view on a particular site and have glass, and the computer says, "No, you can't have glass on that side of the house because the star rating would be too low." It seems to me that you can get into problems when you try and come up with a computer program that covers every conceivable eventuality.

**MR OSTERHAGE:** That's why I said there's a mismatch between the program and deemed to satisfy or alternate solutions under deemed to satisfy, which we don't believe the software programs at this point in time will address. They may in the future.

**DR BYRON:** Yes, but if somebody comes up with a really unusual type of house and they've got a very good reason for orienting it in a particular way, they can actually make the case, can't they, of why - - -

**MR OSTERHAGE:** Through deemed to satisfy, yes.

**DR BYRON:** Yes. But the onus is on them to prove that it would be equivalent in terms of performance.

**MR OSTERHAGE:** Yes.

**DR BYRON:** Do we have any idea how much it costs if anybody takes that route, to be able to document that the way you've done it is as good as either the computer simulation or the deemed to satisfy?

**MR OSTERHAGE:** I'm not aware of too many designers or builders who go down that route. Even if they did, they would have to convince the certifier to sign off on it. Just to give you an example, the performance requirement in the Building Code says that you can allow for a building next door as shading your wall, but I'm yet to find a certifier who will sign off on that.

**DR BYRON:** What happens if the building next door gets knocked down?

**PROF WOODS:** They're risk averse, is what you're saying.

**MR OSTERHAGE:** That's right. They look after their professional indemnity insurance.

**DR BYRON:** Rational. I've found all that very interesting, especially the details - the numbers, the facts and figures - in the two submissions. But I don't think I've got any other specific questions.

**PROF WOODS:** No. I was curious as to metropolitan Brisbane, but you've given me at least a broad order of what we're looking at there as well.

**MR OSTERHAGE:** Yes.

**PROF WOODS:** But no, I mean, there's a lot of very detailed calculation.

**DR BYRON:** So can I take it that you're in agreement with one of our draft recommendations in the sense that before rolling out and ratcheting up the changes that have been introduced over the last couple of years, it would be a good idea to have them independently reviewed to see how effective they've been?

**MR OSTERHAGE:** Absolutely. You can't demonstrate market failure otherwise.

**DR BYRON:** Okay.

**PROF WOODS:** Fair enough.

**DR BYRON:** Is there anything else you wanted to say by way of rounding up?

**MR OSTERHAGE:** Even though we have energy provisions in the Building Code of Australia, and for example the Queensland government proposing to ban electronic hot water systems, even if some of those matters don't get up, we are concerned that they get up by alternate methods anyway.

**PROF WOODS:** Yes.

**MR OSTERHAGE:** A lot of land developers now are possibly influenced by local government councils - that they put building covenants on the sale of a land which wouldn't require these things anyway.

**DR BYRON:** Yes. I'm glad you mentioned that. I was very struck with the covenant that was in your submission - the attachment - actually specifying the type of appliances that will be installed in the kitchen.

**MR OSTERHAGE:** Correct.

**DR BYRON:** Which seemed to me a very innovative use of planning controls. I don't think they specified what colour the curtains had to be, did they?

**MR OSTERHAGE:** No.

**PROF WOODS:** I like their phrasing. I mean, you've got the Building Code. You've then got override by local governments. The commission has done a previous inquiry that said, "Hang on, let's just have one set of rules, not two." But then here it says, "Notwithstanding the provisions of the BCA and local government regulations, the following considerations should be given to location of house," so layer 3 comes in over the top. I think it just proves the point that we need to rationally decide what's in the BCA and then allow for zonal variation to reflect climate et cetera and leave it at that.

**MR OSTERHAGE:** One of the things which concerns industry: industry wants a level playing field. If local governments put additional requirements on, it's a cause of concern for the industry. A builder may be building on one side of the street to a set of rules, and building exactly the same home on the other side of the street which might be in a different local government area and have to build to a different set of rules. What the industry calls for is a level playing field.

**DR BYRON:** Yes, I think that point has been made quite a few times before. It's not a bad point. Okay, thank you very much for coming. We'll move on.

**DR BYRON:** Now, are there people from the EPA who wanted to come and talk? No, okay. It's wide open then. Is there anybody who would like to come and give evidence to us on the record? Come and take a seat, introduce yourself, and thanks for coming.

**MR COLE:** I'm Peter Cole. I did a course at Ithaca College, in renewable energy. I thought I would put my thoughts down and I put in a submission, number 89, on a rough design on supplying energy using geothermal technology. Basically we drew a hole in the ground and - well, you would have to look at 89 for me to explain it. At any rate, I wrote down some things and I'd like to read them out, if I may.

**DR BYRON:** Yes.

**MR COLE:**

Inevitably, renewable energy will take over from fossil fuels, but while we still have a supply of fossil fuels and global warming gets worse and worse, now is the time to develop efficient renewable energy systems. Do not wait till fossil fuels becomes too expensive to use, both financially and environmentally. In the words of one of the government officials in Germany, those who don't invest in renewable energy won't have any energy.

If we supply the energy efficiently and use the energy efficiently, we would ensure a high standard of living for all. To supply renewable energy efficiently, we tap the forces of nature. I believe the two most efficient forces to tap are geothermal and tidal power. These forces are totally reliable and deliver efficient energy 24 hours a day, seven days a week. Supplying energy to the world is a trillion dollar business and these two forces are money in the bank and, if tapped efficiently, can supply us with more electricity than we can use.

That's just my view.

**PROF WOODS:** Thank you. Your background? You said you'd done a course.

**MR COLE:** Yes. I was a plumber before that, down in Victoria actually, and moved up here and hurt my back. So I took up taxi driving, and whilst taxi driving I did a course at Ithaca College and a business course at Caboolture.

**PROF WOODS:** Are you finding practical ways of improving energy efficiency even in your own lifestyle and activities?

**MR COLE:** The taxi industry for a start runs on LPG, so that brings the cost down. We've managed to reduce the electricity uses in the house by just changing the light bulbs to fluoros, which is not a great cost. You just each week buy a few fluoro bulbs and change them over. When we were doing the efficiency, the course in Ithaca College, we went and saw houses that had solar power, solar panels - about 16 amps, I think they had - and they had solar hot water services as well. One bloke had a family - teenagers and that - and his power bill came to \$60 for the three months.

**PROF WOODS:** Yes, fairly impressive.

**MR COLE:** Yes, but it was very expensive to set up.

**PROF WOODS:** Yes, the capital cost is - - -

**MR COLE:** Like, he said the capital costs are - you know, it takes a long time to get it back.

**PROF WOODS:** Yes.

**MR COLE:** Putting it on new houses would be a definite problem, because it would bung the price of the house up for sure. So the owner really needs some incentive to do that, you know. Maybe the tax on houses when you buy a house could be - you take the tax off to cover the cost of the solar panels and the solar hot water service, bring them into equal and give the owner the choice whether he has - you know, don't make it compulsory but give the owner the choice whether he pays the tax or pays for solar panels and solar hot water services. It could be a go.

**DR BYRON:** Okay. Have you had any personal experience with either geothermal or tidal energy generation?

**MR COLE:** Have I had any experience with it?

**DR BYRON:** Yes.

**MR COLE:** I'm just struggling to do the calculations on it but I worked out - the pipes would have to go in underground. Just try and visualise this: five kilometres squared of pipes all underground and the bottom of the pipe is low tide and the top of the pipe is high tide. That will produce over 200 cubic metres of air being forced out the end of that pipe per second. That's what I calculated.

**DR BYRON:** There was a proposal I think in Western Australia, an area where the tide comes in and out very fast, and they were going to put a hydro-electric station

there to basically use the tide to drive the turbines in both directions.

**MR COLE:** Yes.

**DR BYRON:** I was wondering if that was the sort of thing you had in mind.

**MR COLE:** No.

**DR BYRON:** Then there's this other - I think it's in South Australia where they're doing the hot dry rock thing.

**MR COLE:** Yes.

**DR BYRON:** Where you drill two holes down into the hot dry granite - - -

**MR COLE:** Right.

**DR BYRON:** - - - put water in and steam comes out.

**MR COLE:** Comes out the other end, yes. I heard about that. I've never seen it.

**DR BYRON:** No. I was just wondering if you had anything in particular in mind.

**MR COLE:** With the tidal, I've built at home a bypass system where, if you pump air into it or suck air out of it, the wheel spins in the one direction. I took it to a couple of developers to try, but they weren't really interested. They were more interested in getting into the American market with, you know, better can openers and stuff like that. So I've got this - you know, it's not really an expensive thing. I think it cost me \$80 to build. That's just - well, yes, I'm thinking of taking it on The New Inventors and see if someone will pick it up.

**DR BYRON:** Yes. That sounds like the way to go.

**MR COLE:** Yes.

**PROF WOODS:** All right. No further questions from us.

**DR BYRON:** Thank you very much.

**MR COLE:** Thank you.

**PROF WOODS:** Thank you.

**DR BYRON:** Is there anybody else? I think we're all done for now. Thank you very much for coming, ladies and gentlemen, and the public hearings will resume tomorrow morning in Sydney. Thank you.

AT 12.50 PM THE INQUIRY WAS ADJOURNED UNTIL  
TUESDAY, 31 MAY 2005

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