

**ECONOMICS AND INDUSTRY
STANDING COMMITTEE**

**INQUIRY INTO THE ECONOMIC IMPLICATIONS
OF FLOATING LIQUEFIED NATURAL GAS OPERATIONS**

**TRANSCRIPT OF EVIDENCE
TAKEN AT PERTH
WEDNESDAY, 13 NOVEMBER 2013**

SESSION TWO

Members

**Mr I.C. Blayney(Chair)
Mr F.M. Logan (Deputy Chair)
Mr P.C. Tinley
Mr J. Norberger
Mr R.S. Love**

Hearing commenced at 10.50 am

Ms LEANNE HARDWICKE,
General Manager, WA Division, Engineers Australia, examined:

Mrs HELEN PEDERSEN,
President, WA Division, Engineers Australia, examined:

Mr FRANCIS NORMAN,
Engineer, WA Division, Engineers Australia, examined:

The CHAIR: Welcome. On behalf of the Economics and Industry Standing Committee, I would like to thank you for your appearance before us today. The purpose of this hearing is to assist the committee in gathering evidence for its inquiry into the economic implications of FLNG. You have been provided with a copy of the committee's specific terms of reference. At this stage, I would like to introduce myself and the other members of our committee. I am Ian Blayney, the Chair; Hon Fran Logan, Deputy Chair; Jan Norberger; Peter Tinley; and Shane Love.

The Economics and Industry Standing Committee is a committee of the Legislative Assembly of the Parliament of Western Australia. This hearing is a formal procedure of the Parliament and therefore commands the same respect given to proceedings in the house itself. Even though the committee is not asking witnesses to provide evidence on oath or affirmation, it is important that you understand that any deliberate misleading of the committee may be regarded as a contempt of Parliament. This is a public hearing and Hansard is making a transcript of the proceedings for the public record. If you refer to any documents during your evidence, it would assist Hansard if you could provide the full title for the record. Before we proceed to the inquiry's specific questions we have for you today, I need to ask you the following questions: have you completed the "Details of Witness" form?

The Witnesses: Yes.

The CHAIR: Do you understand the notes at the bottom of the form about giving evidence to a parliamentary committee?

The Witnesses: Yes.

The CHAIR: Did you receive and read the information for witnesses sheet provided with the "Details of Witness" form today?

The Witnesses: Yes.

The CHAIR: Do you have any questions in relation to being a witness at today's hearing?

The Witnesses: No.

The CHAIR: Would you like to make an opening statement for us?

Ms Hardwicke: I would, please. Thank you very much for inviting us to attend today. We really appreciate the opportunity. Today, we are here to represent the engineering profession. I just wanted to mention a little bit about Engineers Australia first and about engineering to give you a better understanding of what it is all about. Engineers Australia is the peak representative body for professional engineers, engineering technologists and engineering associates. We have more than 100 000 members Australia-wide from all disciplines of engineering and we have over 16 000 members here in WA. As a professional association, we set and maintain professional standards for our members and these are benchmarked against international educational and practice standards. We encourage the development of engineering knowledge and competencies, and facilitate the

exchange of ideas and information. We also have a key role in informing community leaders and decision-makers about engineers and engineering issues.

Engineers and engineering have been indispensable contributors to Australian prosperity and lifestyles. Engineers have practical skills to fix practical problems. They design, build and manage Australia's critical infrastructure and engineers make ideas work to strengthen the community. Without engineers, our critical infrastructure would fail. Engineers provide advice for decision-makers who are transforming the economy, and Australia needs to build a strong engineering profession to support our ambitious nation building efforts. Engineers are vital to the success of many major policy initiatives including infrastructure, energy, the national broadband network, and sustainability initiatives across the country. We work to build Australia for future generations. Engineering innovation is essential to transform the economy to a high value, high tech future. We provide solutions to decision-makers about practical problems and the challenges facing us.

The skills and expertise of engineers are actually unique. A lack of engineering skills can result in serious risks to safety, productivity and progress. While engineers are trained and equipped to do many different jobs, the reverse is not true and people trained in other skills are simply unable to function as engineers, so we believe that Australia must maintain a strong engineering skills base. Having said that, it is also important to understand that engineering knowledge is growing at a rapid pace as industry constantly looks for new ways of doing things. Technological shifts means that the skills needed today will be different from what is needed tomorrow. To become a fully competent engineer, lengthy training is necessary. Academic entry level courses are up to four, sometimes five, years in full-time study and this is followed by a period of practical experience and professional formation of a minimum of three years. There are numerous fields of specialisation in engineering, and while large areas of knowledge are common across most fields of engineering, career development and the acquisition of practical experience occurs within specialisations so that in reality there is limited and at times no substitution between engineers from different fields. Practical experience is critical in determining an engineer's capacity to make independent engineering design decisions and in meeting the requirements of many projects and positions.

Until recently, there was a large shortage of engineering professionals in a number of disciplines, principally because the domestic graduation rates were not sufficient to meet the rapid growth of the resources sector, and the temporary business migration process was not providing sufficient qualified and experienced engineers. For instance, between 2001 and 2011, the average annual growth in demand for engineers for Western Australia alone was 8.6 per cent compared to Victoria, which was 3.4 per cent. The sharp slowing of the WA economy has resulted in a lessening of demand for engineering services. For instance, in 2011, demand reduced in WA by 23.9 per cent, but this result needs to be seen in the context that it followed an increase in demand in 2010 of 45.5 per cent.

Western Australia is heavily reliant on engineering-dependent sectors of the economy. Under the ABS categories, these are mining, including petroleum; construction; manufacturing; and professional services. These sectors account for over 57 per cent of the state's economic output, and these four closely related sectors provide employment for about 40 per cent of the state's full-time workforce and also employ over 40 per cent of the state's engineering professionals. Since 2006, we estimate that the number of engineers in Western Australia has increased by 54.3 per cent to around 35 000. Although we do not have specific data for WA or for the oil and gas industry as a whole, the latest census data shows that Australia has around 3 500 engineers working in the oil and gas extraction field. This does not include all the other facets around the construction and operation of oil and gas facilities and the wider support and supply infrastructure. Changes in technology and industry drive changes in the required skills base and bring with it many opportunities. The resources industry most likely continue to be the state's dominant demand driver for engineering goods and services and, hence, engineering capability and engineering professionals. Many of the construction projects for the resources sector have been or are nearing completion. As projects

move to their operational phase, the type of engineering input likewise changes from design and construction to operations management, maintenance, upgrades and expansion.

In terms of oil and gas facilities, we are seeing an industry in transition. As outlined in our submission, engineering design for any new process plant follows a strict and structured sequence: concept select, front-end engineering and design, and detailed design. These phases include areas that have to comply with Australian design standards and safety codes. This work is often performed by Australian engineers either resident in Australia or working overseas in one of the project design centres. Historically, LNG plants have been designed in overseas locations and this means that we have little current design experience in Australia for such technology. The same applies for the design of a facility of the scale of an FLNG facility. On the other hand, subsea infrastructure is regularly designed by Australian companies or Australian offices of international companies using either completely domestic-based workforces or through split execution of the work. This approach would work for FLNG. At any given time, there are a number of Australian engineers and design personnel working in international design offices for projects in Australia. So, while much of the design of facilities like FLNGs may be undertaken overseas, it is often done by teams with Australian personnel as part of them.

In terms of manufacturing and fabrication of topside modules for an FLNG facility, this is a large and complex undertaking that requires specialised handling and requires large port facilities. Local labour and shipping costs can mean it is not cost effective. Similar modules for onshore plants are typically fabricated overseas in locations and shipped to Australia. Inspection and testing of the finished modules must be done to recognise Australian standards and this work can only be undertaken by licensed Australian personnel. Similarly, in many cases, the components used must comply with appropriate Australian standards necessitating their supply from or through an Australian supplier.

[11.00 am]

Western Australia will be the first location in the world to have FLNG deployed into its offshore oil and gas industry. In our submission, we outlined the limited opportunities for Australian participation in the construction of an FLNG installation. It is the operational phase where the greatest potential lies for the Australian engineering fraternity to be engaged with the technology. The facilities will be in situ for 15 to 20 years in each field and during that time will require operational personnel from many professions, including operators, engineers from many different disciplines, technicians and support personnel, virtually all of whom can be sourced from the existing skill pool in Western Australia. The facilities will require ongoing maintenance, both ad hoc full-time maintenance engineers and technicians based on the facility, and planned maintenance undertaken by combinations of offshore and onshore personnel. Much of this work would logically be undertaken by Australian-based engineers and technicians. There will also be ongoing modifications required, both as the FLNG technology becomes better understood and as the field characteristics change over time. Australian engineers working with the original facility designs could readily perform this work.

Australia is a recognised world leader in the complex and technically challenging field of remote operations. This, coupled with the potential number of FLNG facilities in Western Australia, makes us well placed to potentially become a world leader in the knowledge base of operational support of FLNG facilities as they evolve and become more commonplace. WA's engineering sector will continue to be a key contributor to the long-term viability of the state's economy. Both government and the private sector need to focus on maintaining international recognition of the quality of WA's engineering services and work together to ensure the sector is well positioned for future opportunities, both domestically and internationally.

In order to provide more in-depth information today, I am joined by our division president, Mrs Helen Pedersen, who is a chartered practising structural engineer, and our division vice-

president, Mr Francis Norman, an engineer who has many years' experience in the oil and gas sector. As representatives of Engineers Australia, we welcome the chance to provide our views to the committee and we thank the committee for this opportunity.

The CHAIR: Thank you for coming along. You did not mention that engineers have saved a lot more lives than doctors.

Ms Hardwicke: No, we did not; but it is quite true, thank you!

The CHAIR: It is one of your favourite lines, I know!

Mr F.M. LOGAN: Thank you very much indeed for coming along. Sorry, Leanne, but you did make a statement earlier on that historically LNG trains are done overseas. Well, that history only goes back to train 4 of the Burrup. I mean, prior to that everything was done primarily here in Western Australia with some input from overseas. Can you give the committee some feedback on what happened, what was the impact on engineers here in Western Australia or Australia, when the decision was made to then do train 5 completely overseas in London? From that point in time, all other LNG train engineering has been done overseas. We hear various information from various sources about the overall impact, the number of engineers that left Australia because there was simply no work for them.

Ms Hardwicke: Engineering is a highly mobile international profession, so they move around quite a lot in any event. There have been concerns expressed about Australia losing a lot of expertise in this particular area. I cannot say from a Western Australian perspective how it impacted, because I was not here in Western Australia at the time. But I can say overall, I think, there has not been a gigantic impact because a lot of the companies that have been designing and building these facilities have included Australian engineers in their teams.

Mr F.M. LOGAN: That is not what I hear. I mean, there were very, very large numbers of engineers involved in the LNG trains 1 to 4 here in Western Australia—large numbers. Those numbers were not replicated overseas; it was a handful of people in their London offices overseas.

Ms Hardwicke: I do not know.

Mr Norman: I was not working in Western Australia at the time, so I cannot really comment on how that came about.

Mr F.M. LOGAN: One of the issues that has been raised by various companies in the move to FLNG and to doing design work overseas is that Western Australia and Australia do not have the capacity to do any of that work. We are not talking about fabrication and construction; we are talking about engineering. What is Engineers Australia's response to that?

Mr Norman: In terms of raw numbers, there are enough engineers here. I think the differential that arises there is the experience and the skills. A vessel of the size of an FLNG facility is not something that has been designed here in the past—that size of barge—likewise, the design for the topsides. Going back to what happened after train 4, I guess, when those skills went away, they are not here anymore. To try and rebuild all of that here would be a very onerous undertaking for those involved in putting those projects together. I suspect they would have to bring in a large number of overseas engineers to work with the people. Given that they already have design centres in places like London, as you mentioned earlier, to relocate those people for one project would probably be problematic for them as well.

Mr J. NORBERGER: You pointed out in your submission that, obviously, a lot of the parts, various parts, under the modular system are now being manufactured throughout the world—overseas—but that in fact represented an employment opportunity for Australian engineers, because generally they will get seconded to be in these locations to oversee that manufacturing to make sure that that manufacturing is actually being done to Australian design specifications. I suppose in contrast we hear from a lot of the fabricators here in WA that they are getting a huge amount of

rework where things are being manufactured cheaply overseas; coming here; falling way short of safety, design—you name it—standards; and then needing to go through a rework phase before they can be installed. So where is the disconnect? If we have got Australian engineers, as you say, overseeing these things, are our engineers not doing a good job or is it the case that we do not have Australian engineers overseeing it or are they just token?

Mr Norman: I guess we cannot speak for specific projects or specific parts of projects, but certainly I have heard the same stories, as you are talking about, where some projects have had problems with equipment arriving in Australia theoretically ready to be used, which once it is inspected proves not to be. It comes down to having sufficient numbers of people deployed into these places with the right skills and with the right level of knowledge and experience. The people executing the projects themselves would have to be the ones that could actually answer that question for you in a specific —

Mr J. NORBERGER: So you are not getting any feedback from your membership base? You mentioned that they need to have sufficient numbers. You could have members saying, “This is crazy! I’m on my own over here and the work that I’m supposed to be overseeing is way beyond what I’m capable of”, and that is why things are slipping through the net; or, “I’m telling everyone it’s not right, but they’re basically telling me to shut up.” I would have thought that as the peak body for these sorts of engineers, they would maybe come to you and vent their frustrations, if in fact they have some.

Ms Hardwicke: We have not heard as an organisation any of those comments back to us.

Mr P.C. TINLEY: You talked about the mobility of the engineering skill set. Obviously, here the cost differential in terms of engineering labour is significantly higher compared even with the UK. Is that your experience or understanding of members?

Ms Hardwicke: Do you have an answer, Helen, for the cost of labour here in Perth?

Mr P.C. TINLEY: The cost of engineering. We have heard figures as much as 30 per cent higher to have the same work done here as opposed to the UK, for example—Reading or something.

Mr Norman: I have certainly heard similar numbers. It fluctuates, obviously, with the exchange rate, but I have heard similar numbers that there are substantial cost differences.

Mr P.C. TINLEY: For the purposes of the record, do you think, though, the contribution of the exchange rate and the depressed economic circumstances of Europe have fed into that at all?

Mrs Pedersen: I certainly think that engineering companies are looking internationally to see where their lowest cost centres are for doing design, and they are certainly moving to make their engineering more capable of being done in low-cost design centres, so work packaging and sending overseas is becoming a lot more common.

Mr R.S. LOVE: I guess the inquiry is trying to get a grip of what the differences will be in the landscape if FLNG is a reality in Western Australia. From the sound of it, there has not been a lot of work. Correct me if I am wrong, but there actually is not a lot of work now in LNG for Australian engineers. Is that what I am hearing from you?

Ms Hardwicke: Because the construction phase has wound down, that part of the work for engineers in Australia is winding down as well. But the operations and the maintenance area is the one where we need to turn our focus to, unless there are some more projects that are going to be constructed.

Mr R.S. LOVE: That is what we are trying to get to the bottom of, because the construction phase is not wound down; it is actually expanding rapidly, in a sense, but the methodology of the extraction is moving from onshore to offshore. But that is not to say that construction is winding down; it is shifting overseas. So is there actually a negative to your professionals in that occurring or not?

Mr Norman: In the engineering going overseas? For those engineers who would otherwise be engaged with designing here in Perth, then there will be a negative.

Mr R.S. LOVE: But if you were not being engaged to design the related onshore components anyway, what were you actually doing in construction? What is the negative effect for your people, if there is any? There is a whole series of positives we will talk about later that you highlighted in your submission, but what are the effects on the engineering community from a change to FLNG?

Mr Norman: Some of the specific skill sets required by the people to be involved in an FLNG facility as opposed to an onshore plant will be different. In the short term, at the moment, if hypothetically there was another plant being built onshore, then there would be a need for people to be involved with infrastructure that would be required, associated with those plants.

Mr R.S. LOVE: Do you have any numbers of engineers, like 500 or 1 000—how many are not going to be able to afford to buy a pizza for the family? What is the effect on the engineering scene in Western Australia?

Mr Norman: I do not have particular specific numbers in terms of how many engineers would be involved or would not have been involved in these. I do not know whether we have seen any numbers for anything else.

Mrs Pedersen: But from a skills development space, I guess, when you have a project locally, it is not just the senior engineers on the job that are designing the bulk of it; you are also exposing a whole heap of other people to that industry. You have got graduates coming through; if you have got a project locally, you can bring graduates in to learn the industry and so forth. When we are starting to look at supporting operations and so forth, you need people who understood the design to be able to implement that knowledge in operations and maintenance as well. So, there is potentially a negative impact in terms of the future members of our profession.

Mr F.M. LOGAN: Let us do a comparison of one to the other. In the construction of the Chevron Wheatstone project and the Gorgon project at the moment, you have pipeline engineers, structural engineers, mechanical engineers, electrical engineers, petroleum engineers—the list just goes on and on and on. In FLNG you have only a handful of those; they will not be needed. So, it leads on that the impact would be larger than we assume—correct?

Mrs Pedersen: I guess the difference is that these developments are so far offshore that it is not viable to have that kind of onshore development. So if you are talking about developing or not developing, then you have FLNG or nothing; it is not FLNG or onshore.

[11.15 am]

The CHAIR: What we are learning about the FLNG process is that the whole system has to work on a continuous maintenance basis rather than major shutdowns. The question I have about that is, if there was a work crew of 150 or 200 people on there doing maintenance, do you have any idea if there is a ratio of engineers to people working? Do you have an idea about whether there would be such a ratio? The other thing is, I would assume that the branch of engineering that is dealing with this floating LNG would be a specialised branch, would it not? Should we now be putting in place a course, and how difficult would it be to put in place a course, to train engineers specifically for this branch of engineering?

Mr Norman: I do not believe there would be a specific fixed ratio. It would depend on what type of work was being undertaken at the time.

The CHAIR: If they were doing maintenance work on one of these—whatever you call them—vessels, there would have to be one or several engineers there, would there not?

Mr Norman: Yes.

The CHAIR: Okay; so they would not work without one. UWA seems to be the one breaking its neck to get into this area; how hard would it be for it to have another course that runs parallel with its other engineering courses to specifically train people in FLNG?

Mr Norman: Most of the engineering discipline sets that would work with FLNG would be the traditional mechanical, electrical and chemical engineering.

The CHAIR: So it is putting together another course out of existing units with maybe one or two specialised things in there.

Mr J. NORBERGER: As a follow-up to the Chair's question, how many of your members are currently working for companies like Technip or whatnot on FLNG, either in Australia or abroad? How many Australian engineers are able to get exposure to this technology and get the experience?

Ms Hardwicke: We just do not have access to that information. We do not actually collect data on where our members work. As a professional association, we focus on accrediting university courses and competency standards. In the past we have not collected all that industry data about where they are and where they are moving to. That is something we are looking to do in the future, but we just do not have the information at our fingertips at the moment.

The CHAIR: Yes.

Mr F.M. LOGAN: In your submission I noticed that you have also followed the companies' mantra that Australia could become a world leader in the knowledge base of operational support of FLNG facilities. You may be aware, if you have seen what has been in the newspapers—you will be aware once you see the submissions that have come in to our committee—that the likely number of people to be employed at any one time on a FLNG facility is anywhere between 200 and 300 people, and probably less for the Bonaparte project because it will be a smaller production. And then the backup in the offices would probably be about the same number as it is today—anywhere between 800 and 1 000 people. How do you see that Australia is well placed to become a potential local leader in this field, given the fact that whilst there are a number of full-time jobs for both engineers and technical people over the life of the project, the actual physical number of jobs, particularly for engineers, is not that many?

Mrs Pedersen: You are talking about people directly employed by the company in direct operation and not looking at the wider industry in terms of support for that.

Mr F.M. LOGAN: Yes, directly employed by the companies. They will have a permanent maintenance crew on board and there will only be shutdowns from time to time.

Mr Norman: There is a second tier of engineering companies that provides support to each of those operators as well, so there would potentially be more people in there. In framing our submission, our thoughts may have been aspirational, but potentially having several of these things operating off our coastline, there would—maybe critical mass is not the right term—be a large enough number of these that we would, just through our exposure to them, build up our knowledge base here.

Mr J. NORBERGER: Prior to coming to today's meeting you have been quite vocal on this issue, which I suppose you have every right to be and probably understandably so, seeing that you are the peak body representing engineers in Australia. Could you outline what activities you have done, and what you are doing, to advocate the best possible outcome for engineers, in the likelihood that the FLNG future is the way to go and modularisation follows the route it is going, as well as the flow-on effect that will impact engineers? What is your advocacy program and what are you guys doing to get in front of some of these big decision makers and rattle the chain on behalf of Australian engineers? You represent 100 000 of them.

Ms Hardwicke: We have an ongoing program of talking to decision makers right across the board, both industry and government, about the need to maintain an Australian skills base and the need for constant innovation. We certainly talk to the tertiary sector and universities an awful lot because we

accredit their engineering programs. We talk about making sure that those elements are part of their programs so that we are actually delivering graduates who are able to be innovative thinkers at the other end and not stuck in traditional disciplines. In terms of a set-down advocacy plan, it is just part and parcel of our everyday discussions. We consistently and constantly have interaction.

Mr J. NORBERGER: How successful would you suggest those have been?

Ms Hardwicke: Over the last couple of years our advocacy program right across Australia has been increasing. I believe that the reputation of the engineering profession has gone up and that decision makers are actually listening to us and seeing the need to have a well-recognised engineering profession in Australia. If you go back twenty years, people did not know what engineers did; they thought it was something to do with roads and bridges maybe, or something to do with a building. I think that decision makers and industry leaders are now seeing the importance of engineering in underpinning just about everything we do in our economy.

Mr J. NORBERGER: Mind you, I would have thought that these big oil and gas companies would have already understood the value of engineers. I think they would have seen them in their true value. The real key comes back to the opportunities for Australian engineers. Francis, earlier you said that in your initial submission you may have been a little aspirational; has your viewpoint changed? We obviously read your submission with some interest. It was written with passion, which we would expect from a representative body. Would you say your viewpoint has changed since then?

Mr Norman: I still believe that the opportunities are there for us to continue engaging with both the operators and the design houses that are designing these things and to try and get the best we can for our members here.

Mrs Pedersen: We certainly get feedback that Australian engineers are very valued overseas. They are seen as hardworking, innovative and knowledgeable. We are trying to build a profession that can work globally and is well respected overseas. From a positive perspective, we hope that a lot of Australian engineers will be involved in these projects just by virtue of the fact that they are Australian engineers and they are well respected.

Mr J. NORBERGER: Is that what we are telling our potential uni students: do this course so you can leave Australia, because you are not going to find any work in Australia? It is basically a course to become an ex-pat.

Ms Hardwicke: It is also a course to come back to Australia. We find that our engineers might go overseas, but then they return.

Mr P.C. TINLEY: Engineers Australia manages the register of engineers, yes?

Ms Hardwicke: No, there is no registration system in Australia.

Mr P.C. TINLEY: In Queensland there is.

Ms Hardwicke: In Queensland there is, but we do not manage the register. The Board of Engineers in Queensland manages it. But what we do is act as an assessment entity for the board. We actually test the competency of the engineers.

Mr P.C. TINLEY: Looking at the Queensland model, it seems to me that for the members who seek and get put on that registry there has been some success in terms of the work that they get. That is anecdotal because I have only asked the questions around the various departments over there. But why does your organisation not promote the idea of a register for engineers across the country?

Ms Hardwicke: We are and we do advocate very strongly for a national registration system. We have been in talks with the government here for a long time about getting a registration system for engineers up.

Mr P.C. TINLEY: In that process, given that this is a design compliance and safety issue as much as an economic issue, why would we not insist that any engineer working on any project in Western Australia, regardless of where that engineering is done, be accredited on our list—if there was such a registry. Is that a fair statement?

Ms Hardwicke: If you are talking about the impact on public health and safety, then yes.

Mr P.C. TINLEY: No, I am talking about the fact that if we had a register of engineers in the state of Western Australia and we are having these projects designed in Reading, or pick a site, that the engineers working on those should be accredited to an Australian standard.

Ms Hardwicke: We would have to agree.

Mr R.S. LOVE: At the end or through the body of the submission you made, you spoke about some opportunities that might specifically come from FLNG, like subsea anchors, risers and those types of thing. How do you see the Western Australian government best being able to encourage as much work as possible to be done by Australian firms and thereby your members? What would you like to see from the government to encourage that?

Mrs Pedersen: I guess raising awareness of the capabilities would be one and assisting the capability. The maritime complex in Henderson provides our industry with a much greater capability to deliver on projects, so providing infrastructure is another. If we look at the operations and maintenance phase, some sort of engineering study of the infrastructure required to support these facilities would be forward looking and would provide Australian suppliers with the opportunity to get involved in that phase. In terms of the construction phase, I suppose it is looking at what infrastructure we have at the moment to assist in the delivery of those and in assisting suppliers to be aware of the supply chain processes.

Mr R.S. LOVE: If you are being delivered a module or a FLNG system that you have no knowledge or experience of, would you expect to have any engineers employed in its maintenance? Or, as a professional or collegiate group in Australia, would you feel that at some stage you actually need to be part of and involved, if not in the actual development of it, certainly in keeping pace in some way with what is actually being delivered, so that when the big vessel arrives offshore, there are people here familiar enough with it to participate in its operation? And, how would that be achieved?

Mrs Pedersen: I am not sure how it would be achieved, but I do think it is very important.

[11.30 am]

Ms Hardwicke: Perhaps one of the ways that Engineers Australia could assist its members is we currently hold a lot of CPD sessions and technical sessions to share information between the engineering disciplines and within specific disciplines, and we will certainly be seeking to make sure that that information was brought to our members by all sorts of different means—it could be a speaker talking to the engineers locally, or the beaming in of a webinar or something from overseas. That is what our organisation would do to keep our engineers abreast of what is happening and to share the technical knowledge.

The CHAIR: You would have actually had members, I would assume, up in Korea working on that Prelude investment now, would you not?

Ms Hardwicke: There could well be.

Mr Norman: There could well be. As the lady said earlier, we do not actually track where our members are but there will certainly be people from the operating company up in Korea. We would certainly like to think that a number of those will be Australian —

The CHAIR: On the Shell website there is an interview with an Australian girl—I am pretty sure she is an engineer—who is working on the project. I do not think she would be there if she was not an engineer.

Mr J. NORBERGER: If she is not a member, you guys should sign her up.

The CHAIR: Maybe she's a Korean pretending to be an Australian.

Mr R.S. LOVE: With respect, I was actually trying to get some evidence on how they could actually see that developing. I do not get the feeling that there is a concept amongst the local business community of how to get involved with the operations of this FLNG technology when it arrives. I do not know what you guys do in terms of representing your members, but if you want to get involved in this, I would have thought that you need to be staking out a position as to how you see your members participate in this industry, which will arrive one way or the other, off our shores very shortly. I am not getting that sort of roadmap from anyone at the moment. I suppose I am looking for clues. We have been to universities and we have seen a few guys playing around with a couple of machines and the like, but there does not seem to be any concerted effort to get Australian people into the operation of this technology. Have you got any thoughts on that or anything other than what is in the submission?

Ms Hardwicke: We are a professional association and we represent individuals rather than companies, so we do not have the company intelligence in terms of what the local companies are doing to get involved. For instance, we have an oil and gas facilities group consisting of the engineers who work in oil and gas facilities. I would bet my bottom dollar that their future program would certainly involve big discussions around FLNG.

Mrs Pedersen: It has.

Ms Hardwicke: It already has.

Mr R.S. LOVE: So is there a group within your organisation that specialises?

Ms Hardwicke: Yes.

Mr J. NORBERGER: I am hazarding a guess here that Francis and Helen are both engineers. Can I assume you actually have day jobs, and I mean that in a nice way? Do either of you or other members of the committee or your state executive—I am not quite sure what terminology you go by—currently work for an oil and gas company?

Mr Norman: I do not work for an operator, but a small oil and gas consultancy.

Mrs Pedersen: I do not. I am in the mining industry.

Mr J. NORBERGER: What about in the broader context? I do not expect you to know 100 000 of your members, but you are a state executive and I imagine you would know, reasonably well, how many people in your state executive are actually working for an oil and gas company?

Ms Hardwicke: Two.

Mr J. NORBERGER: Do you think that that helps your organisation in regard to the advocacy and what you are hoping to achieve, or is that seen as potentially a conflict? Will they be worried to speak up because they do not want to put their job in jeopardy?

Ms Hardwicke: As an individual they would probably not be in a position to speak because of the restrictions that all companies put on their employees, which is why Engineers Australia represents engineers. We do not see the conflict because we do not have a close relationship with particular companies. Like I said, we represent individuals. The issues we deal with are around engineering-related skills-based education issues, and those types of things. Having different disciplines and people from different companies actually assists us to look at the bigger picture and to get an understanding of what the issues are from all parties, so, no, we are not influenced by any particular party.

The CHAIR: In your submission you say that —

... Australia is well placed to potentially become a world leader in the knowledge base of operational support of FLNG facilities ... potentially placing Australia at the forefront of the understanding of such complex operations.

How will knowledge derived from being involved in FLNG operational support compare to knowledge built up by Shell over several years of designing FLNG technology; and, flowing from that, can field observations truly compete with the ability to conduct research by repeated simulation such as that done at the Maritime Research Institute in the Netherlands?

Ms Hardwicke: I do not know that we can answer that.

Mr Norman: We certainly cannot comment on the research at the Maritime Research Institute in the Netherlands. I am not aware of what is happening there. The design of any kind of industrial project is done with the end goal of finishing that project and delivering it to the clients, and then you move onto the next project. Sometimes you have the opportunity to learn, as the designer, from what has been done and take some of that knowledge onto the next project. Sometimes you do not. When you are the recipient of that project, you have to work out how it works, which bits work and do not work as well as were expected, what you can change, what you can expand, what you can learn from and how they perform all the time.

The CHAIR: You do not have to answer this question, but what do you think Shell's mindset will be? Will its mindset be, "How can we sneak engineers into Australia from our other operations to be used on this platform?" Or do you think it will be thinking, "Yes, we really want to train up Australians to be the world leaders in this area"? As I said, if you do not want to answer it, do not answer it.

Ms Hardwicke: I do not think we can answer on behalf of Shell.

The CHAIR: But presumably you probably had some exposure to it and its mindset. Shell will tell you that it has been in Australia for 106 years. It is now the largest foreign investor in Australia. It very much sees Australia as a quite important part of its world and if it invests that amount of money in the country, it has confidence in its long-term future here. At the same time, if it suits Shell to do something a particular way, it might be happier doing it that way, so it is up to us to put rules in place so that our people get trained up to do those jobs and that Shell is not just flying people in to do them. It is probably not a fair question to ask you, so we will move on.

Mrs Pedersen: We are dealing with individuals and part of that involves maintaining relationships with companies so that we can continue to deal with their individual engineers on a professional basis and maintain their skills. We need to be in a cooperative consultative space. If companies came to us and asked how we could assist with getting up a course at a university to help train people in this field, then our accreditation fields would be right onto it. We can help out with how individuals gain skills. We are not in the business of telling industry how to run its business.

Ms Hardwicke: But we are in the business of asking industry to make sure that we train up enough engineers and that they have enough programs to take on graduates and put them through that formation phase so they can become the best engineers they can be, and later on become chartered or available for independent practice, and that is something that Engineers Australia constantly pushes with industry; that is, that we need to have an Australian skills base here in engineers.

The CHAIR: Forecasts say that by 2020, 80 per cent of the world's engineers will be in China and India. What arguments are there for not outsourcing engineering services overseas to lower the cost?

Ms Hardwicke: It is all about the terminology in terms of what you classify as an engineer. A lot of the engineers produced by China and India are not at the professional engineer level. They are actually at the engineering technologist and associate level, and sometimes lower down the chain,

so it might be someone who is actually a trades-based engineer. I think those numbers are a bit rubbery. If you are talking about full-on qualified professional engineers who do most of the sign off on design work, yes, they might have an overwhelming number, but I think everyone else also has a stake in the game.

The CHAIR: That is a positive answer. Have we got any more questions? I would like to thank you for your evidence before the committee today. A transcript of this hearing will be forwarded to you for correction of minor errors. Any such corrections must be made and the transcript returned within 10 days from the date of the letter attached to the transcript. If the transcript is not returned within this period, it will be deemed to be correct. New material cannot be added via these corrections and the sense of your evidence cannot be altered. Should you wish to provide additional information or elaborate on particular points, please include a supplementary submission for the committee's consideration when you return your corrected transcript of evidence. With that, I would like to thank you very much for your attendance today.

Ms Hardwicke: Thank you.

Hearing concluded at 11.42 am