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Ecolibrium



LEEDer
of the pack

A Sydney stadium impresses.





Son rise,

A third-generation member of AIRAH, **Peter Dobney, F.AIRAH**, has enjoyed a career of considerable variety and influence. After starting professional life as an HVAC engineer, he concluded it by managing energy contracts for major Australian manufacturers. Ecolibrium editor **Matt Dillon** spoke to Dobney on the occasion of his retirement, asking him to reflect on the memorable moments and lessons.

Ecolibrium: You have been involved in some landmark projects and fascinating work in energy efficiency. If I asked you to pick out a highlight, could you do that – your finest professional moment?

Peter Dobney: There are several, but two stand out.

First, negotiating Orora's Power Purchase Agreements with wind farms.

Second, receiving the Australian Energy Efficiency Council's Leading Energy User Award and also the NZ Energy Efficiency and Conservation Authority's Major Energy Consumer Award.

Eco: How did you go about designing the Antarctic bases – or presumably the HVAC systems they used. Was there anything to model them on – something that inspired you and the architects?

PD: I was part of the original Department of Housing and Construction (formerly Department of Works) design team for the rebuilding of the Australian Antarctic bases at

Mawson, Casey and Davis. It was decided that there should be a number of separate buildings at each base so that the occupants would have to venture outside even in the middle of winter, as one of the problems with having one integrated building was that the occupants suffered from "cabin fever". (Ed's note: No kidding!)

I was involved in the actual building design to minimise heat loss, as we had to design for -40°C. That meant triple glazing, walls constructed from 300mm styrene cool-room-type panels plus an airgap and internal lining.

There were air locks for all external doors.

Central heating was by means of hot water radiators plus a ducted fresh-air ventilation system, which included heat recovery exchangers and snow melting preheaters.

Air intakes had to be designed to eliminate the entry of snow if possible.

I also was involved in the design of the power houses, which had several diesel generators with radiator and exhaust gas

heat recovery to supply electricity and heating hot water to the living quarters and other buildings. Ventilation of the power houses was also a bit of a challenge.

Potable water was supplied from large water storage tanks, which had to be kept above freezing, and water was produced by melting snow and ice.

All pipework, including sewerage, had to be heat-traced to prevent freezing.

We worked closely with the Australian Antarctic Division, and they had contacts with the British Antarctic Survey who had extensive experience in building in polar regions; however, much of the work we did was ground-breaking.

There was only a short period of time for outside construction activities over summer, so all components were manufactured and assembled in Australia prior to being disassembled and shipped to the Antarctic bases.

Joe Archibald, another AIRAH member and DHC colleague, took over this project when I moved to Enerzonics, a consulting engineering firm.



100

sunset



Lal Lal wind farm, outside Ballarat, Victoria.

Eco: What was the most challenging thing you encountered in your career, and how did you overcome it?

PD: The greatest challenge that I have had to face in my career has been at Orora Ltd – a major Australian packaging manufacturer, formerly Amcor Ltd – where I managed their energy supply contracts.

Over a period of four years, energy (gas and electricity) costs for their Australian operations increased by \$50m/year to over \$100m/year.

An energy management plan that delivered energy savings of 15 per cent over four years was implemented.

Instead of purchasing energy from retailers I managed Orora's transition to enter into gas supply contracts directly with gas producers and also to buy electricity directly from the electricity spot market.

To manage the exposure to the electricity spot market, we utilised an automated dispatch engine to start onsite back-up

diesel generators when spot prices were above their short-run marginal cost.

Orora's back-up generators have a combined capacity of over 3.5MW.

In addition, a waste to energy project was implemented at Orora's paper mill in NSW whereby a gas engine was supplied with biogas from the mill's waste-water treatment plant, and this had an output of 1MW. Waste heat from the gas engine was used to pre-heat feed water to the boiler house to reduce gas consumption. Having knowledge of the Antarctic power-house design was really handy.

This project, which cost around \$2m, had a one-year payback and in addition to the reduction of electricity and gas purchased from the grid, its electrical output was renewable energy, and so Renewable Energy Certificates were able to be created and sold.

Eco: What was the most important lesson you learned along the way?

PD: I learnt this very early on thanks to AIRAH life member Clive Broadbent, my boss and mentor at the Department

of Housing and Construction, and that was, “Make sure you design systems for lowest total cost of ownership, not just lowest capital cost.”

This has stood me in good stead over my career, and it’s very difficult for anyone to argue against.

Eco: Was it a difficult transition from mechanical engineer to energy efficiency expert, or more of a segue, a natural transition?

PD: It was a very interesting transition. My engineering design and construction experience stood me in good stead for my transition into the energy efficiency field, but that was only part of it.

I was fortunate to be involved in the deregulation of the electricity and gas industries, as a number of Enersonics’ clients needed advice as to how to best purchase their energy.

As I got more and more involved, I saw this as an opportunity to advance my career in this area, so not only was I managing energy efficiency programs for major manufacturers, but I was also managing their energy portfolios.

I soon realised that energy users were not being adequately represented and the supply side was influencing politicians and regulators, so I helped form the Energy Users Association of Australia (EUAA). A significant part of my time was then spent lobbying politicians and regulators for better outcomes in the gas and electricity markets and regulated energy network businesses for all large energy users.

Eco: As GM Energy and Resources for Orora, you negotiated power purchase agreements with wind farms to provide more than 80 per cent of Orora’s power requirements for 10 years at 400GWh/yr. What is the appetite of Australian manufacturers for green power?

PD: Most Australian manufacturers are now very focused on their carbon footprint and sustainability in general; their customers and shareholders are also keen for them to become more sustainable, so they are continuously looking at how to do this.

One way to significantly improve the carbon footprint of large energy users is to purchase more renewable energy.

This can be done in two ways: either just purchasing more renewable energy certificates than the current target (20 per cent) or by entering into a power purchasing agreement with a renewable energy generator (solar or wind farm).

The first option is very simple but quite costly whereas the second option is more complex but can actually lead to a cost reduction.

Australia’s electricity markets are in a transition period, and going forward it will be necessary to increase energy security and storage as coal-fired generators are closed.

Batteries are only a short-term solution, and so gas-fired generators will be required until alternative energy sources are economically viable.

Eco: Is reasonably priced power supply a problem for Australian manufacturers?

PD: A number of energy-intensive manufacturers have had to close their operations due to high energy prices in Australia.

The underlying cause for the high power costs was the large volumes of Australian LNG being exported. In fact, three times what’s used in domestic consumption is exported. Higher gas prices lead to higher electricity prices because of the reliance on gas-fired generation.

At present, COVID-19 has had a major impact on global LNG demand and domestic gas and electricity demand, and so gas prices and electricity prices have recently slumped. It will be interesting to see how long this trend continues.

No doubt once the pandemic is over energy markets will revert.

Eco: What did you make of certain politicians describing wind turbines as “ugly” a few years ago?

PD: Wind turbines are amazing feats of engineering. The ones installed at the Lal Lal wind farm that Orora has a PPA with are over 100m tall, with blade lengths of 60m and tip speeds of up to 200km/hr.

They have been designed for operating with dramatically lower noise levels than older wind turbines, and they certainly do not concern grazing animals. They are definitely not ugly although there are certainly scenic

locations where they would have an adverse impact on the landscape.

Eco: Gas is featuring in the news a lot at the moment. Do you see it as a feasible “interim” measure? What do you make of the Victorian government’s decision to allow onshore gas drilling? Can you explain how resources companies are actually allowed to export so much Australian gas (80 per cent is the figure bandied around)?

PD: Gas is essential as a transitional source of energy for power generation until such time as other forms of renewable energy can be relied upon to maintain grid security and stability.

Gas is still the cheapest form of thermal energy and until renewable fuels such as hydrogen become competitive with gas, it will remain as a major source of energy, particularly for manufacturing.

The Victorian government has finally come to its senses and ended the moratorium on onshore drilling for gas in Victoria, but they have not allowed fracking of coal to release coal seam gas.

The moratorium has put the Victorian gas market in a precarious position, as the existing Gippsland and Bass Strait gas fields are all now in rapid decline.

The Queensland gas fields that were developed for LNG export have never delivered the volumes of gas necessary to meet LNG export contracts, and so Victorian gas has been used to make up the shortfall. This has led to a tripling of gas prices and a shortage of gas in Victoria and NSW.

Had COVID-19 not hit, we may already have been facing real gas shortages.

It could take up to four years to bring on any new gas fields in Victoria, should they prove to be economically viable. If the gas shortage occurs before then, the government has no one to blame but itself.

When the LNG export projects were first envisaged, the EUAA together with the AIG undertook some modelling of the potential impact of higher gas prices on domestic industry. It was very alarming.

We took this information to Canberra where we met with the Energy Minister and PM at the time only to be told that

there was no need to reserve any gas for domestic use, as there would be a surplus of gas and prices would be lower.

Their own gas inquiry forecasted that gas prices would rise to \$6.00/GJ (international parity) whereas we have recently had to endure gas prices as high as \$12/GJ.

The WA gas market learnt this lesson many years ago, and the WA government instigated domestic gas reservation, and now WA has the lowest-cost gas in Australia.

Unfortunately, the federal government did not learn from this.

Eco: In your experience dealing with politicians, do you think the powers that be accept the science of climate change?

PD: The climate change battle has been raging amongst political parties since John Howard was prime minister.

He undertook to implement a Carbon Scheme, but the Greens thought that it was too weak and would not agree to it. Had it been implemented then, later governments – Liberal and Labour – could have expanded it and increased the CO₂ reduction targets. Australia would have been a world leader in carbon reduction.

Instead we have had three goes at it and the PM's office became a revolving door.

One of the major opponents of course was Tony Abbott. Now he is out of politics things may change; however, there are still a number of politicians such as Matt Canavan who sit in electorates where coal mining and coal-fired generation provides most of the jobs. As Australia is very reliant on coal exports and coal-fired generation, this will remain one of the roadblocks.

Even if they accept that CO₂ emissions are largely responsible for climate change, they are unlikely to ban coal exports.

Until all countries are signatories to a universal climate change treaty Australia will be at a distinct economic disadvantage if it sets unrealistic carbon reduction targets.

No new coal-fired generators are likely to be built in Australia so CO₂ emissions from electricity will continue to decline.

I believe that we will have the technology to achieve much larger CO₂ reductions

within the next decade and we need to encourage industry to move down this path. But many have long-term investment – 30 years or more – which will require assistance, or we will have to face up to them moving offshore, with the possibility of them generating even large CO₂ emissions when they do.

Eco: You stayed an AIRAH member even after transitioning out of the HVAC&R industry. Could you describe the importance of AIRAH to you and the industry?

PD: I joined AIRAH as a student member and was involved in it in the early days as a young boy, and my father and grandfather were both very active members.

I formed many friendships through AIRAH, and I was always happy to contribute at a state committee level.

The Chief Engineer of the Department of Works (Housing and Construction) where I first worked as an engineer after graduating, Frank Wickham, was a great supporter of AIRAH and allowed his engineers to contribute to AIRAH.

I have always found AIRAH to be a very supportive association, providing technical information on a wide range of topics. And although I was not directly involved in the HVAC industry, many of the manufacturing processes that I have been involved with utilise steam boilers or direct-gas firing and complex control systems, so there was always some connection.

Having become a Fellow of AIRAH while still involved in the HVAC industry also ensured I remained a member.

Eco: What advice would you give to AIRAH members at the start of their careers?

PD: You should never stop learning. Try to widen your views.

Look at the best way to solve the problem most efficiently on a life-cycle cost basis, keeping in mind the imperative to minimise the carbon footprint. ■

The 100 faces of AIRAH

Peter Dobney, F.AIRAH,
is one of the 100 faces of AIRAH.

To read more, go to
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