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PROFILE

GLEN HILTON, DP World Australia

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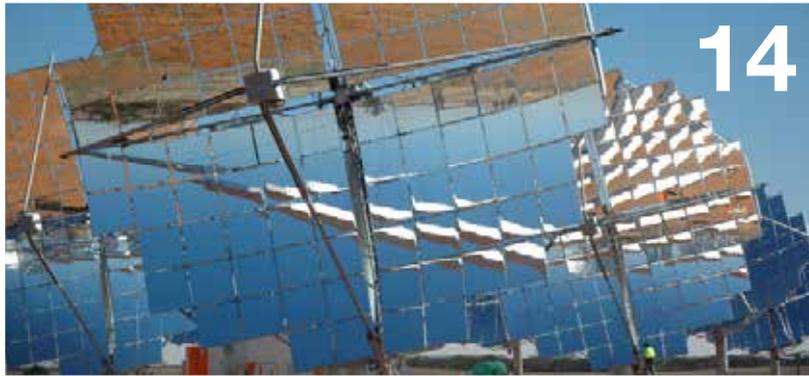
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Front Cover:
The future of power comes in all shapes and sizes
See page 14

From the bridge

Big, bigger, biggest... what comes next?

By ROD NAIRN AM, CEO, Shipping Australia Limited

consensus was up to 10,000 TEU and within 10 years.

While Australia boasts the biggest bulk port and biggest coal port in the world (Port Hedland and Newcastle respectively), and Australia's place as a design driver in bulk ships is evidenced by 'Wozmax' and 'Newcastlemax' ship classifications, Australia is a small player in global container shipping. Only two of our ports; Melbourne and Sydney, fall within the top 100. Therefore, we are definitely out of the race when it comes to defining container ship design. Like the youngest child in the family, we get the hand-me-downs from the bigger siblings. In shipping, that usually means, what the big lines have left over when they replace ships on their more important routes.

Well, those big container ships are here now, and didn't that happen fast? At least five years ahead of estimates. While the global news was the maiden voyage of the MSC *Gulson* through the Suez Canal, the big new for Australia was the arrival of two 9500 TEU (approximately) Bosphorous-Max ships, *Maersk Skarstind* and *MSC Elma*, within a few days of each other. Maybe not 400 metres long, but to the amazement of many, including me, these 300 metre long 48.2 metre beam ships are being accommodated in all our mainland capital city ports, including Swanson Dock - that's under the West Gate bridge and up the Yarra River.

Congratulations to the ports of Brisbane, Botany, Melbourne, Adelaide and Fremantle for your foresight, investment

"Woh-hoh-oh the ship's are getting bigger"... you could almost say that (a slightly mis-quoted) 'Mental as Anything' just about has our industry covered.

In August the **world's largest container ship**, *MSC Gulson*, arrived in Bremerhaven to complete her maiden laden voyage from China. At 400 metres long and 60 metres wide, the *Gulson* has a massive nominal capacity of 23,756 TEU and is the first of ten ultra large container vessels that MSC has on order. The ship is equipped with scrubbers to comply with IMO 2020 low-sulphur emissions, and can be adapted to operate on LNG in the future.

It's not just the northern hemisphere either.

Before the privatisation of the port of Melbourne, I was approached by various consultants asking "what sized ships do your members want to bring to Melbourne and when will they come?" It was a tough one to answer, and while no shipping line would put their hand on their heart and specify a size and date, the general



MSC Gulson loading in Shanghai

Image: MSC



MSC Elma making a perfect picture in Port Botany

Image: MSC

and hard work to accommodate visits from these ships. Previously, in *Blame it on the Panama Canal*¹ I criticised the lack of foresight to plan for bigger ships in Melbourne, particularly the Infrastructure Victoria report which insinuated that Melbourne didn't need ships bigger than 6800 TEU for the next 15 years, so they wouldn't plan for it! A bit 'King Canute' holding back the tide? But now I must eat humble pie and congratulate the Port of Melbourne, Victoria Ports Corporation Melbourne, the harbourmaster and pilots for working together to develop operational and safety protocols to bring these bigger ships up the Yarra.

It is probably about time that I raised the matter of **coastal shipping regulation** again. While it has been out of the limelight of late (apart from the Victorian coastal shipping review), this restrictive and bureaucratic legislation has been quietly stifling opportunities for domestic sales for our producers and manufacturers, and encouraging import substitution.

The recently announced LNG facilities at Port Kembla and Newcastle are prime examples. They have received a warm reception from many east coast Australians who see the possibility of an abundant gas supply bringing down prices, but the likelihood that the gas will be imported from overseas is - despite Australia currently being the largest producer/exporter of natural gas in the world.

This piece of legislation has been a complete failure, it has reduced shipping lines' participation in carrying domestic cargo and substantially increased the

administrative compliance burden of those that do. This has led to more freight on trucks, and unnecessary increase in greenhouse gas emissions and sadly, more deaths on Australia's roads.

A key aim of the Act was to encourage and protect Australian flag shipping, but it has failed at that too. The steady decline has continued, so at last count there were nine internationally trading Australian flagged vessels. It really is time for a change in the Coastal Trading Act.

This year's theme for IMO's World Maritime Day, celebrated on 26 September, is **"Empowering Women in the Maritime**

Industry". It is about time that supporting and empowering women received dedicated focus in the global maritime community. I am impressed to see the number of women in positions of influence in the Port Authority of New South Wales, who were highlighted in their recent news release "Meet the women keeping ships safe in NSW". I also think it is timely to recognise the pioneering efforts and achievements that Australia's Navy has made in this regard, over the past 35 years. You will find some recollections on this history on page 24.

It is truly a complete coincidence that our **women in shipping feature** this edition



Maersk Skarstind at Fremantle

Image: Fremantle Ports

¹ See <https://shippingaustralia.com.au/blame-panama-canal-ships-size-growth-costly-port-melbourne/>

The container exhibition goes west

For the past 18 months the Container Exhibition - **the Box that Changed the World** – has been drawing crowds and spreading the word throughout New South Wales about how the humble container has completely revolutionised international trade. That exhibition, which started outside the National Maritime Museum in Sydney back in October 2017 has now informed and amazed 234,557 of our fellow Australians from Darling Harbour to the beachfront in Wollongong, then out west to Wagga Wagga, Narrabri and now at the Western Plains Cultural centre in Dubbo.

Where to next? The National Maritime Museum is currently engaging sponsors to enable the exhibition to travel to Fremantle where it is due to launch 1 November and then potentially onto Darwin for 2 May 2020. Make sure you support or visit this exhibition as it educates the public of Australia on the importance of containerisation.



Regional Councillor Stephen Lawrence opens the Container Exhibition in Dubbo accompanied by Michael Harvey, Australian National Maritime Museum; Marika Calfas, CEO NSW Ports and Kent Buchanan, Western Plain Cultural Centre

Image: AMY McINTYRE – The Daily Liberal

is Commodore Fiona Freeman, current Hydrographer of Australia, and one of the officers to serve under my Command in HMAS *Flinders* in the mid-1990s.

Our feature article is all about **the future of power** and there are some wide-ranging views to consider. You could come to the conclusion that it's all about solar and wind, but read on, as there is much more to it than that, and I don't limit this concept to Australia's traditional fallbacks of coal and gas. Clean coal certainly has a future, and LNG is cleaner and greener, but what about that taboo word, nuclear?

Australia's anti-nuclear mind-set has been set by Midnight Oil songs and the nuclear

disarmament protests of the 1980's, which inextricably linked nuclear power with nuclear weapons. But these are two very different things, and maybe it is time to think again? There have been amazing developments in the area of nuclear power that might just make it a viable and realistic option for Australia. Small, safe modular reactors can produce enough power for a medium-sized city in an area not much bigger than a football field, and with zero emissions. Isn't that what we need to save the future of our planet?

Shipping rates are on the up and it seems that it's all down to **IMO low-sulphur 2020**. The 0.5 per cent sulphur limit will be with us by the time you receive our next magazine. It will undoubtedly have significantly more of an impact than the feared Y2K bug, which came loudly and disappeared with a whimper at the turn of the century. No one should be surprised that there has been a recent spike in shipping rates in all sectors, as the chronic over-supply of capacity in some trades has been strangled, at least temporarily, while more and more ships are taken off-line to fit scrubbers or have other modifications ahead of the IMO low-sulphur deadline, on 1 January 2020.

There is no doubt that bunker surcharges and freight rates will rise to factor in the increased cost of low-sulphur fuel, or recover the capital investment and higher operating costs of fitting scrubbers, but by how much? Melwyn Noronha dissects some of the fact from the fiction on page 44.

For more than a year I have been commenting on the planned introduction of a **new biosecurity levy**, which was a surprise announcement in the 2018 Budget. The planned levy is to return an additional \$108 million to the Federal Government each year. No one doubts the need for strong biosecurity - our industry fully supports it, but the fact is that industry is already covering around 80 per cent of the cost of protecting Australia's biosecurity. This number is continuing to grow as our level of imports increase, while the Government has reduced its allocation in real terms over the past seven years.

The good news is that Minister for Agriculture, Bridget McKenzie, has now released the Report of the Bio Levy Steering Committee. This is a comprehensive report and its release now puts all the considerations out there in the open. It will inform future discussions. It builds on the previous reviews and highlights a serious lack of authoritative information on relative risk vectors.

You should be aware that the terms of reference for the committee required us to recommend HOW to collect the revenue, not WHETHER it was justifiable to place a further load on industry.

And let's remember, every Australian benefits from strong biosecurity, and everyone who buys imported products (and that is everyone) is a risk creator. Therefore, biosecurity is a public good and it makes sense to spread the levy across all taxpayers through budget appropriation. ▲

From the Box that Changed the World to the WORLD in a BOX

It is no accident that this second year of the Container Exhibition coincides with the 50th anniversary of the arrival of the *Encounter Bay* in Australia. This event on 28 March 1969 marked the commencement of international container trade between Australia and Europe.

Our previous two magazines have included a number of features on the *Encounter Bay*, the birth of the container trade and the changes that containerisation has brought to the wharves and waterfront.

So you've **read the book** and **you've seen the exhibition**, now you can **WATCH THE MOVIE**.

Fifty years of international container trade for Australia is certainly something that should be celebrated. The *Encounter Bay's* maiden voyage was the watershed event that heralded a paradigm shift in ocean freight movement. A shift that made the impossible, possible.

To commemorate this event in the era of digital communication, an intrepid and enduring group of shipping industry enthusiasts, led by Martin Orchard, with the support of the International Trade Development Fund, Maersk Line, Shipping Australia and others, have produced a 20 minute documentary expounding the amazing development of the international maritime container trade since the arrival of the *Encounter Bay*.

The film titled "The World in a Box" will be launched by Federal Minister for Trade Simon Birmingham in Adelaide on 22 October, with future screening proposed for other capital cities and ultimately digital release on the internet.





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VIEWPOINT

Australia is well served by international shipping

By ROD NAIRN

Australia's economy and every Australian's quality of life depends on international commercial shipping.

Yes, we are an island. Air transport connects our people to the world and carries about two per cent of volume of our high value cargo. But the vast majority of our freight goes by sea, more than 98 per cent of it.

Australia has the fourth largest international sea-freight task in the world.

There are around 5,000 unique international ships (yes, they are the ones flying foreign flags and demonised by Australia's maritime union) making more than 30,000 port calls to more than 70 ports around Australia's coast each year.

They carry our imports of every-day goods that you take for granted, more than \$200 billion worth of: food, fuel, clothing, toilet paper, farm and mining machinery, fertiliser, cement, vehicles, televisions, computers and smart phones, to name a few.

They also carry around \$220 billion worth of exports to balance our trade. Most of these are heavy, resource or agricultural commodities: iron ore, coal, mineral sands, grains, pulses, meat and wine.

These ships come in all types and sizes, designed and optimised for specific purposes: dry bulk, liquid tankers,

container ships, roll on-roll off, heavy lift, cruise ships and floating hydrocarbon production and storage vessels. They all come to Australia to service our needs. Many are on a regular route and return again and again, others are chartered on the spot market for a specific task and when that's done, they sail elsewhere.

You don't need to own every book when you can use a library? You don't need to own every tool you use when you can hire the best tool for the job (though I admit it would be nice). You don't need to own every car, or bus or train that you ride in.

International shipping is efficient use on a global scale, this is minimising waste and conserving resources. This is good for the planet and it is good for Australia.

The best interests of Australia are served by focusing on optimising the benefits that international shipping provides to the greater good of ordinary Australians. It should not be considered as the golden goose to squeeze for more fees and taxes. The more taxes you impose on international shipping visiting Australia, the more every Australian will pay for the imported goods they use. Neither should foreign shipping be treated as a pariah.

At last count there were just four large Australian flagged commercial ships engaged in international trade. There are another 42 Australian-owned ships sailing under foreign flags on open registries. And why is this so? Because it makes sound commercial sense and

ship owners are not forced to deal with Australia's militant and self-serving maritime union.

There are many open registries in the world that are attractive to ship owners because they specialise in managing international shipping, minimise regulatory burden and costs of operation, and provide investment incentives. These registries apply international standards which are absolutely appropriate for international shipping.

Since the global implementation of the Maritime Labour Convention, the rights and conditions of international seafarers are protected. These conditions can be checked and enforced by coastal states, and so they should be. Australia is prominent in its enforcement of the MLC and I applaud them for that.

Shipping is an international commercial industry, where there is a demand for ships and the potential for a commercial profit to be made, there will be ships to serve the demand. There is also an enduring overcapacity in almost all sectors, so there are always ships looking for their next commercial opportunity and ready to service Australia's need.

Commercial shipping is a service, it is a means to an end, not an end in itself. Shipping is needed to move cargo internationally and domestically. Australia can control it through our port State controls, you don't have to own it, or fly the Australian flag to use it. ▲

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Sustainability during transition

By CRAIG CARMODY, chief executive officer, Port of Newcastle

For more than 220 years, Port of Newcastle has been providing a global trade gateway linking the Hunter and regional NSW with the world. There is no doubt the world has changed immensely in that time.

There are now three major transitions underway, representing risk and opportunity for the Port of Newcastle and our region:

- The transition to a decarbonised global economy;
- The transition of the Australian economy from a mining investment boom to broader-based growth; and
- The transition to alternative energy solutions.

One clear impact of these transitions is that coal demand will change over time. The rest of the world is already planning accordingly. A common question is “when will demand for coal decline?” Perhaps a second question needs to be asked: “will the decline be off a cliff or a controlled descent?” The answer to both of these questions has significant implications for the Port and the future of the Hunter region.

Port of Newcastle currently handles 166 million tonnes of cargo per year and \$29 billion of annual trade. Coal represents more than 90 per cent of our volumes and over 80 per cent of Port of Newcastle’s revenue. The Port is the world’s largest coal export port. While ever there is demand, the port will continue to actively support the efficiency and reliability of the Hunter’s world-class coal supply chain.

With its unlimited and unconstrained land,

transport and channel capacity, Port of Newcastle has immense potential to benefit from the transitions that are underway.

The business case for a Newcastle Container Terminal continues to grow. It would have widespread benefits for Newcastle, the Hunter and Western and Northern NSW – and ultimately the State and Nation.

Globally, the container shipping industry has been changing the size of its container vessels. 33 per cent of new builds will be larger than 11,000 TEU. At the same time, the global fleet mix is dividing between smaller container vessels and Ultra Large Container Vessels (ULCVs).

Australia’s existing East Coast container ports, with their location in the centre of city congestion and lack of dedicated freight rail and vacant land, are in a situation that cannot materially be changed. Essentially, none of these ports can handle a vessel over 11,000 TEUs.

Port of Newcastle has none of these issues and is the best placed port on Australia’s East Coast to handle modern Ultra Large Container Vessels of more than 14,000 TEU.

We know vessels of this size do not currently visit Australia. They do not as they cannot be accommodated. To argue that there is no need for a ULCV terminal in Australia is to ignore the fact

that the best infrastructure is the one built before it is desperately needed. Infrastructure is built for future growth – not because inefficiencies become so bad they negatively impact on economic performance or productivity.

A ULCV terminal in Newcastle would ensure Australia can participate in the low cost, high productivity, low emissions future of the global container trade. In the context of sustainability during a future transition from coal, it would be good for Australia, NSW and the people of the Hunter region.

Since the container terminal is not currently Port of Newcastle’s gift to give, the Port is focussed on maximising its unconstrained capabilities and realising its unlimited potential.

Newcastle is the port that is ready to host the latest technologies, industry innovations and provide a step-change in the way that freight is handled in Australia. Growing demand for clean, alternative energy sources will provide diversification opportunities that could see Newcastle become a hub for the production and distribution of energy streams, including hydrogen, LNG and solar.

The EPIK Newcastle GasDock project – with an estimated direct onshore investment of up to AUD \$250 million* at the Port – is a great example of the type of opportunity available to Newcastle. This project recently received Critical State Significant Infrastructure status from the NSW Government.

As the port of choice for wind turbine imports, Port of Newcastle is continuing to work hard to support the increase in this trade.

A major port digitalisation project has commenced. This will deliver significant increases in efficient operations and infrastructure utilisation. It will provide the data to guide the Port in future planning and in our transition to a carbon neutral future.

This year, Port of Newcastle marked 220 years of operation. If the port’s potential is realised, imagine what the port will look like in another 220 years.





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- **available port-side land;**
- **unconstrained freight network; and**
- **berthside connections to the heavy rail network.**

Port of Newcastle is embarking on an ambitious diversification strategy that better utilises the full capacity of its assets to grow existing trade and establish new, efficient and cost-effective supply chains.

At the heart of our operation are our people, striving every day to create a safe, sustainable and environmentally and socially responsible Port that realises its potential.

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GLEN HILTON, managing director and CEO of DP World Australia

After 13 years on the road, Hilton is back and ready for action

By ARCHIE BAYVEL

At 49, Glen Hilton has already led a big life by any standards and all indications are that it's getting even bigger.

Recently returned to work in Australia after 13 years in South-East Asia, working mostly for DP, he says, "Looking with fresh eyes at shipping here, one tends to see it as too expensive and under-developed.

"I see a lot of opportunities to improve Australian infrastructure and I would like to be part of that."

Certainly he has experienced managing the big time all over South-East Asia, with his most recent assignment being PTP –

the Port of Tanjung Pelepas – at Johore.

Malaysia's biggest port, it has a capacity well over 11 million TEUs, with plans to grow to 100 million TEU.

"PTP already has 2000 acres of Free Zone land, a five kilometre berth, and offers full marine services for all port users," Glen says. "Its 57 cranes are clearly visible in Singapore, just 30 kilometres away across the strait.

Smack in the centre of the Melaka (Malacca) Straits, it is a keystone port for the massive 3E container vessels (around the 20,000 TEU mark) serving the transshipment trade all the way from Yangon through Singapore, to the next super ports in Hong Kong and the Pearl River.

Glen's arrival in Johore coincided with the arrival of the first of these super ships and the tremendous growth they brought. "I learned a lot," he says, "you can only run these big ships if you've had the experience."

So how does one gain the experience to handle jobs such as that?

They're a weird mob, the likes of Glen Hilton; straveiging around the world; five years here, three years there, six years everywhere, dragging an entourage of wife and children through third world countries with unlearnable languages.

"Expatriate women are the ones who most need to adapt," Glen says, "but when a family arrives at a new city everyone goes out of their way to welcome and look after them.

"The availability of domestic help such as maids and nannies, makes settling in a lot easier. Some women have jobs, while others including mine, who has a logistics business, work from home.

"One's children grow up as international people. My son and daughter, for example, speak fluent Spanish as a result of school in the Philippines, during the four-and-a-half years I spent in Manila.

"It was my first regional role, with responsibility for DP business units in Thailand, Indonesia, and Vietnam as well as Manila. Altogether we handled some 3.9 million TEU and had about 3500 employees.

"It was challenging at first but my previous job had been two years as director-general at the major Caribbean transshipment port of Caucedo, at Santa Domingo, capital of the Dominican Republic. With 700 employees, it handled about 1.2 million TEU.





Port of Tanjung Pelepas, Malaysia's biggest port, with a capacity of more than 11 million TEUs

"Situated on the island of Hispaniola, it was a developing country, a fantastic place with terrific beaches and a tropical island lifestyle.

"It was 2006, and from a trade perspective it was dynamic and well-situated at the cross-roads to many countries: A seven-hour flight to Europe, four hours to New York, and 90 minutes to Miami. Only Australia is very far away, despite the widening of the Panama Canal.

"During this time, I had spells of weeks in New York exploring how to refinance various projects. It was the time of the World Financial Crisis when, for many companies, the world was crashing down.

"It was a fascinating experience. One day you were negotiating with someone and a week later they'd have disappeared.

"It was one of the great financial crises of our time and I learned a lot about how money worked.

"Santo Domingo was my first overseas job and it wasn't at all the one I had expected.

"I had been general manager for CSX World Terminals in Adelaide for more than five years when DP World acquired, it in February 2005. Before that I'd been general manager of Ansett's International cargo handling for four years.

"With DP newly arrived in Australia, and me general manager of its new acquisition, I expected my next job to be head of DP

here. But my overseas-based boss, one Amil Wats, said I needed to see more of the world and I was sent to the Dominican Republic instead.

"I expected to be back in four years to take charge of DP. But I was over-confident and DPA has grown fast and big, because it's taken 13 years to achieve my dream job. But I feel like it's been time training to do this job.

"I got to see how it was done. The best as well as the very bad. Now I've got a fresh eye for Australia."

Glen Hilton's predecessor is Paul Scurrah – the man who, among many other achievements, outlawed swearing by all DP's Australian staff and whose five-year contract here ended late last year. He now heads Virgin Airlines.

Glen says of him: "Paul drove some significant and important changes here, particularly around people safety, culture and an unrelenting focus on our customers..

"Safety and customers will always be the foundation of our businesses and I am committed to building on Paul's legacy. We are results-oriented and geared for growth, which is exciting.

"We are operating in an increasingly competitive environment and the consolidation of the shipping industry, surplus capacity of automated competitors and higher property costs have been

challenging all Australian stevedores.

"I take enormous confidence in DP World's decision to assume majority ownership of our business. It's a commitment to the business and the strongest possible vote of confidence in our ability to succeed and to grow.

- [A limited partnership led by Citi Infrastructure originally acquired a 75 per cent stake for \$1.6 billion in December 2010. Financial Review columnist, Matthew Stevens, has reported estimates that winning back control cost as little as \$US330 million, and taking out Citi's whole position, a little more than \$US650 million. Two years ago the whole industry earned as little as \$25 million from infrastructure charges; estimates for this financial year are around \$180 million.]

"That said, we must respect the reality of the bottom line, which is telling us we simply cannot afford to stand still.

"We must make the most of the assets we have, leverage the global expertise and scale of DP World which is at our disposal, build on our strengths and be prepared to consider new ways of working to ensure the sustainability and ongoing success of DPWA.

"I have a great passion for our industry and I look forward to bringing my experience to DPWA as we continue to meet the challenges of growing our business." ▲

COMMODORE FIONA FREEMAN, Hydrographer of Australia

How a young woman used the Navy to build her character and find the job of her dreams

By ARCHIE BAYVEL

“Professionally, I’m at the pinnacle of my career.” Fiona Freeman says, “I am one of the Navy’s senior officers and the first female to fill the position of Hydrographer of Australia.

“My military title is Director General of Hydrography, Meteorology and Oceanography. That job carries the rank of Commodore – just one step below admiral – but it’s the job not the rank that I’ve always wanted.



As the Hydrographer, Fiona is responsible for providing the nautical charts, electronic navigational charts and nautical information which is used by every ship navigating in Australia’s area of charting responsibility. This is a massive responsibility covering an area of about an eighth of the world’s ocean area and extending from the Antarctic, almost to the equator, including Papua New Guinea and the Solomon Islands.

“There’s a sense of true fulfilment in being at the peak of my profession. I feel really privileged because I have done lots of different things in the Navy on my way to this role, and I’ve never been disappointed.

It’s not just producing charts. Fiona is also Australia’s delegate to the International Hydrographic Organization. This is where the technical matters and standards to do with hydrographic surveying and charting are decided. It also gets political when it comes to demarcation between areas of national charting responsibility.

She has a military role too, responsible for providing marine geospatial information, meteorology, and oceanography to support Navy operations.

“I’ve travelled heaps in the Navy. Last year to India, where I visited its hydrographic school and spent two weeks in Goa. I’ve always been fascinated by India and I enjoy travelling; of course, it is always great to return home to Australia.

“As a junior officer, I was a watchkeeper on the sail training ship *Young Endeavour*. Usually it does short training voyages around the coast of Australia but I spent 12 months with her in 1992, and we joined the Tall Ships Fleet in Genoa and crossed the Atlantic Ocean under sail, to reprise Europeans’ first voyage to America.

“It was an amazing experience. I was only 23, fit and not scared of heights, so enjoyed working aloft. “

“I’m 50 now and have been 31 years in the Navy, 15 of them at sea, including time in command of two vessels.

“Nowadays I’m a surveyor by specialisation but one of my first junior jobs was as a navigator on a survey ship. It was here I watched and helped the surveyors.

“After I left school I was doing a teaching degree in Brisbane but decided I needed something more exciting. So I went into the local Defence recruiting office and they were interested in me. My father was rather taken aback when I announced what I had done but a few months later I was in the Navy.

“Being a female in the Navy was a character-building event for me. I’d become part of an organisation very much bigger than I could have imagined which, at the time, itself was trying to introduce and manage significant change to its workforce. Somewhat naively I just viewed myself the same as the guys I trained

and worked with and, generally, I was treated equally. It was early in my career though that I realised it was not always as simple as that.

As a newly qualified watchkeeper I joined a ship and naturally, as the most junior watchkeeper and 'new kid on deck' found myself assigned to the 'guts' watch – midnight 'til 0400 each night. After six nights of the Commanding Officer coming up and 'visiting' the bridge during my watch, I asked one of the other officers why he would be up and around at that time every night. I learned it was the first occasion he had worked with a female at sea and was struggling with 'trusting his ship' to me without supervision. I am happy to say though, that after raising my concern directly to him and talking through the issue and reassuring him I was trained as well as any other watchkeeper, he was able to enjoy some uninterrupted sleep at night in the following weeks.

"Women in the RAN were only first posted to seagoing positions in 1986, so I was in one of the first waves to join and undertake the full training programme. The concept was very new and until the 1990s we could serve only on auxiliary or survey vessels.

The Navy has certainly moved forward on equality since then, with women now serving in warfare roles and even submarines.

"It's a very different Navy today from when I first joined. Females can serve anywhere now and we form about 20 per cent of the workforce."

"I guess a lot of my character had already been built by my mother's death when I was only 10. Dad re-married quite quickly and that naturally brought challenges to me and also to my stepmother, who had inherited an instant family.

"But we all worked it out very well.

"My schooling was at San Sisto, then a small all-girls college run by Dominican nuns in Brisbane that gave me the foundations on which to build a good career.

"People can go to the best school and have a bad experience, others can go to nondescript schools and turn out great. A headmistress who is a role model and sets expectations makes a difference in those formative years – that is what I had.

"It was supportive and encouraged us to participate in sport and other activities and engage with learning. All of which I believe are the foundations of doing well, and I look back on San Sisto with

gratitude."

"Playing sport has always been an important part of my life, so at 50 I'm still playing for a competitive hockey team – Queanbeyan United. We're not a Navy team but I enjoy the competition and the camaraderie of a group outside of the workplace. It's a great physical and mental outlet."

Asked about the defining moments of her working life, Fiona doesn't hesitate:

- "Joining the Navy,
- Deciding to specialise in hydrographic surveying. Hydrographers like James Cook and Mathew Flinders did amazing work and the fact we produce vital and tangible products made it attractive to me.
- Whilst in command of HMAS *Benalla* realising my father was watching on the wharf as I conned the ship onto its berth in my hometown of Brisbane.

"I think I was a pretty reasonable ship handler, but I was really nervous when I saw Dad watching me."

"I could see that he was so proud of me. Looking back, it was an important time because Dad had recently been diagnosed with cancer, from which he died three years later."

So, what next for Commodore Freeman?

"When you become the Hydrographer, you take on a persona," she says. "It's a position that people have a general understanding of, and they most certainly have expectations of the person filling the role. It's definitely not about the rank, although the holder of this specialised role has to be recognised and empowered.

"There are five other female commodores and a couple of rear-admirals in other branches of Australia's Navy but I have no expectations of becoming an admiral because this is the job I always wanted and I hope to continue in for a while yet.

"Life is about being content. Success is intangible and open to perception – Money? Position? Achievement? I have no doubt these can contribute but none of these things really matter if you are not content. I consider myself successful because I feel content.

"People who have the ability to pause when under pressure or stress, tend to achieve the best outcomes. There can be great value in pausing – it can result in quite different outcomes."

In private life, Commodore Freeman is married to Jeremy, a lieutenant-colonel communications specialist in the Australian Army. She cheerfully points out that whilst the Navy is our senior service, there is certainly no such demarcation at home.

"Jeremy and I never got around to having any children," she says, "but my family includes a younger brother Stephen, who is an assistant commissioner with Queensland Fire and Emergency Services."

So where will Fiona be in 20 years? "By then I will have lived longer than my parents; and Jeremy and I will be enjoying ourselves living close to a nice beach in Queensland. We have a lovely border collie dog but he is already 11, so we will be accompanied by his successor." ▲



The future of power

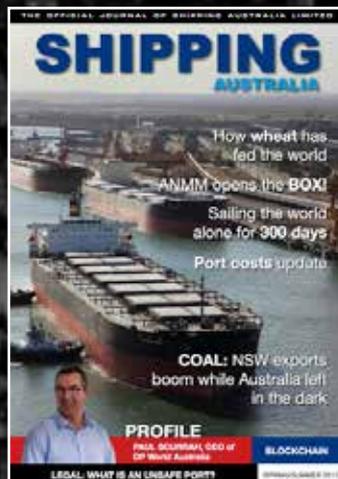
In previous Shipping Australia magazines we have featured the continuing demand for coal (Spring/Summer 2017), the rise in Australian LNG production to world number 1 (Autumn/Winter 2018) and initiatives in the shipping industry to reduce the energy use and greenhouse gas emissions (Autumn/Winter2019).

As more frequent climate extremes turn our focus to how human civilisation can reduce its impact on our planet, it is timely to turn our focus to some alternatives to meeting energy demands.

The future of power takes a broader look at the energy option from some very different perspectives. If you come to the conclusion that it's all about solar and wind, then you need to read on as there is much more to it than that. Clean coal certainly has a future, and LNG is cleaner and greener, but what about that taboo word, nuclear?

Australia's anti-nuclear mind-set has its origins in the nuclear disarmament protests of the 1970s and 1980s which inextricably linked nuclear power with nuclear weapons. But maybe it is time to think again? There does not need to be a link but here have been amazing developments in the area of nuclear power that might

just make it a viable and realistic option for Australia. Australia has one of the largest recoverable uranium resources in the world and small, safe modular reactors can produce enough power for a medium-sized city in an area not much bigger than a football field, with zero emissions. Isn't that what we need to save the future of our planet? Food for thought. ▲



Beginning of the end for coal... and gas

By A SPECIAL CORRESPONDENT

Although the recently successful Liberal National Government, and it would appear, Queensland voters, are in favour of continued coal use, the end of coal as a fuel is in sight. And that's even taking into account currently increasing coal usage in India, Korea, Russia, China and Indonesia.

And we might even be seeing the beginning of the end for natural gas as a fuel too.

Why? Because, as we'll show, renewables energy generation and storage suddenly got cheap and it got good.

Economies around the world are ditching coal. There are now several nations that are surviving and thriving while doing away with coal. See story on page 19.

Australia's not one of them. But it could be. And it could also greatly reduce the use of petrol, diesel and similar transport fuels. See page 18 for details.

The answer is to adopt renewables to generate energy and electrify nearly everything.

Australia's top energy eater is, funnily enough, energy generation (28 per cent of Australia's energy consumption). It takes a lot of energy to make energy by burning coal. Transport uses the next most energy (27.5 per cent). Manufacturing (17.8 per cent) is in third place. Thereafter the main energy consumers are mining (10.9 per cent); residential users (7.5 per cent) and commercial users (5.6 per cent).

Australia can instead meet its energy needs with sunshine, solar panels, wind, windmills, big batteries and seawater. All

of which it has in large amounts. To keep the size of this article manageable, we'll look at solar power, touching on wind from time-to-time, and energy storage. Incidentally, wind and solar tend to be complementary. When the sun doesn't shine the wind does tend to blow.

Many people don't realise just how much energy the sun sends our way. According to the US Energy Information Administration, the entire global consumption of energy on planet Earth in 2015 was 109,136 terawatt hours.

Let's turn that into petajoules: world energy consumption in 2015 was just under 393,000 petajoules a year. The sun sends Australia about 58 million petajoules a year, according to the Australian Renewable Energy Agency.

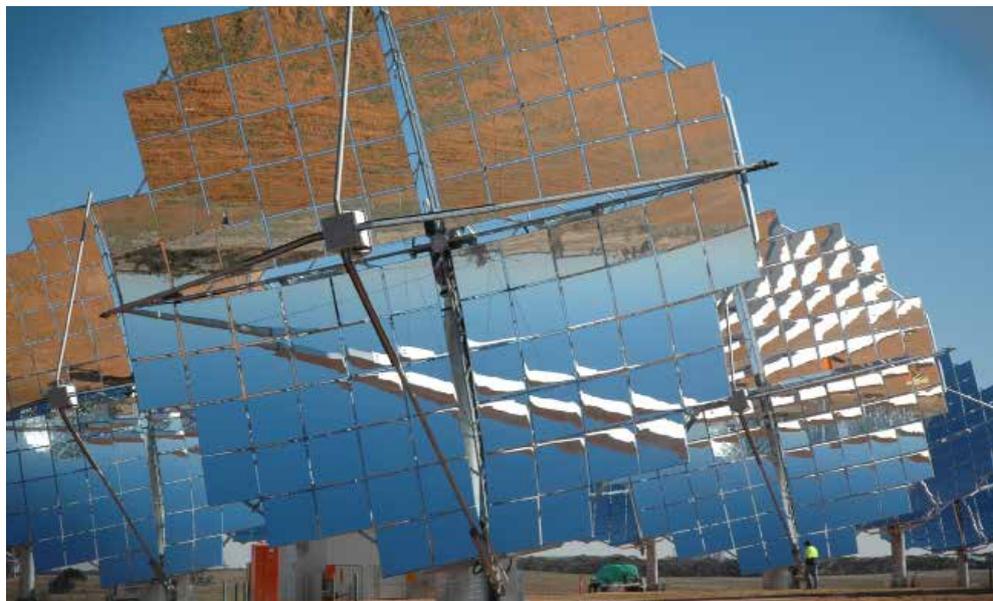
Or to put it another way, Australia annually receives about 148 times more energy from the Sun than is consumed by humanity each year. ARENA also

notes that Australia's solar endowment would fuel Australia's annual energy consumption by about 10,000 times over.

So, Australia definitely has enough solar energy to fuel all its needs.

We need to convert that energy into power. There are several ways to do it but, here, we will look at solar photovoltaics. They're the familiar blue and silver gridded panels.

As of January 2019, there were over two million photovoltaic installations in Australia, with a combined capacity of over 11.1 gigawatts, according to the Australian Photovoltaic Institute. The rate of installation was pretty flat from 2001, when there was zero (or next to zero) installations to the end of 2009, when there were 120,934 kilowatt hours of installations in Australia. So roughly speaking, Australia was installing about 1,222 kilowatt hours a month.



Solar array of 40 giant mirrors at Carwarp, Victoria

Then the volume and speed of installations start to take off. By the end of 2017 there was a cumulative total of 7.2 million kilowatt hours installed. By the end of 2018 there were 11.1 million kilowatt hours installed. The rate of installation over the last 12 months was 322,617 kilowatt hours a month.

So not only has the total volume of installations massively increased, but the speed at which photovoltaic installations are being installed is increasing too.

Solar power is on a fast growth curve primarily because solar panels improved in quality and fell in price.

Today's solar panels are efficient. Solar cells made by Bell Labs in the 1950's converted sunlight to energy at about six percent efficiency. In the late 1970's it was 13 percent. Now, commercially available solar panels today are about 20 to 22 per cent efficient.

Energy output from today's solar cells is cheap too. In 1976, photovoltaic module prices were (in 2018 US dollars) about \$79.3 per watt. At the end of 2018 that figure was 0.3 cents per watt, according to Bloomberg New Energy Finance data. That's a 99.62 per cent price drop. Consultants PV Insights and Energy Trends have since reported average prices as low as 0.27 cents.

Even over the last 24 months or so, the cost of renewables-generated energy continued to plummet. Back in July 2017, on the well-known public affairs show Q&A, then Federal Resources Minister, Senator Matt Canavan, asserted that renewables were not cheaper than coal.

Professor Ken Baldwin, director, Energy Change Institute, Australian National University, subsequently noted that it cost less than \$40 per megawatt-hour to generate energy from an existing coal-fired power station. But the cost of wind power was \$60-70/MWh. So, in one sense, Senator Canavan was right, energy from renewables was not cheaper than energy from coal, subject to the proviso that new renewable energy farms were being compared to old and fully depreciated coal-fired plants.

But new coal-fired plants could not compete on price with new renewable energy farms. The actual price of newly installed wind power in mid-2017 was cheaper than the projected price of \$75/MWh from a new coal-fired power station.

But the market's already moved on, and the debate is over. In November 2018, investment bank Lazard revealed energy from renewables can be cheaper than energy from coal and gas, regardless of whether the fossil-fuelled plants are new or old. Here are Lazard's numbers in utility scale (i.e. farms not rooftops), in US dollars and per megawatt-hour: Wind \$29-\$56; Solar \$40-\$46; Gas combined cycle \$41-\$74; Coal \$60-\$143.

Theoretically, it now costs less (at least in the US) to build a new wind or solar farm than it does to carry on burning coal in an existing elderly coal-fired plant.

Consultancy Bloomberg New Energy Finance independently worked out its own numbers at the end of 2018 and came up with the same conclusion i.e. renewable energy is cheaper than fossil-fuel energy.

As solar plants and wind farms don't generate energy continuously, and demand is not evenly spread (either geographically or over time), then Australia needs a couple of ways to store energy and distribute power.

There are many ways to store energy. We'll look at batteries and off-river pumped-hydro.

Lithium-ion is the current go-to choice of battery material because it's very light; it carries a much higher charge than other materials; it tends to hold its charge; tends not to degrade as much as other types of batteries and it doesn't need a lot in the way of maintenance. And the power output of lithium-ion batteries is cheap. Bloomberg New Energy Finance says the cost of lithium-ion batteries was US\$187 per megawatt-hour in the first half of 2018. Lazard's quotes a wholesale price range of US\$204 to US\$298 per megawatt-hour.

Lithium-ion batteries are also used in "Tesla's Big Battery", otherwise known as the Hornsdale Power Reserve, in South Australia, which was built toward the end of 2017.

Although the battery was built by Tesla, it's owned by French renewable energy company Neoen. The battery is adjacent to, and connected to, Neoen's Hornsdale Wind Farm. That's a 99-turbine installation with a generation capacity of 315 megawatts.

At the time of construction, several commentators in the media said the Big Battery would power tens of thousands of homes in South Australia, if the power blacked out for any reason. But reserve power's the purpose of the Big Battery. It simply does not have the capacity to store enough energy to power, say, Adelaide. The Big Battery offers storage and power of 100 MW/129 MWh. If the Battery were to discharge at its full rate, the Big Battery could run continuously for about an hour and 17 minutes.

There's a two-fold purpose to the Big Battery: profitable arbitrage and even-more profitable grid-wide power protection.

Energy from the wind farm either goes into the local grid or it goes into the battery. When the spot price of electricity is cheap, the Big Battery gets charged up. When electricity is expensive, or if the battery is full, the power is sold into the grid.

The Big Battery protects the grid by controlling the frequency of electricity on it. The State Government has the right to 70 megawatts for the first ten minutes, under certain conditions. That's useful to help stabilise the frequency of electrical power, which varies all the time. If it gets too high, or too low, then automatic fail safes kick-in to protect the grid and the equipment on it. The Big Battery stores and releases power in super-fast time, which helps keep the frequency just right.

Tesla's Big Battery at Hornsdale, South Australia



This is known as “Frequency Control Ancillary Services”. These services are also used when there are planned outages, such as maintenance at power plants. They are traditionally provided by gas-fired plants, which have been the power source most able to respond to change.

But the Big Battery’s performance is not good news for gas-fired power plant operators.

Maintenance was planned for the Heywood Interconnector, which connects the South Australian and Victorian electrical grids, on 14 January 2018. The Big Battery was operational by that date.

The Australian Energy Market Operator explained what happened.

“Regulation prices peaked at \$248/MW on this date, compared to an average of over \$9,000/MW during previous Heywood outages,” AEMO said in its Hornsdale Wind Farm 2 FCAS Trial review of July 2018.

That new, lower, Big Battery-induced price was only 2.67 percent of the normal gas-fired price.

Consultants, McKinsey, delivered further bad news to operators of gas-fired plants. Their research showed that, since installation, the Big Battery captured a 55 per cent share of the FCAS market and caused a 90 per cent drop in prices in about four months.

Industry consultants Aurecon have since estimated that the Big Battery has saved taxpayers about A\$40 million a year in typical FCAS costs.

Another key reason for the installation of the Big Battery is to prevent what’s called “load-shedding”. That’s when rolling blackouts are deliberately caused by the energy grid companies. Engineers hope to prevent the network from falling over when there’s more demand for energy than there is supply.

Yet another reason for the Big Battery is the hope that it will provide protection from unexpected incidents. Owner, Neoen, says that the new installation has prevented supply-demand incident literally thousands of times in its first year of operation. About 100 of those times were “serious”, according to Neoen.

For example, in December 2017, the Loy Yang A coal-fired power station unexpectedly and metaphorically fell over. Within milliseconds the Big Battery (about 1,000 kilometres distant) added power to, and stabilised, the grid.

“South Australia, although cut off from the grid, didn’t lose power as HPR provided frequency support to steady the grid,” Neoen said in a statement.

The battery has proven itself to be a serious money-making machine.

Based on the first six months of operation, specialist media outlets estimated that



the battery had a total potential earning capacity of about A\$18 million a year. Euronext-listed Neoen, revealed the actual figure in its 2018 annual report that its “energy sales on the market consist primarily of revenues from the HPR storage facility (€15.2 million)”. That’s about A\$24.5 million dollars in its first year. Not bad when the construction and installation costs were about A\$50 million.

So the critics of renewable power are right. The wind doesn’t always blow, and the sun doesn’t always shine. But the lights don’t go off in South Australia anymore because of the big wind/battery facility at Hornsdale. And it makes a lot of money at the same time too.

More batteries will be built.

“We see \$548 billion being invested in battery capacity by 2050, two thirds of that at the grid level and one third installed behind the meter, by households and businesses. The arrival of cheap battery storage will mean that it becomes increasingly possible to finesse the delivery of electricity from wind and solar,” says Bloomberg’s New Energy Finance Outlook 2018.

In fact, there’s one about to be built as part of a giant 7,000 square kilometre project in Western Australia. The Asian Renewable Energy Hub near Port Hedland will feature over 11 gigawatts of generating capacity and will have 800MW/1GWh of storage power. Just a reminder, the Big Battery – long touted as one of the world’s biggest – is 100 MW/129 MWh. So the new Western Australia battery will be almost an order of magnitude greater than the South Australia battery.

For longer-term storage, and for power delivery to huge numbers of people, Australia is going to need something with a bit more weight to it.

Off-river pumped hydro is the answer. It is old, simple, reliable and environmentally friendly technology.

When there is plenty of energy being generated by solar or wind, then some power can be used to pump water uphill. When power is needed, and neither solar nor wind farm can supply, then the hydro operator opens the sluice. Water falls down the pipe into the lower reservoir turning an electrical power-generating

turbine as it goes. And the lights stay on.

Pumped hydro requires two reservoirs of water with an area between two to 20 hectares. The reservoirs can be re-purposed mines – plenty of those in Australia. Or, if there is a suitable location, a reservoir can be made by digging a giant pit in the top of a mountain. If the upper reservoir is located on a hill or mountain near the coast, then the sea can be the lower reservoir. That also gives the benefit of using seawater, which is cheap and plentiful, as the pumped fluid.

According to a research study by Professor Andrew Blakers, an engineer with the Australian National University, Australia has about 22,000 suitable sites, all of which are outside of national parks and urban areas. They’re also located in all the States and Territories. Australia effectively has a near-unlimited supply of suitable sites.

Blakers’ 2017 research showed that Australia needs about 450 gigawatt hours of storage capability to power a 100 per cent renewable grid. Malcolm Turnbull’s Snowy 2.0, which will connect two reservoirs in the mountains via series of tunnels, is a pumped-hydro system. Snowy 2.0 offers over 350 gigawatt-hours, Blakers says. So, on those figures alone, Snowy 2.0 accounts for about 78 per cent of the forecast required storage capacity alone. The project got the green light in the final investment decision in February this year. And from a pro-coal coalition administration no less.

Pumped hydro systems less mighty than Snowy 2.0 will offer between five to 25 hours of maximum power, depending on the size of the reservoirs, Blakers reckons. Such systems can reach full power generation in tens of seconds to minutes, in the event of an incident (and batteries can fill the gap between the time of the incident to pumped hydro reaching full power).

Energy efficiency ranges from about 60 per cent for older pumped-hydro systems to as much as 80 per cent for new systems, according to Chi-Jen Yang of the Center on Global Change, Duke University in the US. Off-river pumped-hydro should easily last for 50 to 100 years. The 350 or so systems around the world in existence, already account for 181,190 megawatts of stored energy, which is about 96.49 per cent (or more) of all long-term energy storage, as

reported by the US Department of Energy global energy storage database.

So, what does it all cost? Blakers puts the additional cost (in 2017) of balancing renewable energy supply with demand, at an hourly figure of A\$25–30/MWh. An hourly balanced integrated generation and storage system would have had a levelised cost of electricity of A\$93 MWh in 2017. And, as we have seen, the costs of renewables and have plummeted since then.

Energy economics analyst, Tifeen Brandily of Bloomberg New Energy Finance, comments that, “Solar PV and onshore wind have won the race to be the cheapest sources of new ‘bulk generation’ in most countries, but the encroachment of clean technologies is now going well beyond that, threatening the balancing role that gas-fired plant operators, in particular, have been hoping to play.”

Looking forward, Professors Blakers and Baldwin, are estimating that renewables could drive coal out of the Australian energy market by the early 2030’s.

Readers of this publication will no doubt quickly point out that Australia has two types of coal, steel-making coal and energy generating coal, and most of it is exported. And it could be argued that whether Australia burns or does not burn coal doesn’t really matter.

But there are alternative ways to make steel without coking-coal, although we haven’t gone into it here. And if renewables are pushing thermal coal out of the Australian energy-generation market, what’s to stop that from happening elsewhere in the world?

Well, nothing, really. There are predictions that even the really big coal-using countries, China and India, will opt for renewables over fossil fuels. Bloomberg New Energy Finance’s 2018 outlook reckons that Chinese coal use will peak by 2030, as renewables and batteries begin to dominate. India, which has been building a lot of coal-fired power stations, has the potential for the cheapest new wind and solar energy on the planet. “This poses a profound orthodoxy there that coal is forever king,” Bloomberg New Energy Finance says. It forecasts renewables domination in India by 2050.

What does this all mean for the shipping industry? Well, sooner or later, thermal coal as a seaborne trade-able commodity is dead. The only real questions left are “when?” and “who will be left holding the stranded assets?”.

A further intriguing question is whether the same will happen to gas too. On the current numbers, the most likely answer is “probably, yes”. ▲



Wind farms at York Peninsula, South Australia

Renewables v nuclear?

Nuclear plants can easily produce the energy humanity needs. But is nuclear better than renewables?

Take, for example, France. France generates most of its electricity from nuclear. But French support for nuclear has plummeted. In 2013, French public support for nuclear energy generation was 67 per cent in favour, according to a BVA-Le Parisien survey. But, by 2018, support for nuclear had dropped to 47 per cent, according to an Odoxa survey.

France has a target to reduce nuclear energy generation from current levels, to about 50 per cent of total generation by 2035.

Nuclear has lots of drawbacks that renewables simply do not. Nuclear plants have the possibility of catastrophic failure. There are radiation safety issues at generating facilities, in the supply chain and at mines. Nuclear creates toxic waste. And it needs a lot of cash put away for decommissioning.

Overall, renewables are also just a better deal than nuclear. The cost of electricity from renewables is far cheaper than the cost from nuclear plants. Investment bank Lazard provides some numbers in its 2018 analysis. On a mean average, wind and solar energy costs about \$42 per megawatt hour. Nuclear costs about \$151 per megawatt hour. Energy from renewables is about 3.6 times cheaper than from nuclear.

Let’s look at build time and construction costs.

Construction started in 2005 at Finland’s 1,600 MW Olkiluoto Nuclear Power Plant and commercial operations are forecast to start in 2020. That’s 15 years! And

the plant will likely cost A\$13.75 billion to build. Let’s now look at the largest solar plant in Australia, which is at Bungala in South Australia. It took about two years to build a 275 MW facility for about A\$454 million.

So, six new South Australian solar farms would equal the energy generated by one new Finnish nuclear power plant, at about five times less cost (a total of about A\$2.64 billion). And that’s not taking into account decommissioning costs. If those six solar plants were built back-to-back, they would have been finished two years ago. And as each solar farm was completed it would have added energy into the grid, whereas Finland would have to wait until the end of the 15 year build period before it got a single joule out of its shiny new nuclear plant.

Of course, the solar plants wouldn’t have been built back to back. They’d probably be built somewhat concurrently. So they would probably all have been finished, assuming slippage time, about a decade ago.

Nuclear is simply not competitive anymore. Even the nuclear industry thinks so. The International Atomic Energy Agency wrote, in its September 2018 projections, “Nuclear power’s electricity generating capacity risks shrinking in the coming decades as aging reactors are retired and the industry struggles with reduced competitiveness... Overall, the new projections suggest that nuclear power may struggle to maintain its current place in the world’s energy mix.” ▲

Other countries can change, why not Australia?

It is worth noting that many countries rely heavily on nuclear power. Nuclear is the world's second largest source of low-carbon power (30 per cent of the total in 2016) [World Nuclear Association (WNA)].

There are several countries now that generate only a little, or no energy, by burning coal. These include Belgium, Cyprus, France, Iceland, Lithuania, Luxembourg, Malta, New Zealand, Norway, Sweden, Switzerland and Tajikistan, to name a few.

Some of those countries, such as Belgium, rely on a lot of gas. Others, such as Lithuania, Sweden, France, Tajikistan, New Zealand and Iceland don't use much coal or gas at all. In November 2018, WNA statistics showed that France was the highest user of nuclear power, at 78.1 per cent. France is also the world's largest net exporter of electricity, due to the low cost of generation. Lithuania uses 72.1 per cent nuclear power and Sweden - 35 per cent (WNA January 2018). Tajikistan and New Zealand use mainly hydro-electric power.

Other countries are doing away with coal. The UK, for instance, just went a whole week without burning coal. Admittedly, coal only accounts for about 9 per cent of power generation in the UK (less than half the 2015 figure, due to doubling of the carbon price floor to £18). Other gross energy production comprised 21 per cent nuclear, 42 per cent from gas, with 24.5 per cent from renewables. By 2025 the electricity power system will operate with zero carbon.

Let's look at Belgium. Belgium is a physically small country, but it has a surprisingly large economy. It was formerly a heavy user of coal but the country shut its last coal-fired power station in March 2016. That's just a little over three years ago. Belgium is still heavily dependent on gas as a fuel though. Belgium uses 51 per cent nuclear and 26 per cent natural gas (WNA September 2018).

So, after coal shut down, what happened?

Back in late 2015, the value of Belgium's total economy stood at \$496.70 billion international dollars, according to the International Monetary Fund. An "international dollar" is a hypothetical currency used by economists for country-comparison purposes. Belgium had an unemployment rate of 8.52 per cent and a gross domestic product per head (parity of purchasing power basis) of just under \$44,201. On 1 January 2016, Belgium had a population of just under 11.3 million

people, according to Government agency Statistics Belgium.

Today, the value of Belgium's economy is estimated by the IMF to stand at about \$572.1 billion international dollars. Its GDP per head (PPP) is \$49,877. It has an unemployment rate of 6.76 per cent and a population of about 11.38 million people. Inflation (average consumer prices; percentage change) has moved about from 2016 to now year-from-year in a range between 1.77 per cent to 2.22 per cent.

So, whatever else quitting coal may or may not have done in Belgium, it certainly hasn't harmed the country's economy.

Of course, Belgium is not Australia. Belgium is not an exporter in the same way as Australia. They have different climates, resource base, economic set-up and so on. So let's look at some different countries and compare.

Canada is phasing out coal by 2030. But Canada relies on nuclear power for 15 per cent of its electricity.

The climates of Canada and Australia are notably different. Canada is probably the country that is most comparable to

Australia. They have similar socio-political cultures of largely British descent. They are both federal states that follow the Westminster system of government. They both have large, sparsely populated landmasses and are both primary resource and export-driven economies. They have similar sized economies (in total and per head), similar unemployment rates and total populations.

Let's also look at some coal-dodging countries that, when grouped together, have some similarities to Australia. The group of seven low coal-using countries (see table below) together have, in aggregate, a total gross domestic product, a GDP per head, unemployment rate and population, that are comparable to Australia. A couple of countries on the list have hot dry climates too.

These two comparators, Canada and the aggregate group of seven low-coal using countries, are well on the way to ditching coal. If they can do it, there are few reasons why Australia cannot, even without the support of nuclear energy, given our potential for renewable power generation. ▲

	GDP PPP \$ billion	GDP/head PPP \$	Unemployment rate	2018/2019 Pop
Australia	1,318	52,373	5.3	25,359,000
Canada	1,837	49,651	5.8	37,000,000
Low Coal Group	Total	Average	Average	Total
	1,336	56,560	5.0	25,109,062
Countries that comprise the low- or no-coal using group				
	GDP PPP \$ billion	GDP/head PPP \$	Unemployment rate	2018/2019 Pop
Belgium	551	48,245	5.9	11,463,692
Cyprus	35	39,973	8.4	864,200
Iceland	19	55,917	2.7	358,780
Lithuania	97	34,826	6.3	2,790,472
Luxembourg	64	106,705	5.0	613,894
Malta	21	45,606	4.0	475,701
Switzerland	548	64,649	2.6	8,542,323

Notes: Totals and averages do not include Australia; dollar signs refer to IMF "international dollars"

Sources: IMF; UN; National "population clock"; official figures/estimates

UK SMR technology envisaged by the Rolls-Royce-led UK consortium can produce nuclear power in a new way anywhere in the world. It solves the conundrum of how to create affordable energy, and more of it, with a lower carbon footprint

Source: <https://www.rolls-royce.com/products-and-services/nuclear/small-modular-reactors.aspx#/>



The case for nuclear power – reliable, affordable and low carbon electricity

By JOHN HARRIES, Australian Nuclear Association

Nuclear power is a major generator of electricity in most advanced and many developing countries, where it is considered an essential part of their electricity supply. Nuclear power plants are very reliable, operating at a high capacity factor of 81.5 per cent – global average 2017 – providing dispatchable electricity day and night.

Nuclear power is a very well-established technology, with over 17,000 power reactor-years of commercial operation since the first commercial power reactors started in the 1950s.

Currently, there are 444 nuclear power plants connected to the grid in 30 countries, with an additional 54 nuclear power reactors under

construction and 111 nuclear power reactors on order or planned with approvals, funding or major commitment in place. In 2018, nuclear provided 10.3 per cent of the global electricity and about 18 per cent of the electricity of advanced economies.

In 2018, nuclear power plants around the world produced 50 per cent more

clean electricity than wind and solar combined. In the European Union and USA, nuclear produces more low carbon electricity than hydro.

Low carbon electricity - renewables and nuclear

Decarbonising our electricity system will need all low carbon technologies – wind, solar, hydro and nuclear –

to work together. A cost-effective low carbon system could consist of a sizeable share of wind and solar, an at least equally sizeable share of dispatchable zero carbon technologies (nuclear and hydro) and a residual amount of gas-fired capacity to provide additional flexibility alongside storage and demand management, and the expansion of interconnectors.

Wind and solar depend on backup power and or storage, which needs to cover at least several days. This backup is usually provided by open cycle gas plants where there is limited availability of hydro. The cost of storage and backup power must be included when assessing the economics of variable renewables like solar and wind.

The use of nuclear enables countries with nuclear to achieve low carbon emissions from electricity generation. For example, nuclear supplied 72 per cent of electricity in 2016 in France, which had an electrical generation carbon emission intensity of 58 g CO₂/kWh compared to 440 gCO₂/kWh for its neighbour Germany, which has a similar sized electricity grid and is closing nuclear plants.

Finland currently has four operating reactors (total 2700 MWe) and a soon to be operational new 1600 MWe reactor. In 2016, electricity production in Finland was 34 per cent nuclear and 23 per cent hydro and its emission intensity for electricity was 112 g CO₂/kWh.

Cost competitive

The International Energy Agency analysed different electricity

technologies and found that nuclear power is competitive with fossil fuel and renewables. The long potential operating life and low operating costs of nuclear offset high construction costs. The construction cost of nuclear power reactors depends on many factors including the type of reactor, whether it is first or nth of a kind, and the country where the reactor is being built.

Recent builds have highlighted the high costs of first-of-a-kind new reactors built in Western Europe (Finland and France) and USA, compared with reactors built in Asia, where there is a well-established supply chain and a continuous series of reactors are being built. China's average overnight costs for building reactors are more than a third less than that in the EU.

The time to build a reactor has a major bearing on costs of reactors. Although the construction of some first-of-a-kind reactors now nearing completion in Finland, France and the USA have cost much more than planned, the overall conclusion of the International Energy Agency study stands - in most countries nuclear is economically competitive as a generator of electricity.

The United Arab Emirates was a country with no nuclear power when it decided in 2008 to introduce nuclear power. UAE selected a bid from a Korean Electric Power Company (KEPCO)-led consortium in December 2009, for four Korean-designed APR1400 reactors at Barakah in the United Arab Emirates. The first of these four 1400 MWe plants is expected to be connected to the grid in

2020, with the last plant in 2023.

Safety

Even including the major accidents in Chernobyl in 1986 and Fukushima in 2011, nuclear power remains among the safest of all generation technologies based on lives lost per unit of electricity produced, over the 60 years of commercial operation.

The Chernobyl accident is the only accident in the history of nuclear power generation in which members of the public are known to have been killed by radiation; and that the Chernobyl reactor type would not have been licenced outside the former Soviet Union.

Reactor designs are continually being improved, based on the operating experience of current reactors. Reactors suitable for Australia will already have been licensed overseas and will be supported by an extensive safety analysis which will be reassessed by the Australian regulator.

Nuclear power - viable option for Australia

Options for Australia would be 1000 MWe power reactors like those recently built overseas, or small modular reactors factory built and transported to site.

Nuclear is a viable option to add reliability to the Australian electricity system and reduce carbon emissions. It is important that the legislative prohibitions be removed so that nuclear can be properly assessed and considered on its merits. ▲

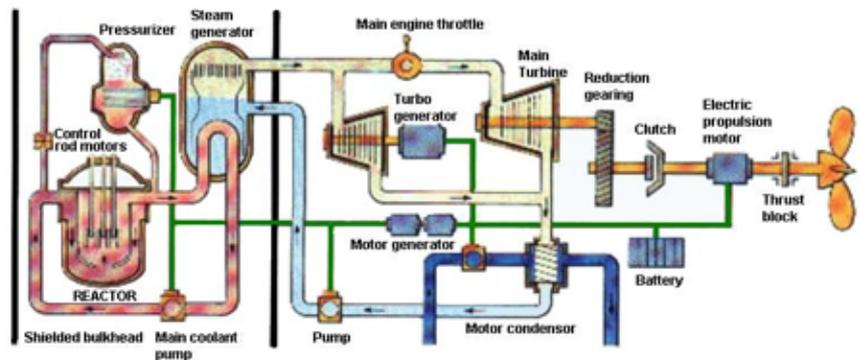


Starting a conversation on nuclear power

By SUBMARINE INSTITUTE OF AUSTRALIA*

In the current Australian political environment, it would be much easier to discuss ‘fission generated, steam powered, propulsion’ than to canvass ‘nuclear power’, although they mean the same. The word ‘nuclear’ has been demonised in Australia, and there has been a failure of leadership to provide balance to what little public debate occurs on the subject. Over the past 60 years there have been several government reviews into the possibility of developing nuclear power to generate electricity. Although those reviews have been generally supportive of nuclear power, the construction of a nuclear power station has never eventuated. Of the G20 nations, Australia is one of only three that does not derive some electrical power from nuclear energy. As a further point of difference, Australia has legislation prohibiting nuclear power. We are alone in imposing such a limitation.

Pressurized-water Naval Nuclear Propulsion System



The Federal Government has made a commitment to build 12 French-designed *Attack* class submarines in Adelaide, as replacements for the six ageing *Collins* class submarines. The new submarines will be conventionally powered – meaning diesel. The 2016 *Defence White Paper* called for these submarines to be ‘regionally superior submarines with a high degree of interoperability with the United States’.

The consideration of nuclear power for submarines is a matter of interest to the Submarine Institute of Australia (SIA), the nation’s foremost organisation for promoting interest in submarines. The SIA has over 400 members from around the world. The SIA Executive Committee comprises office-bearers and members from many major defence industry companies. The Institute hosts an annual conference to consider strategic issues as they relate to submarines and emerging technology.

What then, is the strategic significance of submarines? The Indo-Pacific region is now home to more than 50 per cent of the world’s submarines. It is also a region where about two thirds of our exports and imports are carried. This is in Australia’s area of interest, albeit it is also the area of interest of a number of nations, large and small. These nations, who hold claims to this strategic area, are also the ones who have invested in submarines. Why? Because submarines are the only platform capable of independent operation in an area where that nation may not control the sea or air. It is that capability which provides government with options for strategic consideration.

Operating in this environment is not without its challenges. The size and geographical location of Australia impose long transit times upon Australia’s submarines. The speed and endurance offered by nuclear-powered submarines are tailor-made for these conditions, as



Royal Australian Navy Collins Class Submarines, HMAS Collins, HMAS Farncomb, HMAS Dechaineux and HMAS Sheean sail in formation while transiting through Cockburn Sound, Western Australia, in February 2019. Image: © Commonwealth of Australia 2019

the time taken to make those transits and be available in areas of interest in our region, are much reduced when compared to a conventionally powered submarine. Nuclear propulsion allows a submarine to proceed at high speed without endurance constraints, and frees it from having to expose itself to recharge its batteries. As the figure shows, the major part of the nuclear propulsion plant is steam-driven turbines and gearing, a technology that has been well used in all navies for over a century now, and on which Australia has extensive past experience.

In the interest of promoting discussion on strategic submarine issues, the SIA is promoting debate for serious consideration be given to nuclear propulsion for the class of submarines following on from the *Attack Class*. Any future planning for a nuclear submarine is likely to take decades, and any submarine capability gap must be avoided at all costs. It must be stressed that the SIA fully supports proceeding with the conventional-powered *Attack class* submarines.

One of the primary reasons frequently claimed as to why the Navy has not embraced nuclear power to this point, is the absence of a nuclear industry in Australia. It appears that whenever nuclear power is considered, the arguments associated with the need for new forms of electricity generation and Defence needs, such as submarine propulsion, are considered in isolation. If the civilian and naval needs were considered holistically however, the case for a local nuclear industry might be stronger and more coherent.

To assist in promoting this conversation, the SIA is holding a one day seminar in Canberra on 2 October (Details are at the SIA website:<https://www.submarineinstitute.com/events/Nuclear-Seminar/>).

It is an important conversation and one we need to have. It is a conversation about why nuclear power has not gained traction in a country which holds the world's largest deposits of economically recoverable uranium. The conversation will look into

the obstacles, challenges and opportunities for an Australian nuclear industry that might support both civil and defence needs for nuclear power. ▲

**The Submarine Institute of Australia was created to promote informed discussion and research in the fields of submarine operations, engineering, history and commercial sub-sea engineering - otherwise known as submarine matters.*

Empowering women in the maritime community - Navy leading the way

By COMMODORE ROD NAIRN AM (retired)

IMO World Maritime Day is celebrated on 26 September. This year's theme is Empowering Women in the Maritime Community, I have been impressed by the way that the Royal Australia Navy has led the way, in Australia at least, towards achieving gender equality in its sea-going workforce.

It is about time that the Royal Australian Navy received some well-deserved credit for the amazingly positive steps that it has taken towards achieving gender equality. In the last 30 years, the RAN has transformed its seagoing workforce from a bastion of blokes, to gender equality in almost every role.

The Navy embarked on the journey of equal opportunity out of necessity. Even in the 1980s, it was clear that as an employer trying to attract thousands of seafarers to work some demanding routines (what could be categorised as 'fly in fly out without the out') they could no longer ignore half the population of Australia. Women had served in the Navy for years, they just hadn't been allowed to serve at sea, and in an organisation all about sending ships and men to sea, that immediately classified women as second-class support staff. But things were about to change.

The strategic decision was made to send women to sea in non-combat vessels, in the mid-1980s. It took a few years to implement, new ships could be designed to accommodate both sexes, but existing ships would need to be modified.

In 1985, I was serving as executive officer in HMAS *Flinders*, responsible for the management and efficient survey operations of a small 50 metre survey ship, based in Cairns, with a crew of 45. In these pre-GPS days, to achieve the accurate positioning for surveying, required radio transmitters to be set up at multiple locations ashore. Setting up these stations was a tough job, carrying loads of heavy equipment, through tropical scrub to the top of the highest peak: batteries, antenna, 45 kilogram gas bottles and gas generators, transmitters and of course, ground clearing equipment. For each station I would use a team of six or eight men, each carrying about 30 or 35 kilograms, and we could have three teams ashore at once, and still keep the ship

operating safely.

Introducing women into this environment would be a challenge. On average, they physically could not carry the same amount of weight, so we would have to send more people on each team, take longer to establish shore control and reduce the ship's operational efficiency. The alternative would be to send the men ashore to do the heavy lifting and keep the women onboard to operate the ship. But this would create a two-class structure. I was NOT a fan.

Female officers were first posted to sea in 1987. The first female junior sailors were posted to the inshore survey vessels HMA Ships *Paluma* and *Mermaid*.

It seems that timing is everything, and serendipitously, technology changes aligned perfectly with the posting of females to sea. By the late 1980s GPS had replaced radio fixing systems and there was no longer a requirement for multiple shore stations. Ship deployable, bottom mounted tide gauges further reduced the need for burley blokes heavy lifting. The operational argument against women at sea had vanished and the scene was set for change.

I returned to HMAS *Flinders* as commanding officer in 1993 and three of our officers were female, unfortunately limitations in the ship's design couldn't accommodate females in the other ranks. By then the inshore survey vessels HMA Ships *Paluma* and *Mermaid* had proven that the closer to 50/50 the gender mix of the crew, the more smoothly the ship operates, and the less gender related difficulties experienced.

After the successful introduction of mixed crewing in survey ships, Navy moved quickly to remove barriers and expand female career opportunities. Females were posted to patrol boats and major surface combatants. Then in 1998 the door opened to females serving in submarines.

20 years - Women in submarines

In 1998, the Royal Australian Navy became the fourth Navy in the world to permit women to serve on board submarines. The first female submariners began their training in June 1998, with the first qualifying mid-1999.

For most people in the Submarine Branch today, women have simply always been a part of submarine service. The contribution of women has been overwhelmingly positive: they have served at sea and ashore; as sailors, engineers, warfare officers and technicians, and this year marks 20 years since the first female received her 'dolphins'.

There have been many achievements to date, from both sailors and officers alike, with two of the most recent being the first ever female executive officer of a Royal Australian Navy submarine, who was awarded the Conspicuous Service Medal as part of the Australia Day 2018 Honours List. Maritime Warfare Officer, Submarines Commander Susan Harris, was recognised for exceptional leadership, dedication and professional knowledge, as both a workforce specialist and submariner.

In addition to Commander Harris'

achievement, Petty Officer Kerry Cousins was a finalist in the Women in Defence Awards 2019. A highly motivated, inspirational Senior Sailor dedicated to the advancement of the interests of the submarine enterprise, PO Cousins is a pioneer female in the submarine community. As one of the first women serving in Australia's strategic deterrent, Kerry has been inspirational to other women considering a career in submarines.

The last bastion of male domination is now about to be breached. As this edition goes to print Navy has opened the doors to females to enter the clearance diver category – those that are first in harm's way – responsible for bomb disposal and Navy's feeder category for the elite Special Air Service.

The Royal Australian Navy doesn't need to blow its own trumpet over promoting women in the maritime, it is now business as usual. If you ask a woman serving in the



For the RAN, discrimination in employment roles for males and females is consigned to history

Navy what it is like to be a female serving at sea, they will probably wonder why you are asking. ▲

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Transport fuel security through electrification

By A SPECIAL CORRESPONDENT

Of late, there's been a lot of worry in the national media about fuel security. The fear is that Australia does not have enough liquid fuel stocks to cover demand in the event of an international emergency. The Maritime Union of Australia has also been campaigning on the idea that Australia should have a Canberra-controlled domestic ocean tanker fleet, ready to carry Australia-destination liquid fuels, in the event of an international emergency.

These concerns are understandable. But they're probably now irrelevant.

Electric vehicles do not need liquid fuel. They require power from sunlight. And it's hard to conceive of a fuel source more secure from enemy action than sunlight.

And electric vehicles will surely push fossil-fuelled vehicles out of the Australian market before too long.

The Australian Bureau of Statistics said there were 19.2 million registered motor vehicles in Australia, at the end of January 2018. Those vehicles are nearly all fossil-fuel powered.

About 74 per cent of Australian vehicles are passenger vehicles, and just under 20 per cent are freight carrying vehicles (light commercial vans, light trucks, heavy rigid trucks and articulated trucks). The other six per cent are vehicles of various types, such as camper vans, motorbikes, buses and so on. We'll ignore them.

Figures from the ABS show that Australians are currently not buying electric cars. But consumers overseas are. More than 50 per cent of consumers in Norway bought an electric car in

2017, according to Dr Mortimore, a road transport economist with Griffith University.

There are a few reasons why Australians are not buying electric cars. We'll just look at the two that are commonly voiced. One is a perceived lack of range and the other is a perceived lack of charging infrastructure. But there are increasingly more charging points in Australia – they can be found in the car parks of the major supermarkets.

Meanwhile, the various State and Federal governments are backing fast-charging highways around the country. For example, the Queensland Palaszczuk Government unveiled its "electric vehicle super highway," a network of charging stations along the Queensland coast, back in June 2017. Drivers probably won't be waiting too long during the charge-up time either. Drivers in the US can plug into superchargers, which will charge a battery from near flat up to about 50 per cent in ten minutes. Tesla has built a network of them across the US.

A perceived lack of range, i.e. how far a car can drive on a single charge, may be just that: perceived. Roy Morgan Research says that the average Australian car driver will drive 14,000 km a year. Divide by 365 and it works out at about 38 kilometres a day.

Freight trucks do a lot more driving than that. A recent study, using in-truck gathered data, by Transport Certification Australia and the Australian Road Transport Suppliers Association, found that heavy freight vehicles average about 158 kilometres each journey.

Electric vehicles can easily cover either of these distances on a single charge.

For instance, the Hyundai Ioniq Electric car can be bought in Australia for about \$44,000, according to Carsguide. It comes with a range of 230 kilometres and a full charging time of five hours. There are other electric cars with much

greater ranges.

Electric trucks with a big range can be bought here in Australia too. Melbourne-based SEA Electric makes several different models. Its biggest offering is the SEA Drive 180b. It has an upper gross vehicle mass of 26 tons, a range of up to 300 kilometres on a single charge, continuous power of 225kW and torque of 3,500 newton metres. We'll translate that for you. It's a big truck that can pull a heavy load over a big distance on a single charge.

Incidentally, electric vehicles are powerful too, despite recent claims from the Prime Minister, Scott Morrison, that they can't pull a trailer. Owing to the huge amount of power direct from the battery straight to the wheels, electric vehicles can generate a huge amount of torque. Hop onto YouTube and you can find movies of Tesla cars towing Qantas planes, for instance.

Although the upfront cost of electric vehicles is greater than the cost of combustion-powered cars or trucks, the cost of fuel needs to be considered. For example, energy retailer AGL was offering rates of one dollar a day to recharge electric cars. That gives electric cars a fuel bill of \$365 a year. Multiply that up by the ten years or so that Australians seem to keep cars and you're looking at a ten-year fuel bill of \$3,650 in total. Good luck trying to find a petrol or diesel car that will beat that. And electric vehicles cost less in repairs and maintenance because they are much simpler machines than combustion-engine vehicles.

Given the overwhelming cost and performance advantage of electric cars and trucks, it's inevitable, barring some unforeseen incident or bizarre government action, that electric cars will push petrol and diesel cars out of the market.

And when that happens, there will be little need to worry about our liquid fuel stocks. We won't need them anyway. ▲



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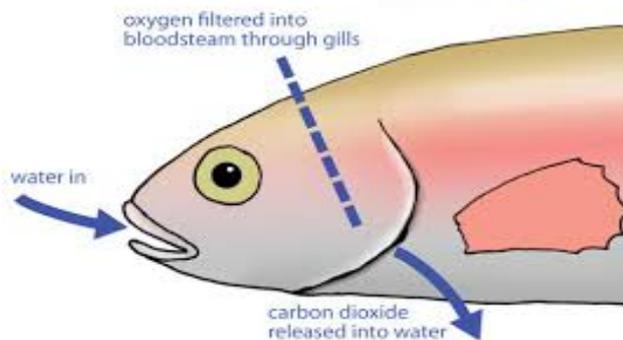
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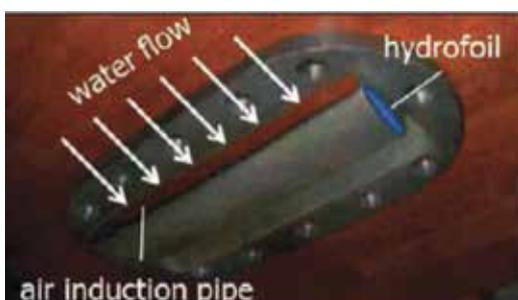
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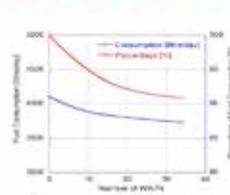
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* Test results in Table 4 Sea Trials, I. Kurnagaetai, OceanEngineering95(2015)183-194



Trade wars and refining transactions: reducing your risks

By ANDREW WILLCOCKS, associate director, International Chamber of Commerce Australia, ACCI

Had Adam Smith been alive today he would have probably delighted in our increasing technological capacity to circulate goods, knowledge, and services around the world.

Much has been written about the 18th Century Scottish philosopher's *laissez-faire* economic theory. In *Wealth of Nations* he proposed that transactions between private parties could operate best when they were largely free from government intervention.

This notion underpinned the beginnings of our economic thinking about comparative advantage, and spurred on the increasing circulation of global trade into the modern day.

However, little popular attention has been paid to the reliance of Smith's ideas on exchangeability. Namely, that in order to transact trade, an exchange of terms needs to happen, exchanges of information need to be trusted, and the path to a commercial agreement and its attached goods must be largely free from regulatory obstruction.

Smith would have marvelled at our unobstructed systems; the internet, our constellation of digital communications, international containerised shipping, standardised international sales contracts, distributed ledger and blockchain, as well as the determination of the maritime shipping industry to sail adaptively into any regulatory environment.

Even with these technological augmentations, so much in our modern goods trade still depends upon trust between people, knowledge of the

regulations, and a rule-based legal certainty that survives across multiple jurisdictions.

However, goods trade now faces massive and unexpected regulatory obstruction. This trend has been ignited by trade flows that challenge traditional regulatory structures, especially for economies that were constitutionalised during times of domestic and imperial – rather than contemporary international – trade.

As a consequence, our cross-border trading problems are multiplying: Brexit, the China-US trade skirmish, the disruptive Uber-isation of commerce, and an influx of behind-the-border national barriers are all causing delay and added cost to shipments.

Meanwhile, national leaders and their regulators grapple with the *realpolitik* of a goods and services trade that dashes in and out of nations via our technologically super-charged supply chains.

National regulatory hammers have begun to be used on international commercial walnuts, and the unintended consequences are looming large across traditionally stable markets.

What are shippers and traders to do in such an uncertain environment? The answer: batten down the hatches and ensure your trading transactions are watertight.

International institutions have continued to make progress in recent decades on the shorthand expression of trade terms for trading parties to improve the reliability of trade transactions.

These global projects are refined across decades of use and practice, forming tools for traders to reduce

misunderstandings and risk, and enhance their ability to agree.

One such set of tools are the Incoterms® rules, published by the global rule-setting organisation the International Chamber of Commerce (ICC) since 1936. The new 2020 rules are about to be released in September 2019.

The ICC Incoterms® are rules for interpreting standard three-letter 'trade terms' used by importers, exporters, lawyers, transporters and insurers across the world for international and domestic sale contracts that allocate certain obligations, costs and risks between the seller and the buyer. They have become crucial for understanding how – and what – each party agrees in a transaction.

For example, if you are a trader, lawyer, insurer, or transporter reading this article, but you don't know what the ICC Incoterms® 2020 version of CIP, DDP, or CFR means, you are at serious risk of having a misunderstanding about your goods trade, which could in turn cause serious loss.

For this reason, the Australian Chamber of Commerce and Industry is proud to launch the important new ICC Incoterms® 2020 rules in Australia, which are now available so that businesses can prepare for the changes prior to the entry into force of the new rules from 1 January 2020.

We encourage all businesses engaged in trade to obtain the new ICC Incoterms® 2020 rules as soon as possible, before the entry into force deadline.

For further information on how to obtain these vital new publications, including future workshops, please contact: info@australianchamber.com.au ▲



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We need the politics and spin to stop and the rain to pour

By ADAM KAY, chief executive officer, Cotton Australia

Water is a cotton farmer's most precious natural resource and the industry's greatest limiting factor. That is why good water stewardship and growing 'more crop per drop' has always been a focus of the Australian cotton industry.

The Australian cotton industry believes in smart water use that improves the health of our waterways and environment, makes our farms more efficient and allows our regional communities to be more resilient.

Australian cotton growers produce yields three-times the world average, making them the most water efficient producers of cotton globally. It must be recognised that the Australian

cotton industry has achieved a greater than 50 per cent water efficiency gain over the last 15 years.

Some examples of irrigation water use efficiency measures our growers have undertaken include:

- Making on-farm storages deeper, to reduce evaporation.
- Improving soil conditions that in turn improve water availability to the cotton root system.
- Implementing water systems that re-use water.
- Incorporating rotations, mulching and stubble retention practices to retain soil moisture.

- Scheduling irrigations to conserve water.
- Using soil moisture probes.
- Improving irrigation systems like laterals, pivot and drip.
- Laser-levelling fields to prevent ponding and water loss.

The Cotton Research and Development Corporation (CRDC) has also invested millions of dollars in water use efficiency research over the past 20 years. Key areas of focus of studies included:

- Alternative, more efficient irrigation systems and technologies.
- Maximising the efficiency of dams and channels.
- More efficient ways to deliver water to the crop.
- Achieving uniform application of water to cotton plants.
- Monitoring water use and getting the timing of irrigations right.
- Promoting investment in water-smart infrastructure.

Australia is currently in the grips of a long and devastating drought. This drought is impacting all agricultural sectors, including the cotton industry.

In the 2018-2019 season, Australia's cotton crop was reduced by half due to the effects of drought and reduced water allocations. This season's crop will be reduced by half again, if there is no rain. This is concerning for our growers, but I am confident that the industry's resilience will see us





through and prepare us for when the rains return.

In January this year, the combination of an extreme drought, above-average temperatures and a deoxygenating algal bloom caused a major fish death event at Menindee in New South Wales.

The devastating incident sparked a very heated debate leading up to the New South Wales and Federal elections. The cotton industry quickly became the whipping boy and the focus of many people's anger across traditional and social media platforms.

The national debate became so hostile that South Australian senator, Rex Patrick, in a calculated move to boost his own profile and relevance, launched a dangerous political attack on the industry by introducing legislation to ban the export of cotton from Australia. It must be remembered that South Australia is a State where no cotton is grown, and the move was clearly a contrived, politically-motivated one.

Right across the supply chain, the cotton industry has united over the past 8 months to strongly, proactively defend our industry, educate the

public and ensure we are well positioned to manage the continued effects of drought.

The Murray-Darling Basin Plan is not perfect, and we acknowledge that some in the community have concerns about it. But the Australian cotton industry wants to see the full implementation of the Plan, as it was written in 2012 and re-agreed to by State and Federal water ministers in 2018.

The Plan has already recovered 2,100GL of water for the environment. It is the best and only deal that could be achieved by the Basin States and the Commonwealth after years of negotiation, and we need to get on with the job of implementing the Plan.

This view is also shared by the National Farmers' Federation, National Irrigators' Council and the New South Wales Irrigators' Council. We agree that more monitoring is required, particularly around the outcomes of environmental water. Similarly, it is important the Commonwealth Environmental Water Holder and other environmental water holders explain how environmental water is being used, what outcomes they are hoping to achieve, and then report back on those outcomes.

If the drought was not crippling enough, Australian farmers, including cotton growers, have also been under siege from sections of the media and politics, who are not providing the full story on complex water issues.

Cotton Australia joined other agricultural groups, including the National Farmers' Federation, in calling for accurate and balanced media reporting on water issues.

Reports filled with inaccuracies, factual omissions and misrepresentations do not constitute balanced journalism, and are unnecessarily creating confusion and angst for the general public and the agricultural industries being targeted.

The Australian cotton industry is attempting to clear up some of the misunderstandings by opening our gates, presenting the facts and proactively engaging with urban and rural communities, politicians and media outlets.

Despite the challenging year it has been for our industry, enduring media attacks and a crippling drought, we remain a resilient agricultural sector. The reality is, without much-needed rain in the next couple of months, the production forecast for this coming season is not optimistic. However, it must always be remembered that droughts come and go, and there will be good times ahead. While that may be difficult to see now, I know our industry is committed to bouncing back and being stronger than ever. It is this resilience, commitment to excellence and best practice, and the passion of our growers that helps make us a world-leading industry, in good times and bad. ▲



Commissioning Australia's new icebreaker

By CLINT THOMAS AM CSC, managing director, Serco Australia

The Southern Ocean is a formidable force. Home to some of the most extreme weather in the world, freezing temperatures and mammoth icebergs, it's a challenge to design and build a ship that can withstand such conditions. So, when an icebreaker also needs to be a state-of-the-art scientific research platform that will serve Australia's Antarctic needs for the next three decades, innovation is a must.

Australia's new icebreaker, the RSV *Nuyina*, is a \$1.91 billion investment by the Australian Government and will form the centrepiece of the Australian Antarctic Strategy. Serco Australia is managing the design and build of the vessel and will operate and maintain the icebreaker when it arrives in its home port of Hobart in 2020.

With more than 50 years' experience delivering services to the Ministry of Defence in the United Kingdom, and 22 years providing maritime services to the Royal Australian Navy, Serco drew on its expertise in complex project management and vessel operation to ensure the icebreaker was fit-for-purpose.

A scientific research platform, icebreaker and resupply ship in one, the *Nuyina* will be powerful enough to break 1.65 metres of ice at a continuous speed of three knots, quiet enough to allow researchers to use acoustic instruments, and large enough to resupply Australia's four Antarctic and subantarctic stations at once.

At 160.3 metres long and 26,000 tonnes, the *Nuyina* will be more than one-and-a-half times longer than Australia's current icebreaker, the RSV *Aurora Australis*, and around three-times heavier. It will have a 1200 tonne cargo capacity, enabling it to carry ninety-six 20 foot shipping containers inside its holds.

The *Nuyina*'s 300 per cent larger cargo capacity and 70 per cent larger fuel-carrying capacity will mean resupply operations to Australia's four

research stations can be undertaken faster and more efficiently in a single voyage.

The vessel will have an increased range of 30,000 nautical miles and will be funded to operate at sea for 200 days each year. With significantly greater icebreaking capability, it will be able to undertake winter voyages into Antarctic waters; a feat which has previously been impossible.

Australian Antarctic Division Director, Kim Ellis, said the *Nuyina* will be a remarkable addition to Australia's Antarctic capabilities.

"It will deliver for us new opportunities for scientific research and capabilities for logistics, passenger transfer and fuel resupply that we've never had before," Mr Ellis said.

"When *Nuyina* is launched in Hobart in 2020 she will be the most powerful research and logistics ship in the Southern Ocean and a terrific contribution to Australia's Antarctic efforts."

Among the scientific 'game-changing' design elements are the ship's hull and propulsion system, which have been designed to reduce noise associated with the engines, gearboxes, propellers, and bubble formation. The 'Silent-R' noise specification is also supported by a hybrid propulsion system, which includes diesel generators on flexible mounting systems (to absorb vibrations). A moon pool, to

deploy oceanographic equipment, and a wet well sampling space, will allow scientists to undertake marine research while the vessel is operating within the ice. The watertight wet well sampling space is unique to the *Nuyina* and will allow scientists to collect and study fragile marine organisms in their natural environment for the first time.

Thirty-two crew and 117 expeditioners will travel comfortably onboard, for expeditions lasting up to 90 days. To make the long sea journeys more enjoyable, the ship includes a 96 seat theatre, a library, and an observation bridge/deck, just below the navigation bridge. This area will be used to undertake observations of sea ice, wildlife and weather, and will double as a recreational and meeting space. As well as crew and expeditioner cabins, there are also a conference room, dining room and lounge.

The design of the vessel was carefully considered.

Through our role in the design and build of the vessel, Serco has worked with scientists and specialists in the Australian Antarctic Division to consider what the future for scientific research in the Southern Ocean will look like, and how this vessel can best meet the research and operational needs required over its 30 year lifetime.

The result is a vessel that offers unrivalled scientific, logistics and icebreaking capabilities.

The advanced capabilities of the icebreaker open up exciting



At 160 metres long and 26,000 tonnes, the Nuyina is three times the capacity of Australia's current icebreaker

possibilities in scientific research, such as discovering new species and learning more about the unique Southern Ocean environment.

It truly is a step-change in Australia's Antarctic research capability.

A ship of such calibre demands a skilled captain equal to the task of skippering tough Antarctic voyages. Masters Scott Laughlin and Paul Clarke recently joined the Hobart-based *Nuyina* crew and come to the role with extensive experience working in the Southern Ocean. With more than 70 voyages to Antarctica between them, the Masters are enthusiastic about continuing their work in the icy southern waters.

Scott has completed more than 50 voyages to Antarctica. As Captain of the RSV *Aurora Australis* for over 10 years, he is familiar with the cold and challenging conditions of the Southern Ocean.

"The Southern Ocean is a captivating place to work," Scott said.

"Every day you can see the extremes of nature from the subtle hues of the blue and white in the make-up of the Antarctic ice, to the majesty of the birds and animals that live in such a cold and hostile place."

Scott's seafaring experience has made him an invaluable member of the project. Joining Serco in 2014, Scott was part of the team who compiled the successful bid to design, build, operate and maintain the *Nuyina*, and then more recently as a member of the engineering team, managing the design and build phase.

Paul's experience includes 11 years working for the British Antarctic Survey, where he undertook more than 20 voyages to Antarctica. Starting with the company as a deck hand in 1994, his recent appointment as Master of the *Nuyina* fulfils a lifelong goal.

"My ambition was always to become the Master on a polar research vessel. I very much enjoy the type of ice navigation challenges, research and survey work that we will undertake on the *Nuyina*," Paul said.

The name *Nuyina* comes from the palawa kani language spoken by



Masters Scott Laughlin and Paul Clarke, enthusiastic to take on their new ship



The Australian public has had a sneak preview of a LEGO version of the Nuyina, built by “The Brickman” Ryan McNaught. One of only 14 certified LEGO master builders in the world, Ryan is also a judge on the TV show LEGO Masters Australia. Inspired during a trip to Hobart in 2016, when he saw Aurora Australis preparing for one of its annual Antarctic resupply voyages, Ryan approached the Australian Antarctic Division. Learning a new replacement icebreaker was under construction, he grabbed the opportunity to build a LEGO model replica. At 2.8 metres long, the Nuyina model took Ryan and his three assistants 117,612 LEGO bricks and 328 hours to build. The model is currently on display at the Australian National Maritime Museum in Sydney.

Tasmanian Aborigines, meaning ‘southern lights’ (or aurora australis). The name recognises the long connection that Tasmanian Aboriginal people have with the atmospheric phenomenon. The vessel was named by Australian schoolchildren through a competition run by the Australian Antarctic Division.

The Nuyina is due to arrive in Hobart next year. Construction of the vessel is being undertaken in Galati,

Romania, by shipbuilder Damen. Harbour acceptance trials and the interior fit-out are currently underway, with sea trials to be completed early next year. When complete, the Nuyina will rise to ten decks at navigation bridge level and measure 50.2 metres from the keel to the top of the weather radar.

The project is expected to create hundreds of jobs for Tasmania and provide opportunities for Australian

businesses to deliver support services such as repair and maintenance, docking, security, cleaning, provisioning and stevedoring.

Serco is currently accepting expressions of interest for industry partnerships and will be recruiting crew positions later this year.

For more information, visit www.serco.com/icebreaker ▲



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The future's looking greener for containerisation

By BRENDAN McAULIFFE, chief executive officer, AQUIO

Since first being introduced in 1956 to international trade, the shipping container has seen a remarkable increase in importance for global trade over the last 50 years. In 1968 fewer than one million containers were shipped around the world, by 2016 this had increased to 182 million containers. More than 90 per cent of items shipped internationally are facilitated by shipping containers, everything from clothes to cars to computers. The shipping container has profoundly changed global trade by facilitating reliable and cheap transportation of goods across countries. This, in turn, has had far-reaching consequences, on the positive side it has driven down the price of items through opening new economies of scale. On the downside, the environmental impact of container shipping, an increase in carbon dioxide emissions.

With the growth in international shipping, the packing and unpacking of shipping containers has presented hazards to both employees and employers, for example:

- Hazardous fumes – fumigants used for pest control, off-gassing from products shipped in the containers,
- Manual handling – heavy lifting,
- Falling objects – due to shifts in the contents due to transport, falls of containers in container stacks.

Where a hazard is identified, elimination is the primary goal. If elimination is not possible, the hazard

must be controlled as practically as possible to minimise the risk to workers. Safe Work Australia has developed a series of information sheets to provide practical guidance for Australian workers to manage health and safety risks associated with unpacking shipping containers, including exposure to hazardous chemicals, for example fumigants and solvents. Suggestions by Safe Work Australia to eliminate or minimise exposure of workers to hazardous chemicals in shipping containers include using barriers and warning signs, as well as providing workers with personal protective equipment.

This paper is particularly concerned with hazardous fumes and the risks posed therein. Workers may be

exposed to dangerous chemicals while unpacking shipping containers. The health risks posed may not only affect the workers involved in container unpacking, they may also apply to supervisors, site managers and inspectors who gain long-term exposure through consistent exposure to the containers as part of their everyday job.

In 2011, Safe Work Australia conducted research in Melbourne investigating the presence of residual chemicals in shipping containers. They surveyed 76 containers and found air borne hazardous chemicals in 74 of the 76 containers. Some of the hazardous chemicals detected included:

Hazardous Chemical Residue	Listed Source	Alternative Source
n-hexane	Off gassing from packaging materials, consumer products or cargo carried	Solvent-based paint
Ethylene dibromide	Fumigation	
Ethylene dichloride	Fumigation	
Benzene	Off gassing from packaging materials, consumer products or cargo carried	Solvent-based paint
Alkylbenzenes	Off gassing from packaging materials, consumer products or cargo carried	Solvent-based paint
Ammonia	Fumigation	
Chloropicrin	Fumigation	
Hydrogen cyanide	Fumigation	
Styrene	Off gassing from packaging materials, consumer products or cargo carried	Solvent-based paint
Toluene	Off gassing from packaging materials, consumer products or cargo carried	Solvent-based paint

Source: Managing Risks of Hazardous Chemical Exposure When Unpacking Shipping Containers Information Sheet, Safe Work Australia (2012).

As can be seen from the above table, the most common hazardous chemical residues identified are fumigants and solvents. Toluene (92.1 per cent) and xylene (73.7 per cent) were the most commonly identified air borne hazardous chemicals in the shipping containers tested.

When workers were interviewed during this research, it was identified that those exposed to the air borne hazardous chemicals were more likely to report:

- Symptoms of memory loss,
- Asthma,
- Irritation of the eyes,
- Dryness of the mouth,
- Dryness of the throat.

In addition to the health effects that can result from exposure to these chemicals, solvents are also highly flammable, which cause fire and explosion risks when exposed to heat, sparks or a naked flame. The combined impact of health effects and fire risks associated with solvent-based materials in shipping containers increases the risk of sick days, staff turnover, WorkCover claims, increased insurance risk, specialised risk and safety training, and litigation, all of which are indirect costs that increase overheads for business.

Promoting better practices and training of staff to recognise and reduce the impact of residual chemical exposure from shipping containers must be a high priority for empty container parks. This represents minimisation of risk. However, consideration must be given to the elimination of air borne hazardous chemicals from solvent-based paints that are widely used to upgrade the interior of shipping containers.

It is a requirement to display notification of fumigation and a dangerous goods placard for solvents on the exterior of shipping containers, which would alert workers to the potential risks posed by air borne hazardous chemicals. It is often overlooked that the products used to coat the interior of shipping containers can contribute to off-gassing and subsequent inhalation risks of hazardous chemicals. Indeed, of the five non-fumigant hazardous chemicals identified in the Safe Work Australia research, all of these are common raw materials found in solvent-based, quick dry paints used for spraying the interior walls and ceilings of shipping containers. Interestingly, it is not required to placard a container that has had solvent-based paint sprayed on the interior when the outgassing

of hazardous chemicals from these solvent-based paints, toluene and xylene, were the two most commonly detected airborne contaminant in shipping containers.

Over the past decade there has been an increased emphasis on sustainability by the shipping industry, with a large focus on emissions reductions and the carbon footprint of their operations, and the subsequent impact that would have on climate change, for example, Maersk Low Carbon Future, CMA-CGM Corporate Social Responsibility Policy and IMO 2020. The issues faced by the shipping industry to make its operations more sustainable and environmentally friendly, are both short-term and long-term challenges. Long-term challenges will require significant investment on the behalf of ship owners, container owners and port operators. There are some shorter-term strategies that can be undertaken with minimal investment, to improve sustainability and worker safety. The most immediate strategy is a switch from solvent-based to waterborne coatings.

The introduction of waterborne coatings into the container industry first started back in 2010. Since then the use of waterborne coatings for the coating of newbuild containers has been mandatory from April 2017. One of the biggest challenges presented to the container building factories in switching from solvent based to waterborne paints, was meeting the application process criteria, which is more involved for waterborne than for solvent-based. Solvent-based paints were used in the container manufacturing industry for a reason: they are far easier to apply and more forgiving if there are shortcomings in the application process, and more tolerant of cold weather. It was noted that there were significant costs associated with switching from solvent-based to waterborne application processes for container manufacturers, including additional heating, venting and dehumidification, there was an increase in power consumption of up to 60 per cent to facilitate the use of water borne coatings.

Trends in the paint industry indicate that since the early 1990s, solvent-based enamel paints have been banned in Europe in architectural coatings, however, they are still used in Australia today. By 2000, low VOC architectural coatings had become mainstream. By 2010 the benefits of low VOC and ultra-low VOC paints were being recognised in the architectural sector. While these benefits are applicable to water-based

industrial coatings, like those that could be used on shipping containers, this transition has not occurred on a large scale in Australia, with a focus on fast turnaround, which is achieved using fast evaporating solvents. However, by transitioning from traditional solvent coatings to new cutting-edge water-based technologies, the shipping container M&R industry will benefit from:

- Increased workplace health and safety,
- Reduce risk in the supply chain by not having to handle dangerous goods in their cargo,
- Fewer worker sick days,
- Lower overall risk profile for the work site, reducing insurance,
- Better environmental footprint,
- Extremely low investment cost.

Unlike the container production lines in China, there is no significant cost associated with a shift from solvent-based to water-based coatings. Indeed, initial trials indicate that there are many direct and indirect cost savings associated with the use of water-based paints for container M&R, including:

- Up to 30 per cent reduction (litreage) in material used,
- Reduced costs for DG transport, storage and compliance,
- Reduction/elimination in PPE and health and safety costs,
- No purchasing of additional solvents or waste solvent disposal,
- Elimination of protected equipment requirements (flameproof tooling, hoists, lighting).

The use of water-based coatings in the Australian shipping container M&R industry should be investigated, with priority to improve health and safety of workers charged with carrying out upgrades, reducing the risk of exposure to solvent-based air borne hazardous chemicals for workers, supervisors, site managers and inspectors. On top of this there are the associated environmental benefits which help shipping lines meet their environmental policy targets, as well as meeting consumer preferences for sustainable products and services. ▲



Caring for seafarers who serve us!

By REVEREND TAY, principal chaplain and chief executive officer, The Mission to Seafarers, Sydney

According to the Annual Review statistic from MTS London (FAN June 2019, Issue 26), the year 2018 was another significant year. The global team is one of the largest port-based welfare operators in the world. With 200 ports benefitting from our support in 50 countries; 121 Mission to Seafarers' Centres; 70 frontline staff; 100 honorary chaplains and 1000s of volunteers. Our teams are on call 365 days a year, visiting ships, offering hospitality and advocating on behalf of seafarers and their families. Below are some statistics for 2018:

- 70,600 ship visits, up from 65,000 in 2017,
- 353,000 seafarers were helped by our teams, a rise of 18 per cent from 2017,
- 3) 673,000 visits were made to our 121 Seafarers' Centres, a rise of 16 per cent from 2017,
- 4) 439,000 seafarers provided with transport, a huge 64 per cent rise from 2017.

To quote our Secretary General, The Reverend Canon Andrew Wright, "We

remain proud to be making a significant contribution to the happiness and wellbeing of seafarers and their families, often in quiet ways but sometimes dramatically so."

Likewise, for The Mission to Seafarers Sydney, we have seen a significant growth in caring for seafarers around the world, with compassion. We are creating the awareness among seafarers and the wider community that at our Mission Centre - we are providing a home away from *home* for seafarers; a place of *hospitality* where they can relax, reflect and be refreshed and a sanctuary of *hope*, especially for those who are weary and looking for a place to cast their emotional and spiritual anchors to find assurance, peace of mind and rest for their soul. We understand the issues of mental health for seafarers which many of them are struggling due to isolation, loneliness, depression, and we are here to support them and to assist them.

Operation Cruise Terminal 2018/2019

The Cruise season for 2018/2019 started on a high note. It was exciting to see record numbers of seafarers from the cruise vessels visit our Mission! Since our Mission moved to Hickson Road in the year 2013, I was quite puzzled as to why so few seafarers from the cruise vessels visit our Centre. I have been visiting the crew on board the various cruise vessels each year but not more than ten seafarers visited our Mission each season.

Since we launched our OCT, we have had more than 250 seafarers visit our Mission. From experience, 90 per cent of seafarers on board the cruise vessels have not heard of Mission to Seafarers, the other 10 per cent who have heard of our Mission do not know where we are located. We can proudly say, that we have increased the awareness of our Mission among the seafarers, with our presence at Overseas Passenger Terminal, visiting them on board the vessels, and we have distributed 3000 copies of our flyers! Our *Operation Cruise Terminal* has been a great success! Thanks to our great team of players - both staff and volunteers.

Parcel Collecting Centre at MTS

Another successful story is that, we informed seafarers from the cruise vessels that they can send their parcels or orders to our Mission's address. When their vessels call at OPT, they need to come in personally to collect their parcels. With this initiative, we have seen more than 150 parcels delivered to us this season. They were very grateful to us for rendering this important, critical and practical service to them.

Operation White Bay Cruise Terminal 2019/2020

The next cruise season commences in September/October 2019. With such great success and breakthrough last season, we will continue our Operation Cruise Terminal 2 at OPT. In the meantime, we are planning a new initiative called, *Operation White Bay Cruise Terminal*. There are many cruise vessels visiting White Bay Cruise Terminal and a number of vessels berthed overnight. The seafarers on board have no means of travelling to the city or visit our Mission. We are here to attend to their needs and hopefully to be able to transport them to our Mission and to visit our beautiful city.

International Seafarers' Welfare and Assistance Network (ISWAN)

This year we were nominated for two Awards, namely - The Best Seafarers Centre of the Year 2019, and The Dr Dierk Lindermann Welfare Personality of the Year Award 2019. We have been shortlisted for both Awards to be presented on Wednesday, 11 September 2019 in London. I want to thank all seafarers, supporters, friends, volunteers, staff and board members for their nominations. A special thanks to all our staff and volunteers for their untiring service, support and care shown to the seafarers around the world.

Christmas Thanksgiving Celebration

Each year in December, we organise Christmas Thanksgiving Celebration. At this event, we give thanks to God for the many blessings He bestowed on us, for seafarers serving us and to thank each of you for your support, participation and donations. May I invite you to celebrate with us on Tuesday, 10 December 2019 at 5:30pm - 7:30pm at our Mission. We are organising Christmas gifts for seafarers during this season. If you wish to donate, please deliver your gifts to our Mission at 24 Hickson Road, Millers Point, Sydney 2000.

If you would like to know more about our Mission and like to get involve, this celebration is a great opportunity for you to attend and to get to meet seafarers and interact with them. I encourage you to **partner with us in Caring For Seafarers Who Serve Us!**

Please visit our website: www.missiontoseafarers.org.au Facebook: [missiontoseafarers](https://www.facebook.com/missiontoseafarers) - Sydney

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Some trade wars are more equal than others

By BERNARD GRESSER, director, Infinitas Assets Managements Limited

It seems like an eternity ago since the Trump pre-election rhetoric turned into the real impositions of tariffs on China.

That which was first tweeted about in March 2018 turned into on-again, off-again tariff announcements.

This really escalated into a full-blown trade war at the end of August 2019.



Considering it took from 2016 until now for the rhetoric to turn into a real pseudo-sanction environment, there are really no excuses for not being prepared for it.

The hostile US-China environment will be seen historically, as one of the multiple trade disputes that we have seen between economies that are classed as developed (which may be being generous) and economies that are still classed as emerging or developing (which would be very much understating their output and sophistication).

Looking at a few different aspects of the US-China trade war, we can see how different players have reacted.

In a previous article I wrote about how

exports from the US were still making their way into China, tariff free, via transit countries.

These countries included Korea, Japan and even Argentina (the Argentinian soy bean import/export data over the past 12 months is now too significant to ignore).

A country that is now starting to make headlines is Vietnam.

After Vietnam's economic growth accelerated from sub seven per cent during 2017, to above seven per cent in 2018, most forecasters were expecting economic growth to moderate during 2019.

Those forecasters appear to have

been too conservative, with Vietnam potentially being on track for another seven per cent plus year and maybe even seeing an acceleration over the previous year.

How has Vietnam been able to continue their economic miracle?

It all comes down to geography. As per the included map, Vietnam borders southern China.

The fact is that Vietnamese rail and port facilities allow easy transit in and out of China, for goods.

This is one of many loopholes that is currently being exploited by market forces to meet consumer demands, in China and the US. At some stage, this avenue of transit might be closed. However, at the moment, there is little doubt that Vietnam is benefitting from the US-China trade war.

Vietnam has demonstrated that it is a winner from the ongoing situation.

For every winner, there is a loser.

Supply chains that are leveraged to 5G appear to be wearing a substantial amount of pain.

Without going into the technical aspects of 5G or the perceived national security concerns, the delay in 5G has backed up the entire supply chain. There are so many moving parts to this, one can understand why there has been so much discombobulation.

First, Chinese telecommunications giant Huawei was not initially impacted at the early stages of the China-US trade war. Effectively, this was only a 2019 development. Now Huawei and their market-leading 5G devices, have turned into key issues in the trade war.

Next, for 5G networks to work you need hardware and networks to support these ecosystems.



All one has to do is look at the quarterly filings of the 5G ecosystem components makers to see how either their order book has slowed or been disrupted. This is because global supply chains span continents. When internal company orders are impacted by price hikes of 25 per cent, it turns the economics of that supply chain upside down.

Then you move further down the supply chain and see companies like Apple, having their sales and release dates of newer 5G products delayed.

These disruptions to the 5G supply chain are typically being worn by that middle market, who has no control over the purchasing orders of the global telecommunication giants.

Due to consumer demands, one way or another, this technological gridlock will be broken. It's just a matter of who does it and when.

Some Australian companies are benefiting from the US-China trade dispute.

Some Australian companies should be benefiting a lot more than they are.

An example of an Australian company that is delivering on this front is Australia's largest UHT milk producer, Freedom Foods.

The export of consumer goods, like UHT milk into China, has become

a regulatory mine field for the inexperienced. Now, suppliers into the Chinese market must address COO (Country of Origin) requirements and increasingly COR (Chain of Responsibility) compliance demands. Freedom Foods appears to have navigated those issues well. As per their last result, demand for the UHT product outstripped supply.

Many Australian companies could learn from the regulatory experiences of Freedom Foods.

On that note, many US companies can learn from Freedom Foods. Access to a market (in this case China) is one thing. Providing a world beating product in another. Ultimately, it doesn't matter about having a perceived level playing field when it comes to international trade. If you are selling the best product at a competitive price, you'll be surprised how little tariffs impact you.

At some stage, the US-China trade war will be resolved. This resolution will be a political solution. This resolution may not see any meaningful differences from where the US and China were before this current dispute started back in March 2018.

Keep in mind that this column may not age well.

Considering we are in an environment of 3am tweeting, everything can change at a moment's notice. ▲





Exchange rates in the current trade environment

By PAUL BETTANY, Foreign Exchange partner, Collinson & Co

Introduction

The US/China Trade war has triggered global growth concerns, and forced Central Banks across the world to shift monetary policy to an extremely and historically stimulative level. The RBA has led the way, with two rate cuts since the re-election of the Liberal Government, and the promise of more, as the situation demands. The RBNZ also reacted, with a 50 basis point cut of their own, confirming the danger level to these trade exposed economies. The US Federal Reserve has also cut rates, and both the ECB and the Bank of England have indicated further 'Quantitative Easing'.

US/China trade wars

The US/China trade war is escalating, with arrows being fired at the Chinese, via President Trump's 'twitter' account. Never before has a trade war, or any politics, been conducted in public via social media! The Chinese and US had all but reached an agreement some months ago and were on the verge of signing, until a last-minute withdrawal by the Chinese. The comprehensive nature of the agreement apparently had far reaching repercussions for the Chinese, which included not only balancing the trade deficit, but addressed the rampant 'Intellectual Property' theft and subsidised export industries. The extent of the compromise was just too much for the Communist Chinese leaders to swallow.

The last-minute withdrawal from the process angered the Americans, who reacted by imposing further sanctions

on Chinese exporters. The US had increased tariffs on US\$250 billion of Chinese exports from 10 per cent to 25 per cent and in addition, have imposed 10 per cent tariffs on the remaining US\$300 billion of exports! The Chinese responded, but are very limited in their reactions, due to the imbalance in trade (US\$500 billion deficit/surplus). The Americans have suspected the Chinese of delaying tactics in the hope Trump will not be re-elected and they may negotiate a far more favourable treaty with a Democrat President?

President Trump's response was initially greeted with panic by markets, as global equity markets crashed, over fears of the damage to global growth and international trade. The existing supply chain is under threat. The longer the trade war continues, the more permanent the damage. The Chinese economy is suffering, and their economic data releases confirm this. China has re-routed exports through 'third parties' but the longer the 'war' extends, the more other Asian Tiger Nations fill the production/export gap. This will necessarily impact the Australian economy in the near future, as China is the biggest export market. It is a dangerous, high stakes game, the Chinese Government are playing.

Central Bank action

The immediate impact of the 'US/China Trade War' was seen in markets, with equities crashing and fears emerging of a global recession. Remedial action has been demanded and been forthcoming. Central Bank action over monetary policy and fiscal action by governments

have been a prompt stimulative to avoid further damaging global economies. The RBA has cut rates twice since the re-election of the Liberal Government. The RBA has noted the impact of the trade war on the domestic economy and promised further QE as is necessary and demanded. They have led the way and others have followed. The Bank of England, the ECB and Bank of Japan have promised further stimulation through monetary policy. The ECB and Bank of Japan have already got negative interest rates, so will need further action, through purchasing/repurchasing programmes and expending the money supply. The Federal Reserve has reversed their Quantitative Tightening (QT) strategy and begun to cut rates again. The Federal Reserve and Chairman Powell are under extreme pressure from markets and the President. The Fed has been under a sustained twitter attack from President Trump, who blames them for raising rates too soon and too fast. He is a strong advocate of low interest rates to stimulate economic activity.

The global QE should stimulate business investment and encourage economic growth. It also triggers yet another global currency war. The lower interest rates undermine the associated

currencies and this has been reflected in the trade exposed, commodity currencies of Australia, New Zealand, Canada etc. The Fed's action has been tempered, and therefore the dollar has risen to historical highs. The immediate effect of this is to undermine the

purchasing power in non-US dollar economies, and flow directly into cost-of-living pressures.

The Australian experience

The surprisingly re-elected Liberal/National coalition Government has brought some certainty back to the economy, and provided a boost to a seriously challenged housing market. The seas may be calm, but the economy is under serious threat, with global growth concerns hitting the trade exposed economy. The ongoing US/China trade war is upsetting the supply chain and beginning to impact the domestic economy. Economic growth is sluggish and is manifesting itself in the form of economic data. The RBA has been quick to act, cutting interest rates twice, in two months, postelection. This should encourage investment and hopefully stave off recessionary pressures. It does not assist the AUD, with the only saviour possibly coming from the actions of the Federal Reserve.

To avoid currency volatility, exposed companies need to employ orthodox risk management techniques, to ensure pricing certainty. Currency risks can be managed effectively,

AUDUSD chart



by accurately forecasting foreign currency cash flows and mitigating the risks, with effective and available management tools.

Summary

The ongoing US/China trade war has forced stimulative fiscal and monetary policies to combat global economic growth fears. These actions have

undermined the trade exposed countries' currencies and equity markets. The economic fallout from the political impasse is wide and far reaching. A solution may come anon, and restore economic confidence and sentiment, but this war may extend until after the US Presidential elections (November 2020) - let's hope not?! ▲

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IMO's 2020 Low Sulphur Fuel (LSF) – Are we ready yet?

By MELWYN NORONHA, deputy CEO, Shipping Australia Limited

The worldwide implementation of this important new IMO requirement from 1 January 2020, represents a regulatory game changer.

With less than six months to implementation, by now most of the shipping industry would have decided on the best way to deal with this new sulphur cap. Available options to the shipping fraternity include burning a compliant fuel, installing scrubbers or retrofitting with LNG engines.

Apart from the significant additional cost of compliant fuel, implementation will be complex because of the sheer magnitude of the switchover and the much larger quantities and different types of fuel involved, as well as continuing uncertainties about the availability of compliant fuels in every port worldwide, immediately after 1 January 2020.

Main issues

Some of the issues that both regulators and industry are contending with are:

- Availability,
- Scrubbers – Open loop and closed loop,
- Transition and impacts on engines from the use of compliant fuel oil,
- Compliance,
- Bunker surcharges.

Availability

The oil majors have all made assurances via statements or in media reports that low-sulphur fuel will be available later this year in container shipping ports around the world, and they have expressed confidence that supply will be sufficient. However, the demand will be enormous, with BP expecting over 90 per cent of the global bunker market to comply with the 2020 sulphur cap.

Impacts on engines

Another issue facing shipowners and some engine manufacturers, is the potential impact on engines associated with the use of varying levels of LSF, which include:

- Compatibility issues associated with mixing of paraffinic and aromatic base fuels;
- Use of exhaust gas cleaning systems, known as *scrubbers*, could create blockage in the exhaust that increases back pressure, which may require the manufacturer to make engine modifications, including turbocharger upgrade or retrofit, approved by the relevant class society.

- Cylinder liner wear and tear – more difficult to balance the corrosive influence of sulphur and the cylinder oil in low sulphur fuel, leading to increased wear.

The key message for shipping lines, has been to contact the engine manufacturer early, to discuss compliance options and to determine the most appropriate solution, including consideration of consequential issues with this solution.

Bunker surcharges

As the date inches closer, analysts following energy markets are becoming alarmed at the possibility that the spread between light and heavy fuel oils, which will inform the surcharges shippers pay, could be larger than shippers are anticipating. Examining various sources, it seems the price will be somewhere between \$200 and \$250 higher than that of high-sulphur fuel.

In terms of bunker fuel prices, the major global container lines have separately outlined revised Bunker Adjustment Factors (BAFs) that replaced the old formulas on 1 Jan, this year. The carriers say the new formulas are better suited to recouping the additional cost of meeting low-sulphur fuel requirements that the container shipping industry estimates will add between \$10 billion and \$15 billion to its annual fuel bill.

Will the new rules affect freight rates?

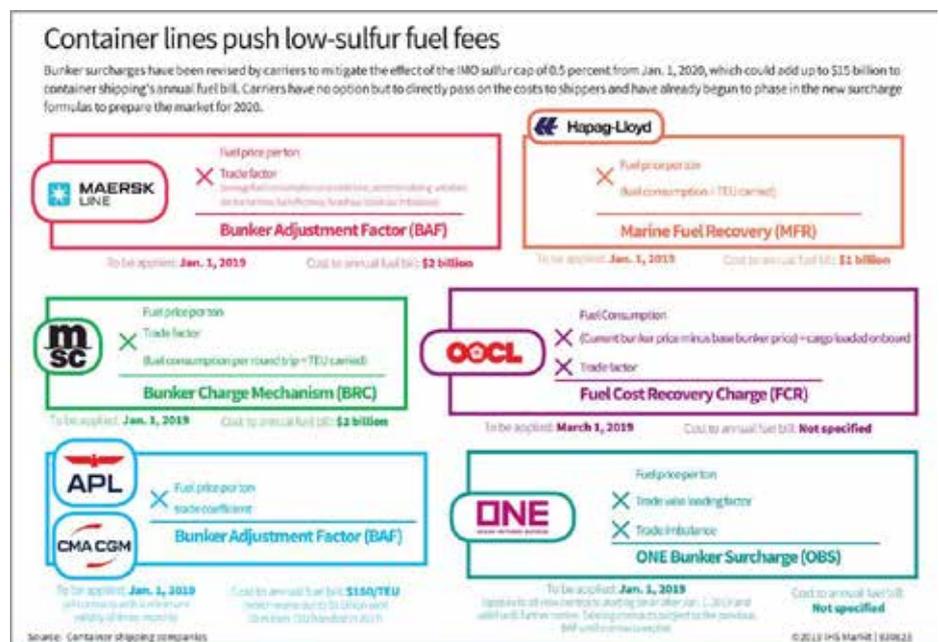
Yes, but by how much remains to be seen, and a lot will be dictated by supply and demand. Fuel prices will play a significant role in the rise of shipping rates, as 60 per cent of a ship's operating cost is fuel. The refining industry will have to alter its production, increase the supply of low-sulphur fuels and manage excess supply of high-sulphur fuels. The extent of the rise would depend on how much low-sulphur fuel was made available internationally.

Examining the various sources, it seems the price will be somewhere between \$200 and \$250 higher than that of high-sulphur fuel.

New regulations are certain to influence freight rates. These rates can fluctuate depending on:

- Time and distance between ports,
- Weight and density of the cargo,
- Freight classification,
- Mode of transport,
- Tariffs and taxes,
- Fuel costs.

Rising fuel costs, means rising freight rates, with much of these costs being passed to consumers. According to Goldman Sachs, it is estimated that the total impact to consumer wallets could be around US\$240 billion. ▲





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Traxens role in the new digital strategy

By PETER CREEDEN, director, MPC International Pty Ltd.

August 26, 2019 – The digital pace has quickened, thus things may have changed by the time you read this article.

This quickened pace was made clear when the Digital Container Shipping Association (DCSA) made some big announcements soon after my last article was published. Thomas Bagge, CEO of DCSA, was successful in getting CMA CGM onboard as a founding member. DCSA also announced that Evergreen, Hyundai Merchant Marine, Yang Ming and Zim joined as members. Henning Schleyerbach joined as COO. These announcements are significant developments for the industry.

The founding members of the DCSA have joined forces in pushing a strong digital strategy.

The recent, separate announcements by the shipping lines about the investments in Traxens and more shipping lines joining Tradelens, not only mark a huge step forward for the industry but also send a clear signal to the wider supply chain market that the shipping lines have a strategy going forward.

These steps taken have shown a willingness by the shipping lines to move towards a digital future but is it enough?

The decision by Maersk to invest in Traxens, a smart container company, brings together the top three carriers (MSK, MSC, CMA) as equal shareholders in the Marseille based company. Hapag Lloyd announced they will roll-out the Traxens devices on 100,000 reefer units. Therefore, the shipping industry has chosen a leader for their IoT devices but how quickly will they upgrade their container fleets?

There are three major players in the IoT space that have made good inroads into the container shipping market; GlobeTracker, Orbcomm, and Traxens. Of the three, only Traxens seems focused on getting the shipping lines into the IoT world. This focus has paid off, with strong investments and purchases by the top lines.

CMA CGM, Hapag Lloyd, Maersk, and MSC have all made commitments to rollout 50,000 or 100,000 Traxens devices over the next year. Hapag Lloyd will upgrade their entire fleet with Globe Tracker devices.

It is unclear how many containers are actually using IoT devices. Overall, these commitments are too small to make a significant change in how the shipping lines manage their container fleets in the next few years.

Each of the top shipping lines have container fleets of more than two million containers. Reefers make up, generally, only 20 per cent or 25 per cent of the overall fleets. If 100 per cent of the reefer fleets for the top three carriers were upgraded, then 1.2 million reefer units would need IoT devices.

Given the basic maths, the number of upgraded reefers seems very short. All reefer fleets should have these smart devices. With critical and high value commodities such as fish or pharmaceuticals, the benefits of “remote” or proactive monitoring are not only prudent for cargo loss prevention but also a cost savings initiative.

Re: cost savings, smart reefers eliminate the need for long, manual pre-trip inspections. Some shipping lines are pushing the limits and avoiding pre-trips all together. These short-term strategies have only increased the risk of failures and cargo claims. Other lines are starting to use AI and machine learning to predict when they can avoid pre-trip inspections.

Using data analytics to suggest when reefers should go through the pre-trip inspections is a great way to truly start moving into the digitalisation of shipping. The application of AI and machine learning have their limitations now but, over the next few years, will only improve.

It is important to note that reefer containers are like any physical machine, proper maintenance is the only way to ensure proper performance. In a single export cycle, a typical container is handled about 15-20 times until the cargo is unpacked at destination. Until the predictive software can constantly plan the best maintenance routines, the cautious choice would be to ensure the boxes are pre-tripped for the customer's benefit.

The real benefits will be when smart devices are rolled out on the dry container fleets.

When this happens, shipping lines will be able to own and create their own data.

This will eliminate the dependence on the terminals, depots or other suppliers in the supply chain to provide the container tracking data. The improvements in data quality alone make the move to smart containers a good investment.

Going beyond the gate (of an empty depot, intermodal terminal or ocean terminal) and tracking where the container is actually packed or unpacked, will provide the opportunities for shipping lines to use AI and machine learning to dramatically improve their container fleet management and their understanding of the inland movements.

Globally, shipping lines control less than 40 per cent of all inland movements, known as carrier's haulage. The highest penetration of carrier's haulage is in the UK, with most lines doing over 90 per cent of the movements. Many shipping lines in the UK are using transport planning and optimisation systems to perform the carrier's haulage triangulation (using import containers for export loads).

The lowest carrier's haulage percentage, at less than 4 per cent, is right here in Australia and China. If shipping lines want to do more carrier's haulage, adding smart devices to their container fleets will not only provide a significant advantage to improving the understanding of inland movements but, additionally, increase understanding of how to properly enter the market with a competitive and quality offering.

Overall, shipping lines should rollout IoT devices on their dry container fleets for the cost savings benefits and market penetration opportunities. Having Traxens is the cornerstone of owning and controlling the data.

Interestingly, having Tradelens is how the shipping lines will sell the data. I will explore the Tradelens platform and its role in the shipping lines digital strategy in the next article.

The establishment of a strong digital strategy by the shipping lines is a great step forward for the industry. Hopefully, it will keep up with the quickening pace and pressures that are coming from outside the industry. ▲



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Changes to wine export systems

By ANDREAS CLARK, chief executive officer, Wine Australia

Wine is one of a handful of regulated exports from Australia, and later this year changes to Wine Australia's Wine Export Approval software will mean changes to the shipping exemption process.

The Wine Australia Licensing and Approval System (WALAS) will deliver what users have been looking for – enhanced access, greater flexibility and self-service for edits and amendments. It is delivering changes that will allow:

- greater control and enhanced access 24 x 7,
- users to apply online for all import certificates and, once approved, users can make minor changes such as shipment departure dates online, and,
- greater control of accounts, including review and payment online in real time.

What do you need to do?

One of the key changes that will impact shipping and freight businesses will be that shipping agents will be able to register and engage with the new WALAS software, allowing exemptions to be completed online anytime, rather than the current system of applying via a manually processed form.

Shipping exemption categories include:

- Shipments under 100 litres – defined as a consignment made up of one exporter, or one or more related exporters; on one ship or aircraft; to a single port of discharge; whether or not to one consignee;
- Contained in the personal luggage of a traveller;
- For the household of an individual who is moving;
- For display at a trade fair or comparable event;
- For a scientific or technical purpose;

- For diplomatic or consular establishments as part of the duty free allowance of the establishment;
- For victualling supplies that are held on board a means of international transport;
- Commercial samples for a prospective buyer.

Wine Australia will be providing on-line tutorials on how to use the software to help freight businesses switch to the new system.

Exporters and freight businesses are reminded that an export permit number is granted for a specific consignment being sent by a particular licensed exporter. It cannot be interchanged between exporters and consignments.

Wine Australia is working with Borderforce to ensure regulatory control of exported wine shipments.

Accurate records through the production chain are part of the process required to protect Australian wine's international reputation by ensuring a traceback process from consumer to vineyard.

To keep up to date with news about training and the system cutover, visit Wine Australia's website (www.wineaustralia.com/selling/further-information/walas). News updates will also be included in the regular Exporter News e-newsletter – you can subscribe to the newsletter from the signup button at the top of Wine Australia's homepage (www.wineaustralia.com).

For more information on the export approval process you can visit www.wineaustralia.com/selling/further-information/exporting-wine

If you have any questions, please contact exports@wineaustralia.com ▲

Ross McAlpine - a long voyage around the buoys

By FRANK NEEDS

After more than 65 years in the shipping transport industry, the past 28 years with Mediterranean Shipping Company Australia, one of our industry stalwarts, Ross McAlpine, has recently “swallowed the anchor”.

As so many did in the 1950s, Ross followed in his father’s foot-steps and started work as a copy boy at the Sydney Morning Herald. But after some 18 months he decided that was not the career he was seeking, so in April 1954 he applied and was successful in obtaining a job at McDonald Hamilton and Company, a leading shipping agency and trading company in Sydney.

Ross cut his teeth in the shipping world as a junior clerk in the overseas outward freight department. Peninsular and Oriental Steam Navigation Company Group (P&O) was among the companies managed by MH & Co. Promoted to their publicity department in March 1955, he received a very solid grounding in advertising and point of sale procedure. In 1958, P&O entered into partnership with Orient Line, to become Orient and Pacific Line (O&P). P&O and Orient Line integrated in 1960 and O&P was absorbed into the new company called P&O-Orient Lines.

Subsequently, Ross was transferred to Eastern and Australian Steamship Co. (E&A), and worked in the administration, advertising and property departments for several years.

As his experience grew, Ross took on responsibility for chartering vessels for the carriage of wheat and general cargoes, and also for the import of vehicles. That was in the conventional vessel days, prior to the introduction of containerisation in the late 1960’s.

The managing director of the Swire Group seconded Ross to take up the position of manager of The Northbound Shipping Conference (ANSCON), which was tasked with establishing freight rates and centralising cargoes (previously carried in conventional

vessels) with contracts, especially with meat exporters and other commodity groups, trading to Japan and North Asia.

Ross also visited Japan and South Korea, on numerous occasions, as a member of shipping lines delegations to negotiate freight agreements with leading importers, especially wool, which was the largest general cargo commodity.

In the 1980s, cruise liners saw a revival as a holiday destination, rather than a means of transportation, not seen since the invent of air travel, with the airing of the ‘Love Boat’ TV series. In 1990 Ross was offered a senior position with the embryonic MSC Australia at its Sydney office, managing their newly formed MSC Passenger Services, for the cruise liner *Achille Lauro*. The first challenge was to learn the Italian way of doing things, after 36 years of working under the British system – the food and wine were definitely better! He travelled to Pacific island ports to set up agents and liaise with various port authorities.

In 1992 he took a new roll at MSCA, as Corporate Services manager, liaising with Federal and State government agencies to ensure the new rules and regulations on carriage of containers were appropriate.

Ross recalls one highlight of his time with MSCA when the MSC *Fabienne*, then the biggest container ship to visit Australia, sailed under the Sydney Harbour Bridge.

“We all held our breath as she slipped under the Harbour Bridge and berthed close to our Sydney office. It was a wonderful public relations exercise”.

Ross represented MSCA as a director of The Australian Chamber of Shipping (ACOS,) which subsequently combined with Liner Shipping Services to become Shipping Australia Limited (SAL). Over the next 20 years he managed to serve as chairman of each of the various committees in the

organisation. The most challenging one, he admits, was chairman of the Public Relations Steering Group, which produces this magazine. Surprisingly, Ross didn’t finish his working career too far away from where he started!

Ross has always been very diligent in carrying out his tasks and it is no accident that he developed a reputation as a very fine administrator and astute negotiator. Like a dog with a bone, he would not let go of issues that needed solving, pursuing them with tenacity and endurance to ensure the best outcome could be achieved for the benefit of all parties.

Thank you, Ross for your substantial contribution to the shipping industry in Australia. Your colleagues and friends wish you a richly deserved and very happy retirement. ▲



Ross McAlpine (left) and the author, with a historic photo of the first Board of The Overseas Shipping Representatives Association (OSRA) which started in 1912, the origin of Shipping Australia Limited

THE SCENE



Eleni Petinos MP, Parliamentary Secretary for Transport and Roads; Scott Henderson, SAL chairman



Ken Downie, Inchape Shipping Services; Len Phillips, HMM Australia; Mario Fernando, Pacific Asia Express; Bryan An, Hyundai Merchant Marine; Shehan Dissanayate, HMM Australia



Paul McClintock AO, chairman; NSW Ports

Our SAL NSW State Committee Parliamentary Luncheon, was held on Monday 24 June 2019, at Parliament House in Sydney.

We were joined by our guest speaker, Ms Eleni Petinos MP, Parliamentary Secretary for Transport and Roads, who delivered an engaging speech.

The luncheon was sponsored by NSW Ports and was well attended and enjoyed by all.



Hannah Graves, Seaway; Nat Brown; Brendan Zhang, PVH; Serge Deschanel, Gazal



Rod Nairn, SAL CEO; Eleni Petinos MP, Parliamentary Secretary for Transport and Roads



Jason McGregor, Port Authority of New South Wales; Bill Rizzi, SAL NSW state committee chairman



Sue Tomic, DP World; Natalie Wallace, ACFS; Megan White, Trusted Trader Consulting; Lindsay Reed, Paragon DCN



Ian Brooks and Lindsay Reed, DCN; Brian Lovell, Australian Federation of International Forwarders Ltd



Paul Nicholson, Castellino Marine; Andrew Karas, MSC; Olav Castellino, Castellino Marine



*Michael Masson,
Infrastructure Victoria*



*Ben Bekic,
Wisetech Global*

**SAL Victoria breakfast event –
Tech takeover of shipping**

On 21 August, SAL hosted a special SAL Breakfast Event at The Langham Hotel in Melbourne. The event was a sell-out and was proudly sponsored by Svitzer.

“Disruption” is the buzz word used to explain threats to longstanding practices and processes across many fronts, no more so than in the delivery of services.

We welcomed two excellent speakers, no strangers to disruption.

Michel Masson, chief executive officer, Infrastructure Victoria, and Benn Bekic, corporate development, Wisetech Global.

This was an informative event for all businesses transacting over Australia’s ports.



Rod Begley (left), chairman, SAL Victoria, hosts SAL directors and guests

**Biennial Newcastle Luncheon –
20 September**

A packed house in Newcastle heard Grant Gilfillan, in his penultimate week at PA-NSW, described the Authority and their achievements in empowering women in the maritime industry before giving his very personal and positive perspective on the history and future of the coal industry.

Nicolaj Noes, combined comedy and wit to entertain the guests with an overview of Svitzer’s drive to improve safety and efficiency.

Thanks to our sponsors Port Authority of New South Wales and Svitzer Australia for making this event possible.



*Grant Gilfillan, CEO, Port
Authority of New South Wales*



*Nicolaj Noes, managing director,
Svitzer Australia*

Australian port price increases

This year's review of port tariffs has reflected tariff increases in excess of the published CPI of 1.8 per cent, in many cases the increases have been substantial.

NSW Ports announced a 3 per cent increase to their tariff, effective 1 July 2019, for Navigation Charge, (Port Dues), Site Occupation and Cargo Wharfage and Utilities Charges. The Navigation Charge for ships loading coal at the Coal Terminal or conducting cargo operations at the BlueScope Berths increased by 4.3 per cent.

NSW Ports further advised a 3.68 per cent increase in pilotage charges, effective 1 July 2019. In addition to pilot charges, the permit attendance charge for process hot-

work and dangerous goods permits has increased to \$99.76 per hour.

Port Authority New South Wales introduced a general price increase of 4.68 per cent, comprised of 1.68 per cent (based on the Australian Bureau Statistics CPI December 2018, Sydney result), plus an additional 2 per cent, to all statutory and miscellaneous charges in the port of Eden.

Darwin Port has increased its fees, with the exception of Port Induction Fees, by a flat 2 per cent.

Towage and marine service provider Svitzer Australia introduced, from 1 April 2019, an average of 2.8 per cent Australia-wide public tariff.

Brisbane reflected an increase of 22.5 per

cent in water charge. However, maintained their tariff adjustments to be in line with inflation.

Last year the tariff increases in Melbourne were less than CPI, except for Wharfage on export containers, where a further 2.5 per cent reduction was achieved.

Port Botany bucks the trend with substantial increases in wharfage (inwards) 4.5 per cent (outwards) 6.8 per cent. Sydney also increased the Navigation Charge 3.7 per cent, Mooring 4.0 per cent, Site Occupancy 3.0 per cent and Pilotage 3.6 per cent.

At the time of publication, Port Philip Sea Pilots had not published a tariff increase for the current period. ▲

Port	Service	2019	2018	2017	2016	2015
Albany	Navigation Fee	2.3%	2.6%	0.5%	2.5%	2.6%
	Berth Hire	2.3%	2.6%	0.5%	2.4%	2.7%
	Infrastructure Fee	1.8%	2.4%	0.0%	2.5%	7.2%
	Pilotage	2.3%	2.6%	0.5%	2.5%	2.6%
Brisbane	Wharfage	1.8%	1.9%	1.6%	1.7%	2.0%
	Harbour Dues (reefers)	1.8%	1.9%	2%	20%	2.0%
	Port Access Charge	0.0%	4.0%	3.1%	3.1%	3.3%
	Berth Fisherman Island	1.8%	1.9%	1.6%	1.7%	2.0%
	Security Charges	1.7%	2.3%	1.8%	1.8%	2.4%
	Towage	2.8%	2.9%	3.5%	5.0%	3.5%
	Pilotage (all services)	2.3%	3.5%	3.5%	3.5%	3.5%
	Vessel Utility Charge	22.5%	2.0%	1.6%	1.9%	2.2%
	Transfer Bulk Liquid App. Fee	1.8%	1.9%	1.6%	1.7%	2.0%
Darwin	Wharfage	2.0%	1.9%	1.1%	0%	31%
	Berthage	2.0%	1.9%	1.1%	0%	16%
	Pilotage	2.0%	1.9%	1.1%	0%	0.8%
	Port Dues	1.6%	2.1%	0.8%	0%	0.8%
Flinders (SA Ports)	Cargo Service Charge	1.6%	2.5%	2.2%	1.0%	1.5%
	Harbour Services Charge (base)	3.2%	3.4%	3.3%	2.0%	3.9%
	Navigation Charges	2.8%	3.5%	3.3%	1.9%	2.7%
	Pilot Charges	3.7%	4.2%	4.1%	4.5%	5.1%
Fremantle	Wharfage & Berth Hire	2.0%	1.5%	2.5%	2.0%	2.5%
	Mooring	2.0%	5.0%	2.5%	2.0%	2.5%
	Pilotage	2.0%	5.0%	2.5%	2.0%	2.5%
	Dynamic Under Keel Clearance	2.0%	1.5%	2.5%	2.0%	2.5%
	Port Improvement Fee	2.0%	1.5%	2.5%	2.0%	2.5%
Gladstone	Harbour Dues	1.5%	1.7%	1.9%	1.7%	2.5%
	Tonnage/Wharfage	1.5%	1.7%	1.9%	1.7%	2.9%
	Mooring dues	3.0%	3.0%	3.0%	3.0%	4.0%
	Security Charge	1.4%	1.7%	1.8%	1.7%	2.5%

Mackay	Ship Charges (tonnage)	3.0%	1.5%	2.1%	3.0%	2.2%
	Cargo Charges	3.1%	2.9%	2.1%	4.2%	2.2%
	Service & Security Charges	3.5%	3.0%	2.0%	3.0%	2.3%
	Towage	0.0%	18.0%	11%	0%	-17%
Mid West Ports -Geraldton	Wharfage/unit	2.0%	1.0%	3%	50%	5.2%
	Ship Charges - general	2.0%	1.0%	3%	80%	5.1%
	Ship Loading	2.0%	1.0%	3%	32%	5.1%
	Berth Hire	2.0%	1.0%	3.0%	5.0%	5.1%
Newcastle	Wharfage	2.4%	2.4%	1.9%	4.0%	3.9%
	Navigation Services (90k GT)	1.7%	3.4%	1.6%	3.9%	24%
	Site Occupancy	1.7%	3.4%	1.7%	3.9%	3.9%
	Towage (average)	2.8%	2.9%	2%	11%	5.0%
Melbourne	Wharfage (Containers export)	-2.5%	-2.5%	-2.5%	-2.5%	0%
	Wharfage (Containers import)	1.3%	1.9%	2.1%	1.4%	2.7%
	Non Containerised/General Cargo	1.3%	1.9%	2.1%	1.3%	2.8%
	Motor Vehicles	1.6%	1.6%	2.3%	1.0%	2.7%
	Dry Bulk	1.2%	2.1%	1.9%	1.5%	2.6%
	Bulk Liquid	1.3%	1.7%	2.2%	1.4%	10%
	Channel Fees	0.7%	1.9%	2.1%	1.3%	2.7%
	Berth Hire	1.3%	1.9%	2.1%	1.3%	2.7%
	Wharf Access	0.9%	1.9%	2.9%	1.0%	2.0%
	Towage	2.8%	2.9%	2.4%	6.8%	13%
	Security	1.3%	1.9%	2.1%	1.1%	2.8%
	Pilotage	0.0%	1.4%	1.9%	1.2%	4.0%
Port Botany	Import container wharfage	4.5%	186.3%	1.9%	2.0%	2.4%
	Coastal full container (inwards) wharfage	6.8%	90.5%	1.9%	2.0%	2.4%
	Transshipment container wharfage	2.0%	2.2%	2%	155%	2.4%
	Import general cargo wharfage	4.5%	109.2%	2%	2%	2.7%
	Coastal general cargo (inward) wharfage	6.8%	79.2%	2%	2%	2.7%
	Towage	8.0%	2.9%	2.4%	7.9%	3.5%
Port Hedland	Tonnage	7.4%	22.9%	0%	0%	0%
	Wharfage	13.2%	12.2%	0%	0%	0%
	Berthage	7.5%	7.0%	0%	0%	0%
	Temporary Storage	7.9%	6.7%	0%	0%	0%
Port Kembla	Wharfage (non-container)	3.2%	3.0%	3.1%	2.9%	2.9%
	Wharfage (container)	3.0%	3.0%	3.0%	3.0%	3.0%
	Site Occupancy	3.3%	3.0%	3.0%	3.0%	3.0%
	Navigation	3.7%	3.0%	1.7%	2.1%	2.5%
	Pilotage	3.7%	4.2%	3.5%	3.5%	4.7%
Portland	Port Tonnage	1.9%	2.1%	2.0%	2.9%	3.0%
	Wharfage (container)	2.7%	1.9%	2.1%	5.7%	2.2%
	Berth Hire	2.8%	2.9%	2.9%	3.0%	3.1%
	Mooring	3.9%	3.9%	3.9%	3.9%	3.9%
	Pilotage	4.9%	4.9%	5.9%	3.9%	3.9%
	Towage	2.9%	3.9%	3.9%	3.0%	3.6%
Sydney	Navigation	3.7%	4.0%	3.7%	3.5%	4.7%
	Mooring	4.0%	0.0%	3.5%	3.5%	4.7%
	Site Occupancy	3.0%	3.4%	6.6%	2.7%	6.9%
	Pilotage	3.6%	4.4%	3.2%	2.7%	4.4%
Townsville	Cargo Charges	1.8%	2.4%	2.6%	2.5%	5.0%
	Project Cargo import	1.8%	2.4%	22.4%	2.5%	5.0%
	Services to Ship Charges	1.6%	2.8%	1.0%	2.4%	0.4%
	Towage (<50,000)	3.4%	5.9%	3.0%	3.0%	4.0%

Port-rail connections needed to cope with freight volume growth

By JIM WILSON*

Imagine a giant spine. Not made of bone, flesh and blood. But of steel, concrete and crushed stone. Imagine too that it's 1,056 miles long. And that it costs US\$7.5 billion (A\$10.9 billion).

Australia is building the Inland Rail, a giant railway that will act as the north-south logistics "spine" in the eastern part of the country. About 70 per cent of Australia's 25.49 million people live in this area of the continent. The region generates about 78 per cent of the country's employment and 75 per cent of the nation's gross domestic product.

Australia's population is forecast to grow by 60 per cent over the next forty years. Freight volumes in the region are already big – by 2030 more than 32 million tonnes of freight will be moved between Melbourne and Brisbane. "That's the equivalent of almost 1.2 million B-Double [a tractor and two trailers] truckloads of freight every year," the Australian Rail Track Corporation (ARTC) says.

Freight volume growth

That's not a static figure. The big problem that the Inland Rail is being used to solve is the problem of freight-growth. "Freight volumes on Australia's east coast are forecast to more than double by 2050 – our existing road and rail networks won't cope with this increase in freight without further investment," the ARTC says.

The case for Inland Rail is that it will reduce the number of truck movements, the amount of fuel consumed (and therefore the amount of emissions from fuel), reduce the injury and death toll from the roads, reduce road congestion and lower the cost of freight.

It will likely cause complementary investment along its route, as trucks

converge on newly-built distribution centres, to load and discharge cargo to and from the Inland Rail. It will also help generate access to regional and international markets for over nine million tonnes of agricultural freight.

Inland Rail route

The Inland Rail will connect to the national rail freight network and thence to the ports at Perth and Adelaide. It will also connect the port of Melbourne to the port of Brisbane.

Well, almost.

There's a sophisticated on-dock rail project planned for the port of Melbourne, a port that handles three million twenty foot equivalent unit (TEU) ocean shipping containers a year. That on-dock rail will snake west through the city of Melbourne to a rail/road distribution and logistic centre at Tottenham in the city's west. From there, the Inland Rail will twist and turn its way ever north along the eastern part of the continent. It will run through plains, through fields and forests, over rivers and through towns and cities.

Until, at last, arriving within sight of the port of Brisbane, it will stop. Short.

For some unknown reason, the great inland railway, which will form the spine for the vast majority of Australian intermodal and agricultural freight movement, will not actually connect to the port. It will stop at a rail terminal in the city's southwest, called Acacia Ridge.

Local industry bodies are not impressed.

"The Inland Rail project... will transform Australia's freight networks, enhancing supply-chain efficiency and safety, boosting the nation's export competitiveness and unlocking regional development and employment opportunities for local communities," says the high-level lobby group, the Australian Logistics Council. But, it cautions, "interconnectivity is everything.

While Inland Rail will play a critical role as a 'spine' in our freight network, it will ultimately rely on connections to other key freight infrastructure, including intermodal hubs and ports".

But what if...

And so, Port of Brisbane has commissioned, and released, a report from Deloitte Access Economics (DAE) modelling what would happen if the Inland Rail did actually connect to the port of Brisbane.

The port of Brisbane handles about 1.35 million TEU ocean shipping containers each year. Rail's current share of ocean shipping boxes hauled to and from the port of Brisbane has dropped from about 12 per cent ten years ago, to about 2.5 per cent to three per cent today. In comparison, the ports at Sydney (2.2 million TEU) and Melbourne (3.0 million TEU) have a container rail share of about 20 per cent.

Rail modal share at the port of Brisbane is extremely low compared to international estimates. At the port of Bremen (Germany) in 2015, for instance, rail's container throughput is over 40 per cent and in 2015 at Los Angeles it was about 35 per cent, the consultants say.

And, according to DAE, "without a dedicated rail freight link the trend will likely continue, potentially declining to around one per cent by 2035". But if a rail freight link is built to the port of Brisbane, then there is the "potential to significantly increase rail's share to between 12 per cent to 30 per cent by 2035 (if not sooner)".

Modal shift benefits

DAE says there a number of benefits that would derive from a modal switch.

The current 1.35 million TEU throughput at the port generated about four million local truck movements, in addition to "many tens of thousands" of over the road truck movements. Throughput growth forecasts for the port of Brisbane suggest that there



will be over five million TEUs handled at the port by 2050, and truck movements are expected to grow to about 13 million truck movements over the same period.

DAE says that a 30 per cent modal share of the box trade at the port of Brisbane would remove about 2.4 million trucks from the road network. That would also include an elimination of 12.8 billion net tonne kilometres of long-distance trucking. Savings of about A\$130 (US\$88.9) per TEU could also be realised, and there would be reduced congestion costs of about A\$195 million annually, as freight trucks leave the road. Road maintenance costs would reduce by about A\$155 million annually for the same reason.

The DAE gives the worked example of cotton haulage from inland Australia (Goondiwindi and Thallon) to the port of Brisbane. It's a near 100 per cent truck-haul trade. The consultants point out that the regional railway network to the port of Brisbane is limited to about 15.75 metric tonnes (a metric tonne is 2,204.6 US pounds). But a four-axle truck can take a payload of about 48 tonnes (with a total of 63 tonnes gross).

"This means that trains using 40 foot flat container-carrying wagons cannot accommodate two loaded containers of grain (typically, loaded into 20 foot containers with circa 25 tonne payload, with 2.25 tonnes tare weight of the container). However, two loaded 20 foot containers of grain (gross circa 28 tonnes per container) or two loaded 40 foot containers of cotton (gross circa 32 tonnes per container) can be hauled by an A-Double road train. The A-Double, which can access the port from Goondiwindi and Thallon... is becoming a significant part of the agriculture exports supply chain, via the port".

DAE reckons that connecting the Ridge to the port would increase gross regional product by about A\$5.4 billion (US\$3.69 billion) between 2018 to 2045.

From terminal to port... right through or under the city

Of course, it's one thing to say (or write) that a rail link should be built from the Acacia Ridge Terminal to the port. But there's one tiny little thing that's in the way. It's the city of Brisbane.

Cities put a lot of problems in the way of freight routes. In Brisbane specifically, road overpasses are too low for double-stacked box trains; existing freight trains to the port are limited to 680 metres; there are at least five flat junctions at or near Acacia Ridge where freight and passenger rail merge; freight trains cannot operate during peak weekday hours; there are multiple level crossings and there are freight-passenger rail conflicts. There's also about 16 straight-line miles of houses, roads, shops and offices between the rail terminal and the seaport.

Engineers could always just knock out a big corridor through the city, as the New South Wales State Government is doing through the city of Sydney, to build its giant motorway corridor, WestConnex, to the west of the city. But that kind of option tends to be unpopular.

So, the main options on the table to connect to the port are an eastern rail freight corridor, including some kind of dedicated freight tunnel; an upgrade of the existing freight corridor or the digging out of a 26 kilometre electrified tunnel.

Railroad tycoon: which way to the coast?

The first option, a new Eastern Rail Freight Corridor, would either be one straight, long, rail tunnel from Acacia Ridge to the port,

or it would be a combination of above and below-ground options, broadly following the route of a local motorway.

Upgrading the existing corridor was disregarded as "socially unacceptable," for the simple reason that large numbers of properties would have to be torn down and "numerous arterial road structures would be completely rebuilt". And the end result would be a corridor "with too many substandard curves and gradients".

The final option to be considered, an electric tunnel, was rejected. An electric tunnel would require a cargo-swap from diesel to electric trains, which would limit the tunnel's carrying capacity, "while increasing its operational complexity". And it would involve digging through an environmentally sensitive forest area.

DAE concluded that, while a long tunnel is "feasible," it carries more cost and more significant risks than the Eastern Freight Rail Corridor.

"No diesel-operated freight tunnel of this length has been constructed beneath an urbanised area before. It is also evident that adopting a route in a tunnel does not eliminate community and environmental impacts. While potential noise, vibration and air quality impacts require more thorough investigation to predict accurately, the study indicated that they could prove substantial," the report said. ▲

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Townsville welcomes Ports Australia Conference

By MIKE GALLACHER, chief executive officer, Ports Australia

Less than six months after unprecedented monsoonal rainfall flooded Townsville, causing over \$1 billion damage to the region, the strength of the city and its community to bounce back from such tragedy was evident when the city welcomed the inaugural Ports Australia 'Business and Operations' Conference in June.

With major sponsorship from the Port of Townsville, the event launched with an aerial pilot transfer display by Aviator Group, followed by an extensive 'on water' tour of the port and its surrounds. Both capturing the interest of around 150 industry attendees, together with numerous media outlets present.

Queensland Minister for Transport and Main Roads, Mark Bailey MP, officially opened the Conference held at Rydges Southbank, and detailed his Government's commitment to growing the ports sector and in particular, the significant investment and support for the Port of Townsville's development. This was expanded upon by the Drew Penny, general manager of Port of Townsville, in his detailed presentation on the future of the port. Showcasing both the facility and the surrounding region, Drew left attendees without any doubt the future

of trade to and from Townsville is very positive.

With a wide variety of topics for discussion over the two days, this conference provided interesting speakers presenting on issues such as RoRo coastal shipping opportunities in Queensland, the impact of climate change on port planning, and the future approach of the Federal Government to address marine biosecurity. Speakers included Richard Haward, Gladstone Ports Corporation, unveiling the outcome of their trial of capturing tidal turbine energy at the port and the potential for future work based on the experience of the 6 month project.

That evening, networking was the order of the night at the sold-out conference dinner, also held at the Rydges Hotel and sponsored by GHD.

The following morning former Olympian and chair of Port of Townsville, Renita Garard, spoke about the importance of the further development of the port to the region and the State, and she was followed by a broad spectrum of presentations ranging across issues such as pilot transfers, the transition to low sulphur fuels, and a presentation by Peter Creeden examining the future of cargo shipping in Australia and globally.

The event also heard from the Australian Cruise Association on growth in the Australian market, and this was followed by presentations on innovation of stevedoring at VICT, Human Resource Management by Engage Marine, and wrapped up by Ash Sinha, policy director, Ports Australia, discussing the World Ports Sustainability programme.

This inaugural event was well received by attendees, as it successfully struck the balance between topical presentations and time for industry networking. ▲





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