Greg Hunt officially opens CCN Live 2013.

The future of carbon pricing and emission targets

THE CCN LIVE CONFERENCE BEGAN WITH TWO WORDS: CARBON PRICING. WHILE CARBON PRICING MEANS DIFFERENT THINGS TO DIFFERENT PEOPLE, THE AUDIENCE AGREED ON ONE POINT, AND THAT IS THAT CARBON PRICING HAS HAD A SIGNIFICANT IMPACT ON THE HVAC&R INDUSTRY.

MINISTER FOR CLIMATE Change, Greg Hunt, officially opened the 2013 CCN Live conference with a detailed outline of how the new government plans to abolish the carbon tax in the wake of the September 7 election.

The plan includes the establishment of a carbon purchasing fund, an emissions reduction fund and a reverse auction.

"Whereas the carbon tax tries to drive up the price of basic services in order to force down use, with a massive deadweight loss, we will not provide a dollar unless there is an actual reduction of emissions," Hunt said. "Just like a contract for wheat, we only pay on delivery of actual abatement."

Hunt claimed that the Coalition's Direct Action Plan will ensure Australia reaches its target of a five per cent reduction in emissions by 2020.

He said the Emissions Reduction Fund will have an initial allocation of $300 million, $500 million and $750 million over the forward estimates period.

"Decisions on allocation will be made through a reverse auction starting with the lowest priced abatement. More importantly, the funds will only be allocated when there is a direct reduction in emissions. In short it is a contract for delivery."

Hunt said if elected, the Coalition will abolish the Climate Commission, the Climate Change Authority, the Clean Energy Finance Corporation and the Energy Security Fund and bring the relevant functions in house, under a merged Climate Change and Environment Department.

He said the Emissions Reduction Fund will operate using existing architecture originally created or proposed by the Coalition.

"That is, we will simply adapt three existing programs and mechanisms," Hunt said.

"First, the Carbon Farming Initiative will be expanded to include a wider range of emissions reduction methodologies. Second, the Clean Energy Regulator will be responsible for approving methodologies. It will ensure the emissions reduction being claimed is genuine and verifiable.

"Third, we will continue to use the existing National Greenhouse and Energy Reporting Scheme (NGERS) – which was created by the former Coalition government – as the key reporting system for Australia's emissions."

Hunt said the tax can be repealed quickly and a whitepaper process will begin immediately after the election.

"We will call for submissions within 30 days of being elected, consult between 60 and 100 days, releasing the whitepaper and draft legislation by day 100," he said.

"Following further feedback the final legislation will be released on day 150 and the new system should commence on July 1, 2014."

AMBITIOUS ABATEMENT TARGETS

The newly elected Abbott Government has identified 20 to 30 million tonnes of potential abatement across the entire energy efficiency sector.

Climate Change Minister Greg Hunt said the HVAC&R community can be at the forefront of these reductions describing it as a "huge opportunity" for the industry.

"And things that can't be reduced shouldn't be taxed; our approach to reducing emissions is incentives-based," he said.

"In Australia we have a highly inefficient approach to reducing emissions, nowhere else in the world are they paying the same level of tax on refrigerants that you pay now."

Hunt referred to a recent report by Frontier Economics which claims the carbon tax will not reduce emissions. In fact it claims domestic emissions will rise from 560 million tonnes to 637 million tonnes between 2010-2030.

The cold hard facts about **HVAC&R branding**

THE AUTHORS OF THE RECENTLY RELEASED COLD HARD FACTS (CHF) 2 REPORT, THINKWELL'S MICHAEL MCCANN AND EXPERT GROUP'S PETER BRODRIBB, CHALLENGED PARTICIPANTS TO DEAL WITH THE INVISIBILITY OF THE HVAC&R INDUSTRY.

AFTER ALMOST A decade of research into the industry it has become abundantly clear to both Michael McCann and Peter Brodribb that the industry is much bigger than most people realise, and much more relevant.

CHF 2 estimates the RAC equipment spend is $5.9 billion per annum and the industry employs 173,000 staff, paying $13.3 billion in salaries each year.

"There are 45 million bits of kit out in the field; we are bigger than we realise," McCann says. The industry's biggest problem is its lack of visibility and the need to own its value, rather than so many other industries taking credit for the work undertaken by Australia's heating and cooling industries. For example, there is no recognition for the $30 billion of perishable food per annum that requires refrigerated transport, which is often claimed by other industries.

McCann says there is a similar situation in the construction industry and it is why the industry needs to be recognised as a "complete set of services."

McCann says the industry needs to recognise where HVAC&R fits into the national economy, why it's so important, and to claim these essential services as its own.

"Refrigeration and air conditioning is not optional; this is critical infrastructure that keeps the city running," he says.

"This isn't about, 'oh dear it's a bit hot', it's more like 'evacuate the building the chillers have gone down' or 'hell the UPS better work or the server farm will go down'.

"What we provide isn't an option; it's critical infrastructure. You can't turn this stuff off." The industry's biggest problem is that nobody notices it because it operates in the background and rarely fails. Hundreds of industries own this infrastructure and claim it as their own, which is why there will be an agriculture spokesperson on television, recognised by millions of viewers, without any mention about HVAC&R's contribution.

"We need to change public perceptions," McCann says. "Industry needs to think of itself in new terms, to see the big picture and address our invisibility.

"We are hidden in a sea of acronyms. HVAC&R doesn't work – we need branding, a public facing name that the consumer understand.

"We should be called the climate control industry. That works and will help us be remembered at the big table in Canberra when it's time to set policy and budgets.

"There are much smaller industries, like pharmacy, that have big buildings in Canberra. We are noticeably absent."

FAST FEEDBACK

Here's what CCN Live participants had to say about the full day conference:

Dunnair

"I really enjoyed the event. I found it very interesting and informative with some excellent guest speakers. I will definitely be looking to attend any future CCN Live conferences."
Dunnair's NSW state manager, Nicholas Siountris

Rothenberger (Super Ego)

"A very well organised event with some top-end, headline industry speakers – that's the main reason I attended. But we should do more of these events, especially with such informative speakers. I took a lot out of it. Congratulations.
Rothenberger's A/NZ managing director, Oliver Taylor.

TOP: Thinkwell Australia MD Michael McCann.

MIDDLE AND ABOVE: Audience engagement was exceptionally high at CCN's first conference.

TRUE TO FORM, SEELEY FOUNDER AND CHAIRMAN FRANK SEELEY DIDN'T PULL ANY PUNCHES IN HIS ADDRESS TO PARTICIPANTS AT CCN LIVE 2013.

Innovate and automate

AS THE FOUNDER of a company that is a market leader in climate control solutions, Seeley is well placed to talk about "life through the eyes of a manufacturer" and to share his uniquely Australian experiences competing on the global stage.

Last year Seeley International celebrated its 40th anniversary and today the manufacturing success story exports to more than 120 countries.

His views about the future of Australian manufacturing are very different to the people he refers to as the doomsayers.

"Contrary to conventional thinking there is a huge future for Australian manufacturing, but only if we innovate and automate – we must do both as if there is no tomorrow because that's where our future lies," Seeley says.

"We can and we will prevail. Look at the United States, where the tide is turning. Manufacturers that went offshore to China years ago are returning to the US and embracing automation; it will work for us too.

"I invite all manufacturers to seize the day, embrace the future and put a lie to the notion that manufacturing is dead and buried."

Seeley is critical of misguided government support and ill-conceived policies like the carbon tax.

"Australia has every right to be frustrated by handouts to the automotive industry, especially to those with multi-billion dollar parent companies offshore," he says.

"The local car industry is struggling with high taxes and cheaper imports but the underlying problem is that the industry is not producing cars consumers want to buy.

"Brands that are succeeding know what their customers want and that's what they deliver."

It's frustrating, he says, to see handouts given to the motor industry with little accountability.

"Where does this money go? Does it go straight out of the country to head office? There should be a caveat on what they give, it should be dollar for dollar," he says.

"If the technology goes overseas and there is no benefit locally you pay the money back."

However, these problems aren't just restricted to the automotive industry, he says.

"Too many Australian inventors have been forced to go offshore due to lack of support. That is a national disgrace.

"If we want a prosperous economy we must encourage research and development (R&D) as a national priority and invest far more than we do now.

"We need a proactive national centre of excellence where business leaders, not bureaucrats, administer an innovation fund to support intellectual property and keep it in Australia."

Seeley stressed the need for experts to assess innovative ideas, not the government.

"The experts are business leaders that have done it and got the t-shirt," he says.

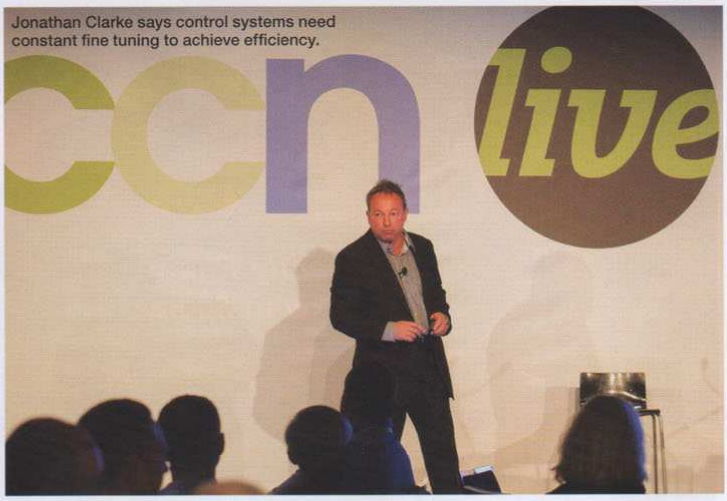
To support innovation at Seeley, the company has an "imagineering" group that includes many of the 50 engineers he employs. They meet regularly to discuss good ideas.

"It's important to spend time chewing the fat," he says. "99 out of every 100 ideas might go out the door, but if one sticks that's okay."

Seeley International founder Frank Seeley delivers a passionate presentation about the future of Australian manufacturing.

Managing control systems isn't rocket science: **simple tips for big results**

WITH 30 YEARS' WORTH OF INDUSTRY EXPERIENCE, NORMAN DISNEY YOUNG (NDY) SENIOR ASSOCIATE JONATHAN CLARKE IS THE FIRST TO ADMIT THAT CONTROL SYSTEMS ARE NOT A FAVOURED TOPIC OF CONVERSATION.



Jonathan Clarke says control systems need constant fine tuning to achieve efficiency.

MENTION CONTROLS, JONATHAN Clarke says, and people get tend to get sweaty and frustrated. But controls, he says, are fundamental to the efficiency of buildings.

"They bind together your refrigeration systems and are the eyes, ears and brains of your building so good controls are essential," he says.

Clarke believes that one problem with today's control systems is that they are based on software that people can't see."

There is no university degree in building management systems (BMS), and yet software engineers do not know the fundamentals of air conditioning.

"Getting skill sets right in this industry is a major problem, not just here but globally," Clarke says.

"If you dig deep down inside your control system, you will find that the software hasn't changed for the past 15 years.

"That is why you have to tell the controls what to do. You can't just set and forget or copy and paste from another building. This stuff needs to be constantly tuned.

"I get asked all the time, 'if I upgrade my BMS will my building be more efficient?' If you get a new BMS but copy engineering like for like and leave it, of course not."

Another problem Clarke sees time and again is tight maintenance budgets, which have a serious effect on the successful operation of a building.

"When times are tough the maintenance budget goes out the window," he says.

To prove his point, Clarke presented a case study in which he was able to achieve outstanding results. The project involved a poorly performing building built in the 1980s with a two-star energy rating.

The goal was to deliver a four-star rating but it was a fully occupied building with a a meagre budget.

"At the end of the day we spent 30 per cent of the budget sorting out maintenance problems," he says. "This is common. Often a building will have good equipment – it just isn't looked after or used correctly."

Clarke says there is an attitude of "if the screen says its working it must be."

The project didn't include new controls, only software adjustments. The new software was introduced in January 2012 and by August the project had achieved 42 per cent in energy savings.

"We allowed every zone in the building to vote to get buy-in from the tenants," he says. "Public education is important."

Zone drifting is also important, as a one degree temperature shift can save up to 10 per cent in energy costs, he says.

"We discovered the damper actuator was broken, which cost $600 to replace but it was costing $17,000 per year and it had been like that for four years.

"This is what I mean about maintenance. A lot of buildings just need a little bit of love and attention."

The new chillers were introduced next and this generated another 10 per cent in energy savings.

"Think about it: the cost of reworking software versus the cost of installing new chillers and you can see the savings we achieved."

After a bit of tweaking and fine tuning, his team got the building to a five-star energy rating.

"This isn't rocket science but the project shows what a difference controls can make when managed correctly."


While most participants were keen to try the sweets at morning tea, Heatcraft managing director Bill Moltner was more interested in catching up on email.

L to R: Simon Bradwell, David Eynon, Glenn Evans, David Hood and Kevin Lee with moderator Sandra Van Dijk

Five industry groups come together for **the great 2025 debate**

ONE OF THE MANY HIGHLIGHTS OF THE CONFERENCE WAS THE PANEL DEBATE WHICH WAS DESIGNED TO STIMULATE THOUGHT AND DISCUSSION, PROVOKE DEBATE AND TO GET PARTICIPANTS THINKING ABOUT THE TOP CHALLENGES FACING INDUSTRY TODAY, AND TOMORROW. FOLLOWING IS AN EDITED TRANSCRIPT.

CCN Editor Sandra Van Dijk

TO START THE debate the panel moderator invited each panellist to nominate the top two issues currently facing industry.

Kevin Lee (AREMA) nominated energy efficiency as a core issue for AREMA members as well as the regulatory environment.

David Hood (SEA) says the biggest issue facing everybody is global warming and climate change.

"This is one area where politicians are doing very little it will be up to us to make a difference," Hood says adding that engineers need to be educated in sustainability.

Glenn Evans (ARC) said a priority for the council is ensuring all refrigerants are licensed and to ensure technicians are properly trained so that a lack of skills don't inhibit the takeup of new and innovative approaches to HVAC&R.

David Eynon (AMCA) was quick to nominate the economy.

"Industry are doing it very tough, and its having an adverse impact on their business," he says.

The second issue was productivity.

"The Australian economy has stalled. Drivers of change that will play an important role in improving productivity for the building and construction industry will be virtual construction techniques and regulation," Eynon says.

Simon Bradwell (FMA) says a major issue is the poor state of local manufacturing. "In the last three years I have seen contractors, builders and refrigeration businesses go bust," he says.

The other issue, he says, is a regulatory regime that doesn't recognise excellence.

"We've been trying to negotiate with government to introduce regulations in our industry, we even have a code of practice and it has driven me around the bend. I have never seen such a bunch of laggards in all my life," he adds.

Panellists and the audience were then invited to nominate the top issues likely to emerge in the year 2025. After panellists joked about whether they would actually be here in the year 2025 it was time to get down to business.

Kevin Lee (AREMA) - "In 2025 we will still be in this room trying to deal with regulation and

we still won't have national licensing," Lee jokes.

He hopes that by 2025 there will be a system in place for technicians to keep their competencies up to date.

"Its a rapidly changing world as we move to low GWP refrigerants, which means techie's that were trained 20 years ago will need up-skilling.

Skills need to be upgraded every few years," he says. With Australia's poor record of trying to implement regulations with so many states and territories, Lee suggests abolishing the states and just having a federal government.

David Hood (SEA) - Hood says that a decade from now everyone will still be grappling with climate change issues especially rising temperatures.

Glenn Evans (ARC) - Training reforms will be a priority by 2025 as steps are taken to change the current modular-based training regime.

David Eynon (AMCA) - Eynon reminded participants that federal/state relations is "an endless piece of string" but says he is a believer in local government and wouldn't like to see the states abolished.

"Public servants in Canberra are not equipped to make decisions on service delivery in local areas," he says adding that there needs to be an open debate about what's good and bad regulation.

"FOR A LOCAL MANUFACTURER TO SURVIVE ITS IMPORTANT TO EXPORT BUT IF WE HAVE AN AUSTRALIAN STANDARD THAT ISN'T RECOGNISED ANYWHERE ELSE IN THE WORLD THEN WHAT'S THE POINT?" - KEVIN LEE (AREMA).

"About 90 per cent of the building stock we will have in 2030 is already here now; stock is increasing by about two per cent per year. So all the stock sitting there now is low grade, old buildings that will need a massive amount of recommissioning. As a result service and maintenance will grow in importance. These skills and how we deliver service and maintenance will become much more important leading up to 2025."


Audience members also contributed to the panel debate

Simon Bradwell (FMA) - In 2025, Bradwell says the world will still need lots of fans. But on a more serious note he says the future world will face issues to do with power consumption, population growth and urban planning. "I agree we need a debate about regulations," he says.

By this stage in the debate there was plenty of audience participation with a number of issues nominated. Australian Refrigeration Association president Tim Edwards called on the industry to come together and to just say yes.

"As an industry we could reduce national emissions by five to six per cent over the next 15 years if we just came together and did it," he says.

Kevin Lee (AREMA) - Lee raised the issue of Australia having a department for climate change, another for sustainability and another for the building code.

"That's three different departments looking after energy efficiency, we should be looking holistically at how we can reduce emissions," Lee says.

Glenn Evans (ARC) - "It would be great to have one Minister to oversee all of this," Evans says.

David Eynon (AMCA) - "The AMCA has been asking for a Minister that is responsible for the construction industry for many years," Eynon adds.

Panellists were then asked to nominate the biggest barriers to industry growth.

Kevin Lee (AREMA) - Lee says an ongoing problem is ignorance and complacency.

He cannot understand why governments are stalling the rollout of smart meters.

TOP: The five panellists on stage.
ABOVE: There was plenty of audience participation during the debate.

"HOW WE DELIVER SERVICE AND MAINTENANCE WILL BECOME MUCH MORE IMPORTANT LEADING UP TO THE YEAR 2025." - DAVID EYNON (AMCA)

"If consumers could see the power they use it would change behaviour; knowledge is power," he says.

David Hood (SEA) - Hood says there is still a great deal of consumer ignorance when it comes to energy efficiency. "We need to build awareness," he says.

The audience were very active during this part of the debate with NSW TAFE's Steve Smith pointing out that the need to raise the skill level of technicians could seriously hinder the industry's future.

"We can build the best machines in the world but it all comes undone if the technicians don't know what they are doing. Many of the young people undertaking trades today need to learn basic writing and adding skills before focusing on their trade, we are teaching them what they should have learnt in high school. Companies spend nine months advertising for an apprentice and are so desperate they are willing to employ someone with a heart beat."

Glenn Evans (ARC) - Evans says consumers want to support energy efficiency but not at a high financial cost which is why costs need to come down for energy efficient products.

Simon Bradwell (FMA) - Bradwell says consumers have been cash rich over the last 10 years but this will change, interest rates are too low. "I don't think people will have as much cash in their pocket," he says. Today, consumers can by an air conditioning unit for a quarter of what they paid in 1984 and the unit is significantly more efficient, he says.

With time running out, panellists were given the option to either comment on one of the CCN Live conference sessions or, nominate what they would change if they became Prime Minister tomorrow.

Kevin Lee (AREMA) - Lee says Australia needs to be a part of the global economy and to avoid developing standards in isolation.

"For a local manufacturer to survive its important to export but if we have an Australian standard that isn't recognised anywhere else in the world then what's the point?" he says. "The process for standards in Australia is fairly robust but we need to be involved on a global scale."

David Hood (SEA) - Hood believes all standards should go through a sustainability check.

"If I was Prime Minister I would work to phase out the fossil fuel industry in Australia as fast as possible," he says adding that there is a lot of rubbish said about renewables but they can meet everyone's requirements.

"We also need to be more innovative, we should value add, not just dig it up out of the ground and flog it. We need to build an innovative culture within our universities," Hood says.

Glenn Evans (ARC) - As Prime Minister, Evans says he would regulate for a more innovative environment and create the right business environment for manufacturers.

David Eynon (AMCA) - Eynon says he would grab hold of the NOLS system and fix it and appoint a Minister for Construction.

Simon Bradwell (FMA) - After turning down the job of Prime Minister because it's "too hard", Bradwell chose to make a comment for his final contribution to the debate.

"It was really nice to see everyone here today, especially Greg Hunt. I'd like to thank CCN for bringing him here so we could hear what he had to say."

THE GREAT DEBATE

The panel moderator was CCN editor, Sandra Van Dijk, and panellists included:

- Simon Bradwell of the Fan Manufacturers Association (FMA);
- David Eynon of the Air Conditioning and Mechanical Contractors Association of Australia (AMCA); Glenn Evans of the Australian Refrigeration Council(ARC);
- David Hood of the Sustainable Engineering Society(SEA); and Kevin Lee of the Air Conditioning and Refrigeration Equipment Manufacturers of Australia (AREMA).

FAST FEEDBACK

Here's what CCN Live participants had to say about the full day conference:

"The climate control industry is facing many challenges and opportunities as it deals with the dynamics of the regulatory environment and flow on effects on the efficient use of energy, refrigerants and increasingly scarce technical skills. CCN Live provided valuable insights into the emerging environment and the importance of pro-actively positioning the industry to shape the responses to these challenges,"
Gavin Tory, director of marketing, Heatcraft A/NZ

"A very well organised event with some top end headline industry speakers, which is the reason I went for the day. We should do more of these particularly with great headline speakers and informative sessions.
I took a lot out of it. Congratulations."
Oliver Taylor, managing director, Rothenberger A/NZ

There was plenty of socialising during the lunch break.

"CCN Live served to bring many HVAC&R industry leaders together for a frank and productive exchange of views on trends in the industry. It was clear to all that innovation will be a key source of competitive advantage for the foreseeable future".
Tim Edwards, president, Australian Refrigeration Association

"The CCN Conference was an exciting showcase of what could be when designers and technicians share a vision. Working together will be the barometer of success in implementing various innovative designs and practices."
Glenn Evans, CEO, Australian Refrigeration Council

"CCN Live was an excellent opportunity to network with industry peers. Innovation is in our life blood. We must keep changing the game to ensure that Australia leads the world in energy efficient products. We welcome Seasonal Energy Efficiency targets for MEPS. It was fantastic to receive so much support for manufacturing in Australia. I think we would all agree that to be competitive we need to be innovative both with our products and the way we operate."
James Martin, business excellence manager, ActronAir

Elizabeth Crouch says national licensing is a "no brainer" reform.

It's been a long journey but national licensing is in sight

DESCRIBING IT AS a long and arduous journey, National Occupational Licensing Authority (NOLA) board chair, Elizabeth Crouch, called on conference participants to grab this opportunity with both hands.

"If we don't do it now another 20 years could pass, we need to pull together and make it happen," she says.

The final step is a meeting of Treasurers in November which will lead to a final decision on the best licensing model to be implemented in 2014.

Crouch says national licensing is about a consistent set of rules but dealing with so many states and territories is never easy. The process has involved the release of regulatory Impact Statements (RIS) in August 2012 which was followed by consultations throughout Australia.

After consultation with industry, Treasury worked on a Decision RIS which examines the net economic position of the proposal.

"The Decision RIS might represent the best option in economic terms but that doesn't necessarily make it the preferred policy," she says.

"For example, option one is the have the ARCtick license only which represents the best net position economically but this option is not supported by industry."

Crouch says option two has the most support from industry and allows contractors to retain full and provisional licenses. At the same time ARCtick accreditation will remain in place.

"Our plan is to do more work to better align national licensing and the ARCtick system as its an ideal opportunity to reduce duplication," Crouch says.

"We also want to include continuing professional development, to target training and to make it a condition of licensing."

Quality design key to manufacturing success

ACTRONAIR IS A multi-million dollar business that began in a garage more than 40 years ago and has undergone significant changes in the past decade.

One area where the company has really raised the bar is in the area of energy efficiency, which was the theme of a presentation by ActronAir's engineering and business excellence manager, James Martin.

As part of its energy efficiency push, Martin says there has been a major focus on controls in a bid to get the best results from its product range.

He admits there are a lot of variable involved in building the best unit possible.

"It's about bringing together the best components and technologies and getting thermal loads right," Martin says.

"There's the fan, heat exchangers, the design, refrigeration, heating – putting all that together in a box so it all works seamlessly – although behind the scenes its quite complex to juggle."

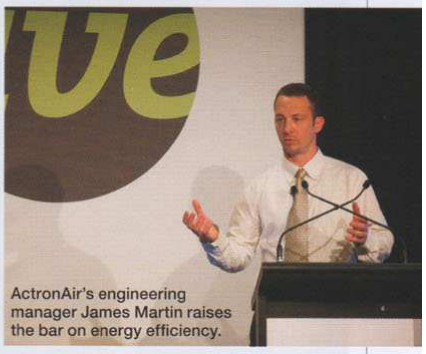
Martin says today's units can be used for a much broader range of applications.

He also outlined a research project that is contributing to improved energy efficiency in the residential home.

CSR House is a living lab that feeds data to the federal government's Low Carbon Living Project.

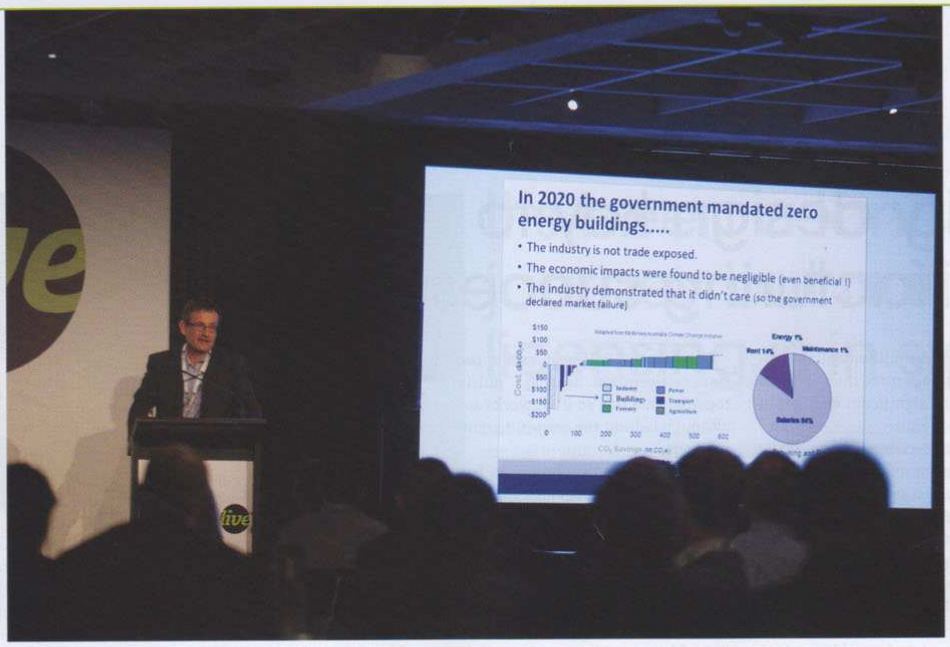
The house uses ActronAir air conditioning units. Moreover, Martin says ActronAir was able to reduce the amount of air conditioning required at CSR House by 50 per cent.

He says ActronAir used thermal modelling to achieve its goal including night and day zoning within the house and also by creating the best thermal envelope possible.



ActronAir's engineering manager James Martin raises the bar on energy efficiency.

More than 3.5km of instrumentation cabling and 140 sensors are installed at the house to provide data which monitors heat flow through materials, thermal bridging across walls, internal temperature and humidity conditions, subfloor conditions, moisture levels, and energy usage for appliances as well as heating and cooling.



MAIN: Dr Stephen White creates a future world where there is more evaporative cooling, solar is commonplace and there is a university degree for professionals overseeing zero emission buildings.

BELOW TWO: Networking drinks provided participants with an opportunity to discuss conference topics in a more relaxed environment at the end of day.

CSIRO researcher shares his vision of a brave new world of **zero energy buildings**

CSIRO RESEARCH LEADER DR STEPHEN WHITE TOOK THE COURAGEOUS STEP OF RECREATING THE HVAC&R INDUSTRY IN THE YEAR 2025 BOLDLY IDENTIFYING THE TECHNOLOGIES LIKELY TO DOMINATE A DECADE FROM NOW.

IN HIS FUTURE world scenario, the government mandates zero emission buildings.

This is the new industry standard and in this environment White says there is plenty of interest in free cooling technology, there are more heat recovery heat exchangers and of course, indirect evaporative cooling just to name a few.

In 2025 all products are much more energy efficient and the focus is on bringing air closer to the person. "It's about air conditioning the space you occupy not the entire building," he says. "This happens through the use of occupancy sensors that switch off the air in places that are not occupied plus smart controls have their own artificial intelligience," he says.

Even in the modern 2020s, White says the industry is still relying on the usual suspects like variable speed drives, high efficiency fans and pumps, generous duct sizing and fans continue to power ahead as "we get rid of electric heat."

"Cooling demand will match solar availability. Solar Photovoltaic (PV) systems are commonplace, its cheap and the amount of solar radiation available in the summer months matches the overall cooling load of the building," he says.

In a world where there are more renewable energy options, a gas-fired trigeneration system isn't so attractive.

"In 2025 trigeneration is seen as a transition solution unless its coupled with something like solar air conditioning," White says.

"At this time there is a war on for roof space. Remember PV is cost effective and people are asking if they should use their roof for solar thermal hot water or solar thermal air conditioning. Or should that roof space be used for my PVs?

"Businesses are putting out product now where the roof is actually a solar product so when you put on your cladding your also putting your solar on.

"This is the age of building integrated construction products that are solarised."

There are no carbon trading schemes a decade from now but there is a renewable trading scheme.

"Organisations are trading in renewable energy certificates as a source of revenue," he says.

There is also a dedicated university degree for the zero energy building industry.

"The tools of the trade for the HVAC industry will require more training, we are selling new technology bundles. For example we are selling solar, energy efficiency and other new technologies. As a result we have a degree that reflects the birth of a new industry – the HVACR&S industry," he says. That's right the S stands for solar.