CYBERSECURITY
Why it should be on every leader’s radar

BENDIGO HOSPITAL
Community focused healthcare

MAGIC TOWER
Science and Magic on the Skyline

QANTAS
Customer focused design
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Introduction.

The New Bendigo Hospital in regional Victoria has been lauded as a world-class hospital. The string of recent industry awards testifies to this accolade.

For our team that worked on designing this project, it’s humbling to know that our work is literally helping to save lives. Our contribution is also creating careers pathways for healthcare professionals in a regional hub, whilst positively contributing to the social and economic fabric of the Loddon Mallee region in Victoria.

These ‘intangibles’ may not be visible on our 3D BIM plans, or discussed at project manager meetings, but they remain inherent within our purpose of Making Spaces Work.

This purpose is our roadmap to delivering client-focused and community-centred infrastructure, facilities and built environment projects.

Our cybersecurity offering also delivers in this way. As featured in this edition, today’s sophisticated hackers and cyber criminals can cause disruption to businesses and wreak havoc on critical infrastructure projects. Our cyber experts work with clients to ensure cybersecurity is not an afterthought, but rather a consideration within the original scope and design intent.

It’s the same with our work at airports.

Our recent collaboration with Qantas has ensured their extension of the Perth T3 Terminal, and refurbishment of the members lounge, have been holistically considered with end-users experiences top of mind.

Understanding the end customer journey is a fundamental component of the engineers’ role.

I certainly look forward to personally experiencing this Qantas terminal and lounge on my next long-haul journey to visit our London team. Ultimately, engineering is about human experiences.

Stuart Fowler
CEO

Twitter: @swf_engineer
Why CYBER SECURITY risks should be on the Sustainability radar

Tony Arnel, Global Director of Sustainability
Imagine, that hackers break into your building’s management system. The air-conditioning goes haywire and the heating cranks up to an unbearable level. The lights and power switch off, causing chaos and confusion. Work grinds to a halt. Worse, people’s safety is compromised as lifts, security and fire systems cease to operate.

If the cybersecurity breach affects transactions on a busy trading floor, the financial implications are obvious. But in some cases, a cybersecurity event could be as significant as a natural disaster.

Consider the ransomware infection which crippled the UK’s National Health Service in 2017. Staff around the country were forced to revert to pen and paper and their own phones as computer and telephone networks shut down. Patients were turned away and people in affected areas were being advised to seek medical care only in emergencies. Thankfully, no lives were lost, but the story could have been a very different one.

According to the IoT Alliance Australia, the world will have more than 1 trillion Internet of Things (IoT) devices up and running by 2035. These devices are soon to be pervasive and their application endless – from wearables that track our heart rate to connected cars, and from sensors that monitor pollution, parking, traffic congestion and rubbish in our cities to smart fridges that know when it’s time to restock.

In the last few years, low cost IoT sensors, switches and gateways have transformed the smart building market. Smart building technology now automates, monitors and optimises heating, cooling, ventilation, lighting, power and security systems and more. These buildings use less energy, are easier to manage and more comfortable in which to live and work. And this means smart buildings are increasingly sustainable buildings.

But as all these devices connect to the internet, the rise in IoT hacking becomes an alarming proposition. Symantec recorded a 600 per cent increase in IoT attacks in 2017, and Gartner estimates that worldwide spending on IoT security will reach US$1.5 billion by the end of 2018.

Raymond Frangie is Norman Disney & Young’s senior cyber security consultant. He says our built environment is now a primary target for cyber criminals, and he has the evidence to prove it.

Frangie recently set up a “trap” for would-be attackers, observing more than 100,000 attacks from 65 countries in a single day.

“Cyber criminals are actively looking for systems to compromise, and building management systems are an obvious target,” Frangie warns.

Most business leaders understand the damage that data breaches can wreak on an organisation. Shares in credit reporting agency, Equifax, tumbled to a 16-year low in 2017 after a cyberattack compromised the privacy of an eyewatering 145.5 million people.

Frangie says international incidents over the years, like the Equifax breach, have driven the Australian Government to establish the Australian Notifiable Data Breaches scheme, which came into force in February 2018, requiring companies to notify the Office of the Australian Information Commissioner, and individuals whose personal information is involved in harmful data breaches. Non-compliant companies face penalties of up to $1.8 million.

But the effect of cyberattacks on our built environment infrastructure has impacts uncommon in other environments, which is why our industry must begin to consider cybersecurity in much the same way we do the structural integrity of a building.

Imagine the consequences if the lights switch off during the SuperBowl, the Boxing Day sales or during peak hour traffic in Sydney? There are potentially enormous financial costs, and the question is then: who will pay for it?
Protecting people and profits

Cybersecurity within built environments is about protecting buildings, public infrastructure and critical services. However, it's also about protecting people within the spaces they occupy.

It would be a mistake to think this is just an issue for large companies. The Target breach in 2013, for example, is a case in point. After the credit and debit card information of 41 million customers were compromised, up to 70 million people were affected. The investigation by US state prosecutors found the hackers had accessed Target's server through credentials stolen from a third-party vendor – a HVAC specialist with access to some of Target's point-of-sale systems.

"Almost five years since the attack, Target is still paying for the breach, recently agreeing to US$18.5 million in compensation to customers, after already having settled $39 million with financial institutions affected by the breach," Frangie explains.

Another recent case involved Austrian hotel Romantik Seehotel Jaegerwirt, which was targeted by cybercriminals in 2017. After the electronic key system at the four-star hotel was infiltrated and disabled, guests couldn't access their rooms. The hotel's reservation and cash desk systems were compromised too.

The cyber attackers demanded a ransom from the hotel management, which the hotel paid. At the time, the hotel's managing director justified the decision because "the house was totally booked with 180 guests. We had no choice. Neither police nor insurance will help you in this case."

"Ninety-five per cent of attacks are financially motivated. If cyber criminals can take a building hostage, it can really hurt the hip pocket," Frangie adds.
Beyond IT: A sustainability issue for the boardroom

So, what does this have to do with sustainability?

Recently, analysts have begun to argue that cybersecurity isn’t an issue restricted to IT departments and building services teams, but an environmental, social and governance (ESG) issue that must be tackled in the boardroom.

When shareholders are increasingly looking for assurance that their investments are with well-governed companies, it’s no surprise that boardrooms are beginning to keep a careful eye on cyber risks.

It’s also about resilience. Many companies are investing in cyber insurance not to replace what they’ve lost, but to bounce back afterwards. In fact, the ability of a company to endure or recover from a targeted cyberattack is likely to become a key expectation of investors, shareholders and clients.

We aren’t necessarily facing a doomsday scenario, and not every HVAC specialist or vending machine technician must become a cybersecurity expert. But it does mean we must start factoring cybersecurity into our designs, Frangie says.

“Cybersecurity can’t be an afterthought. It needs to be considered from day one of the planning process,” Frangie explains.

The message is clear. As we transition to a smart cities ecosystem, cybersecurity will be as important as keeping the lights on. Cybersecurity is not an IT issue – it’s a business issue.
WORLD CLASS HEALTH FACILITY IN REGIONAL VICTORIA
In the past, residents of regional Victoria had to travel to Melbourne to seek specialist care and world class facilities. This has been addressed with the New Bendigo Hospital development. This hospital brings many of those facilities into the Greater Bendigo area, along with specialised capabilities that address the particular health concerns of people in the region.

The goal of the facility isn’t just to provide a contemporary health space, but to create a health centre that blends art, indigenous culture, lush gardens and a deluge of natural light to provide the people of Regional Victoria with a hospital that reflects the community culture, as well as their health needs.

A SAFE, SUSTAINABLE AND CONNECTED HOSPITAL

Described as a breathtaking building, the team behind Victoria’s largest regional hospital have combined these ethereal elements with the latest in ICT and Building Information Modelling (BIM) to create a healthcare facility that delivers healing, connectivity and tranquility in equal measure.

“We set out with an ambitious plan to build Australia’s first world-class Regional Hospital that needed to be self-sufficient in terms of meeting the community’s needs and the requirements of the broader region. It also had to be one of the safest and greenest hospitals in the country.

We wanted a hospital that ultimately provided patients and staff with a tranquil environment, one where we separated the busy everyday activity from the inpatient and care facilities within the internal environment,” says the Acting CEO of Bendigo Health, Peter Faulkner.

At a cost of $630 million, the hospital is a fusion of colour, texture, technology, cutting-edge healthcare and patient-centred wellness.

The Bendigo Health Services combined with the new Bendigo Hospital now provide patient healthcare for approximately 26% of the geographic land mass of the state. This investment has been a significant undertaking to future-proof quality healthcare delivery.

With new technologies and the new treatments available for Bendigo and north west community, patients now can access better healthcare without the arduous travel to the Melbourne metropolitan area. With 372 beds available, the hospital is approximately 60% larger than the previous hospital and services over 25% of the geographic land mass of Victoria.

COMPLEX ENGINEERING FOR GREATER WELLBEING

“The new Bendigo Hospital, like any major health project, is a complex piece of engineering design full of complex systems and technologies – NDY is incredibly proud of the design work we’ve done for the project, but over and above this, we are really proud of the meaningful difference the project will make to the people of Bendigo – the staff, businesses and patients – as well as the making positive contribution to the health and wellbeing of the local community,” said Stuart Fowler, NDY’s CEO.

By focusing on patient-centric solutions, the design for integrating state-of-the-art technology had to ensure the hospital would be prepared to cope with future changes such as high transfer data requirements and the ability to utilise mobile devices, allowing care teams, clinicians as well as patients the mobility to carry out necessary day-to-day activities.

PREVIOUS PAGE: The New Bendigo Hospital provides healthcare services to the region and the community.
THIS PAGE TOP: The hospital design is inspired by the region’s natural environment.
THIS PAGE BOTTOM: Every part of the hospital has access to natural light.
FUTURE-PROOFED, CONTEMPORARY DESIGN

Bendigo Health Executive Director, Information Services & CIO, Bruce Winzar also emphasised the importance of infrastructure design decisions throughout the hospital, such as the clever use of cables and black boxes securing data with a very high reliability factor of 99.99%.

Every design decision considered the entire human lifecycle. In hospitals, most of the patient activity in a hospital occurs bedside. By integrating the electronic medical records with the existing Legacy systems, using the latest unified communications systems and IP network and converging current healthcare systems, the new technology gave staff and patients the ability to interact in a live environment, ultimately providing greatly improved health and wellbeing outcomes.

KEY COLLABORATIVE TEAM

The Exemplar Health consortium consisted of:
- Capella Capital
- Lendlease
- Silver Thomas Hanley
- Bates Smart
- NDY

NDY SERVICES
- Electrical
- Fire Protection
- ICT Consulting
- Mechanical
- NDYLIGHT
- Security
- Sustainability
- Vertical Transportation

New Bendigo emergency entrance provides easy access for emergency vehicles
The new Bendigo Hospital also features clever building planning such as installing key storerooms, portering and warehouses all located centrally – the clinical staff can simply log a job which is immediately acted upon. Any food, materials, linen and waste are transported without any manual handling, relying instead upon electronic trolley to convey items from back of house directly to patient bedside.

Director, Health Services at NDY, Keith Davis discussed the use of BIM as the framework to provide the intelligence on ensuring design integrity, design efficiency and an upside for longer term facilities management.

Creating one of the most energy efficient hospitals nationally, the team at NDY simply focused on the emotional needs of people. The team created a space that made a profound difference to the physical environment – from the use of flowing natural daylight and reduced noise areas to innovative stairs and bridges designed as artistic features.

Michele Morrison, CEO of Exemplar Health describes the hospital as a beautiful building, a tranquil healing space with exceptional interior design incorporating the theme of surrounding valley into various departments - a building the community truly loves.

The new hospital services a quarter of Victoria’s land mass and will assist Bendigo Health to provide the health services expected by the community in the 21st century. The cutting-edge facility is also attracting and retaining the best staff, training the future health workforce for the region, and is supporting other health services as part of an effective regional health system.
With a pedigree of experience working on some of the world’s tallest structures, NDY (a Tetra Tech Company), has been involved in preliminary scoping works for Australia’s tallest building.

Situated on a triangular block of land just 18 by 36 metres, and vested to the Royal Society of Victoria in perpetuity for the purpose of promoting their cause, NDY has been providing some early thinking on mechanical and sustainability outcomes for the former Bureau of Meteorology site on the corner of Victoria and LaTrobe streets on the north-eastern corner of the Melbourne CBD.

The proposed slender tower – named Magic – aspires to 330 metres in height and will consist of over 60 storeys. One apartment would occupy each level with a floor space of between 250 sq m and 320 sq m.

The Magic Tower will push building technology to the limit and reinforce Melbourne’s leadership in science and liveability. Melbourne is, and always has been, Australia’s science capital. Within four years of Victoria’s foundation, Melbourne had its first university, a museum of natural history, and one of Australia’s oldest scientific research institutions – the Royal Society of Victoria.

The Royal Society’s members established Victoria’s first railways, advised on how to supply a reliable source of fresh water to Melbourne, how to lay down the sanitation system still in use today, how and where best to establish a secure source of food, and how to distribute that food internationally. They commissioned a bold (if ill-fated) exploration of the interior of our continent and kicked off Australia’s exploration and long-term interests in Antarctica.

From that start Melbourne has become the powerhouse of Australian science, contributing to the bionic eye, the cervical cancer vaccine, the first printed jet engine, new plastic technologies, and hundreds of life changing discoveries.

“The revitalised Royal Society will keep the flame of curiosity alive in our youngest scientists. Through lifelong learning, we will offer all Victorians an opportunity to empower themselves to make well-informed decisions, shaping the future of regions and cities alike, and giving our state a distinctive edge in the 21st century,” says Society CEO Mike Flattley.
This focus on delivering science excellence and leadership to the community aligns with the NDY Tetra Tech purpose of ‘leading with science’ and ‘making spaces work’, and has been an important undercurrent in the preliminary engineering and sustainability scoping.

Decibel Architecture’s Dylan Brady has created the design and worked behind the scenes to progress the innovative proposition with a broad range of technical engineering and design experts from Victoria. Early engagement with heritage, government and industry stakeholders has been key to establishing a possible pathway to realisation. Grocon has committed to the community driven project, and stepped up to underwrite the projects investigation and permitting phase, with the majority of profits to be diverted to the RSV to form a perpetual endowment fund for their ongoing operations over the next 200 years.

NDY’s global director of sustainability, Prof. Tony Arnel, has been working with Brady, Decibel and other stakeholders over the past two years investigating best possible outcomes for the potential tower. “Melbourne is consistently ranked as one of the world’s most liveable cities because we have a history of creating a built environment that respects the legacy of the city but also looks to incorporate best practice and innovation,” says Arnel.

“Due to the unique footprint of the site, we’ve been working with Dylan and the Decibel team in generating some analysis around mechanical and fire safety systems, and some early thinking around sustainability outcomes that include advanced technology to maximise energy efficiency.”

Brady says this project is not a traditional development play, but rather a new investment model. “This is not a large corporation making a lot of money and running away, this is a community-driven, purpose project,” says Brady.

“We intend to attract the minds of people like Elon Musk, Richard Branson and Bill Gates, who all have philanthropic-driven understandings of value, who would love a fantastic apartment with a brilliant view knowing that the profit of their apartment is being channeled into the scientists and the science outreach programs of the Royal Society of Victoria for the next 200 years,” adds Brady.
This is not a large corporation making a lot of money and running away, this is a community-driven, purpose project.

Arnel, who is also a trustee of the Melbourne Sustainable Fund and President of the Energy Efficiency Council, says the rapidly growing population of Australian cities – and with prime sites at a premium – we can expect to see more of these innovative slender tower projects on the Melbourne skyline in the years to come. “What we do well in this country is not just build tall towers; we build highly efficient buildings that are micro communities.”

Further details about Magic can be found on the Decibel Architecture website: http://www.db-a.co/work/magic/

Find out more about the Royal Society of Victoria: https://rsv.org.au/

Scan the QR code to read the ABC News media coverage:

The Magic Tower project will create a flow of millions of dollars to revitalise the Royal Society of Victoria, enabling it to

- Support citizen science, technology, and science clubs across Melbourne and Victoria
- Enhance and upgrade the heritage-listed home of the RSV to meet modern accessibility requirements and be fit for the 21st century public engagement required
- Develop a science engagement centre and science cafe

Photography by John Gollings.
Renders by bB(A) and Shadowlab
NDY WITH QANTAS FOR THE LONG HAUL
As well as an important destination for business travellers, visiting the UK has been considered almost a “rite of passage” for generations of Australians. In the past, the multiple stop-overs, time zone changes and flight connections meant that passengers often found themselves exhausted at the end of their journey. But that has now changed. With Qantas investing in a new non-stop Perth-London route – as well as world-class passenger facilities – getting there can truly be half the fun.

Qantas Group CEO Alan Joyce said the history-making route would be a watershed for travel, tourism and trade.

“When Qantas created the Kangaroo Route to London in 1947, it took four days and nine stops. Now it will take just 17 hours from Perth non-stop”.

“This is a game-changing route flown by a game-changing aircraft. Australians have never had a direct link to Europe before, so the opportunities this opens up are huge”.

At 14,498 kilometres, this direct flight service is one of the longest commercial routes in the world, taking advantage of the efficiency and comfort of the new 787-9 Dreamliner. The aircraft has improved air quality, lower cabin noise and technology to reduce turbulence, resulting in a smoother, more enjoyable flight for passengers of all classes.

To complement the new levels of comfort available on a commercial route is the facilities available at each end of the flight, including the new fitout of the Qantas lounge at Perth Airport. The new flight will operate through Qantas’ existing domestic terminals (T3/4), which have been upgraded to accommodate international flights. The airline’s current international services from Perth (to Singapore and to Auckland) will also move to this terminal, helping to simplify the journey for thousands of people every year.

Game-Changing Facilities for Perth Airport

Qantas, Perth Airport, and the Western Australian Government have made a significant investment, upgrading the facilities to support the comfort and enjoyment of all travellers on their airline. To achieve this, Qantas enlisted the expertise of Norman Disney & Young, A Tetra Tech Company (NDY), to ensure the fitout of the Perth Qantas Lounge, and the Terminal 3 extension were technically best in class and customer focused.

NDY Project Leader for this project, Renee Fourie says NDY was brought onboard to provide engineering solutions for the refurbishment of the Perth Domestic Terminal 3, “because of the first-class pedigree of transport facilities projects. This included the fitout of the new Qantas transit lounge, which features the first outdoor patio at an airport in Australia, with a barbecue grill and a Neil Perry-designed barbecue menu.”

The Transit Lounge also includes:

» 15 Shower suites including bright LED lighting which can be run in 15 minute sessions to help re-adjust your body clock to the local time zone.

» A Wellness studio that offers stretching and breathing classes held every 15 minutes. This helps relax passengers before a flight, while also assisting them to adjust to a new time zone and work out any kinks once they arrive in Perth.

» Two outdoor decks providing sunshine and fresh air and an authentic Perth experience after the long flight.

» Outdoor BBQ with meals provided by on-site chefs.

» Business facilities, including Free WiFi, USB charging ports, wireless printing, personal messaging, and national Newspapers.

Providing all these services to the appropriate standard was a considerable task, made particularly challenging by the unmoveable date for the new Perth-London route.

“But with a collaborative approach across all stakeholders, we were able to achieve this. The NDY team – along with our project partners – all worked cohesively to achieve this outcome.”

FAST FACTS

» The Boeing 787-9 Dreamliners used on the route will carry 236 passengers across Business, Premium Economy and Economy cabins.

» The 14,498km flight will take approximately 17 hours (slightly more or less depending on winds).

» It is expected to be the third-longest passenger flight in the world, and the longest flight on the Qantas network.
Expanding Terminal 3

Beyond the lounge, the expansion of the southern end of Terminal 3 was a significant addition to the capabilities of Perth Airport. "The terminal is required to handle incoming and departing wide bodied aircraft for long haul international flights and domestic transfers/stopovers within Australia," says Renee.

"This involves providing flexible space and adding ‘swing gates’ for both domestic and international/ transferring passengers and controlled passenger flows. Complying with the security requirements of the Department of Immigration was a challenge, but they were very happy to work with us to ensure that all their concerns were addressed."

Maintaining regular operations in the airport while construction was underway, without compromising security, safety, or the enjoyment of passengers in transit, was another challenge.

As a long-term member of the Perth team, Renee has taken particular joy in seeing the project come together. "Being a part of a history-making project with non-stop flights from Australia to London has been very rewarding," she beams. "To see Perth becoming a major aviation hub, and to have been a part of it, has been very exciting.

Alan Joyce echoes these sentiments: "It's great news for travellers because it will make it easier to get to London. It's great news for Western Australia because it will bring jobs and tourism. And it's great news for the nation, because it will bring us closer to one of our biggest trade partners and sources of visitors."

ARCHITECT NOXON GIFFEN ARCHITECTS

PROJECT MANAGER SAVILLS

BUILDER PERKINS

NDY SERVICES
- ACOUSTICS
- ELECTRICAL
- FIRE PROTECTION
- HYDRAULICS
- ICT CONSULTANCY
- MECHANICAL
- SECURITY
- VERTICAL TRANSPORTATION

KEY COLLABORATIVE PARTNERS
- NOXON GIFFEN ARCHITECTS
- QANTAS AIRWAYS LIMITED
- PERTH AIRPORT PTY LTD
- PERKINS BUILDERS
- DEPARTMENT OF IMMIGRATION AND BORDER PROTECTION
- BYTE CONSTRUCT
- SUMU DESIGN
- DAVID CAON

NDY OFFICE PERTH

CLIENT QANTAS

COMPLETION MARCH 2018
PENTLAND OFFERS A SWEET SOURCE OF FUEL FOR THE FUTURE
The need for secure and affordable fuel and energy has long been recognised by governments and businesses around the world. As the cost of exploration, extraction and transport of traditional fossil fuels increases – as well as the understanding of their impact on the environment – the search for cheaper, more reliable alternatives has gained traction.

One of the most promising is bioethanol. This is used both as a fuel for transport and for generating electricity on a commercial scale. Norman Disney & Young A Tetra Tech Company (NDY) is assisting Renewable Developments Australia (RDA) to develop a low cost bioethanol production facility at Pentland, a bioenergy facility near Charters Towers in North Queensland.

“Bioenergy is an exciting industry to be involved in,” says NDY Sustainability Consultant Nicki Parker. “It’s a complex project, but it’s a fantastic opportunity to show that alternative energy can be affordable, reliable, and have a lower environmental impact than some of the more common energy options. The global bioethanol market is expected to grow to 145 Billion litres in 2022. This creates enormous opportunities for facilities like Pentland to step into a market that is maturing rapidly.”

With the Pentland plant aiming to produce the lowest cost ethanol in the world, the project will start to demonstrate the innovative measures that Australia is exploring in order to meet their future emissions reduction.

The proposed development is located approximately 250 kilometres South-West of Townsville near Charters Towers. The facility produces ethanol using sugar cane and sweet sorghum that is harvested from the on-site 20,000 hectare farm. The biomass will be irrigated using bore water harvesting, integrated into a self contained water and sewage treatment, further minimising the resources needed for operation.

The Pentland Project is aiming to be lowest cost ethanol producer in the world by drawing on numerous innovative ideas and technologies. “The goal is for this project to serve as a ‘Proof of concept’ model for bioethanol production.
by looking at innovative ways to produce high efficiency sorghum, and minimising waste by using by-products as fuel, ” says Nicki. “We expect that the project will do this successfully, and pave the way for the technology to be replicated throughout Australia, and internationally in countries where suitable land is available for growing feedstock. We can become a global leader in literally growing our own fuel.”

This ambitious project puts Australia at the forefront of biofuel production, and offers opportunities for employment, research and economic growth across Australia. The Pentland project is expected to create 500 jobs during construction and up to 200 jobs after construction is complete in addition to producing a carbon neutral renewable fuel.

THE PROCESS

Bioethanol is useable as a fuel replacement, or added to petroleum as an inexpensive way of increasing the octane rating. The Ethanol is produced from the source plants via a fermentation process using glucose derived from sugars, starches and cellulose extracted from sugar cane and sorghum. Sugarcane is a proven and extremely efficient converter of sunlight and water into energy and is considered one of the highest yielding energy crops available. Sorghum isn’t as popular on a global scale, due to most varieties of sorghum being native to Australia, and therefore less frequently adapted to this type of farming. The fermentation process separates the glucose into ethanol and carbon dioxide. With the feedstock plants close to the bioethanol distillery, the CO2 can be reabsorbed by the plants and the carbon released into the atmosphere can be minimised.

“The ability to recapture the CO2 byproduct is a definite added advantage of this project,” says Nicki. “It also future-proofs the concept if regulations surrounding carbon emissions come into being, here or abroad.”

The Pentland Advantage

The Pentland Project involves the development of a fully integrated sugarcane farming, processing and ethanol distillation facility. The traditional model of bioethanol generation involves a refinery sourcing plant material from a third party, which adds to the supply chain and expense. By co-locating the refinery and feedstock, the resources needed to source, transport and grow are minimised, while the quality can be tightly monitored and the harvesting programme adjusted to ensure supply at the required times.

The first generation processing is expected to yield approximately 190 million litres of high grade bioethanol. The facility is designed for expansion to include a 2nd generation ethanol production stage extracting a further 150 million litres of ethanol from the waste byproduct of the 1st stage ethanol production.

Production will increase to 344 million litres by June 2020 annually at an average price of 80c per litre, which equates to $280m in export trade out of the region at least for the next 10 years.

The project is proposed to increase Australia’s ethanol production by 80%. This will lower our reliance on oil imports, while also providing technology and expertise that is readily exportable, as well as local jobs and development.

NDY provided water (raw, potable and irrigation), sewer, electrical, communications and fire reticulation services throughout the site to a preliminary design level. This allowed the project to attract funding from the Australian Renewable Energy Association (ARENA). NDR then progressed on to integrating this into the larger facility, and incorporating the services into vendor supplied machinery and plant.

“To contribute to a new industry that is providing jobs and training to so many people, as well as leveraging the innovative thinking of our people is immensely rewarding,” says Nicki. “The fact we can do it while also minimising the environmental impact of fossil fuels, and lowering the cost of fuel for all consumers is particularly exciting.”

LEFT AND ABOVE: The land in North East Queensland is ideal for sorghum and sugar cane crops.
GEOTHERMAL

THE OTHER SUSTAINABLE OPTION
When most people hear the term Geothermal, they usually think of large-scale power generation. But Geothermal is a viable, clean heat source that can provide substantial operational cost savings for many precinct level developments – even in the middle of a busy city.

Geothermal has long been considered a viable way of generating power, for individual building or small precincts. However, the start-up investment for a facility capable of powering a city is considerably greater than other clean energy sources, such as solar or wind. A key difference is that Geothermal also offers a reliable, cost effective and unobtrusive solution to the heating needs of precinct developments and public facilities.

NDY Associate Director Jeff Dusting has worked on several Geothermal heating projects, and believes that there can be significant operational cost benefits as well as improved occupant experience with a localised geothermal system. “In the right project, Geothermal can lower operational costs, as well as providing a near-neutral carbon footprint for the precinct,” he says. “This operational saving improves cash flow for the owners, as well as lowering the expenditures of tenants and users of the facility. One recent example is Scarborough Pool in Perth. The Geothermal system is so efficient that there is no requirement to use solar blankets or boilers for the outdoor pool. This also saves on staff time, keeping costs down even further.”

What exactly is geothermal?

Geothermal is essentially using the natural heat found deep underground to power or heat a building above ground. This can be ambient heat from over a kilometre underground, or tapping into water sources that are heated by underground activity, such as geysers or hot springs.

This same heat can be used to generate electricity by boiling water (or a specialised liquid such as pentane) so that it generates steam and turns a turbine on a dynamo, generating power. Geothermal power generation can be a sophisticated process, but as a source of heat, the process is much simpler.
Geothermal heating

Geothermal power generation requires temperatures high enough to boil water, requiring very deep wells and pipes. This increases the initial cost considerably, however, the temperatures for heating a building to comfortable levels are substantially lower. This means that the depth and complexity of the system can be reduced, making it viable for much smaller scale projects.

Direct Vs indirect heat transfer

Geothermal heat transfer comes in two main types, Direct and Indirect.

Indirect uses heat from deep below the surface to heat a refrigerant, which is then used to warm up the environmental systems. The Scarborough Pool in Perth uses this type of system, providing with a constant supply of warm water to keep the pool heated and comfortable all year round.

Direct geothermal energy uses pipes that are sunk just a few metres into the ground to extract heat in winter for heating (through direct heat transfer through the metal, or via a refrigerant pumped through the pipes) and to sink the heat in summer, cooling the building.

Some buildings can utilise both systems simultaneously. NDY designed one of the first geothermal projects in Manchester. The First Street Site is a 250,000 sq m mixed use development that utilises a ground source heat pump that taps into the heat capacity of the ground, which at 12m below the surface remains fairly constant. This improves the efficiency of the building’s heating and cooling plant. Closed loop boreholes effectively use the ground as a heat “sink” throughout the year whereby energy from the ground is either rejected (cooling) or absorbed (heating) into the system.

The ground source heat pump and borehole solution takes advantage of the moderate temperatures in the ground to boost the efficiency of the mechanical systems and reduce the running costs of heating and cooling plant.

The biggest advantage of such systems is gained when heating and cooling is carried out throughout the year, as the heat rejected in summer is stored in the ground and used for heating in winter.

Retrofitting Geothermal

“There’s this school of thought that geothermal is only for new buildings,” Jeff says. “That’s just not the case. There are many ways to integrate a cost-effective geothermal solution into an existing building, even in a major metropolitan area.”

NDY has refitted several buildings with geothermal systems, including X Y and Z.

Geothermal for Pools

“Pools and aquatic centres represent a large number of our geothermal projects,” says Jeff. “The heat requirements of these facilities make geothermal a very attractive option, with a very short payback period.”

By using renewable energy to heat the water, rather than traditional gas boilers, hundreds of tonnes of Carbon are saved, as well as significant operational costs. At the Scarborough pool, the City of Sterling estimates that the geothermal system saves them around half a million dollars in heating costs per year, a saving that allows the council to put funds to much more practical use.

As precinct level power generation and services sharing becomes more popular, geothermal will also form an integral part of providing precinct level sustainable solutions.
The Benefits of Geothermal

It’s always available.

Unlike other renewables such as solar and wind, geothermal is always operational. The temperature of the rock deep underground is reasonably constant, making the system predictable and efficient.

Low maintenance costs.

The simplicity of the system means it’s cheap to operate. Initial setup can be expensive, but this can be rapidly offset by operation savings.

A renewable heating solution

Even if the system is taking advantage of a natural reservoir of water underground, with proper management, the water taken can be less than the water that feeds into the system. A closed loop system takes nothing from the environment except heat, making it a very low impact method of heating.

A simple solution, even at a small scale

The system essentially has just a few basic components: Underground pipes, some pumps, and a heat exchanger. By keeping it simple, maintenance costs are reduced.

SOME OF NDY'S GEOTHERMAL PROJECTS INCLUDE:
- ST HILDA’S SCHOOL FOR GIRLS – 50 M OUTDOOR POOL
- SCARBOROUGH OUTDOOR POOL
- RIVERTON LEISUREPLEX INDOOR AQUATIC CENTRE – CONVERSION TO GEOTHERMAL HEATING
- MANDURAH AQUATIC RECREATION CENTRE
- HALE SCHOOL - OUTDOOR 50M AND LTS POOL

**BINNARY CYCLE POWER PLANT**

**FLASH STEAM POWER PLANT**

**DRY STEAM POWER PLANT**
Making Good for the House with No Steps
The end of a commercial lease is a big undertaking for a business. There are many things to consider, including relocation of equipment, inspections, updating clients and suppliers, along with a whole host of other details. One factor that is often ignored until the last moment is the “Make Good” clauses in most commercial contracts. While they can cause headaches for some businesses, NDY Property Consultancy Manager Simon Tillbrook has found a way to simplify a part of the process for his client, while benefiting a worthwhile charity.

What is “Make Good”? 

The make-good provision in a commercial real estate lease is a standard inclusion to return a premises back to its condition when first rented, regardless of any improvements done in the meantime. With modern offices needing many bespoke fitout elements, this can be a costly undertaking.

Many businesses also take this as an opportunity to update their workspace, so old furniture and fitout elements are discarded and sent to landfill. Simon was aiding a client in one such Make Good project when he saw an opportunity to help a worthwhile charity.

A step in the right direction

“We were helping a client taking over a new space, and the previous tenant had left their furniture behind, which was all marked for disposal,” says Simon. “The amount of waste that comes from a typical make good project is quite staggering. Sending perfectly good office furniture to landfill is a terrible waste, so we looked into options to recycle the furniture.”

“We connected with a local charity called House with no steps, a disability service provider, and we were pleased that they could use the chairs, tables and sofas in their office and respite homes, which otherwise would have gone to landfill.”

The House with no steps is one of Australia’s leading providers of disability services. Their work ensures people with a disability have greater choice, control, and freedom. Established in 1962 by Lionel Watts, CMG, MBE, House with No Steps has been supporting people with a disability for over 50 years. The focus has remained the same: enabling people with a disability to realise their personal aspirations and goals.

The recipient of the two metre tall letter, Learning & Culture Manager of House with No Steps Pauline Luttrell, sent a thank you email saying to Simon and the Asset Performance team, saying: “I wanted to send you a big THANK YOU for the generous donation of office furniture to the Belrose team at House with No Steps. We are one of Australia’s leading disability service providers and are dedicated to giving people with a disability greater choice, control and freedom.”

“A charitable organisation we focus our funding on our customers and sometimes this means we have very simple office furniture. The recycled furniture you have kindly donated has put a smile on the teams faces and came just when we needed it.”

According to Pauline, the charity had to recently refit their lower ground floor offices due to water damage, with all the furniture requiring replacement.

“We managed to obtain some desks but didn’t have enough working desk chairs,” Pauline explains. “When Simon mentioned that he may be able to provide some I was very excited and got our team involved. We also picked up some lounges, the black leather ones have been put in our canteen area where our supported employees have lunch (we employ people with disabilities in our packaging and canteen at Belrose) and these have meant we could replace some fairly old lounges.”

“The red lounges have made their way down to the lower ground and staff use them for informal meetings and when the want to read documents in comfort. However the biggest talking point has been the letter P – everyone wants their own letter now! It has pride of place outside my office.”

Simon and the Asset Performance team were justifiably proud of their contribution, both from a charitable perspective, and from a sustainability point of view. “Often, such items are discarded following a vacancy, so being able to help a valuable charity continue their great work is immensely rewarding,” he beams. “It really shows how a small bit of thought and consideration can make a big difference for people. I’m very proud of the team, and hope House with No Steps can continue their great work.”

How to support the House with No Steps

This year, the House with No Steps needs to raise over $4 million from the community to continue their support for over 3000 children and adults with a disability. If you would like to contribute to this worthwhile charity, please visit https://www.hwns.com.au/Supporting-us or call 1300 LETS GO (1300 538 746).