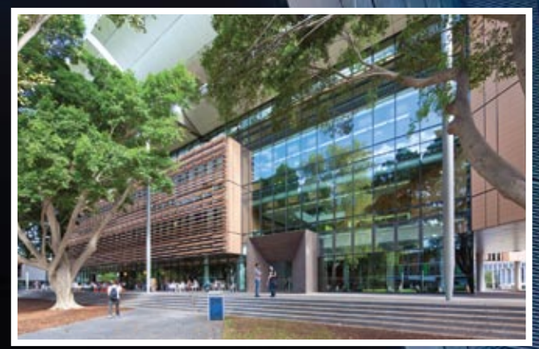
UNSW TYREE ENERGY TECHNOLOGIES BUILDING

CREATING A POSITIVE ENERGY

CONSTRUCTION COMPANY : Brookfield Multiplex
PROJECT MANAGER : Capital Insight
CLIENT : University of NSW
COMPLETION : December 2011
ARCHITECT : FJMT
SURVEYOR : Project Surveyors
STRUCTURAL, FACADE, GEOTECHNICAL, TRAFFIC & CIVIL ENGINEER: TTW
MECHANICAL ENGINEER : Steensen Varming Australia
PROJECT END VALUE : $125 million



The Tyree Energy Technologies Building (TETB) is the new home of energy research at the University of New South Wales (UNSW), designed and constructed by Brookfield Multiplex. The innovative energy and technologies building is located on the last prime site on campus, fronting both Anzac Parade and the University's entry boulevard and serves as a gateway for the campus.

As the new home of energy research at UNSW, this landmark, 6 Star Green Star energy-efficient building is a state-of-the-art powerhouse for ground-breaking research, education and industry collaboration in the development and practical implementation of sustainable energy technologies.

The 15,000m^2 building, which is used largely by the Faculty of Engineering, features teaching and learning spaces, workshops and display spaces, research spaces including wet and dry labs and a cafe. Designed to facilitate leading edge research in photovoltaics, a state of the art "Class 10,000" clean room has also been integrated. This ultra-clean laboratory will be used for the research and development of more efficient silicone chips for PV solar panels.

Awarded a 6 Star Green Star Education Design v1 rating, it features a gas-fired tri-generation plant, low energy displacement cooling, heat recovery systems, two thermal labyrinths with 1,100sqm of roof-mounted solar panel array utilising the latest UNSW solar cell technology. The $125 million project will support industry collaboration and provide a formal learning space for 300 engineering students.

Luis Soares, Design Manager at Brookfield Multiplex for the Tyree Energy Technologies Building said one of the biggest challenges of the project was the complicated roof form which has become a hallmark of the building.

"The roof design included a significant number of photovoltaic cells and PV panels. We had to maximise the amount of panels on the roof so we tried to fit them in where we could. The roof is wave-like and the PV panels are mounted on the face of the wave. We also had a metre wide gutter box and for design and construction purposes this created challenges for both safe construction and long term maintenance access," Soares said.

"The roof is made from structural steel and it is a very complex structure because it had to support an external roof form as well as the inverted wave-like structure underneath. It also incorporated a series of automatic windows which open out to enable the hot air that may be elevated or captured by the building during the day to escape."

Soares said the roof is 30metres above the ground and the roof form resulted from an extended design development and documentation phase which put pressure on the building program.

The 6 Star Green Star rating has been achieved through a number of innovative design techniques including the PV panels and a tri-generation plant. There is also a special labyrinth of tunnels below ground to allow outside air to be drawn into the building to make heating and cooling more efficient.

Sun shading installations on the north and west of the building also help with temperature control and the complicated façade which includes eight types of material including louvers and glass act like a secondary skin on the outside of the building to allow for better airflow.

"There were other challenges with building the TETB," said Soares. "Each of the user groups had complex individual briefs and de-canting requirements as they are being re-located from a number of different buildings. Immediately upon the award of the contract we were required to collaborate closely with our consultant team, the University, its advisors and the user groups to co-ordinate an extremely complex family of base building services to service all their research laboratories. Finalising the brief over hundreds of hours of consultation required specialist input that in some cases required overseas expertise."

"Construction was completed within a constrained site surrounded by university accommodation and sporting facilities and adjoining the university mall. This required ongoing interface management to ensure materials handling and construction activity minimised their impact on students and staff."

The solid working relationship established with UNSW was a key ingredient in the timely delivery of the project. Peter McGeorge, Associate Director (Planning and Development), Facilities Management, UNSW said, "The collaborative approach by Brookfield Multiplex has been critical to us, as halfway through the construction period, we amended the scope of works. Brookfield Multiplex embraced these changes with a high level of professionalism and transparency for which we are extremely grateful."

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UNSW Tyree Energy Technologies Building, NSW

KEEPING IT COOL AT UNSW

Allstaff Airconditioning is a market leader in the field of air conditioning and mechanical services with an ability to create innovative mechanical services solutions for projects of substantial complexity and scale.

The Allstaff Airconditioning group of affiliated companies has undertaken successful projects in all areas of Victoria, NSW, the ACT and Northern Territory. Soon after starting operations in 1996 the NSW branch was awarded its first major project – the World Square site in the Sydney CBD, with the contract for the Avillion Hotel, car parks and apartment buildings following in January 1997. Since then the company has been involved with the Ernst & Young office tower and lower retail sectors on this site.

Allstaff Airconditioning undertake a substantial number of projects in NSW and from its offices/warehouses in Gladesville, Sydney providing services including project management, special projects specializing in retrofits, refurbishments and other small projects, designing energy efficient solutions, estimating and tendering, and drafting.

It was no wonder then, the company was selected to install the complex air-conditioning system in the UNSW Tyree Energy Technologies Building. Project manager Adam Ewers said it was a unique job for the company with a number of challenges. "One of those challenges was the ultra high purity gas lines that were installed by our sub contractor Hoslab. We have done a number of these projects in the past including hospitals and other laboratories," he said.

Specialist Laboratory extraction equipment & processes have been installed to accommodate the user group requirements. The UHP stainless steel gas lines were installed by a specialist contractor. All materials were delivered to site in clean bags and all welding completed within a specially built mobile clean room. The pipework was then moved to the onsite location and installed into position. These piping runs reticulate throughout the building to all Laboratories and involved 20 specialist welders and installers taking approx eight weeks to complete.

"The successful growth of Allstaff is attributed to the total commitment to quality workmanship and our dedication to customer service and satisfaction. Only specially trained people can work on these types of projects," Adam said.

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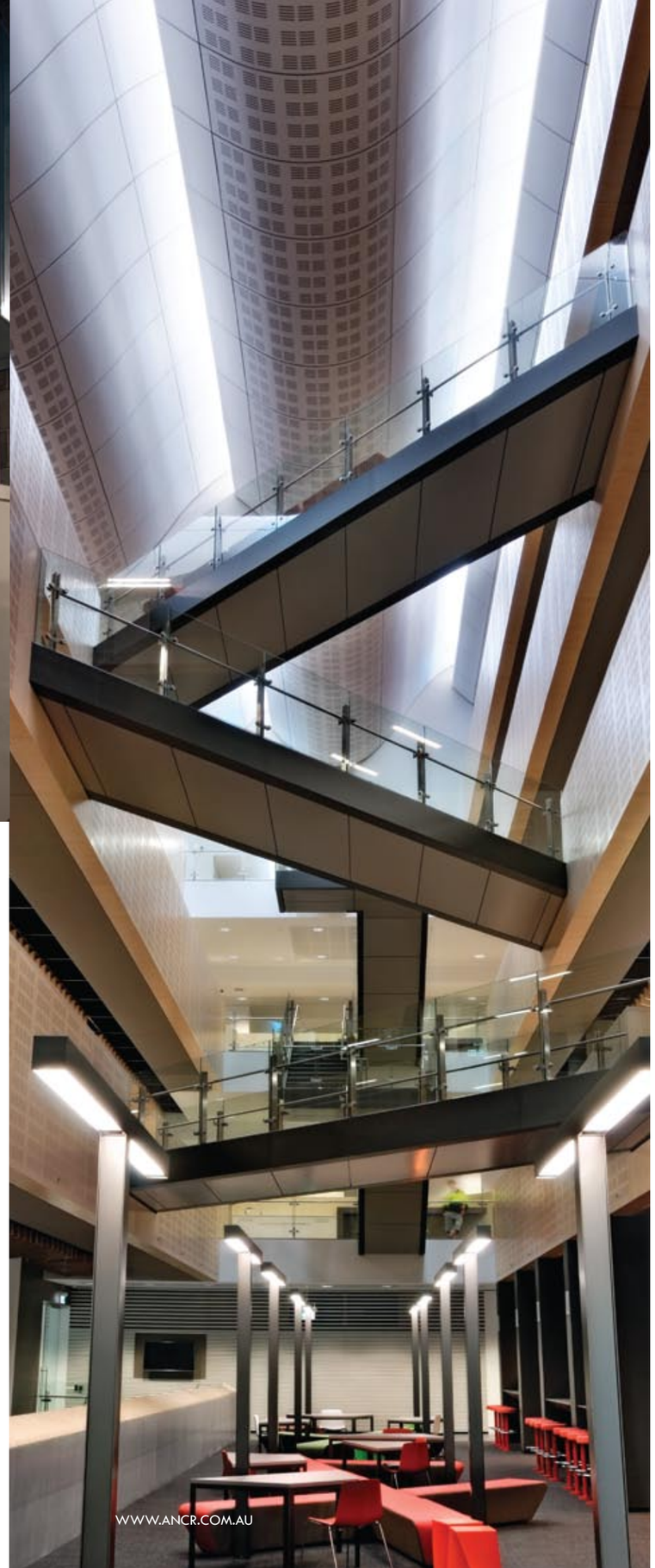

WORLD CLASS

New ideas and a fresh approach is the hallmark of Cubic Interiors and the company's work on the Tyree Energy Technologies Building at NSW University was no exception. Started 18 years ago by Robert Migliorino, Cubic Interiors has a passion to provide a unique, professional and state-of-the-art building projects service to the corporate marketplace. Migliorino's engagement with design, his championing of innovative products and his ability to coordinate and deliver complex and demanding interior building projects has established him as the leading professional in his field.

Cubic Interiors was responsible for all the partitioning, glazing, solid and suspended ceilings in the iconic UNSW building and the scope of works included not just fit out but designing the unique structures that are set to become a hallmark of the structure. Migliorino said developing ideas for the building which incorporates laboratories, offices and a stunning atrium, was a challenge but one to which Cubic Interiors was ideally suited.

"There were some new ideas used in the fit out. We used fibrous plaster for the spoon-shaped ceilings to achieve the geometric shapes required and the sound and acoustics needed," he said. "All the profiles of the ceilings were done on Computer Aided Design technology and models were then made from composite materials to ensure the designs would work." The suspended ceiling systems were constructed from plaster board, timber blades, metal pans and the unique spoon ceiling under the atrium roof is done in fibrous plaster, shaped using moulds. The casts for the moulds used to construct the curved panels were completed in Perth and the sections were then transported to Sydney. More than 500 sections were required to complete the project which involved more than 80 trades people on site including carpenters, glaziers and plasters for more than five months.

"Our team of selectively chosen, highly skilled professionals bring many years of experience to every project we undertake. Our core management team's extensive industry experience allows us to easily understand complex and difficult projects and go forward to deliver world class, state of the art solutions," Migliorino said. "This building required quite an intricate process although we have used fibrous plaster before," said Migliorino. "It has created an amazing finish. The building is complex, with a lot of geometric shapes and our trades people had to work around the angles in place." Cubic's strengths in complex project management, coupled with superior design and fabrication skills and certified OH&S Management Plan to AS/NZS 4801:2001, make Cubic a market leader that can undertake large scale roll out projects nation-wide. Cubic has offices in Sydney, Canberra and Perth and are also building a presence in Melbourne and Brisbane.

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UNSW Tyree Energy Technologies Building, NSW

SMARTEK - AHEAD OF THE GAME

The UNSW Tyree Energy Technologies Building Project deployed Smartek, state of the art compliance risk management software for contractors, licensing, plant & equipment and OH & S. Brookfield Multiplex (Multiplex) was the driving force for Smartek in 1996, when it asked Barringtons to build an online contractor compliance system for the Olympic Stadium project. BMX has provided assistance for the development of Smartek over the last 15 years.

As with all Brookfield Multiplex sites, the Smartek system provides:

- improved corporate governance
- online contractor database & registration (business/employee/plant & equipment register)
- online inductions (competency based)
- online compliance management
- tiered compliance alert system
- entrance control
- live site data
- site reports as requested
- photo id for all workers
- contractors certified to be Brookfield Multiplex compliant
- a vehicle to facilitate contractors managing their own data
- a marketing tool to your clients

Smartek is customisable allowing users to set compliances in minutes with variable access depending on business role. Simple to use, even casual visitors can be inducted into the system; however, BMX knew exactly who was on site at any time. The user-friendly interface assisted compliance across the project. Any report required could be generated automatically.

- "Denied on Site for Period" - shows denials dropped from 21 to 1, over a particular month
- "Expiring Public Liability and Workers Comp 7 day look ahead" - shows 16 contractor's PL/WC would expire in the next month.
- "Subcontractor Employee Summary Count on Site" - shows total staff each day over a month, ranged from 60 to 250 with monthly people on site from 09/10 to 07/11 rose from 900 to 5000.

Smartek put Brookfield Multiplex ahead of the game with online, real time, on-time risk compliance and management. For a demonstration of Smartek's functionality, go to www.barringtongroup.com.au and click on compliance management.

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