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Institute of Healthcare Engineering, Australia

HEALTHCARE FACILITIES



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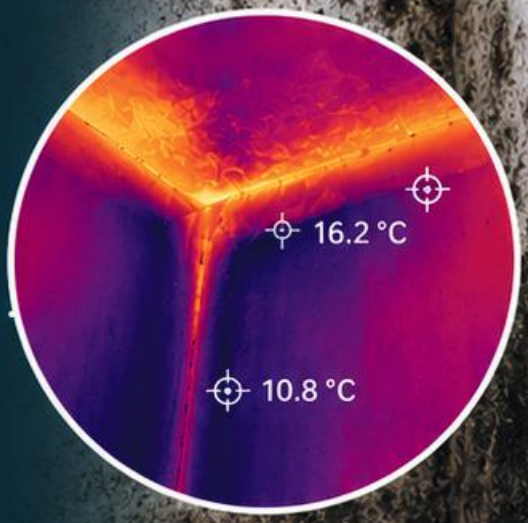
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Editor's Message



I HAVE BEEN FRUSTRATED of late. For some strange unexplained reason I have been following the real life tragic comedy that is US politics. I have been comparing the questionable actions of their political leaders with the responding actions of their worldly counterparts and I am aghast at the difference.

My wife and I have been to the United States many times and we can say without any doubt, that those Americans we met were friendly, welcoming and staunchly patriotic, yet I cannot fathom why the good people of the United States would put up with such abhorrent acts that have had such a negative impact on their livelihood and livelihoods of those residing in the greater world community.

I know that if our politicians acted in a similar manner they would be quickly turfed out on their behinds, in fact Australians have a history of doing so.

This got me thinking about why in this era of enlightenment that we humans still allow ourselves to be led by obviously incompetent or corrupt people. What is it that we need to identify with that would allow ourselves to be led down a dangerous path?

Have you ever pondered the reason why we humans are the top of the evolutionary chain, be it deserved or not? I have, and to satisfy this curiosity I set about doing a fair bit of research. I have come to agree with those who are far more educated than I am, that it is our ability for cognitive thought that sets us apart. We have the gift to believe in things unseen, things that are not tangible yet are very real in the sense of our existence.

We believe in many things that we cannot see or touch, yet to us they are very real. I will give you an example, take the organisation that you work for, it is an entity just as you are, yet you cannot touch or see it. The organisation exists, it has power, it can employ people, it can earn money and it can buy products yet it has no substance. For it to exist and to function, we humans have to believe it exists. Therefore, cognitive thought requires a level of faith.

That sets the stage for this editorial. Our world in the greater community is laced with episodes where we interact with virtual entities, and those entities need a voice. That voice usually comes in the form of an influencer or multiple influencers and it is these I want to talk about.

There are vastly different types of influencers and I will not include AI generated entities, for simplicity I will stick to flesh and blood people. There are the social media influencers who are usually self centred people who use inane podcasts or videos to spruik their opinions, philosophies and or products with the intent of building a legion of subscribers and for some the hope of making a lot of money in the process. Then we have those influencers, who do not use any media to demonstrate their learned and tested skills and proven expertise to empower those in their charge to make positive changes.

When comparing influencers, social media influencers generally rely on their audience's curiosity and somewhat voyeuristic nature in producing content under the flimsy guise of informing, educating, enlightening or just plain entertainment. These people use the podcast content to define who they are or are not, yet they demand a level of faith from their audience to believe that they, and what they are portraying is indeed truthful. Whilst there is a place for social media and those who produce the content, the level of anonymity that social media brings and the ease in which adverse manipulation can be applied by those unseen, extreme caution must be exercised when using such content for decision making. Social media does not allow for direct challenges to the validity of the information being portrayed or the integrity of the influencer.

Whereas the latter are people who in their day to day lives use their abilities and passion to change or affect how

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people act, think or feel and without using any direct force. Their "content" is in what they do, how they act, what they say and how they say it. Their ethics and morality is on constant display in how they live their lives, in what decisions they make and how those decisions affect other people. The validity of who they are, their decisions and their actions is always open to challenge and confirmation.

Every day, we constantly interact with virtual collectives such as our religion, our government, the internet, our employing company and the like and each demands some level of our faith or belief. They each have their own influential voice that will sing their song to those willing to listen.

My question to you dear reader is which influencer are you willing to place your faith in? Your choice of influencer is vitally important, especially in today's volatile and uncertain environment.

Now I would like to influence you, if I may.

The IHEA WA is hosting the IHEA National Symposium at the Fremantle Esplanade Hotel from November 16 to 18, 2026. The symposium theme is "Collaboration by Design: Advancing Healthcare Together". This is an opportunity to come together to listen to and discuss your concerns with key healthcare professionals.

For more information on the event please visit the IHEA website.

Kindest regards
Frederick Foley



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National President's Message



AS ANOTHER QUARTER passes, the scale and complexity of investment across Australia's healthcare estate continues to provide both opportunities and challenges for our profession.

In Western Australia, construction has commenced on the $807 million expansion of the Royal Perth Hospital Emergency Department. Delivering substantial new capacity while maintaining a fully operational emergency and trauma service is precisely the type of complex brownfield challenge where healthcare engineering expertise is critical. Regional WA is also seeing investment, with contracts recently awarded for the $73.4 million Meekatharra Hospital redevelopment and a new $60 million, 32-bed modular ward at Albany Health Campus. The latter is particularly interesting as our industry continues to explore modular construction as an alternative approach to healthcare delivery. In my experience, modular solutions are seldom cheaper, but the potential to undertake significant construction and fit-out away from an operational healthcare environment can deliver important programme benefits – particularly where time and disruption to existing services are critical considerations.

Elsewhere, the $2 billion new Bankstown Hospital in NSW has received planning approval and appointed its early contractor involvement partner, while construction has commenced on Stage 2 of the Manning Hospital redevelopment. In Queensland, a new 15-year masterplan for Mackay Base Hospital has been released, with Stage 1 to deliver at least 128 additional overnight beds together with expanded emergency, surgical, maternity, paediatric and neonatal services.

These developments remind us that healthcare engineering is increasingly about delivering more within live, complex environments – balancing patient safety and continuity of service with constructability, sustainability, technology and whole-of-life asset performance. Early engagement of engineering and facilities expertise remains essential if these investments are to achieve their intended outcomes.

Closer to home, preparations are well advanced for our IHEA National Symposium, "Collaboration by Design: Advancing Healthcare Together," in Fremantle from 16–18 November. The program promises an excellent opportunity to exchange ideas, challenge conventional thinking and strengthen relationships across our industry. I strongly encourage members to register and join us in Western Australia. Early-bird registration closes on 16 October, so now is the time to secure your place and take advantage of the discounted member registration rate.

I look forward to seeing you in Fremantle.

Best regards,
Michael

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AUSTRALIAN MADE

New South Wales/ACT

AS WE WELCOME spring, I am pleased to reflect on another busy and productive period for the IHEA Australia NSW/ACT Branch. Our members continue to demonstrate tremendous professionalism and resilience as the healthcare sector responds to ageing infrastructure, evolving clinical demands, sustainability targets, workforce pressures and rapid technological change.

Healthcare engineers, biomedical engineers, facilities and asset managers, project professionals and our industry partners all play a critical role in ensuring healthcare environments remain safe, reliable and fit for purpose.





Through our Branch activities, we remain focused on bringing these professionals together to share knowledge, build connections and learn from one another.

Engineering Under Pressure – 2026 Annual PD Day

Our major event for the remainder of the year is the Annual Professional Development Day, being held on Friday, 4 December 2026 at Royal Prince Alfred Hospital (RPA).

This year's theme is Engineering Under Pressure: Delivering in High-Risk Environments, and we are delighted to once again partner with the Society of Medical & Biological Engineering NSW (SMBE) to deliver the event.

The program will bring together healthcare engineers, biomedical engineers, facilities managers, project managers, infection prevention professionals, industry partners and healthcare leaders from across NSW and the ACT.

Healthcare infrastructure and clinical technology operate in demanding environments where critical equipment failures, infrastructure outages, urgent works and competing priorities require professionals to make complex decisions while maintaining patient safety and operational continuity. This year's program will explore real-world challenges and lessons learned from those working at the frontline of healthcare engineering, biomedical engineering and healthcare operations.

Following the formal program, we will continue with our four-hour Sydney Harbour cruise – a great opportunity to unwind, network and reflect on the year with colleagues and industry partners. We hope to see many of our members there to finish 2026 on a high.

Site Tours and Industry Engagement

In June, members had the opportunity to visit **Wilhelm Integrated Solutions' headquarters** for a behind-the-scenes tour of their operations and technical capabilities. It was a valuable opportunity to exchange ideas, learn more about industry solutions and strengthen connections between our members and industry partners. Our sincere thanks to the Wilhelm team for their hospitality and for sharing their expertise with us.

We are also working with Health Infrastructure and Nepean Blue Mountains Local Health District to arrange a member site tour of the Nepean Hospital Stage 2 Redevelopment in the coming months. With the project currently in its commissioning phase, this will be an exciting opportunity to view the redevelopment prior to occupation and gain insight into the delivery of a major contemporary healthcare facility. Further details will be provided to members soon.

These site visits are an important part of our Branch program, providing practical learning opportunities and connecting members with the projects, people and innovations shaping healthcare infrastructure.

Supporting Our Profession

A continuing priority for the Branch is supporting the development of future leaders within our profession. Attracting, mentoring and retaining skilled professionals is essential as we navigate workforce challenges and prepare the next generation to manage increasingly complex healthcare infrastructure and technology.

I encourage our experienced members to continue sharing their knowledge and creating opportunities for emerging professionals to learn from the wealth of experience within the IHEA community.

I would also like to sincerely thank our **Branch Committee members, volunteers, sponsors and industry partners**. Their ongoing support enables us to deliver professional development, site visits, networking opportunities and other valuable initiatives for our members.

Looking ahead, we remain committed to delivering relevant educational opportunities, strengthening industry engagement and advocating for the important role healthcare engineering professionals play within the broader health system.

Finally, thank you to all our members for your continued support of the **IHEA Australia NSW/ACT Branch**. I look forward to connecting with many of you at our upcoming events and, in particular, at our Annual PD Day in December.

I wish you all a productive and successful spring.

Cameron Ivers
NSW/ACT President.



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Victoria/Tasmania

WELCOME TO the Victoria / Tasmania Winter Update 2026

Our Lunch & Learn sessions have seen significant growth over this period, reflecting strong engagement across the team. We also had an excellent recent site visit to Sunshine Hospital, Western Health, which provided valuable insights into reliability engineering and breakfast panel discussion covering industry insights, covering the current challenges facing Healthcare facilities managers and engineers.

Looking ahead, we are excited for our upcoming Branch Christmas Function — details below

Regards,
Michael McCambridge
John Mihalinac
Steven Ball
Pablo Perez-Reigosa
Michael Goodman
Vanessa Galina

Branch Activities

Lunch & Learn: Site Tour – Predictive Maintenance, Smart Infrastructure and Healthcare Asset Reliability
Date: Thursday, 09 July 2026
Time: 08:30 AM to 2:00 PM (AEST)
Location: Sunshine Hospital
Attendees: 75

The Victoria/Tasmania Branch was warmly welcomed to **Sunshine Hospital** for an engaging Lunch & Learn event hosted by the **Western Health Engineering Department**.

The program explored a range of topics critical to the future of healthcare engineering and facilities management, including **predictive maintenance, reliability-centred maintenance, condition monitoring, indoor air quality, healthcare sustainability, asset management, fire protection, and critical infrastructure**. The event attracted a diverse audience of facilities and engineering professionals, consultants, and Department of Health representatives.











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[1] AR6 methodology.









Michael Goodman expertly acted as Master of Ceremonies, ensuring the day ran smoothly and remained on schedule.

A special thank you to the event's major sponsors, **Camfil** and **SAS Asset Management**, for their support.

Presentation Highlights

Stuart Smith (Western Health Support Services) opened the session with an insightful overview of healthcare engineering services, highlighting the often unseen but critical role engineering teams play in maintaining safe and reliable hospital operations.

Sharon Nobel from the **Institute of Quality Asset Management (IQAM)** provided an overview of education and training opportunities available to strengthen asset management capability across the sector.

Masoud Goudarzi, Western Health Reliability Engineering, presented on Western Health's reliability-centred maintenance strategies and the application of predictive maintenance approaches across critical assets.

Dr Forbes McGain, Director of ICU at Western Health and renowned sustainability advocate, delivered a thought-provoking presentation on environmental sustainability in healthcare. Attendees were particularly struck by the statistic that a single ICU bed can generate a carbon footprint equivalent to seven domestic homes.

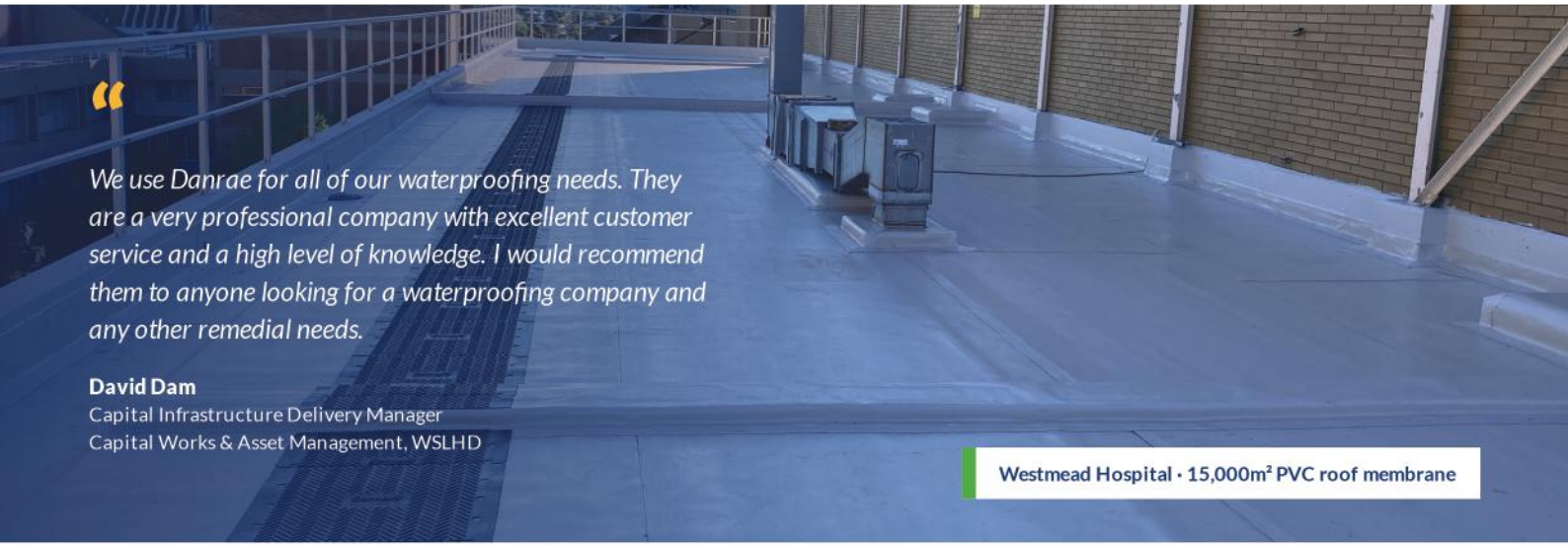
Arash Ali from **Camfil** discussed advanced filtration technologies that provide both superior indoor air quality and improved energy efficiency, leaving attendees with the memorable message:

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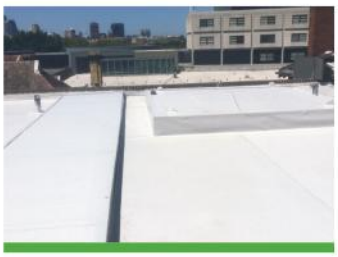
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"If you don't filter the air, your body will."

Jeff Park from **Veridian Pulse** highlighted proactive maintenance strategies that improve reliability, reduce risk, and support more informed asset management decisions.

Shane Scriven from **SAS Asset Management** focused on translating engineering evidence into robust investment decisions through effective business case development. His practical presentation included the reminder that:

"Business cases are rejected due to the font."

Muhammed Ayad from **Victaulic** concluded the presentations with an overview of innovative fire protection technologies, including a hybrid fire suppression system that combines water and nitrogen as an alternative to halon-based systems, recently installed at the new Western Hospital.

Site Tour and Hands-On Demonstrations

Following lunch, attendees split into two groups for a guided tour of the **Joan Kirner Women's and Children's Hospital** building and a series of practical demonstrations.

Participants had the opportunity to see critical infrastructure firsthand and gain hands-on experience with predictive maintenance technologies, including:

- Air Handling Units (AHUs)
- Pump systems
- Vibration analysis equipment
- Thermal imaging tools
- Laser alignment systems

The demonstrations showcased how condition monitoring and predictive maintenance techniques can enhance asset reliability, improve operational efficiency, and reduce lifecycle costs in complex healthcare environments.

A Successful Industry Event

The event provided an excellent opportunity for knowledge sharing, professional networking, and exposure to emerging technologies and best practices in healthcare engineering and asset management. The combination of expert presentations and practical demonstrations ensured attendees left with valuable insights that can be applied within their own organisations.

The Victoria/Tasmania Branch extends its appreciation to Western Health Engineering Department, all presenters, sponsors, and attendees for making the day such a successful and informative event.



Lunch & Learn: Built to Withstand: Designing Healthcare Facilities for Multi-Hazard Resilience
Date: Wednesday, 15 July 2026
Time: 12:30 PM to 1:30 PM (AEST)
Location: Zoom
Attendees: 16

Jordan specialises in capturing the post-disaster functions of critical infrastructure and translating them into practical resilience measures for natural hazards. He consults with government, engineers, architects and project delivery teams across Australia and New Zealand, and contributes to industry guidance through standards, technical societies, university research and technical conferences.

The session explored how the IL4 Special Study framework supports the design of facilities that can maintain performance and operational capacity during multi-hazard disruptions.

The building code requirement integrates business continuity, organisational knowledge, and international best

practice to ensure facilities are prepared for a range of natural hazards. The presentation concluded with a great Q&A session, with Jordan and John Callea addressing the various questions.

Breakfast Meeting: Healthcare Infrastructure in Transition: Challenges, Priorities and the path ahead, Breakfast + Panel Discussion
Date: Thursday 17 September 2026
Time: 07:30 AM to 09:30 AM
Location: 1864 President Lounge Carlton Football Club, Ikon Park
Attendees: 56
The Vic/Tas Branch hosted an excellent breakfast meeting and panel discussion focused on **Healthcare Infrastructure in Transition: Challenges, Priorities and the Path Ahead**.

We were fortunate to bring together a diverse and experienced panel:

Jacqui McFarlane, Director of Engineering, Health Support Services, Western Health

Stuart Smith, Divisional Director, Health Support Services, Western Health

Lisa Antonio, Executive Director, Technical Design, Assurance & Planning Services, VIDA

Rebecca Bailey, Manager, Asset Support, Statewide Public Health Asset & Infrastructure Portfolio, Victorian Department of Health

James Shields, General Manager, Growth, The Ascott Limited

The panel brought perspectives from across healthcare, government and the hotel sector, creating an engaging discussion on the challenges, priorities and opportunities currently shaping infrastructure planning, investment and service delivery.

Our panellists shared valuable insights on a range of highly relevant issues, including changing infrastructure priorities, balancing immediate operational pressures with longer-term investment, asset and facilities management challenges, and the importance of ensuring healthcare infrastructure remains **safe, resilient and responsive to evolving service needs**.

It was particularly valuable to include representation from the hotel industry. This provided a different perspective and highlighted the opportunities for healthcare to learn from other sectors in areas such as **customer experience, service delivery, the impact and application of AI, asset management and operational efficiency**.

A real strength of the session was the open and interactive nature of the discussion. The diversity of perspectives generated thoughtful conversations around both the challenges facing the sector and the opportunities for greater **collaboration, innovation and knowledge sharing**.

Special thanks to **Don Tully** and **Anne Leeds from BSRA**, **Wayne Corbett** from **Programmed Maintenance**, and our very own **Vanessa Galina** for their support, creating the program and sponsorship of the event. Thank you also for the expert chairing and facilitation of the session, which ensured the conversation remained practical, interactive and engaging throughout.

Feedback from attendees was extremely positive, with many commenting on the quality and relevance of the discussion. Perhaps the best indication of the session's success was the consistent view that **the conversation could easily have continued for another hour**.

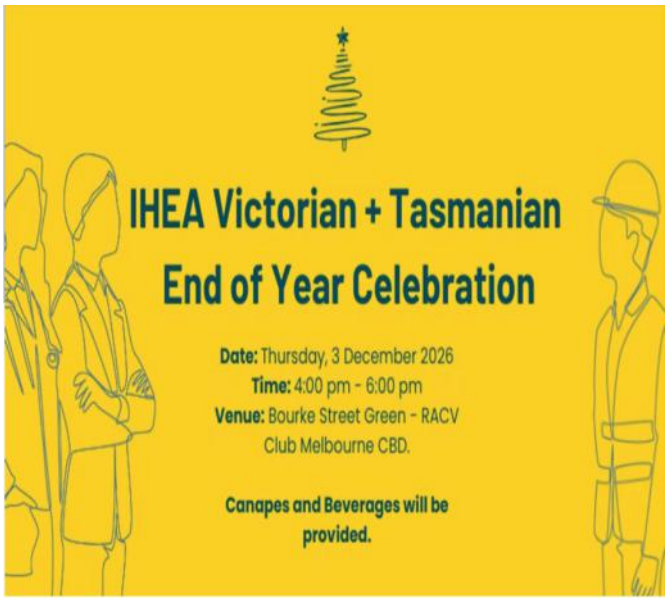
Thank you to our panellists, sponsors and everyone who attended and contributed to such an informative and engaging discussion.

Events such as this reinforce the value of bringing together leaders and practitioners from across **healthcare, government, industry and related sectors** to share experiences, challenge current thinking and explore practical responses to a rapidly changing infrastructure environment.

We look forward to continuing these important conversations through future **Vic/Tas Branch events**.

Look Ahead activity

Remember to keep an eye on the upcoming events tab on the website www.ihea.org.au/eventinfo and RSVP to future events



All lunch & learn sessions are available on IHEA Website under the members section – Resources Learning + Professional Development | IHEA

Committee meetings are held monthly on the 2nd Wednesday at 9:30 am via Teams. Branch members are welcome to attend—email the Committee of Management for an invite.

Michael McCambridge
Vic/Tas Branch President

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Western Australia

THE IHEA WESTERN Australia Branch held its Special General Meeting on **19 August at Melville Tennis Centre**, combining an informative technical presentation with the election of the Branch Committee for the coming year.

The evening featured a presentation from **MKDC** on aged-care refurbishment, exploring innovative approaches to increasing resident capacity within existing facilities. The presentation demonstrated how thoughtful refurbishment and redesign can unlock additional capacity without necessarily resorting to demolition and construction of a new multistorey replacement. The topic prompted useful discussion around making better use of existing healthcare and aged-care infrastructure.

The Special General Meeting also marked the conclusion of the **2025/2026 Committee**, with nominations and elections held for the new committee.

Two new committee members joined the Branch leadership team: **Shyam Rozare from QEII** and **Andrew Davidson from NMHS**. A Secretary was not nominated on the night, so this position remains open. Brendan Mcfaull will also serve as the **National Board Representative** for the coming year in addition to continuing as WA Branch President.

2026/2027 IHEA WA Branch Committee

Position	Committee Member
President	Brendan McFaull
Vice President	Zac Browne
Treasurer	Gavin Kinsella
Secretary	**Open**
National Board Representative	Brendan McFaull
Membership & Engagement Coordinator	Shyam Rozare
Technical & Standards Advisor	Steve Delides, supported by Rupert Lodge

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- and more...

Committee Member	Alex Foster
Committee Member	David Chokolich
Committee Member	Fred Foley
Committee Member	Rupert Lodge
Committee Member	Andrew Waugh
Committee Member	Andrew Davidson

I would like to welcome our new committee members and thank all those who have volunteered their time to support the WA Branch. The breadth of experience across the committee puts us in a strong position to continue building member engagement, sharing technical knowledge and supporting the healthcare engineering community across Western Australia.

I also thank the outgoing committee for their contribution over the past year and look forward to working with the new committee during **2026/2027**.

Brendan McFaull
IHEA WA Chapter President

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Queensland

IT'S BEEN A big few months for the QLD branch, and this is my first update as your new president — so first up, a big thank you. Danny Tincknell has led this branch brilliantly, and while he's stepped back from the president's chair into the Past President role, he's definitely not going anywhere. Big shoes to fill, but I'm excited to get stuck into it this year.



Committee update

At our Annual Special Meeting, held during the July PD session, we farewelled Danny from the top job (into Past President) and welcomed some changes to the committee:

- **Danny Tincknell** — moving into the Past President position
- **Linda Jordinson** — that's me, taking on the President role
- **Josiah Padget** — stepping up to Vice President
- **Mick Ward** — continuing as Treasurer
- **Nick Coffey** — continuing as our National Board Committee Member
- **Aaron Lui** — joining the committee as a General Committee Member

We're still on the hunt for a Secretary, so if that's you (or you know someone who'd be great), come and have a chat.



QLD PD Session — Pineapple Hotel

30 July, Kangaroo Point

Great turnout for our July session, kicked off with a welcome from outgoing President Danny Tincknell. Three speakers took us through where healthcare infrastructure is heading — from connected OT systems, to smart isolated power supplies for critical care areas, to site-wide power quality monitoring in hospitals:

- **Aneesh Nair** — Honeywell
- **George Kotenko** — Ampcontrol
- **Richard Luca** — NHP

Big thanks to all three for giving up their time and expertise, and to everyone who came along.



Regional Development Day — Cairns

2 September, Cairns Hospital & Rydges Cairns

Our second event for the year took us up to Cairns for a full-day Regional PD Day, and it was a ripper. Morning kicked off with a guided tour of the Cairns Hospital and helipad redevelopment — massive thanks to Cliff and his team at Cairns Hospital for hosting us, and to Patrick Chambers and the Schneider Electric team for putting together the site history and running the tour.

After lunch we regrouped at Rydges for an afternoon covering everything from hospital design and corrosion, through to electrical safety, live-site contracting, all-electric

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hospitals, and UV. A big thank you to all our speakers and sponsors for the day:

- **David Stonely** — Suterarch
- **Mark Collen** — CETEC
- **Leo Ward** — Power & Data Support Services
- **George Bettany**
- **Chris Connelly** — Babinda Electrics
- **David Erskine** — Schneider Electric
- **Jason Vecchio** — Opira

We had a wonderful turnout, including a great showing from our Townsville crew, several of whom made the road trip down to support the branch. Adrian Duff, Danny Tincknell, Josiah Padget and Mark Collen also made the trip — and the day wrapped up with dinner at the Cock & Bull, crocodile schnitzel included, for anyone brave enough to try it.





Looking ahead

Thanks to everyone who came along to both events — you're what makes them work. And a reminder: this is your association, so you get out of it what you put into it. If you're keen to get more involved, present at a PD session, or jump on the committee (Secretary role still open!), come and have a chat.

Coming up this year:

- **Joint Golf Day with the NSW Branch** — early 2027
- **Christmas Quiz Night** — Thursday, 26 November 2026 (venue still in the works — stay tuned)
- **QLD Mid-Year Conference** — pencilled in for Thursday, 4 June 2027 — lock it in your calendars

With a great committee behind me and Danny still very much in the picture, I can't wait to see what we get up to this year. More soon.

Linda Jordinson
President, IHEA QLD Branch





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Australian Standards:
How and Who Writes the Rules?

In June, IHEA WA hosted a professional development session exploring an important but often overlooked question within healthcare engineering: how are Australian Standards developed, reviewed, and updated?





The session was presented by Ben Russell, Engagement Manager, Health Sector at Standards Australia, who provided members with valuable insight into the standards development process. Attendees gained an understanding of how standards are proposed, drafted, reviewed, and published, as well as the critical role played by technical committees and industry stakeholders.

A key theme of the presentation was the relationship between standards and regulation, and how industry professionals can actively contribute to the development of future standards. Ben Russell highlighted the importance of practitioner involvement, demonstrating how healthcare engineers, facilities managers, infrastructure professionals, and asset managers can provide practical expertise that helps shape standards relevant to their fields.

Australian Standards influence many aspects of healthcare facility design, operation, maintenance, and safety. Active participation from industry professionals helps ensure that standards remain practical, evidence-based, and responsive to the challenges faced in modern healthcare environments.

For members who were unable to attend, the session was recorded and is now available online through IHEA. We encourage all members to view the presentation and consider opportunities to contribute to standards development and review activities relevant to the healthcare engineering profession.

For more information and access to the recording, visit: IHEA Professional Development Presentations







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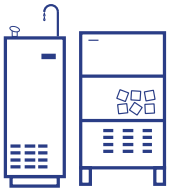
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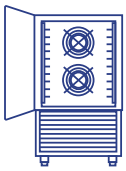
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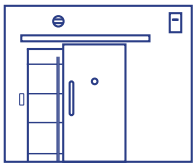
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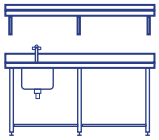
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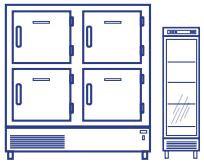
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PROGRAM

MONDAY, NOVEMBER 16

2pm - 5pm	**Technical Tour 1 - RFDS Jandakot**
5pm - 7:30pm	**Registration Open** Location: Southern Cross Lobby, Esplanade Hotel Fremantle
5:30pm - 7:30pm	**IHEA National Symposium Welcome Reception** Sirius and Pleiades Rooms, Esplanade Hotel Fremantle

TUESDAY, NOVEMBER 17

8:30am - 7:15pm	**Registration Open - Day 1** Location: Southern Cross Lobby, Esplanade Hotel Fremantle
8:45am - 9am	**Welcome to Country**
9am - 9:15am	**Official Symposium Opening & Housekeeping** WA President & MC
9:15am - 9:30am	**Official Symposium Address**
9:30am - 9:45am	**IHEA National Presidents Address** IHEA National President
9:45am - 10:30am	**Keynote Address** Professor Gary Martin
10:30am - 11am	**Morning Tea & Exhibition - Day 1**
11am - 11:45am	**LARU - WA HFG Update 2025 - Inclusion of clinical and infection control sign off, implementation and expectations**
11:45am - 12:45pm	**IHEA Annual General Meeting**
11:45am - 1:15pm	**Lunch & Exhibition - Day 1**
Session 1: Future-Ready Healthcare Design, Technology and Capability	
1:15pm - 1:40pm	**Reimagining the Modern Operating Room: A Collaborative Engineering Approach to Integrated OR Design** Chad Wilhelm and Ben Healey, Wilhelm Integrated Solutions
1:40pm - 1:55pm	**Beyond the HEPA Filter: Why Whole-System Performance Determines Healthcare Air Quality** Kristian Kirwin, National Engineering Manager, Camfil Australia
1:55pm - 2:10pm	**HVAC Setbacks and Clinical Perspective** James Anderson, Clinical Anesthetist
2:10pm - 2:25pm	**AIRAH - Table Height Velocity and Equilibrium Distribution** Graeme Perry, AIRAH
2:25pm - 2:45pm	**Session 1: Q&A Panel**

2:45pm - 3pm	**30 Second Sponsor Spruik**
2:55pm - 3:25pm	**Afternoon Tea & Exhibition - Day 1**
Session 2: Compliance, Monitoring and Whole-System Assurance	
3:25pm - 3:40pm	**Focus on Measurement and Monitoring of Critical Processes and Environments** Andy Gay, Director & CEO, Sva
3:40pm - 3:55pm	**Optimising CSSD Water Treatment through Innovative Plant Design and SureClear Technology to Enhance Compliance, Safety, Reliability and Operational Efficiency** Craig Greatbanks, General Manager, Western Water Solutions Pty Ltd
3:55pm - 4:10pm	**Implications of the 2025 ADWG for Lead Compliance in WA Healthcare** Ryan Milne, Business Development Manager, Ecosafe International
4:10pm - 4:25pm	**Reducing Water Waste and Protecting HVAC Assets: A Non-Flush Chemical Commissioning Case Study at Midland Private Hospital** Steve Delides, Technical Director, FLOWIO Group
4:25pm - 4:45pm	**Session 2: Q&A Panel**
4:45pm - 5pm	**IHEA Symposium Awards and Membership Medals** Symposium Sessions Conclude - Day 1
5pm - 7pm	**IHEA National Symposium Cocktail Reception** Sirius and Pleiades Rooms, Esplanade Hotel Fremantle

WEDNESDAY, NOVEMBER 18

8:29am - 3:15pm	**Registration Open - Day 2** Location: Southern Cross Lobby, Esplanade Hotel
8:30am - 8:45am	**Welcome & Housekeeping - Day 2**
8:45am - 10:15am	**Women in Leadership Session** Panellists: Anne Sinclair, Rebecca Streeton
10:15am - 10:45am	**Morning Tea & Exhibition - Day 2**
Session 3: Human-Centred Healthcare Environments and Safety	
10:45am - 11am	**Quieting the Chaos: The Importance of Building Acoustics in Hospitals** Benjamin Martis, Acoustics Project Technical Lead, Stantec
11am - 11:15am	**Walk in Their Shoes** Peter Murray, Sales Consultant - WA, Altro Apac
11:15am - 11:30am	**Advancing Healthcare Staff Safety with Accurate Indoor Location Intelligence** Gary Gilbert, BDM, Wesco Anixter
11:30am -11:50pm	**Session 3: Q&A Panel**
11:50am - 12pm	**30 Second Sponsor Spruik - Day 2**

Session 4: Sustainable, Reliable and Energy-Efficient Infrastructure	
12pm -1pm	**Lunch & Exhibition - Day 2**
1pm -1:15pm	**Reliability and Energy Optimisation of Sunshine Hospital Critical Assets via Maintenance Strategy Review, Condition Monitoring and Precision Maintenance** Masoud Goudarzi, Reliability Engineer, Western Health
1:15pm -1:30pm	**Presentation to be confirmed**
1:30pm -1:45pm	**Healing Healthcare Infrastructure: How Retrofits Impact Energy, Carbon, and Cost** Daniel Garcia Gil, Segment Solution Consultant, Schneider Electric
1:45pm -2pm	**Cleantech Asset PPM** Alex Foster, Foster's Services
2pm -2:20pm	**Session 4: Q&A Panel**
2:20pm -2:50pm	**Afternoon Tea & Exhibition** Session 5: Infection Control
2:50pm -3:05pm	**Presentation to be confirmed**
3:05pm -3:15pm	**IHEA Standards Representation Update** Steve Delides
3:20pm -3:35pm	**Session 5: Q&A Panel**
3:35pm -3:45pm	**Next Conference Presentation**
3:45pm -4pm	**Conference Close & Prize Draws** **Symposium Concludes**



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Stage 2

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Stage 3

Develop Asset Maintenance Plan



Stage 4

Data Upload Into Information System



Stage 5

Develop Asset Management Plan, CapEx/OpEx

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From Condition Assessment to an Investment Programme: A Data-Driven Framework for Healthcare Infrastructure

S Safi (PhD, FIEAust, CPEng, CAMA)
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Abstract
Healthcare infrastructure portfolios require a clear line of sight from asset identification and physical condition assessment to risk, remaining useful life, intervention priority, cost and capital investment programming. This paper presents a multidisciplinary methodology for assessing hospital buildings and engineering services at the lowest appropriate level of the asset hierarchy. The approach integrates review of hospital asset-management data, comprehensive physical inspection, asset-register validation, defect and risk assessment, digital field-data capture, photographic evidence, technical review and final reconciliation.

The framework converts assessment evidence into decision-ready outputs: corrected asset information; condition and defect registers; remaining-life forecasts; indicative repair and renewal estimates; facility reports; and portfolio investment profiles. Application to an illustrative 20-year hospital model demonstrates how asset-level evidence, calibrated assessments and reconciliation can be translated into preventive and corrective maintenance requirements, refurbishment and replacement forecasts, and lifecycle plans. The results establish a transparent connection between observed asset condition, risk-based intervention timing and portfolio investment decisions.

Keywords: healthcare infrastructure; condition assessment; asset management; lifecycle cost modelling; remaining useful life; capital investment planning; asset-register validation.

Introduction

Healthcare facilities depend on the continuous performance of infrastructure assets, including building fabric; structural and civil elements; mechanical, electrical and hydraulic services; fire systems; vertical transportation; medical gases; communications; and security systems. Failure within any of these asset groups can disrupt clinical services, introduce safety or compliance risks and create unplanned capital demand. As portfolios age, asset owners therefore require an assessment method that is comprehensive, repeatable and sufficiently detailed to support both operational decisions and long-term investment planning.

This paper addresses the gap between conventional condition surveys and investment-ready evidence by integrating asset-register validation, condition and risk assessment, remaining-useful-life estimation, and bottom-up maintenance and renewal cost modelling. The framework links each source record and field observation to a prioritised intervention, cost forecast and portfolio programme, supported by digital evidence, quality assurance and final reconciliation.

Accordingly, this paper presents a methodology for integrating asset-register data, multidisciplinary condition evidence, reliability information, risk criteria and lifecycle assumptions into a transparent and auditable healthcare infrastructure investment programme. The principal contribution is a practical framework that preserves traceability from each source record and field observation to the resulting condition rating, remaining useful life, intervention scope, timing, cost and portfolio-level priority.

The framework was applied to a sample hospital asset portfolio using available asset-register, condition,

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maintenance, defect and cost information. The case is presented to demonstrate the method and its decision outputs rather than to provide a statistically representative benchmark for all healthcare facilities. Facility-identifying information has been omitted, and monetary results should be interpreted within the stated scope, data-quality constraints and estimating assumptions.

Integrated Assessment and Cost-Modelling Methodology

Previous research on healthcare asset management has established the importance of lifecycle forecasting, maintenance optimisation, regulatory compliance and benchmarking [1–4]. The present framework extends that work by integrating field-level asset reconciliation, multidisciplinary condition evidence, reliability history, risk-based intervention timing and bottom-up cost modelling within a single traceable workflow. Expected-life and cost assumptions draw on published industry references [5–7], while the condition-rating method is calibrated using local evidence and consultation with the asset owner or maintainer. This integration addresses the practical gap between completing a condition assessment and developing an auditable investment programme.

The methodology comprises two sequential and interconnected stages. Stage 1 establishes the evidence base through asset-register validation, comprehensive condition assessment, identification and risk assessment of defects and chronic issues, and quality-assured data reconciliation. The resulting validated asset register, condition assessments and prioritised issue register provide the inputs to Stage 2, in which lifecycle modelling forecasts expenditure across five cost components: preventive maintenance, corrective maintenance, asset replacement, asset refurbishment, and remediation of chronic issues and identified risks.

Stage 1 – Asset Validation, Condition Assessment and Issue Identification

Controlled Baseline and Asset Reconciliation

The assessment establishes a controlled baseline from the issued Asset Register, Building Register, Functional Locations, asset identifiers, drawings, previous assessments and available maintenance, defect and failure information. This defines the expected asset population, preserves source-record provenance and provides the reference point for field findings, new assets, corrections and unresolved discrepancies.

Before fieldwork, registers, Functional Locations, floor plans, piping and instrumentation diagrams (P&IDs), single-

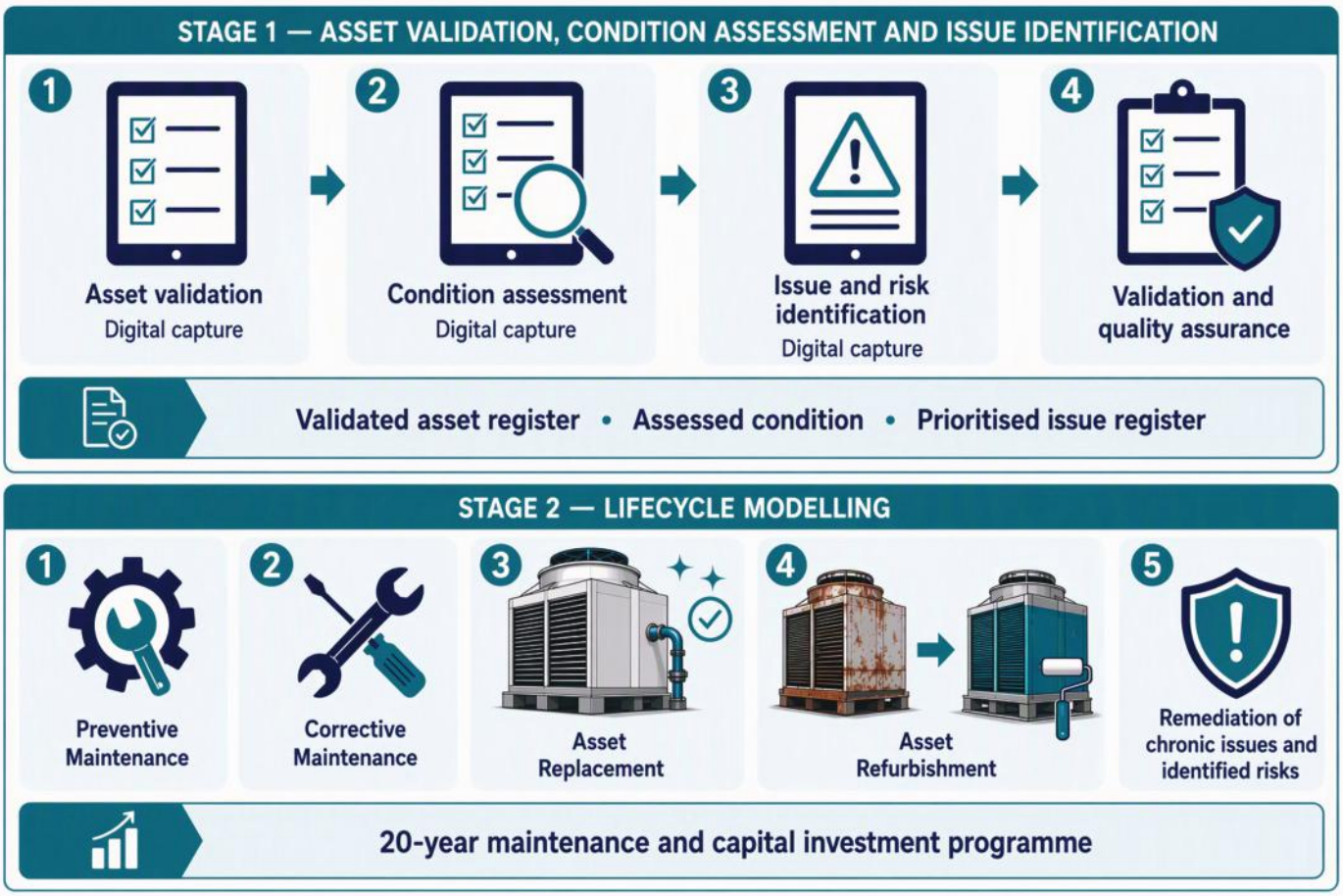


Figure 1 Integrated Assessment and Lifecycle-Modelling Framework

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Rating	Status	Definition
1	Excellent	Asset has no defects; condition and appearance are as new.
2	Good	Asset exhibits superficial wear and tear, minor defects or minor deterioration of surface finishes; no major maintenance is required and no major defects exist.
3	Fair	Asset is in average condition; deteriorated surfaces or functional services require attention, and backlog maintenance work exists.
4	Poor	Asset has deteriorated badly; serious structural problems, defective elements, frequent service failures or a significant number of major defects exist.
5	Very Poor	Asset has failed, is not operational, and is unfit for occupancy or normal use.

Table 1 Condition Rating Definitions

line diagrams, contracts, inspection reports and service histories are reviewed to confirm hierarchy relationships, identification conventions and known data gaps. Relevant records are then preloaded for efficient on-site verification.

On site, assessors confirm asset existence, identity, hierarchy and location; capture available nameplate, operational and lifecycle attributes; and link photographs of the asset, label and material condition to the record. Barcode and global positioning system (GPS) functions may be used to improve identification and reduce duplicate entry.

Each source record receives an agreed reconciliation outcome, including assessed, not found, duplicate, relocated, incorrectly recorded, inaccessible, out of scope or additional. New assets and proposed corrections are supported by evidence and kept separate from approved master data. Inaccessible assets retain the attempted date, restriction, available evidence and required follow-up; condition is not inferred without an approved basis. Facility-level reconciliation confirms that every nominated record has a final status.

Asset-to-parent, space and Functional Location relationships are verified so that maintenance, risk and renewal information can be aggregated without losing asset-level evidence. Conflicts between drawings and registers are recorded with supporting evidence rather than resolved by assumption.

Comprehensive Asset Condition Assessment

All nominated assets are physically inspected unless an alternative assessment basis is formally approved and documented. Individual assets are assessed against their identifiers, while system-level ratings are based on inspection of the components necessary to support a defensible overall rating. Assessors validate identity and location, record condition, defects and apparent compliance observations, estimate remaining useful life, and link photographs to the relevant asset, Functional Location or defect. Engineering-services ratings combine physical observations with available operational, maintenance and failure history; visual appearance alone is not treated as evidence of functional performance. Where complete inspection is not practicable, the extent of coverage and the resulting limitation are recorded.

Condition ratings are assigned in accordance with the documented condition-assessment procedure and the established five-point scale from Excellent to Very Poor. The assessor determines an initial rating through visual inspection of the asset's physical condition, functional performance and defect severity. This rating is then validated through consultation with the hospital asset owner or maintainer and review of the asset's maintenance and failure history, including recurring faults, breakdown frequency and corrective-maintenance demand. Where this evidence indicates that visual condition alone does not represent the asset's operational performance, the rating is adjusted to reflect its demonstrated reliability and site operating experience. The rating definitions applied in the assessment are summarised in Table 1.

Remaining useful life is initially estimated by applying the condition-based remaining-life percentage in Table 3 to the asset's expected life. The estimate is then reviewed against installation date, utilisation, operating environment, known defects, maintenance and failure history, and consultation with the asset owner or maintainer. Where this evidence indicates that the condition-based calculation does not represent the asset's demonstrated performance, a documented adjustment is applied, together with its rationale and confidence level.

Risk, Defect and Remedial-Action Identification

Risk identification is integrated with asset validation and condition assessment. Assessors record deficiencies, deterioration, obsolescence, apparent non-conformances and hazards, linking each observation to the relevant

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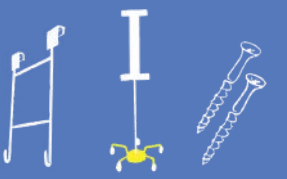


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asset, system, space or Functional Location with location, photographs, defect category, likely failure mechanism, affected service and stated limitations.

Safety and apparent-compliance observations are traced from the applicable legislation, code, standard or asset-owner requirement to the affected asset and required follow-up. Field assessment does not replace statutory testing or certification; matters requiring intrusive investigation or specialist determination are referred to an authorised provider.

Material issues are rated using approved likelihood and consequence criteria, considering safety, clinical disruption, loss of function, regulatory and environmental exposure, criticality, redundancy and temporary controls. The rating determines priority, escalation and target rectification; significant risks are reported promptly rather than deferred to the facility report.

Recommended actions address the observed failure mode and required risk reduction and may comprise immediate controls, repair, specialist investigation, certification, refurbishment, replacement or system upgrade. Each record states the scope, required competency, timeframe, dependencies, constraints and indicative cost basis. Where evidence is insufficient, the recommendation defines the investigation needed before a permanent solution is costed.

Actions are transferred to the defect or risk register with an owner, priority, due date and status. Closure requires evidence of completion, an approved alternative or formal acceptance of residual risk. Access-dependent actions remain open until inspection is completed or the limitation is accepted.

Digital Capture, Data Validation and Quality Assurance

Mobile and web-based forms are configured around the approved survey protocol and asset-management information-system upload structure. Preloaded records, offline working, barcode and GPS, high-resolution photographs, mandatory fields and controlled values support consistent capture of asset identification, hierarchy, location, condition, defects, risk, recommended action, remaining useful life and reconciliation status. Validation rules test completeness, format, range, uniqueness, hierarchy and cross-field consistency during data capture and after synchronisation. Before full rollout, pilot assessments and assessor-calibration exercises standardise interpretation and application of the assessment criteria. Discipline leads then review assessment records for technical accuracy, completeness and consistency. Systematic errors identified through quality review are tested across the affected dataset and corrected before the validated data are released for modelling.

Stage 2 – Lifecycle Modelling

Lifecycle modelling is undertaken using the validated asset register, assessed asset conditions, remaining useful life, prioritised issue register and the applicable asset-classification reference data. The model forecasts expenditure across the following five cost components:

1. Preventive Maintenance (PM)
2. Corrective Maintenance (CM)
3. Asset Replacement
4. Asset Refurbishment
5. Remediation of chronic issues and identified risks

At the asset level, annual preventive-maintenance costs are calculated from the assigned maintenance strategy, task frequencies, labour hours, labour rates, materials, spare parts and support allowances. Corrective-maintenance costs are estimated by applying the condition-dependent CM-to-PM ratio in Table 3 to the preventive-maintenance estimate, with allowances for the higher labour rates and material requirements associated with corrective work. Refurbishment and replacement events are scheduled according to assessed condition or in-service date, expected life, refurbishment interval and cost basis. Remediation projects are incorporated based on their approved priority, scope, project-overhead allowance and programme timing. Asset-level results are then

Asset Classification Name	PM Strategy Name	Life Exp. (yrs)	Refurb. Freq. (yrs)	Refurb. Cost as a % of Replacement Cost	Library Minimum Cost	Library Maximum Cost	Library Average Cost
Chilled Water Pumps	Centrifugal Pump	15	5	25%	$6,118	$19,467	$12,793
Chillers	Screw Chiller	15	10	30%	$25,917	$833,919	$346,858
Cooling Towers	Cooling Tower	20	10	30%	$51,468	$261,000	$172,981
Distribution Boards	Distribution Board	20	10	20%	$7,930	$96,200	$24,175
Goods Lifts	Lift	25	10	20%	$321,103	$403,245	$362,174
Fire Doors	Fire Doors	20	5	5%	$1,060	$6,763	$2,284

Table 2 Sample Asset Reference Data Library

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aggregated by facility, asset class, expenditure category and forecast year.

Asset Register and Asset Classification Reference Data

The minimum asset data required for modelling comprise: asset details, including asset identifier, name and classification, with manufacturer and model information where available; lifecycle details, including in-service date and purchase cost or replacement value; and condition-assessment information, including observation date, condition rating, current usage, operating environment and criticality. Where an observed condition rating is unavailable, the model may use an age-based proxy derived from the facility age or other documented evidence. Proxy ratings are identified explicitly and are not treated as equivalent to field-observed condition.

The reference-data library supplies classification-level assumptions and provides a consistent basis for Sections 2.2.2-2.2.5. Table 2 illustrates maintenance strategy, expected life, refurbishment parameters and cost ranges for sample asset classes.

The expected-life, cost and maintenance assumptions in the reference-data library were informed by published sources, benchmark data from existing and new hospitals, and available asset-register and site-assessment data. These assumptions were calibrated in consultation with the facility asset-management team, considering asset use, criticality and the operating environment, including exposure to coastal environmental conditions.

Estimated Cost of Preventive Maintenance

Preventive-maintenance expenditure is estimated from the validated population of maintainable assets. Each asset is assigned a planned or unplanned maintenance type using the reference-data library. For assets requiring planned maintenance, the applicable service plan is aligned with statutory, manufacturer and technical requirements and converted into an annual schedule of tasks, frequencies, labour hours and required competencies. Annual delivery cost is calculated from labour rates and task duration, with allowances for materials, spare parts, quality checks, administration and supervisory support.

Expected Cost of Corrective Maintenance

Corrective-maintenance expenditure is modelled as a condition-dependent proportion of preventive-maintenance cost. The CM-to-PM ratios in Table 3 are planning assumptions that increase as condition and remaining life decline and are calibrated, where sufficient evidence is available, against local work-order volumes, recurring failures, labour rates, material expenditure and asset criticality. The calculation applies an average corrective-work labour-rate factor of 125% of the preventive-maintenance labour rate and a material allowance equivalent to 20% of corrective labour cost, consistent with the source methodology [1]. Delivery allowances include trade resources, quality checks, administration, supervision and spare parts. Where local evidence is insufficient, the result is reported as an indicative planning allowance rather than an empirically validated forecast.

Condition	Remaining Life (%)	CM to PM Ratio (%)
Excellent	95	10
Good	75	44
Fair	50	58
Poor	20	87
Very Poor	5	116

Table 3 Remaining Useful Life and CM-to-PM Cost Ratio

Lifecycle Replacement

Lifecycle replacement expenditure is forecast for all in-scope assets using classification-based expected lives, adopted in-service dates and replacement values. Reliable asset-register data are used where available; otherwise, documented estimates are derived from facility age, consultation with asset managers and the reference-data library. The first replacement year is determined from the adopted remaining useful life, after which subsequent replacements are scheduled at the full expected-life interval where that interval falls within the forecast horizon. Replacement costs are assigned to the scheduled years and aggregated to produce the annual portfolio forecast.

Lifecycle Refurbishment

Lifecycle refurbishment expenditure is forecast for applicable assets using classification-based refurbishment intervals and a defined percentage of replacement value. Installation dates and replacement values are taken from the asset register where reliable, with documented proxies derived from facility age, consultation and the reference-data library where necessary. The model schedules the first refurbishment event from the adopted in-service date or current lifecycle position and repeats the event at the applicable refurbishment interval across the analysis period. Each event is costed using the adopted refurbishment percentage and replacement-cost basis, then aggregated by forecast year.

Remediation of Chronic Issues and Identified Risks

The final cost component converts prioritised defects, chronic issues and upgrade needs into programme-level interventions. Candidate works are identified through building and engineering-services audits, workshops with the healthcare facility asset-management team, reliability analysis of Enterprise Asset Management System work-order history,

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and review of previous condition-assessment reports. For each selected intervention, the model defines the observed problem and failure mode, risk-reduction objective, indicative scope, required investigation or design, implementation dependencies, operational constraints, cost basis, priority and recommended start year.

Figure 2 summarises the process for translating an identified issue into a costed intervention. The estimate incorporates the observed failure mode, risk-reduction objective, recommended remedy, access and operational constraints, investigation and design requirements, project overheads and target implementation timeframe. Examples of potential capital intervention projects include remediation of mould in hospital heating, ventilation and air-conditioning (HVAC) ductwork and upgrades to information and communications technology (ICT) infrastructure that no longer meets current standards.

Each intervention is assigned a priority and target implementation timeframe using the asset owner's approved risk criteria and escalation requirements. In the illustrative programme, extreme risks require immediate action, high risks are targeted within one to two years, medium risks within three to four years, and low risks within five to six years. Statutory, life-safety or clinically critical matters may require earlier action regardless of the general timeframe. These priorities support sequencing, escalation and inclusion in the capital programme but do not replace applicable legal, regulatory or operational obligations.

Table 4 illustrates the project-overhead allowances applied to two sample capital projects. These allowances are project-specific planning assumptions rather than universal rates and should be reviewed against procurement strategy, site constraints, design maturity, delivery model, market conditions and the asset owner's governance requirements. The resulting total project costs are therefore suitable for portfolio planning but not as substitutes for detailed design or tender estimates.

Table 5 presents the illustrative five-year expenditure profile for the two sample projects.

Overhead Cost Component	Overhead	Project 1 – ICT Infrastructure Upgrade	Project 2 – Cooling Towers Upgrade
	Gross	$2,500,000	$832,500
Preliminaries + supervision	21%	$525,000	$174,825
Margin	5%	$125,000	$41,625
Staging + relocations	2.50%	$62,500	$20,813
Investigation + design	8%	$200,000	$66,600
Insurance	1%	$25,000	$8,325
Statutory fees	1%	$25,000	$8,325
Project management	7%	$175,000	$58,275
Commissioning	5%	$125,000	$41,625
ICT	2.50%	$62,500	$20,813
Escalation	2.50%	$62,500	$20,813
Contingency	10%	$250,000	$83,250
Total Project Cost (TPC)	65.5%	$4,137,500	$1,377,788

Table 4 Project-Overhead Allowances for the Illustrative Capital Projects

Project	Total Project Cost	2026-27	2027-28	2028-29	2029-30	2030-31
Project 1 – ICT Infrastructure Upgrade	$4,137,500	$0 (0%)	$103,438 (2.5%)	$1,241,250 (30%)	$2,689,375 (65%)	$103,438 (2.5%)
Project 2 – Cooling Towers Upgrade	$1,377,788	$0 (0%)	$34,445 (2.5%)	$413,336 (30%)	$895,562 (65%)	$34,445 (2.5%)

Table 5 Illustrative Five-Year Expenditure Profiles for the Sample Projects

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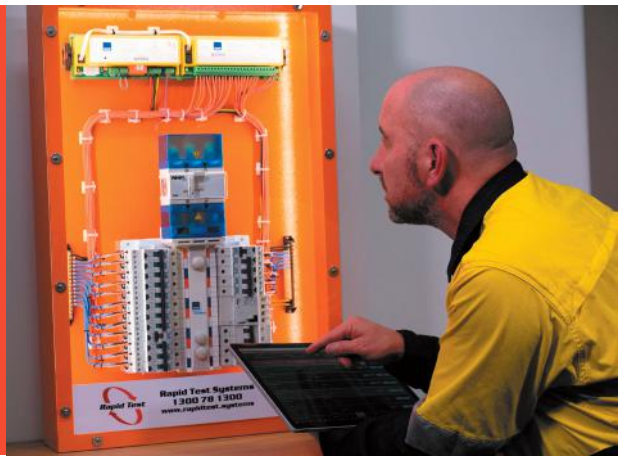
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The estimated base cost for the ICT Infrastructure Upgrade (Project 1) is $2,500,000, subject to confirmation of the compatibility of the existing field devices. The Total Project Cost (TPC), including project overheads, is $4,137,500.

The estimated base cost for the Cooling Towers Upgrade (Project 2) is $832,500, based on both units requiring replacement. The Total Project Cost (TPC), including project overheads, is $1,377,788.

Findings

The 20-year model estimates preventive maintenance, corrective maintenance, asset refurbishment, asset replacement and remediation of chronic issues for the sample hospital. Preventive maintenance represents the recurring baseline requirement, whereas replacement and remediation generate larger and more uneven capital peaks across the forecast period. Presenting these categories together enables the asset owner to distinguish recurrent operating expenditure from condition-driven interventions and planned capital renewal.

The average annual preventive-maintenance requirement for the sample hospital, calculated using the bottom-up model described in Section 2.2.2, is $1,145,554. This estimate covers all maintainable assets within the defined project scope.

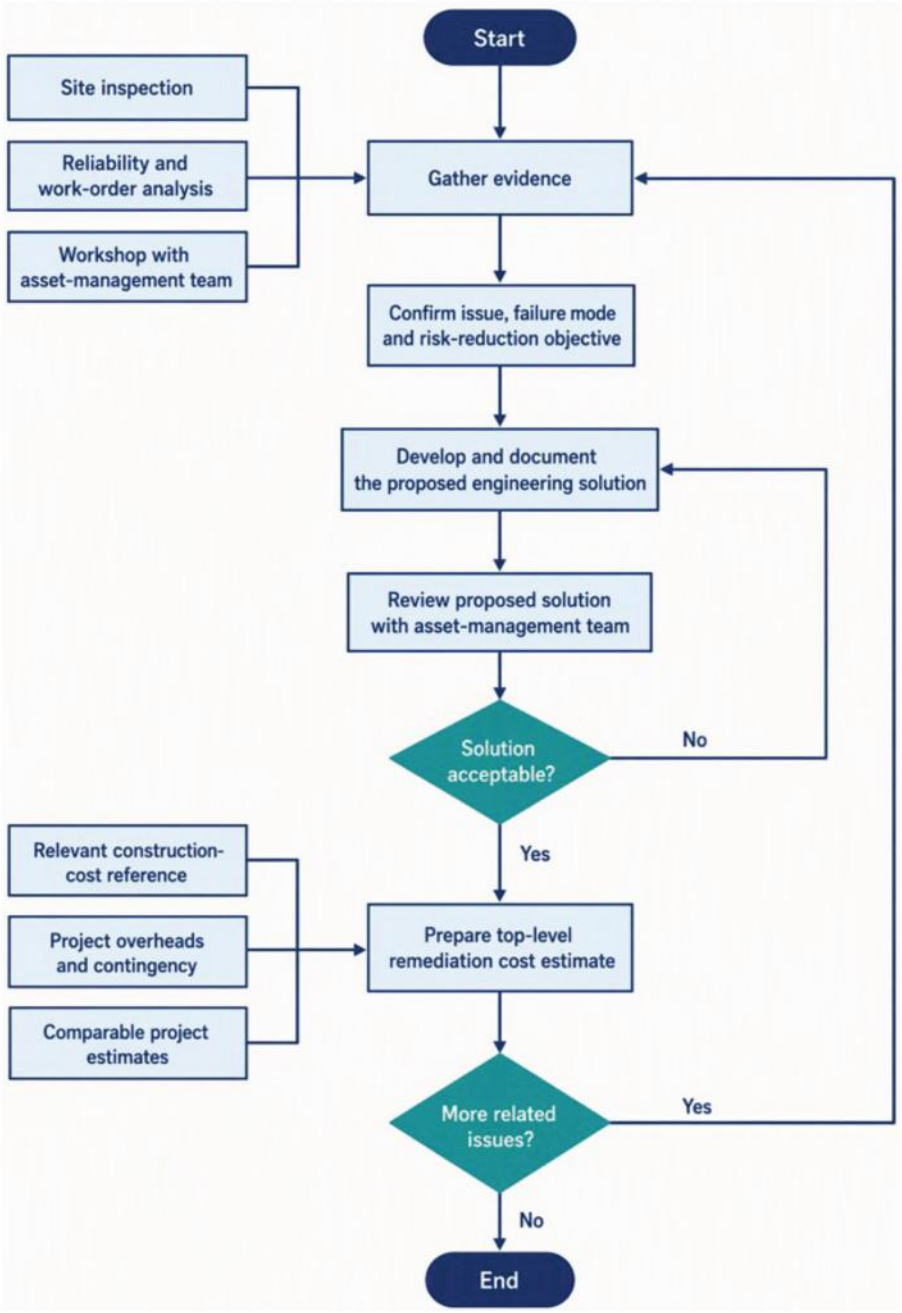


Figure 2 Methodology for Developing Costed Solutions for Chronic Issues

The average estimated corrective-maintenance budget for the sample hospital is $766,684 per year. Annual corrective-maintenance expenditure varies over the 20-year period because the estimate is a function of both the assessed condition of each asset and its deterioration over time. The model therefore reduces corrective-maintenance expenditure after an asset is replaced and increases it as the replacement asset ages and its modelled condition declines.

The total estimated budget for the sample hospital's asset-replacement component, based on the bottom-up model outlined in Section 2.2.4, is $58,815,373 over 20 years, while the asset-refurbishment component described in Section 2.2.5 is $12,633,642 over the same period.

The 20-year lifecycle expenditure forecast for the sample hospital is presented in Figure 3. The uneven annual profile reflects differing intervention timings, highlighting potential funding and delivery pressures and the need for validation, prioritisation, packaging and smoothing.

Cost-Modelling Limitations

The model may underestimate or misallocate maintenance and capital funding because its results depend on the completeness, accuracy, classification and scope of the available asset information. Assets absent from the source register are excluded unless they are identified and added during reconciliation. Proxy installation dates,

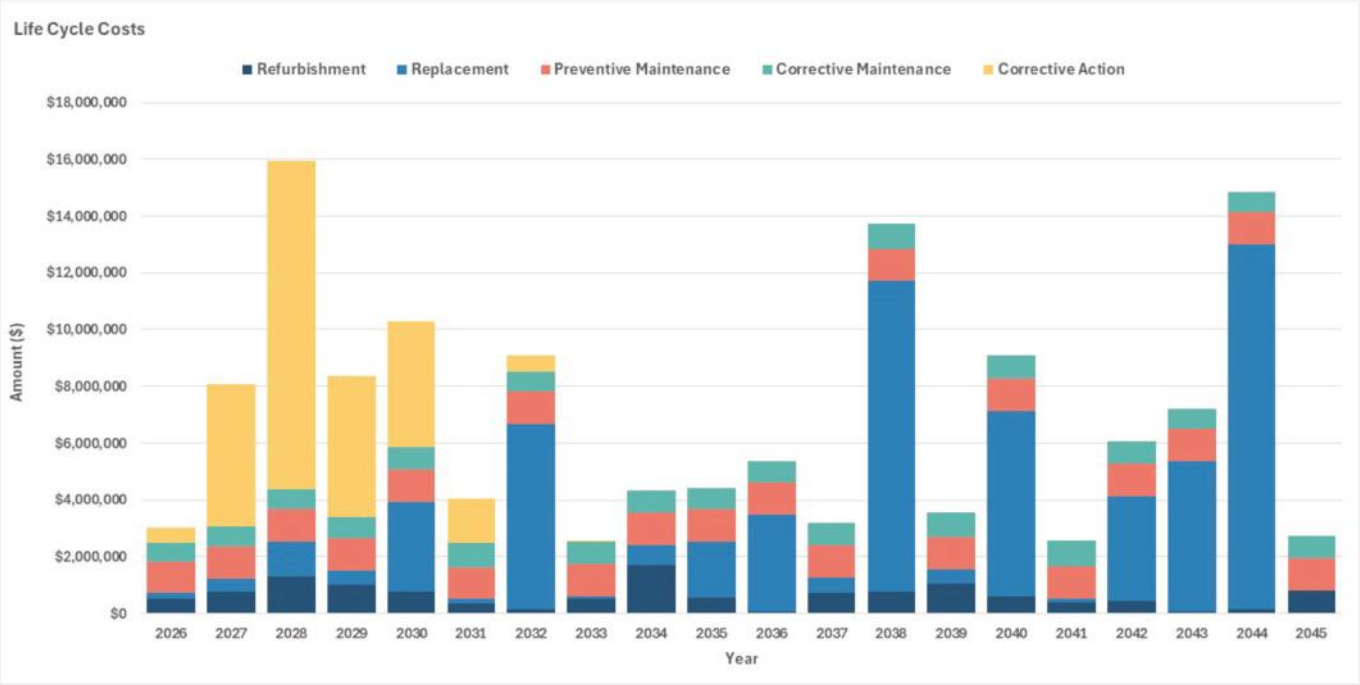


Figure 3 Cost Modelling Results for the Sample Hospital

replacement values and condition ratings introduce additional uncertainty, while exclusions for fixtures, fittings, furniture, equipment, fleet, food services, laundry services, biomedical assets, building replacement, grounds maintenance and soft services constrain interpretation of the portfolio total. The reported forecast should therefore be interpreted as an estimate for the defined maintainable-asset scope rather than as the full cost of owning and operating the facility.

Condition assessment delivers greater value as part of a traceable evidence chain linking operating and capital needs, funding pressures and data limitations. Applying the framework elsewhere requires local calibration, and the illustrative results demonstrate the method rather than provide expenditure benchmarks.

Conclusions

The case demonstrates how a controlled asset baseline, multidisciplinary inspection, reliability evidence, risk-based prioritisation, linked evidence and bottom-up cost modelling can connect field observations to maintenance and capital-planning decisions. Applied to the sample hospital, the framework identified recurring preventive- and corrective-maintenance requirements alongside substantial long-term refurbishment and replacement needs. Although the forecasts depend on the defined asset scope, source-data quality and modelling assumptions, the framework's principal contribution is a transparent and auditable connection between asset evidence, remaining useful life, intervention timing and investment planning. The approach provides a repeatable basis for converting condition-assessment data into prioritised, decision-ready infrastructure programmes, subject to local calibration and governance review.

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Beyond the fluorescent phase-out: audit, replace and recycle ageing lighting infrastructure

The phase-out of fluorescent lighting is creating an important planning moment for healthcare and aged care facilities across Australia. What was once considered a routine maintenance task is becoming a broader asset management challenge as fluorescent lamp technologies are progressively withdrawn from the market and replacement availability begins to decline.

Industry bodies including Lighting Council Australia have highlighted the ongoing phase-out of fluorescent lamp technologies, with a range of commonly used linear and circular fluorescent lamps scheduled for phase-out by the end of 2027. While existing stock may continue to be available for a period, many facility managers are recognising the need to plan ahead before sourcing constraints become a larger operational issue.

For healthcare and aged care organisations, this challenge extends well beyond replacing individual failed lamps. Hospitals, aged care facilities and healthcare campuses commonly rely on large numbers of fluorescent lighting assets across corridors, plant rooms, service areas, amenities, car parks and back-of-house environments. Many of these assets have been in service for years, and as both fittings and lamps age, maintenance teams can face increasing difficulty keeping systems operational through a reactive maintenance approach.

The fluorescent phase-out is therefore best viewed as an opportunity to assess existing infrastructure before replacement lamp availability becomes increasingly limited. Rather than waiting for individual fittings to fail, organisations can take a proactive approach by understanding what lighting assets exist across their facility, identifying higher-priority areas and developing a staged upgrade strategy aligned to operational and capital planning requirements.

An audit-led approach provides valuable visibility into ageing fluorescent general and emergency lighting infrastructure. By documenting installed assets and assessing their condition, facilities teams can identify areas of highest risk, forecast future replacement requirements and create a practical roadmap for upgrading lighting systems over time. This approach can help minimise disruption while supporting continuity, safety and compliance requirements within operational healthcare environments.

For many healthcare organisations, the challenge is not simply identifying which fittings need replacement, but determining when works should occur. An audit provides the information required to align lighting upgrades with maintenance programs, refurbishment works and future capital projects. This enables facilities teams to move from reactive maintenance towards a planned approach that reduces disruption and helps spread investment over time.

The transition to LED technology can also provide broader operational and maintenance benefits. Modern LED luminaires can help reduce energy consumption, lower maintenance requirements and significantly reduce dependence on ageing fluorescent lamp technologies. A planned upgrade program also allows facilities to standardise lighting assets where appropriate, simplify future maintenance activities and improve long-term asset management outcomes.

Responsible end-of-life management should also be considered as part of any fluorescent replacement program. Fluorescent lamps contain mercury and are included within Australian and international phase-out programs targeting mercury-containing lighting products. As ageing fluorescent assets are upgraded, facilities have an opportunity to incorporate appropriate recycling pathways into project planning rather than treating disposal as a separate activity.

Clevertronics supports responsible recycling outcomes through its participation in FluroCycle and by working with specialist recycling partners. For healthcare and aged care facilities, incorporating recycling into a broader audit and upgrade strategy can help simplify project delivery while supporting organisational sustainability objectives.

The strongest outcome comes from combining proactive infrastructure planning with responsible recycling practices. By auditing existing assets, replacing ageing fluorescent fittings through a staged LED upgrade program and exploring appropriate recycling pathways, healthcare and aged care organisations can reduce maintenance risk, improve operational efficiency and better prepare for a future where fluorescent lighting technologies are no longer readily available.

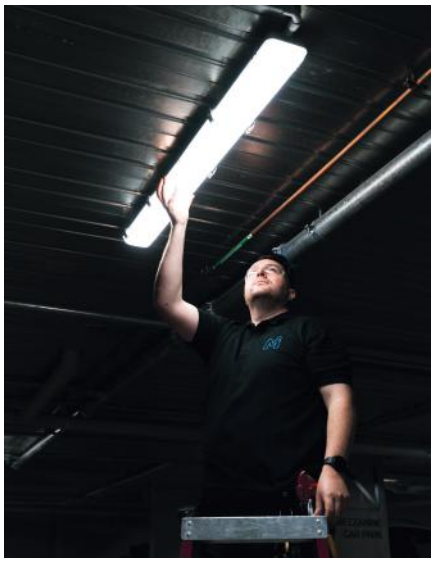
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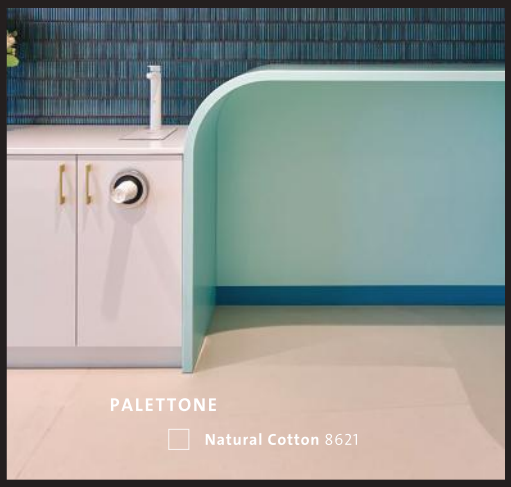
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Electrical Resilience in Healthcare Facilities: A Case Study in Design for Operations

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Abstract
Most Australian hospitals cannot safely isolate their main switchboards for routine maintenance. A 2014–15 asset management audit across all sixteen hospital and health services within an Australian state health service confirmed this as a systemic condition, not a localised failure. The audit also found control systems dependent on single integrators with undocumented custom logic, and electrical documentation that had diverged from physical reality.

This paper presents the Hervey Bay Hospital (HBH) Electrical Resilience Project, which addressed these findings through an integrated design coordinating power distribution, control philosophy, and information systems. The power distribution topology relocates automatic transfer switches (ATS) downstream of the main switchboards, enabling safe isolation with minimal disruption to clinical services. Control systems use unmodified commercial off-the-shelf (COTS) equipment from three established vendors, eliminating single-integrator dependency. An Energy Infrastructure Management System (EIMS), developed by Hexeis, provides real-time visibility and enables condition-based maintenance. After nearly five years of operation comprising approximately 4,500 switching operations with zero failed transfers, the project demonstrates a replicable model for hospital electrical infrastructure.

Keywords: electrical resilience, hospital infrastructure, maintainability, automatic transfer switch, condition-based maintenance, EIMS, open transition ATS, design for operationsregister validation.

Introduction

Healthcare facility electrification is accelerating, with modelling suggesting that full conversion roughly doubles grid power demand for an acute hospital [1]. As the electrical network becomes the single infrastructure system upon which all hospital operations depend, its maintainability shifts from engineering preference to clinical risk management imperative.

A 2014–15 asset management audit across all sixteen hospital and health services within an Australian state health service, an exercise in network-wide infrastructure governance that few comparable jurisdictions have attempted, revealed three systemic findings. First, most hospitals could not safely isolate their main switchboards (MSBs) for routine maintenance. The conventional topology, with automatic transfer switches (ATS) positioned upstream, makes the MSB a single point of failure whose isolation requires a facility-wide shutdown. AS 2467:2008 [2] requires periodic switchgear inspection, yet maintenance was routinely deferred because the clinical costs of planned shutdowns were immediate and visible, while the costs of deferred maintenance (degraded insulation, contamination, rising connection resistance) were probabilistic and attributable to nobody. Each deferral increased both

Food waste. How many times are you paying for it?



The cost of food waste starts long before the truck arrives.

Someone has purchased the food, stored it, handled it and prepared it. When it isn't eaten, it takes up space in another bin and the facility pays again to have it collected.

For healthcare and aged care facilities, prep scraps, changing appetites and uneaten meals are daily realities. Prevention comes first, but there is also an opportunity to rethink what happens to the waste that remains.

Australian company enrich360 works with facilities to explore onsite dehydration as part of a broader food waste management system. Processing waste where it is generated reduces its volume and produces a dry output that is easier to store and handle.

"If we're paying to collect bins full of wet, heavy food waste, it's worth asking what actually needs to leave the site and how often," says enrich360 CEO Jaclyn Geddes.

"Reducing the volume is useful. The real financial opportunity comes when that allows a facility to change its bin sizes, collection frequency or service arrangements."

The dry output can be used in onsite gardens or collected through an organics service, with community partnerships offering another pathway where state regulations allow.

"Start with one bin. Separate the avoidable food waste from the unavoidable and look at what's actually in there," Geddes says. "What could have been prevented? And why are you paying to send the rest on a road trip?"

A better food waste system starts with understanding what's in the bin and questioning what happens next.



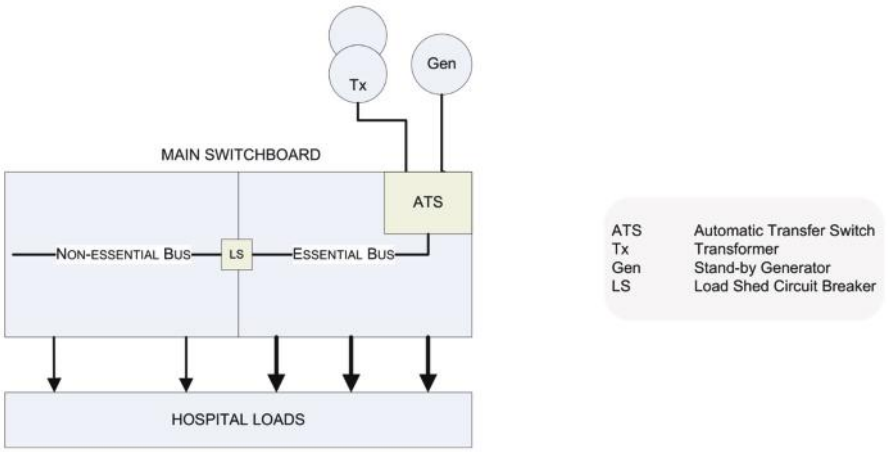


Figure 1: Conventional hospital power distribution topology. ATS upstream of MSB creates a single point of failure (adapted from [4]).

the probability of unplanned failure and the arc flash hazard during eventual maintenance: a self-reinforcing cycle that replaces controlled, scheduled interruptions with uncontrolled, unscheduled outages.

Second, control systems across multiple sites depended on programmable logic controllers (PLCs) with undocumented custom logic. Original integrators were often no longer in business; source code was not version-controlled. As Jaquith observed of government technology procurement, 'customising a vendor's product creates bespoke software the client does not own, cannot maintain, and cannot replace' [3].

Third, single-line diagrams (SLDs) had not been updated since commissioning or had been updated inconsistently. Operational knowledge resided in experienced staff rather than documented systems; a single retirement could render a site's electrical network partially opaque. This is a structural problem, not a records management problem: static documents inevitably diverge from dynamic systems.

These findings persist in new construction because design procurement rewards lowest capital cost despite CIR mandating whole-of-life cost optimisation [12]. The conventional topology passes design review because it is N+1 redundant; that it cannot be maintained without clinical impact is a problem that materialises years after the design team has moved on.

This paper presents the HBH Electrical Resilience Project, commissioned in April 2021 within the Wide Bay Hospital and Health Service (WBHHS). As a mid-life electrical refit of an operational hospital, it demonstrates that the approach is viable within the constraints that characterise most hospital upgrade programmes. The core thesis is that architecture without intelligence is blind, and intelligence without maintainable architecture is academic: the three domains must be designed together.

Design Approach

Three Design Pillars

The design rests on three integrated pillars. The first is maintainability as the primary design driver: if a component cannot be maintained, modified, or replaced without shutting down the hospital, the design is not finished. The second constrains equipment selection to unmodified commercial off-the-shelf (COTS) products from three established OEMs (Schneider Electric for power quality monitoring and smart breakers, ComAP for generator controllers, and ABB for automatic transfer switches) with no vendor product modified from its factory configuration. This eliminates the bespoke PLC assemblies found across the hospital network: what Jaquith terms 'customised COTS', which is 'actually much worse than COTS' [3].

The third pillar is data-driven intelligence through EIMS, which observes but does not control. If EIMS fails, the facility loses visibility, not capability: no switchgear changes state, no generator fails to start, no ATS fails to transfer. The three vendor systems interface through hardwired signals and Modbus TCP, standardised protocols that any competent electrical or controls technician can troubleshoot.

The Maintainable Topology

In the conventional hospital topology (Figure 1), two utility transformers feed an ATS upstream of the MSB. The MSB then distributes to all downstream loads. This arrangement makes the MSB a single point of failure whose maintenance requires either a facility-wide shutdown or live work, both unacceptable under current workplace health and safety obligations [4, 5].

The HBH design (Figure 2) separates the main switchboard (MSB) and generator switchboard (GSB) into independent distribution paths, with approximately 40 ATS units relocated downstream. When the MSB requires maintenance, generators start and synchronise within approximately 13 seconds [7]; the ATS units then transfer loads to the generator supply via the GSB. The MSB can then be fully de-energised and isolated under lock-out-tag-out procedures per AS/NZS 4836 [5], with no live conductors, no load current, and no arc flash hazard. UPS-protected clinical services continue uninterrupted; the brief interruption to non-UPS loads serves as a continuous audit of UPS connection discipline. This procedure is run monthly at HBH as part of routine black start testing.

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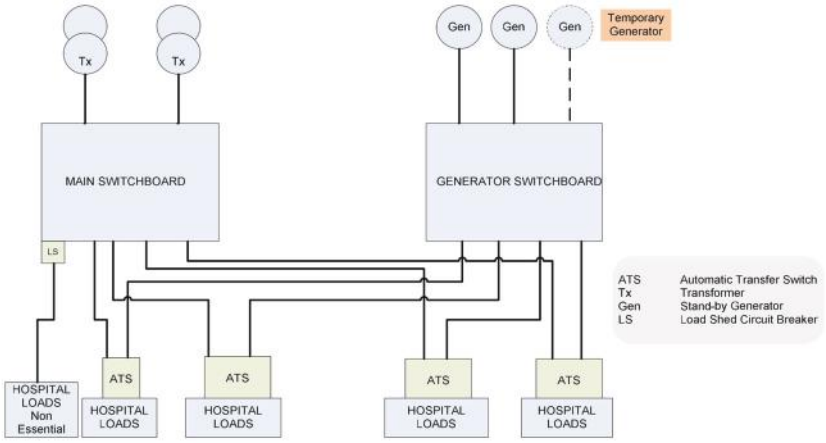


Figure 2: HBH maintainable topology. MSB and GSB separated with ATS relocated downstream, enabling safe MSB isolation under generator power (adapted from [4]).

N+1 redundancy under a 3×60% sizing principle: any two generators exceed 100% of peak demand [4]. The fifth generator was added as a post-commissioning expansion (Section 5.4). ComAP InteliGen controllers manage start sequencing, synchronisation, and load sharing without custom programming. A 2-out-of-3 Castell key interlock on every 415 V bus-tie switch ensures that paralleling of MSB and GSB supplies is physically impossible under any operating condition [7]. The trapped-key mechanism requires a key to be physically removed from each source breaker — proving it is open and locked out — before it can be inserted to enable the bus-tie, making simultaneous closure of source and tie breakers mechanically impossible: physical enforcement, not software.

Open Transition Transfer

Transfer Performance and Cost Case

The ABB TruONE ATS achieves open-transition transfer in less than 50 ms [6], type-tested to IEC 60947-6-1:2021 [8]. Equipment with inherent energy storage (variable frequency drives, UPS systems, switch-mode power supplies) rides through this interval without functional impact. HBH's operational record since April 2021 confirms zero reported clinical equipment impacts across approximately 4,500 switching operations (Section 5.2). For retransfer to utility, the ComAP SUS algorithm adjusts generator frequency to achieve near-phase-alignment, and the ATS transfers within a programmed alignment window [7], standard ComAP functionality requiring no custom logic.

Closed-transition (make-before-break) transfer introduces substantial complexity: combined grid and generator fault levels requiring higher switchgear ratings and arc flash calculations per IEEE 1584 [9]; synchronising and directional protection relays requiring ongoing specialist calibration; and DNSP/AEMO connection agreements with timelines commonly exceeding six months. During a separate project conducted by the authors, a grid fault during a paralleled retransfer caused a total facility blackout — precisely the failure mode that open transition prevents by design. The cost advantages are structural: open transition eliminates the capital cost of paralleling infrastructure, eliminates the schedule risk of connection agreements, eliminates ongoing calibration of synchronising equipment, and reduces downstream switchgear fault ratings. The aggregate effect is a design that is cheaper to build, faster to deliver, simpler to commission, and less expensive to maintain over its 25–30 year economic life [4].

Standards and Compliance

The design uses the performance-based compliance pathway under AS/NZS 3000:2018 Clause 1.6.1 [10]. The compliance pathway was validated during a subsequent application of the same methodology at Maryborough Base Hospital (MBH), where the distribution network operator raised five specific compliance concerns (earthing system design, MEN link arrangement, neutral switching through 4-pole ATS, AS/NZS 3010 [16] clause applicability, and prescriptive versus performance-based compliance), primarily that two MEN links create parallel neutral-earth paths contrary to prescriptive clauses. The technical rationale is that when the MSB is isolated for maintenance and its MEN connection lifted, the GSB must have its own independent MEN; without it, the entire hospital runs without a valid earth reference, a potentially lethal state. The 4-pole open-transition ATS ensures that active and neutral conductors from both sources are never simultaneously connected, and Castell key interlocking makes parallel MEN paths physically impossible.

Independent validation of the MBH design by Darren Margerison, a Licensed Electrical Inspector and member of Standards Australia Committee EL 001 (the committee responsible for AS/NZS 3000), confirmed compliance with all cited clauses [11]. This documented precedent, combined with HBH's operational history since commissioning, provides a robust compliance pathway for future projects.

CIR Volume 4, Section 2 [12] requires that 'distribution infrastructure be designed so that main circuit breakers can be routinely maintained without causing interruption to critical services': a central requirement driving this design.

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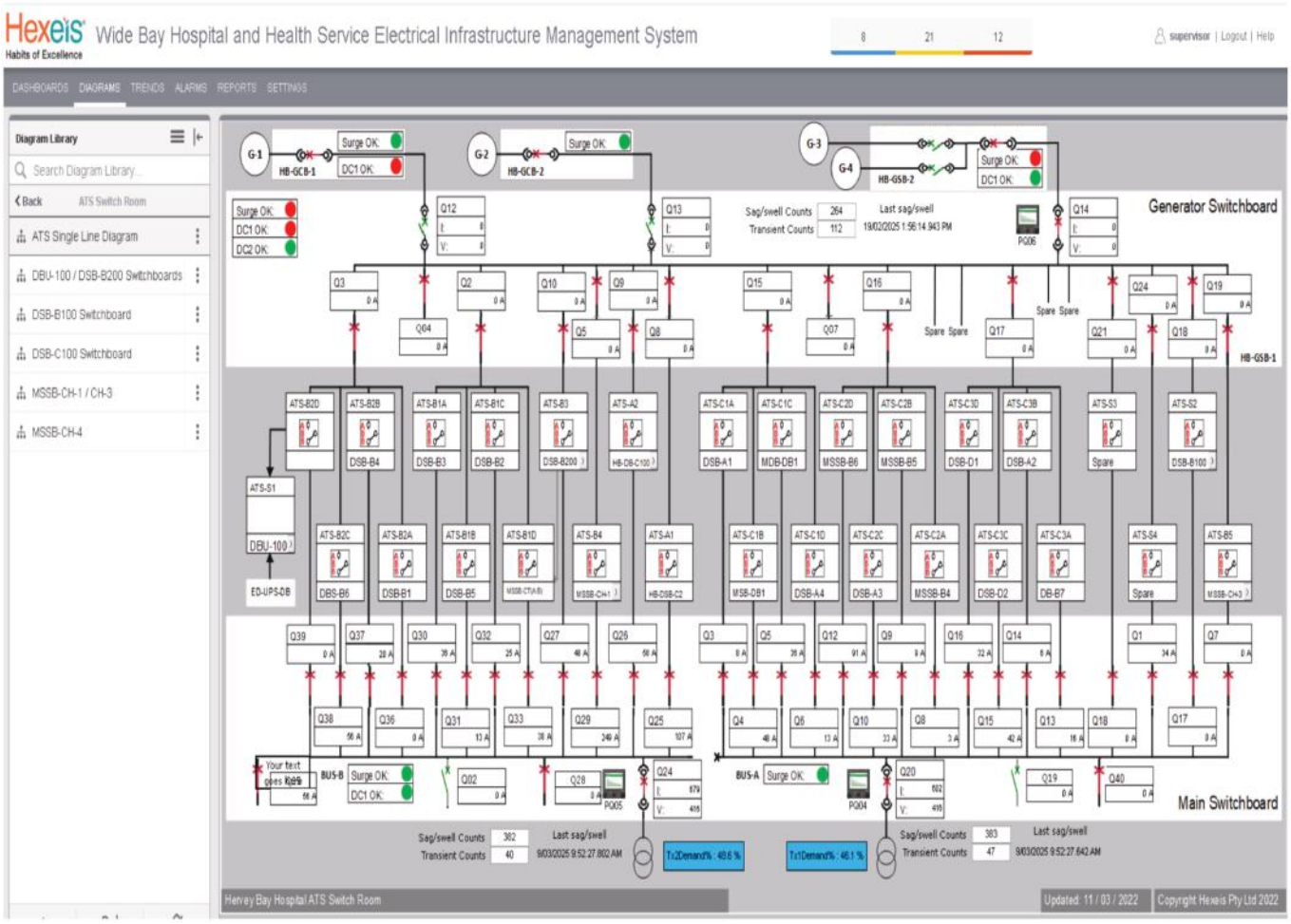


Figure 3: EIMS live single-line diagram showing real-time switchgear status, ATS positions, and generator loading via web browser.

moulded-case circuit breakers, PowerTag sensors, generator parameters, ATS position and transfer history, UPS status, and power quality, substantially exceeding the CIR 2.2.8 minimum requirement for switchgear monitoring [12]. Critically, EIMS observes; it does not control.

Live SLD as Documentation

The EIMS live single-line diagram (Figure 3) displays actual system state in real time (switchgear status, ATS positions, generator loading) accessible via standard web browsers. This directly addresses the documentation deficit identified in the audit: the SLD cannot diverge from reality because it is generated from reality. Trip investigation that previously required site visits to read breaker indicator flags can now be completed from a screen; fault diagnosis that took hours of walking between switchboards takes minutes from the live SLD.

Condition-Based Maintenance and Capacity Planning

Traditional switchgear maintenance under AS 2467:2008 [2] follows fixed-interval schedules regardless of actual equipment condition. EIMS enables condition-based maintenance by continuously tracking two indicators per circuit breaker: electrical aging (cumulative I^2t thermal stress) and electrical wear (contact erosion from switching operations). The CBM funnel (Figure 4) filters the entire breaker population into three categories (maintain now, monitor, and defer), directing maintenance resources to the breakers that need them rather than distributing effort uniformly across the population.

The aviation industry's transition from hard-time overhaul to on-condition maintenance under the MSG-3 framework reduced per-event maintenance cost by approximately 60% [13], with airlines adopting predictive maintenance reporting 25% reduction in overall maintenance cost and 30% reduction in downtime [14]. MSG-3 provides a directional framework for electrical infrastructure, but validated condition-based maintenance thresholds for hospital switchgear do not yet exist as an industry baseline, and HBH's operational period is insufficient to quantify equivalent savings. EIMS is building the evidence base from which such thresholds may eventually be derived.



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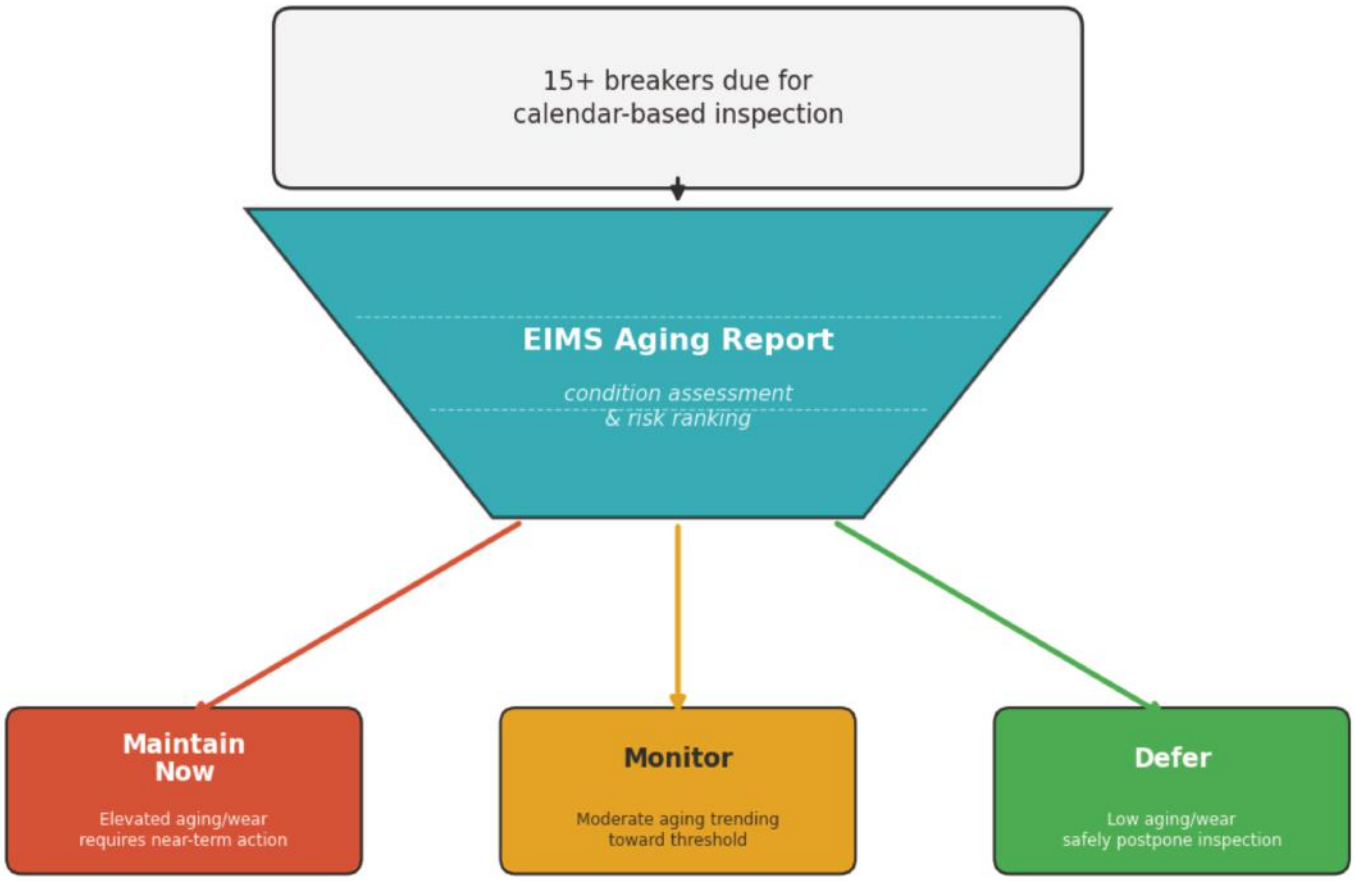


Figure 4: Condition-based maintenance funnel. Filtering the breaker population by electrical aging and contact wear into maintain, monitor, and defer categories.

EIMS also provides validated demand profiles for every monitored circuit. With years of continuous monitoring data, spare capacity is known, not estimated, and peak demand timing is documented, not assumed, enabling capacity planning based on measured data rather than estimated diversity factors.

Power Quality

EIMS logs and trends voltage sags, harmonics, and transients. At another facility where EIMS is deployed, recurring faults in a medical imaging suite were traced to systematic utility voltage sags through twelve months of recorded data, evidence that compelled the distribution network operator to investigate. Without continuous power quality monitoring, such intermittent faults are typically attributed to equipment malfunction and never resolved.

Operational Evidence

Testing Regime

HBH conducts genuine black start tests monthly, twelve times the CIR minimum of one actual supply failure test per year [12]. Each test disconnects the utility supply entirely; generators auto-start, ATS units transfer independently under real hospital load, load-stepping onto the generator bus, and the facility operates on generator power, then retransfers to utility. The test takes approximately 30–45 minutes during normal business hours. Monthly testing is low risk because the architecture supports it: open transition eliminates paralleling hazards, and the separated topology means the test exercises the same path as a genuine emergency.

At another Australian hospital where the authors conducted a similar upgrade, years of parallel-transfer generator tests had been passing without incident. A genuine black start test, at the consulting engineer's insistence, revealed that a UPS serving the dialysis ward had missed its maintenance register; batteries could not sustain load through the transfer interval. The parallel-transfer tests had never exposed this failure because the supply had never actually transferred to emergency power. This is exactly the class of hidden failure that genuine loss-of-supply testing is designed to detect.

Operational Record

Since commissioning in April 2021, every ATS at HBH has operated a minimum of 12 times per year (24 switching events per unit per year: one transfer to generator, one retransfer to utility, each month). Across approximately 40 ATS units, this represents approximately 4,500 cumulative switching operations [7]. The result: zero ATS failures (defined as no ATS failing to transfer when

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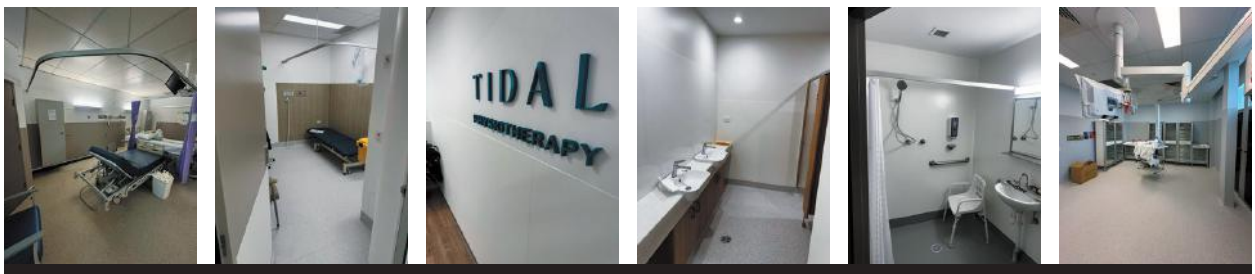


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commanded) and zero reported clinical equipment impacts.

COTS Maintainability and Adoption

The practical consequence of the COTS principle is that HBH's electrical systems can be maintained by the hospital's existing building and engineering maintenance services (BEMS) team: electricians and BMS technicians, not PLC programmers. Each vendor's equipment includes factory-provided configuration tools, diagnostics, and alarm management, all version-controlled, regression-tested, and deployed across thousands of installations worldwide.

The BEMS team adopted EIMS as a daily operational tool within months of deployment, without mandates, training programmes, or change management initiatives. Systems designed to be immediately useful to their operators do not require cultural change programmes to achieve adoption.

The BEMS team's initial reaction to the separated topology SLD was that it appeared more complex than the conventional arrangement. After a detailed walkthrough of the operating sequences, the logic of the design became apparent; the team subsequently modified the ATS on-load and off-load sequencing independently using the factory-provided ATS configuration interface, demonstrating that the perceived complexity resolves into operational familiarity once the underlying rationale is understood.

Replication and Scalability

The same design methodology has been applied at Maryborough Base Hospital (currently in progress) and previously implemented at Ipswich Hospital and Boonah Hospital [7]. Boonah demonstrates that the approach scales down to a 20-bed regional facility as readily as it scales up to a major acute hospital. At HBH, the system has been expanded three times: a fifth generator and additional generator switchboard tier, a Mental Health building, and a 24-bed ward, each accommodated within the existing architecture without modification to the installed base. The architecture scales by addition, not by re-engineering.

Procurement structure also contributed to quality outcomes. The project was procured as separable portions rather than a single design-and-construct package, keeping quality and specification control with the client through their engineer [7]. A consistent Q-numbering scheme established from project inception ensures every circuit breaker carries a single identifier across switchboard drawings, physical labelling, EIMS, and BMS schedules.

For facilities not yet ready for architectural changes, EIMS monitoring can be deployed on any existing electrical network regardless of topology. The monitoring layer delivers standalone value (condition-based maintenance data, live documentation, capacity planning intelligence) and builds the evidence base for capital investment in architectural changes.

Limitations

Several limitations should be acknowledged. Industry-validated condition thresholds for hospital switchgear do not yet exist; EIMS applies manufacturer-provided aging algorithms but lacks a cross-industry baseline against which to benchmark intervention decisions. The evidence base for quantifying condition-based maintenance savings in hospital electrical infrastructure remains insufficient — the directional framework from aviation (Section 4.3) is suggestive but not directly transferable.

The performance-based compliance pathway under AS/NZS 3000 requires detailed engineering justification and independent validation, a non-trivial barrier to adoption that prescriptive standard recognition (as recommended in Section 6) would substantially lower. The initial perceived complexity of the separated topology (Section 5.3) also represents an adoption barrier, albeit one that resolves through operational experience.

Conclusion

The three audit findings (unmaintainable switchboards, unmaintainable control systems, and lost documentation) are structural consequences of design approaches that prioritise capital cost over operational performance. They persist in new construction because the design patterns that caused them are still being repeated.

The HBH project demonstrates that these problems have available solutions. The separated MSB/GSB topology with downstream ATS delivers the maintainability that CIR 2.2.5 requires [12]. COTS equipment from three established vendors ensures systems can be maintained by hospital BEMS teams: electricians and BMS technicians, not PLC programmers. EIMS provides the real-time visibility and condition-based intelligence that transforms maintenance from reactive to predictive.

Two changes would accelerate adoption. First, over four and a half years of operational evidence supports revision of AS/NZS 3009 [15] to recognise modern fast open-transition ATS technology, and direct treatment of dual-MEN configurations in AS/NZS 3000 [10] and AS/NZS 3010 [16] rather than requiring performance-based compliance pathways. Second, procurement frameworks should evaluate maintainability alongside redundancy: a system that satisfies N+1 but requires a hospital shutdown for routine maintenance has not satisfied the design brief.

The operational record (approximately 4,500 switching operations, zero failed transfers, monthly black start testing as routine) provides the evidence base. The methodology has been replicated at Maryborough Base Hospital, previously implemented at Ipswich and Boonah Hospitals, and expanded three times at

HBH without modification to existing systems. Every year without safe isolation is a year of accumulating risk. The technology exists, it is proven, and it transfers.

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Author Biographies

Conrad van Rooyen is Chief Innovation Officer at Hexeis, where he leads the development and deployment of the Energy Infrastructure Management System (EIMS). He holds a Bachelor of Engineering (Electrical and Computer Systems) and is a Registered Professional Engineer of Queensland (RPEQ). Conrad led the design and implementation of the EIMS platform at Hervey Bay Hospital in close collaboration with the WBHHS Building Engineering and Maintenance Services team. His work focuses on bridging the gap between electrical infrastructure design and operational intelligence in healthcare facilities. He is presenting this paper at the IHEA National Conference 2026.

Charles Webster is Managing Director of CR Webster & Associates, a specialist electrical engineering consultancy. He holds the qualifications of Chartered Professional Engineer (CPEng), Fellow of the Institution of Engineers Australia (FIEAust), Life Member of IEEE, and Registered Professional Engineer of Queensland (RPEQ). Charles was the principal electrical designer for the Hervey Bay Hospital Electrical Resilience Project, bringing decades of experience in hospital power distribution design. His design for the separated MSB/GSB topology with downstream ATS placement addressed the systemic maintainability failures identified in the 2014–15 state health service audit. He has since applied the same design principles to Maryborough Base Hospital and other healthcare facilities.

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KAESER Air Service Combats Industrial Energy Waste Nationwide with Intelligent Compressed Air Leak Detection

KAESER Australia has announced a major expansion of its nationwide Air Service capability, placing advanced, intelligent leak detection and compressed air management at the centre of its support for Australian healthcare facilities. While electricity, water, and gas are metered and optimised down to the minute, compressed air (frequently categorised as the "fourth utility") often leaks entirely unnoticed throughout complex plant networks.

This silent waste quietly undermines sustainability targets, increases utility overheads, and compromises operational reliability. To help plant operators combat rising energy expenses, KAESER is deploying factory-trained service technicians nationwide to conduct targeted leak detection audits and deliver end-to-end network optimisation.

The financial burden imposed by unchecked leakages is substantial. Even in modern, meticulously maintained facilities, compressed air networks routinely lose between 15 and 20 percent of generated air through minor, invisible leaks during standard operation. In older piping systems, that loss can easily exceed 30 percent, meaning nearly one-third of total electricity spent on compressed air generation is wasted. This continuous air loss forces central compressors to start significantly more often and operate under full load just to maintain required line pressure.

Over a single year, even a single hairline micro-crack can accumulate thousands of dollars in wasted electrical power. Main distribution pipework also suffers from gradual degradation, including corrosion in aged steel lines, failing adhesive joints in plastic pipes, and vibration-damaged screw fittings. Because these lines are often routed at ceiling height or behind protective cladding, these losses remain unheard amid daily noise.

To resolve these hidden vulnerabilities, KAESER Air Service utilises top-of-the-line ultrasonic leak detectors capable of pinpointing precise leak locations even within high-noise manufacturing environments. Once identified and tagged for professional remediation, KAESER helps facilities implement intelligent management solutions to ensure long-term energy savings.



KAESER's nationwide service network ensures 24/7 uptime for healthcare facilities

KAESER delivers these audit and optimisation services through an extensive Australian service infrastructure anchored by its head office in Dandenong, Victoria, and supported by Sales & Service Centres in Sydney, Brisbane, Mackay, Perth, and Launceston, alongside an authorised partner network. KAESER's service vehicles are fully stocked with genuine spare parts, and factory-trained technicians possess the expertise to service third-party compressor brands alongside KAESER equipment.

To ensure plant safety and compliance, KAESER provides certified air receiver testing according to Australian standards, supported by a 24-hour emergency hotline. Because compressed air systems constantly evolve through facility modifications and daily wear, leak management cannot be a one-off task. Long-term service contracts allow KAESER specialists to conduct regular infrastructure audits, delivering maximum system dependability and lower energy bills without burdening internal maintenance staff.



A specialised flow meter locates leaks that would otherwise remain invisible.

For more information on KAESER's healthcare industry solutions and the full range of KAESER Air Service capabilities, visit https://au.kaeser.com/services/customer-service-kaeser-air-service/ or call 1800 640 611.

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In healthcare, flooring is rarely replaced because it has reached the end of its warranty. More often, it's replaced because years of constant traffic, rolling equipment and intensive cleaning have taken their toll.

The challenge isn't simply choosing a floor that performs well on day one. It's selecting one that continues performing for decades, delaying the day a ward, theatre or clinical space has to be taken offline for replacement.

For more than 40 years, Australian hospitals have relied on Tarkett's iQ Homogeneous Vinyl because it was designed with exactly that challenge in mind. Manufactured as a true Homogeneous Vinyl floor with a full 2.0 mm wear layer, its performance characteristics extend throughout the material, helping it withstand the demands of busy healthcare environments while maintaining its appearance over time.

One of the defining differences is iQ Surface Restoration™, a capability unique to iQ Vinyl. Rather than relying on waxes, polishes or chemical coatings to maintain appearance, the floor can be restored through dry buffing alone. Mechanical friction renews the surface without water, chemicals or stripping, allowing maintenance teams to restore the floor while it remains in service. The result is a floor that continues looking and performing as intended, without the disruption traditionally associated with refurbishment.

For hospitals, the implications extend well beyond maintenance. Every replacement project requires planning, labour, waste removal and often the temporary closure of clinical areas. Extending the life of a floor helps reduce those interruptions, lowering whole-of-life costs while allowing facilities to remain operational for longer.

Durability also plays an important role in sustainability. The longest-lasting floor is often the one with the lowest environmental impact because fewer replacements mean less material consumption, less waste and lower embodied carbon over the life of a building. When iQ Vinyl eventually reaches the end of its service life, Tarkett's ReStart® take-back and recycling program recovers post-use Homogeneous Vinyl and processes it into raw material for new resilient flooring, keeping valuable materials in circulation rather than sending them to landfill.

Backed by a 20-year commercial warranty and decades of proven performance in Australian healthcare, iQ Vinyl offers something increasingly important for healthcare owners and specifiers: confidence that today's flooring decision will continue delivering value long after the project is complete.

Revitalising Healthcare Floors — Without the Disruption

By Higgins Coatings

In healthcare environments, flooring is more than an aesthetic consideration. It is a critical component of infection control, patient safety, and operational continuity. Yet for many facility managers, the prospect of floor replacement triggers a familiar dilemma: the floors need attention, but the cost, downtime, and disruption make full replacement feel almost impossible to justify.

Higgins Coatings' Floor Rejuvenation service was developed precisely for this challenge.

Rather than tearing out and replacing existing flooring, our process restores tired, worn surfaces to a like-new condition — typically within just one to two days. Using high-performance Dr. Schutz treatment systems, globally recognised for durability in demanding commercial environments, we deliver seamless, hygienic finishes specifically engineered for operating theatres, clinical areas, and high-traffic hospital corridors.

The financial case is compelling. Floor rejuvenation typically costs up to 50% less than full replacement, eliminating expenses associated with removal, disposal, and extended downtime. Rejuvenated floors meet healthcare compliance standards, resist chemical exposure, and are easy to maintain — all without extended facility shutdowns.

A Complete Maintenance Solution for Healthcare Facilities

Floor Rejuvenation is just one part of Higgins Coatings' comprehensive service offering for the healthcare sector. As Australia's leading commercial painting and maintenance provider — family owned and operated since 1949 — we bring the scale of a 25-branch national network with the expertise of local, on-the-brush specialists. From interior and exterior painting and ongoing painting maintenance to specialised access works, Building Services, and external façade cleaning via our Altitude Aerial Pressure Washing service, we can provide facility managers a proactive, structured approach to asset care — reducing reactive spend and protecting the built environment year-round.

With 25 branches across Australia, there's a Higgins team local to you — ready to deliver smarter, safer, and more cost-effective maintenance solutions for your healthcare facility. For more information visit www.higgins.com.au or contact 1300 HIGGINS.

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