TJ Effeney Report 2024

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The TJ Effeney Award

In honour of the late Terry Effeney (one of the Australian energy industry's greatest contributors), API along with The Effeney Family, Ergon Energy & Energex (as part of the Energy Queensland Group), have created the T.J Effeney Award. This Award was created to support one of Terry's great passions which was to support the next generation. This annual award will allow successful applicants (API Bursary Holders) to be a part of a national group of students attending EECON.


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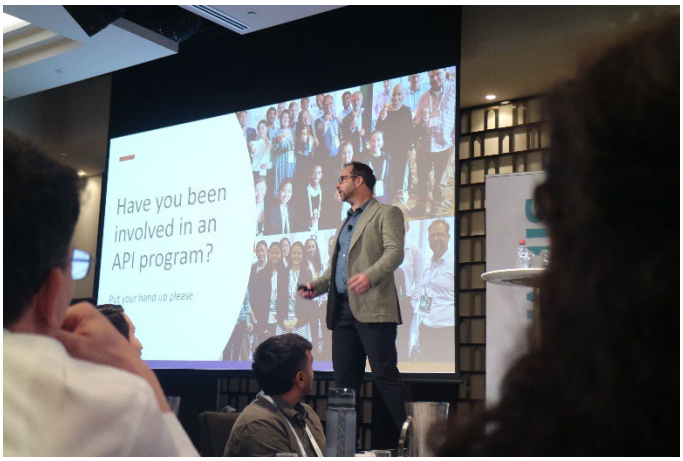

Have you been involved in an API program?
Put your hand up please

The 2024 Wrap Up

As we head into the Christmas period, we at the API are very happy to have the TJ Effeney Awardees come to Sydney for the EECON Conference. It was a wonderful time for both the API staff and students.

Here is a wrap up of what happened, what we saw and what we learned. On Monday the students flew into Sydney, from there we visited API Member, TransGrid, where we got to something very exciting; a site tour of their underground, gas-cooled substation.

When we first arrived at TransGrid, we had an excellent presentation from Lance Wee - an API board member and TransGrid's asset manager. He spoke to us about his role and TransGrid's current power assets and new projects that they are working on.

We then heard from Whitney Spooner, Talent and Capability Advisor with the People, Culture and Safety Team, as she took us through the TransGrid graduate program, how to apply and how the interview process works.

She shared information on opportunities for graduates at TransGrid regarding professional development, employee support, mental health support and mentorship. Then we heard from one of Trans Grid's graduate employees who told us about her experience and what she was working on.

On Monday evening the API kicked off our final Alumni Event of the year in Sydney, which gave the TJ Effeney students a chance to have fun and network with some amazing API program alumni across our member organizations.

On Tuesday and Wednesday, the API Team and TJ Effeney awardees attended the Electrical Energy Society of Australia's (EESA) Electric Energy Conference (EECON) for the main event. We got to see some amazing presentations from the API's CEO Dr David Pointing, Head of Engagement, Stephanie Sommerville and our Professional Programs and Operations Manager, Emily Marschke.

API's female staff and TJ Effeney Awardees were also in attendance at the Women in Energy Breakfast, where they heard from speaker Hester De Wett and host Jenna Connellan followed by networking with the speakers and audience in attendance. Peek into Hester's presentation as she shares her advice for power-passionate undergraduate women.

During all conference sessions, API students volunteered in aiding presenters during their Q&A sessions by providing the audience with mics.

The API Conversation Lounge (in collaboration with CIGRE and EESA) was a space dedicated to continuing the conversation with speakers following sessions and provided the opportunity for professionals to connect with API Students and inform and inspire them to pursue a career in

power. TJ Effeney Awardees also had the chance to meet and connect with API Members, Wilson Transformer Company, Tyree Transformers, and Powerlink Queensland.

We thank Ergon Energy (Energy Queensland) and the Effeney Family in collaboration with the API, in funding the TJ Effeney Award. The Award would not be possible without their generous funding and support.

Alex Arellano

I feel incredibly fortunate to have had such an inspiring experience. From flying to Sydney on the 18th to visit Trans Grid's underground substation, to meeting other students, alumni, and API members over dinner, and attending EECON on the 19th and 20th, it's been a whirlwind few days that left me full of ideas and enthusiasm for what lies ahead. After a week of reflecting on the conference, a few things really stand out. Laurie Curro's talk on black starts was one of the most memorable moments—it gave me a glimpse into just how complex it can be to bring the grid back online after a blackout, something I hadn't fully realized before. I also found it eye-opening to learn about some of the less obvious challenges of renewable energy, like increased transmission distances and energy losses, and the instability associated that tend to get overlooked in the broader conversation about sustainability.

Seeing the innovations like Siemen's blue gas as a replacement for SF6 was fascinating too—it made me think about how technology is finding solutions to issues that don't always get the spotlight. I'm incredibly grateful to API and the Effeney family for making this all possible through the TJ Effeney

Award. Beyond the technical knowledge, the chance to connect with likeminded students and professionals across Australia was priceless. I'm looking forward to incorporating these insights into my studies and my future career in the energy sector. If I could give any advice to current undergraduate students, it would be to put yourself out there and take advantage of every opportunity that comes your way. Events like this are not just about technical learning, they're about meeting people, getting inspired, and seeing firsthand what's happening in industry. Don't hesitate to get involved, it's experiences like these that will shape your career path.

Amelie Blomme

Attending EECON 2024 was a valuable opportunity to deepen my understanding of Australia's evolving energy landscape. The 2-day conference offered unique insights into the challenges and innovations shaping the energy sector across the country. From technical advancements to personal growth, the conference provided me with a broader view of the industry and a clearer vision of my future career.

As someone from Western Australia I had no idea how different the east side of Australia was. I found it fascinating to explore how grid management and energy strategies differ across regions, and I learned about the intricacies of integrating renewables into larger, more complex networks like those in the eastern states, which face different demands and geographical considerations. This learning experience broaden my understanding of grid stability, especially as Australia's energy system evolves with the introduction of more renewable resources.
The second thing I learned was about Western Australia's black start incident, explained by Laurie Curro. I gained insight into how difficult it is to restore power to WA after a total system shutdown. Unlike the eastern states, WA operates on an isolated grid, therefore, it has no help from the other states to restart the system. This made me understand how complex managing the WA's energy grid is and how important it is to plan.

One of the most impactful presentations was given by Hester de Wet, who spoke about the strength of women in the power sector. Her discussion focused on the perceptions that can limit women's progress, the fundamentals of leveraging one's strengths, and strategies for reframing power dynamics. As someone who is just starting my career, this talk encouraged me to approach my career with greater

confidence and highlighted the importance of supporting and uplifting other women in the field. I believe these lessons will help me navigate the industry with a stronger sense of self-assurance.

Beau Hope

The EECON24 conference was an unforgettable experience that reinforced my passion for a career in the power industry. The conference provided a great platform for me to engage with industry professionals tackling the challenges of transitioning our complex grid towards net zero. Peter McIntyre's keynote address was particularly impactful, as he emphasized the need for collective faster action to address the issues driving such transformative change within our energy sector. His insights on the complexities associated with achieving net-zero goals allowed me to reflect on my role as an emerging engineer within this massive transformation. For me, a standout presentation discussed 'how artificial intelligence, machine learning and data science is maximizing distributed energy resources.

Hearing about the innovative applications of these technologies showcased how significant their potential could be in optimising energy systems. This is a topic which I found fascinating as it closely relates to my studies at university. Another highlight was the focus on SF6 switchgear with environmentally clean alternatives, an issue brought to life following our site tour of Transgrid's underground gas-insulated transformer substation. Seeing these technologies firsthand provided me with a much deeper understanding heading into the technical conference. The opportunity to network with API peers and established industry professionals at the conference was invaluable. Talking to experts and other students I greatly deepened my understanding of the diverse and meaningful opportunities in the power sector.

EECON24 was a great source of motivation moving forward. The insights and connections I gained have shaped my journey as I continue with my studies and strive towards industry. I would like to extend my gratitude to the TJ Effeney family & API staff for providing me with this opportunity.

Kimmy Gan

I am extremely grateful to have been able to attend EECON 2024. This was the first professional conference I attended, and it gave me a real insight into a career in power as well as the challenges as we transition to renewables. Throughout the conference, I attended numerous sessions which addressed specific challenges and aspects to meeting net zero. For example, I got to hear about the specific constraints in the transition to renewables, such as voltage imbalance because of solar panels and got to hear about carbon neutral alternatives to what is currently in use, such as natural ester fluid and pressurized air. I also got to meet and connect with many undergraduates and professionals in power.

On the first day, we attended a site tour at a TransGrid underground substation. As part of the site tour, we saw real, in-operationSF6 (Sulphur hexafluoride) insulated switch gear and briefly heard of the complications and environmental impacts of the gas. The next day, at the conference, I got to hear a more in-depth discussion regarding the negative environmental impacts ofSF6 gas. An alternative toSF6 gas was also discussed, specifically using pressurized air in place of the SF6. Since this session directly tied into the site tour, this was a session that I really enjoyed. I also had the opportunity to attend the Women in Electric Energy Breakfast and got to hear insights and networking advice for women in the industry from Hester de Wet, Principal in Strategy and Operations at Aurecon. This presentation addressed topics which I and many women in the industry have struggled with, specifically leveraging connections, and reframing our value as women. Finally, as part of the closing plenary, I heard more of the non-technical challenges regarding climate change and meeting net zero, such a economic considerations and societal perception. This session challenged my preconceptions regarding the main challenges needed to counter global warming and climate change. Prior to this session I had assumed that the technical challenges were the main obstacles in the transition to renewables and after hearing

from the speakers, I realised the significance of these non-technical considerations alongside the technical aspects.

Cassandra Ellis:

Cassandra Ellis, TJE Response. Being able to attend and participate in EECON 2024 has been a highlight of my engineering journey. I am incredibly thankful to the Effeney family and Energy Queensland for the support and opportunity to attend. From attending the plenary discussions, keynote speeches, speaking with exhibitors or connecting with professionals in the conversation lounge there was no shortage of opportunities to learn. Two of my key takeaways were the importance of bringing the customer along on the renewable transition journey, and the range of benefits that batteries can provide. Dr Bill Lilley talked about one of the biggest challenges facing the industry is working with society. He stated the importance of bringing the customer along on the journey, and not just forcing the solution on the community.

Andrew Kingsmill from Energy Co NSW explained how they are ensuring that communities are being consulted to understand the challenges they are facing and how the renewable transition can provide support and leave a positive legacy in the area. Felix Keck from Ausgrid talked about the benefits of community batteries. Not only can batteries support the network by absorbing excess solar exports and providing power in times of increased demand, but they allow a wider customer base to benefit from renewable energy. Mitchell Tap from Energy Queensland explained how they are utilizing batteries to support customers on SWERs. Prior to the conference when I thought of servicing customers my mind pictured one on one support, providing an answer/solution to a specific question. Throughout the course of the conference my perception was challenged, as many of the projects being discussed were on a large scale, such as community batteries, utilizing REZs, or using data to improve asset management.

However, all these projects provided improvements to a larger number of customers. But to be able to ensure the solutions being implemented will support customers sufficient and effective community engagement is needed. My experience at EECON opened my eyes to the range of challenges and opportunities in the industry at the moment. I am very grateful for the opportunity to attend EECON as TJ Effeney awardee and look forward to attending many more conferences in my future.

Dominic Curtin

EECON2024 far exceeded all my expectations. Going into the conference I was excited and nervous; a few questions stewed in my mind, would I know enough to get value from the presentations, would the people be willing to talk to an undergraduate student, what freebies could I get? This conference was my first real exposure to the power industry, of course I've been interested in and followed the big challenges, but I had no idea of the complexities that shape the sector. On the first day, before the conference, we visited Transgrid's substation that is in the basement of their building. It is powerful standing only a couple meters away from 132kV lines that power lots of Sydney. To think that with some SF6 gas we can be that close, and everything can be compact is incredible but this SF6 gas is a potent greenhouse gas, so the industry is working hard to move away from it. The presentations of people's works were inspiring because I got to see what people do in the industry and how they are trying to solve those problems, of course there were some talks that went way over my head, but I still managed to learn something from each talk. One of the umpteen best things about this conference was getting to chat to engineers in the industry. Conversations that started about the products of their company would quickly evolve into advice and teaching me about the industry. I learnt about tap changers in transformers, how they work and why they are important, I learnt about relays and how they become digital to increase their operational capabilities and the implications that it has on security. Everyone I

spoke to was so helpful and willing to share stories and advice, everyone is excited about the future of the power sector and the transition to a more sustainable future. The best part of all was the API team for bringing all of us undergraduate students to the conference.

Hamish Teasdale: As a TJ Effeney Award winner, I was gifted the opportunity to attend EECON 2024. It was a great chance to celebrate 100 years of EESA and to meet some amazing people, forming friendships which I have no doubt will last far into the future.

There were so many interesting presentations at the EECON event - and so much wisdom that I wouldn't have been able to get from university study alone. This included starting a grid from blackstart, more sustainable fuel and oil solutions, to insights into emerging infrastructure challenges such as supporting SWER customers in regional areas and how to integrate BESS in the distribution network.

One of the presentations that leaved the biggest impact for me was from Christiaan Swanepoel (Transgrid). This talk explored the challenges of calculating the emissions of transmission losses – and how this becomes more complex with the introduction of renewable generation in the grid. Whilst not as technically challenging as some of the other presentations, it was presented in a very accessible, and engaging way. Most interestingly, it stepped through how these emissions could be calculated, as well as identifying the limitations of their methodologies and comparing it to known values. This was empowering by demonstrating methodical problem-solving, and highlighting the importance of recognizing limitations, validating results, and fostering confidence in ones ability to tackle complex professional challenges.

This is just one example of how the TJ Effeney Award was an amazing opportunity for me to gain insights into the energy industry – more than what they teach in the classroom !

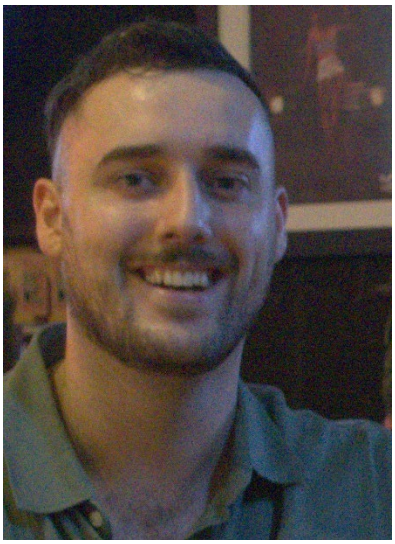
My best piece of advice for any student who can attend this conference is to get out of your comfort zone as soon as you can. The first conversation is always the most daunting, so striking up a conversation at the beginning of the conference really shows how friendly everyone is !

I wish to sincerely thank The Australian Power Institute, Effeney Family, and EESA for allowing me to attend this enriching experience.

Jacob Cubillo:

From the 18th to the 20th of November, I attended the EECON 2024 thanks to the TJ Effeney Award from the Australian Power Institute. As this was the first professional convention I've attended within the power industry, it has been a big eye opener to see what the current leaders in this industry are doing to contribute towards a more sustainable future. The opportunity to chat with the companies at the booths was quite interesting. It gave me a better idea of what is being done in the power industry towards the energy transition and potential careers I can pursue.

Getting a taste of the developments made by the various companies in the power industry has been very invigorating. In particular, it was very compelling to hear Andrew Kingsmill from EnergyCo talk about their proposed electricity infrastructure roadmap, which mainly focused on the implementation of wind turbines in renewable energy zones. Listening to other panels also made me consider how the goal of net zero requires a lot more thorough consideration to achieve. In the panel with the CEO of Cigre, Peter McIntyre, it made me aware that we need to garner more awareness from the public eye to inspire actionable change.
This experience illuminated the ongoing challenges the power industry faces towards the goal of a transition to net zero and the exciting career opportunities within the power sector. Getting to meet like-minded people such as the leaders of these energy companies as well as my fellow awardees makes me intrigued to see what's to come for the power industry in the future.



Jim Riley: Attending EECON 24 as a second-year student was a unique and enlightening experience that offered valuable insights into the power sector. Being early in my studies, I am still piecing together a vision of where I might like to work after graduation. Sitting in the audience, I found that speakers occasionally dropped subtle yet impactful "breadcrumbs" of knowledge, sparks of insight that piqued my interest and encouraged me to explore further. These moments are guiding me closer to finding a future role in the industry that I know I will truly enjoy. This experience also provided an invaluable opportunity to connect with industry leaders and gain deeper insights stressing the urgency of emerging challenges we face as we work toward a more diverse, cleaner and sustainable energy future. And of course, meeting with other API students and alumni, building friendships and strengthening my support network with students in similar stages of their career.

The most pressing takeaway from EECON 2024 was the critical importance of maintaining a stable grid. Laurie Curro delivered a compelling presentation on the vulnerabilities of our power system and how deeply our society relies on reliable electricity. He emphasized that in the event of a full power loss, essential infrastructure, including credit card readers (necessary for purchasing food, fuel, and water), ATMs (accessing money), traffic lights, phone networks, and hospital services, would grind to a halt, with devastating consequences. His discussion highlighted the necessity of studying and preparing for "black system" events to ensure a rapid and efficient recovery. This underscored not only the importance of planning for such scenarios but also the vital role electrical engineers play in safeguarding the resilience of the grid, which underpins the stability of modern life.

As a Queenslander, I found Mitchell Tapp's presentation from Energy Queensland particularly interesting and was surprised to learn that 40% of Ergon's distribution network comprises Single Wire Earth Return (SWER) systems, despite serving only 4% of customers. While I was aware of SWER, I hadn't realized how integral this technology remains to our network. Mitchell highlighted the unique

challenges posed by SWER, such as managing increasing loads and integrating distributed generation. The session introduced innovative engineering solutions, including the Grid-Utility Support System (GUSS), Low Voltage Regulators (LVR), and Stand-Alone Power Systems (SAPS), before exploring a trial of a grid import limiting customer-sized battery energy storage system. This trial aims to bridge the gap between SAPS and community microgrids by increasing demand capacity, limiting network imports, enhancing reliability with backup power, enabling local renewable energy use, reducing system losses, and lowering electricity costs. It's an innovative approach that addresses critical challenges, demonstrating how engineering is driving the modernization of our power grid.

Finally, I'd like to take this opportunity to emphasize to any student reading this the importance of connecting with API. The opportunities for learning and networking have been truly remarkable. Through API, I've made friends, built valuable connections, visited power stations, secured an internship, and gained experiences that are actively shaping my career journey. When opportunities like these come your way, don't hesitate, apply for everything, engage with people, step out of your comfort zone, and, most importantly, enjoy the experience. These moments are invaluable for both personal growth and building a strong foundation for your future.

Jayden Leveridge-Smith: I have been incredibly fortunate to attend the 2024 EECON conference in Sydney. Having visited from Perth, it was an amazing opportunity to explore the city and immerse myself in the current challenges facing the energy sector in Australia. The conference kicked off with an insightful visit to a substation in the heart of Syndey, owned and operated by TransGrid. We were fortunate enough to get a tour of the SF6 transformers which resided underground providing power to a

large segment of the city. They spoke about the importance of safety, and how they incorporated engineering solutions into the design. Achieving safe and reliable operation in a densely populated area of the city. The tour was a fantastic opportunity to apply my theoretical knowledge from university and ask industry experts questions about their thoughts on the energy transition. After the site tour, the conference provided opportunities to hear from various experts in the energy sector as they spoke about their recently published journal articles. These speeches ranged from cyber security, employee engagement right up to technical solutions addressing harmonics and the integration of renewable energy into the grid. However, one speech that stood out was presented by WA's own Laurie Curro. He spoke about the importance of preparation when seeking to perform a black start on the SWIS. He was able to perfectly capture the essence of the problem and outline the steps required, along with key roadblocks to safely restart the system and provide power to the people of WA. While this scenario is unlikely, it spoke to our role as engineers in preparing and planning for worst-case scenarios to manage risk and minimise damage. For all current students, I highly recommend that you take every opportunity that comes your way as you seek to broaden your knowledge and skill set. This event provides an amazing opportunity to explore various engineering pathways by speaking to industry experts. Saying 'yes' to every opportunity that comes your way is the most effective way to grow both as an individual and as an engineer!

Kem Martin: At EECON, I learnt that there is a lot more at play when integrating renewable energy into the grid. For example, since wind and solar are dependent on weather conditions, the amount and timing of this energy entering the grid is not consistent. I didn't know that we needed to consider the intensity and intermittent of this energy, and how this could affect the grid's stability. If a rooftop solar PV owner dispatches too much energy into the grid, the electricity may flow back and trip their inverter.

I also learnt that transformers and transmission lines are much larger than expected and that they use gas as an insulator. The most used insulator is SF6 (Sulfur hexafluoride), which has amazing insulating properties, but is also a potent greenhouse gas. Thus, the security measures around transformers and their end of life are extremely detailed. However, I discovered that there are some companies developing more renewable insulators.

The most interesting talk to me was the one given by Meryn York from AEMO. The integrated system plan really outlined the urgency with which we needed to transition away from fossil fuels and electrify our industries in order to reach net zero emissions. The details of this plan really underlined the necessity for cooperation between companies and communities in order to create a well-connected, stable grid. This further inspired me to look at a future in renewable energy and integrating it into the grid, which would require much planning and cooperating, but I believe it would also bd greatly rewarding to know that I can make a difference in the world.

Ken Braganza: EECON was a rewarding experience, from which the first of the top two things I learnt was that: the way we think about the network (formerly largely just one-way flow) will drastically shift with discussions around reverse flows and new initiatives such as Vehicle 2 Grid. The second key learning for me is the complexity of a black start in the case of a system outage, which we saw at Broken Hill earlier this year in 2024.

Though these are key technical learnings, a broader takeaway I received was the role that consumers play in big decisions in power, which is no longer wielded by big corporations calling the shots. The closing plenary mentioned we might see a shift from the phrase 'transmission being part of the transition' to 'distribution being part of the solution', which I am excited to see the trends around (involving CERMS management and the like).

A topic that challenged my thinking was that community batteries are yet to see commercial viability on a stage beyond trials. I am interested to see how Ausgrid build out their community battery commercial model.

Overall, EECON was a blast and a the site tour of Transgrid's Ultimo substation was a privilege to be a part of. The part of advice I would give to students attending industry conferences is to not be afraid to ask seemingly 'simple questions' because there are likely others in the room with the same question. Also, get out of your comfort zone and approach some of the industry booths and you never know, you might make a lifelong industry connection that way!

Lara Christ: Attending EECON2024 as a T.J. Effeney Awardee was an invaluable experience that deepened my understanding of the energy industry and its challenges. The conference, pertinently themed on "Connecting the Australian Energy Industry," brought together an array of attendees and

speakers, diverse in geography and background, highlighting the diversity that is vital for solving the problems we face in heading towards a more sustainable future.

Engaging with likeminded undergraduates and passionate professionals across the country at the various booths allowed me to learn more about new technologies and approaches, from SF6 free switchgear to composite power poles and digital twins. The stallholder's willingness to share information, and passion for their products left me more informed and feeling optimistic for the future; as did the enthusiasm of my fellow undergraduates who shared their perspectives and experiences from university and industry placements.

A program highlight for me was the site tour at Transgrid's underground Haymarket Street substation. Where I found myself comparing the design and scale to substations I have seen in both Queensland and Tasmania and concluding that it was quite unique and unlike anything I'd seen before. It was awesome to hear about the technical challenges of fitting all the equipment in to such a small city location and about the transformers and switchgear being utilised. I found the SF6 transformers to be particularly interesting as I had not encountered them before, (something I have no doubt will need to be replaced and provide a challenge in the near future given SF6's extreme global warming potential) and also found the multiple levels of the substation to be a pretty cool way of fitting everything in.

The technical and keynote presentations across the two days of the conference were equally enlightening. However, two in particular stood out to me. Laurie Curro's insights on power system black starts and Peter McIntyre's discussion on the issues of the net-zero by 2050 target, as they were able to effectively communicate complex ideas with clarity, humour and passion. I find it to be rare in a technical setting, and one that has inspired me to think about how I engage with people when presenting my own ideas and research.

Overall, EECON2024 was an enriching experience that left me feeling inspired and motivated for my future career in power, and confident in the important role that this sector will play in ensuring a future that is sustainable and affordable for the coming generations. I would like to extend my gratitude to the Australian Power Institute, Energy Queensland and the T.J Effeney family for this incredible opportunity and could not recommend it enough to other undergraduates considering applying for next year.

Luke Pidgeon: My experience from receiving the TJ Effeney Award and attending EECON 2024 was about the sector. Hearing professionals from across the energy sector in Australia has motivated me even more to work and be involved in the power industry. Specifically, one of the key moments for me was hearing about real world practical problems and solutions that extended from my knowledge from university about the sector.

It was invigorating to see topics from my classes being brought up in real world scenarios, especially when I could clarify with professionals later to help understand and realize some of the key situations involved. I would say though that my favorite presentation was by Laurie Curro from Western Power, where he brilliantly discussed the importance for having plans on how to complete black starts on large modern-day grids. This especially resonated with me because of the sheer complexity of our power grid as it is today, and how it will continue to grow in the future. I also really enjoyed a presentation by the CEO of Essential Energy John Cleland, where he discussed some of the challenges of the current projects facing the NSW distribution systems. Specifically, the required increased teamwork he mentioned between the distribution and transmission companies he mentioned I found profoundly interesting. Lastly, I would like to extend my gratitude to the API team, Energy Queensland and the Effeney Family for proving me with this wonderful opportunity, and the team at TransGrid for proving us with a fantastic site tour of their substation in Sydney.

Luvha Shrestha: Attending EECON 2024 as a student was an invaluable experience which offered a precious insight into the challenges and opportunities in the Australian power sector. The variety of presentations from companies operating across Australia was eye opening as I realized although the systems may be different, many of the challenges are common across the industry, with there being a broad number of ways problems are being tackled.

1. Top Two Learnings - Challenges in Decarbonising Across the Sector The conference highlighted the diverse range of problems that need solving to achieve a decarbonised energy sector. These challenges span manufacturing, equipment development, communication systems, and ensuring the stability and reliability of networks. It was eye-opening to hear about the interconnectedness of these issues and the critical need for innovative, multidisciplinary approaches. A key challenge I realised was that while the innovation in the industry is very exciting, this work needs to also make financial sense. Finding the balance between innovation and finances, I realised will be what makes or breaks this movement.

Insights into the NEM. Coming from Western Australia, my exposure to the National Electricity Market (NEM) was limited. With me accepting a graduate program based in New South Wales, I appreciated the focus on the NEM and the NSW network at EECON. The discussions helped me develop a broad understanding of the NEM's complexities and the variety of ongoing projects. With WA's power network being quite different, this exposure was both eye-opening and professionally enriching as I got to understand how although there are differences in the networks, there are also common problems shared across the states. It would have been very interesting if there had been space for more discussions between the NEM and WEM.

2. Key Speaker: Peter McIntyre (CIGRE) Peter McIntyre's presentation was a standout moment for me as he took the room through a rollercoaster of emotions. After two days of technical sessions detailing groundbreaking work in the renewable sector, his talk brought everything together with a compelling

call to action. He emphasised the importance of tackling these uncharted territories, framing them not just as daunting tasks but as critical work with an important purpose. While his message acknowledged the grave nature of the impacts of climate change, it was also empowering, instilling a renewed sense of direction and urgency within myself. His ability to tie technical efforts to a broader, meaningful cause inspired me to see my work as part of a vital collective mission.

3. Advice The presentations were very technically heavy and covered a very large number of sectors. I found it quite overwhelming as I found myself frequently very lost. However, after the first few presentations, I changed my approach. Instead of trying to understand everything, I tried to understand what the key issue the presentation was tackling and what the work added to the industry. This helped me feel less stressed and be able to get more out of each presentation. I would recommend to any students attending industry conferences not to put so much pressure on yourself to understand everything and instead use the opportunity to figure out what's out there. Then use this as a steppingstone to figure out what direction you'd like to dig further in. Additionally, don't forget to go check out the booths! There's a lot of cool techs on display that you can't easily have access to while working.

Matthew Ku: Attending EECON2024 was an absolute highlight for me. It was a fantastic opportunity to reconnect with industry professionals and gain fresh insights into the future of energy and asset management. A personal standout moment was seeing my former employer, Anthony Kwong (Fraser Nash Consultancy), present on his team's innovative machine learning project. Their algorithm, which monitors over 1.4 million distribution network assets in South Australia, is a true game-changer. Anthony's passion for leveraging technology to ensure network safety and reliability was as inspiring as I remember from working with him. Beyond Anthony's session, the conference was packed with fascinating presentations. Several major energy companies showcased cutting-edge technologies for renewable integration and smarter grid management. One session on predictive maintenance for critical infrastructure stood out, highlighting how AI is being used to improve operational efficiency and reduce downtime. The networking opportunities were just as valuable as the sessions themselves. I had the chance to connect with professionals from across the energy sector, including engineers, consultants, researchers and my API buddies. EECON2024 was an incredible experience, filled with innovation, connection, and inspiration. It reinforced my excitement about the future of energy and the role we all play in shaping it.

Matthew Hocking: Attending EECON 2024 last week was an incredible experience, especially as it marked the 100th anniversary of the Electric Energy Society of Australia (EESA).

One of the highlights for me was the site tour of Transgrid's Ultimo substation. It was fascinating to see the SF6-insulated switchgear, transformers, and control units up close, and it gave me a better understanding of how these systems keep the grid running smoothly.

The opening plenary raised some important points, like how IT advancements are changing control room operations, the growing role of DERMS in managing reverse power flow, and the challenges this

creates. The workforce shortage in the industry was also a big topic, which highlighted the need to attract and train more talent in this space.

I enjoyed Laurie Curro's keynote about the black start process at Western Power—it was a great look into the complexities of restarting the grid after a major outage. Another standout presentation for me was Felix Keck's talk on Ausgrid's community battery rollout, especially the work being done to develop new commercial and tariff models to support these projects.

Another major highlight was the networking opportunities the conference provided. Meeting professionals from across the energy sector and hearing their perspectives was incredibly helpful. Conversations often went beyond the presentations, offering practical advice and deeper insights into the discussed challenges and solutions.

Thank you to the API for your incredible support and for providing me with these valuable opportunities to attend EECON24 through the Energy Queensland TJ Effeney Award.

Rachel Robinson:

Top 2 things you learned:

1.How commonly used SF-6 is used in electrical equipment. It's a thick insulating gas that is non-toxic and commonly used in switch gear for its ability to prevent arc flash.SF-6 is also used as an insulator for switchgear, cables, and transformers in the Haymarket substation, as we saw on the tour. Unfortunately, it is an extremely potent greenhouse gas, ~23.5 thousand times more harmful to the environment than CO2. Alot of the EECON speakers mentioned SF-6, and some presented some alternative insulating options.

2. I watched a lot of presentations during the conference and experienced lots of different presentations and public speaking styles. This got me thinking about presentations more generally: how can highly technical information be presented in an engaging way that your audience can follow? One of the challenges in the power sector is engineers and our communication skills, and EECON was a great opportunity to see what presentation styles work best. I picked up 3 key things that I noticed the most engaging presenters did:

a. Hook your audience first with the main point of your topic and then go into furtherr detail.
b. Make sure that your slides convey your message in a streamlined way.
c. Make sure there is time at the end for questions.

Who was your favorite speaker? It was hard to choose a favorite speaker, but I think my favorite speech was by Cameron O'Reilly. Cameron's background was not in engineering, but in economics. The presentation made the argument that new energy infrastructure should be designed on a demand basis rather than a supply basis. The speech echoed a theme I heard in other presentations: the future of renewables is not in transmission but in local distribution. Small, localized energy zones reduce the demand on the national electricity market: less demand for long-distance transmission and larger

generation sources. I found this speech compelling, as it challenged my thinking about the future of renewable energy in Australia.

Rin Gomura: The recurring theme throughout the conference was the challenge of accommodating the rapidly increasing number of distributed renewable resources into the electricity grid. In Australia, the popular uptake of solar panels means that the intermittency of renewable generation causes high generation during the daytime and no energy produced when the sun stops shining—greatly destabilizing the grid. The challenges electrical engineers face include voltage stability, frequency regulation and harmonics. Many speakers shared their experiences and solutions to these issues, including DNSPs and the APQRC.

One of my favorite presentations was by Ty Christopher from University of Wollongong, titled "The Grid of 2034". He painted a picture of how consumers would interact with electricity in the future, and what actions and changes it took from the industry to get there. The emphasis on community microgrids incorporating local generation and local storage feeding local loads makes a lot of sense considering the ongoing rise of consumer energy resources. It also allows apartment dwellers and those who don't own a home to access renewable energy and storage, hopefully at local prices as the power was generated by their Neighbours, and not halfway across the state. Ty equated paying for electricity to our internet connection—we should be paying for bandwidth, not individual bits.

Another huge issue facing industry is the shortage of engineers to execute the clean energy transition. It is a problem faced not just in Australia, but all over the world as we all work towards a carbon neutral future through electrification.

Ryan Taghvaei: Attending EECON 2024 was a dynamic and insightful experience, blending opportunities to network, learn, and engage with the power industry. Connecting with the API cohort was particularly rewarding, as it fostered valuable discussions about the industry's future and the vital role of young professionals in driving innovation. The camaraderie and shared passion for energy solutions underscored the importance of collaboration in addressing sector challenges.

Industry representatives were well-represented, showcasing cutting-edge technologies and forward-thinking strategies. These interactions provided a practical glimpse into the ongoing transformation of the power industry and the diverse pathways for professional growth within it. The focus on decarbonization, digitalization, and resilience resonated with the conference's overarching themes and inspired optimism about the sector's potential. One of the event's highlights was David Pointing's presentation, which passionately addressed the pressing need to encourage more people into the power industry. His emphasis on fostering diversity, mentorship, and educational outreach served as a call to action for all attendees.

It was a poignant reminder that the sustainability of the sector depends not just on technological advancements but also on cultivating a skilled and motivated workforce. The freebies—practical items like wireless chargers, notebooks, and other tech gadgets—added a fun touch, sparking conversations and connections. Overall, EECON 2024 not only broadened my professional horizons but also reinforced the shared responsibility we all have to ensure a vibrant and resilient future for the power industry.

Sarina Wang: Travelling to Sydney to attend EECON 2024 as a recipient of the TJ Effeney Award was an incredible opportunity to meet likeminded students and broaden my understanding about the challenges shaping our journey towards a net-zero 2050.Beforethe conference, we were given site tour of a Transgrid underground substation in Haymarket where we were able to learn about and seeSF6gas-insulated switch gear in action. This discussion was particularly interesting as the next day at the conference, I was listening to companies promoting their SF6-free gas-insulated switchgear and other innovative technologies! One of my key takeaways from the conference was the complexity of connecting renewables to the grid. It's not just the utility-scale generation we need to worry about, but also the impact of small-scale generation from consumer resources like rooftop solar. I enjoyed learning about the technical challenges with maintaining grid stability, managing black starts and building the necessary distribution and transmission infrastructure as well as the role of the consumer, economic challenges and the importance of securing social license.

There is so much more at play and more stakeholders involved than I had previously envisioned. It was also fascinating to hear how data science and digitization are being used to tackle some of these problems. The conference wasn't just about gaining knowledge but also building connections. One of my highlights was exploring the exhibition booths and speaking with industry professionals about the work that they do and the different career pathways available. Coming home with a stash of freebies was an unexpected bonus (special thanks to MathWorks for providing me with my new favorite pair of socks)! I continue my studies, I look forward to applying these learnings, maintaining the connections I have made and exploring what lies ahead in this rapidly evolving industry. My thanks go out to the Effeney family, Energy Queensland and API for making this experience possible.

Sophie Ferraro: Thanks to the TJ Effeney award I had the privilege of immersing myself in the real-world challenges of the power industry at EECON 2024. My experience at the conference was enriching, offering invaluable insights into the power industry and its future challenges. Two standout sessions for me were Laurie Curro's presentation on black starts for large, isolated power systems and Peter Kilby and Dr Daniel Eghbal's talk on Queensland's future DSO. Laurie Curro's session discussed the complexities of initiating power systems from complete outages, emphasizing the critical planning required for large modern grids. Laurie gave a brilliant presentation which was very engaging.

Meanwhile, Kilby and Eghbal explored dynamic connections and grid visibility, presenting a strategy essential for enabling Queensland's energy transition.

Their insights highlighted innovations happening in my state, providing me with valuable knowledge about local advancements in the power sector. A particularly inspiring moment was attending the Women in Electric Energy breakfast, where Hester De Wet's talk on the importance of networking and building meaningful connections challenged my perspective. She addressed the unique strengths and challenges women face in the industry, offering strategies for leveraging relationships and reframing self-perceptions. This session inspired me to engage more confidently with industry professionals and the breakfast allowed me to expand my network and chat with other women within the industry. One piece of advice I would give is to take the time to talk with the booths and learn about the products being used in the industry. For example, one memorable conversation I had was with Civil mart, where I learned about their concrete poles. This interaction highlighted the importance of connecting with diverse industry contributors. It was fascinating to understand how their product is designed and manufactured to ensure durability over time. Thank you to the Effeney family and the API team for this incredible opportunity. I look forward to shaping a sustainable and innovative energy future.

Tracey Nguyen: EECON 2024 was an unforgettable experience with a wide variety of presentations. Topics provided valuable insights into the current landscape, shared goals, and challenges within the power sector, as well as established solutions and emerging innovations to achieve those goals. A key lesson that was learned during the conference was the importance of raising awareness about the power sector, particularly to young students, to ensure a sustainable, skilled workforce in the future. There are many job opportunities within the field due to the sector's growing needs but a lesser supply due to a lack of awareness. By introducing the sector to students at a young age (through means of school visits, talks, programs etc.), it can spark interest and help them understand the vital role that power plays in society.

I also learned about the ongoing emphasis on transitioning away from SF6technology, due to its exceptionally high global warming potential. During the conference, I was introduced to a range of alternative technologies being explored as part of the industry's broader efforts to adopt more sustainable, decarbonized energy systems. Overall, the conference inspired me to realize that I can be part of powerful changes, such as the ones previously mentioned, shaping my future in the power sector. My key advice for fellow students attending industry conferences is to prioritize networking.

These events provide an opportunity to engage with industry professionals from various companies all in one place. Not only can you deepen your understanding in the field, but you can also make a lasting impression.

Trevor Warwick:

Attending EECON was a valuable experience that highlighted the dynamic and multifaceted nature of the power industry. One of the main highlights for me was the diverse range of speakers, covering topics from transmission, distribution, and original manufacturers. This diversity provided a comprehensive overview of the industry's current state and future direction. Additionally, meeting fellow power engineering undergraduates from interstate was inspiring and gave me a sense of camaraderie with others entering this challenging yet rewarding field. Two key learnings stood out during the conference. First, I found the discussion around SF6-freeswitchgear and transformers particularly engaging, as it demonstrated tangible steps the industry is taking toward decarbonization. Equally insightful was the technical progress surrounding Renewable Energy Zone (REZ) development in New South Wales, especially regarding managing renewable energy connections. These topics showed the innovative approaches being adopted to address sustainability challenges in all aspects of the industry not just generation. One of the final talks at EECON challenged my thinking by addressing the need for Australia's energy regulations to evolve to meet net-zero targets. Which was unique as it focused on things outside of just planning and construction and encouraged everyone to remember this when working in their respective fields. For future students attending industry conferences, my advice would be to write extensively and engage with as many people as possible. Networking and taking notes are essential to retaining the important facts and information that you find most compelling.