

2022 NSW Flood Inquiry

Essential Energy Submission



May 2022

Overview

The recent flood events across the North Coast of NSW broke the record books.

Labelled a 'one-in-1000-year' event, unprecedented amounts of rain caused major flooding and widespread devastation, leading to much of northern NSW and southern QLD being declared a Natural Disaster Zone.

Tragically lives were lost, and thousands of houses and businesses were significantly damaged or destroyed. Essential Energy's Lismore and Murwillumbah depots were flooded, with the Lismore depot completely submerged. Electrical infrastructure across many towns in the Northern Rivers were submerged, including the Lismore South Zone Substation, Lismore University station, Murwillumbah Zone Substation and Lismore CBD.

A number of Essential Energy's local employees lost homes or experienced significant damage to their own or loved one's property, and as the business supported these people, their eagerness to assist with our response was testament to the strong and resilient community across the area.

Logistic and fleet teams delivered supplies into the area including food and water for our teams, new poles, crossarms, cable, fuel and specialised fleet equipment, boosting local supplies as access became available.

Access remained a key risk throughout the response, with landslips, boggy ground, roads and bridges washed away. Our crews used drones, helicopters and specialised fleet equipment to access parts of the network, however this was a slow process.

In total, 210 local Essential Energy employees were involved in our flood response, plus 215 additional crew were mobilised from more than 30 locations across regional and rural NSW.

The flooding impacted Essential Energy customers from Tweed Heads in the north through to Coffs Harbour in the south. Essential Energy enacted its emergency response plan and delivered a safe, steady and sustainable response.

Impact on Essential Energy network



Network infrastructure damage

Essential Energy infrastructure sustained significant flood damage across the network from the Tweed Valley to the Coffs Coast. Essential Energy's Murwillumbah and Lismore depots both experienced significant structural damage to the buildings, electrical infrastructure and equipment that was stored at these depots. The Lismore depot was completely submerged in flood water during the first flooding event in February, and then was flooded again during the second flooding event in March. As such, the Lismore depot will require a permanent relocation due to the extent of the damage and likelihood of future flooding. A temporary depot was set up at the Lismore Workers Sports Club.



Photo: Essential Energy's Lismore Depot on 28 February 2022

Equipment at Essential Energy's South Lismore and Lismore University zone substations were also damaged. The South Lismore Zone Substation was damaged to the extent that it was completely non-functional which is a very uncommon event. As the Zone Substation supplies 10 feeders, this caused widespread outages across the region. The Lismore Uni Switching Station was also partially submerged, damaging secondary systems in the control room on site. In addition, the entire Lismore CBD underground network was underwater for days.

Customer Impact

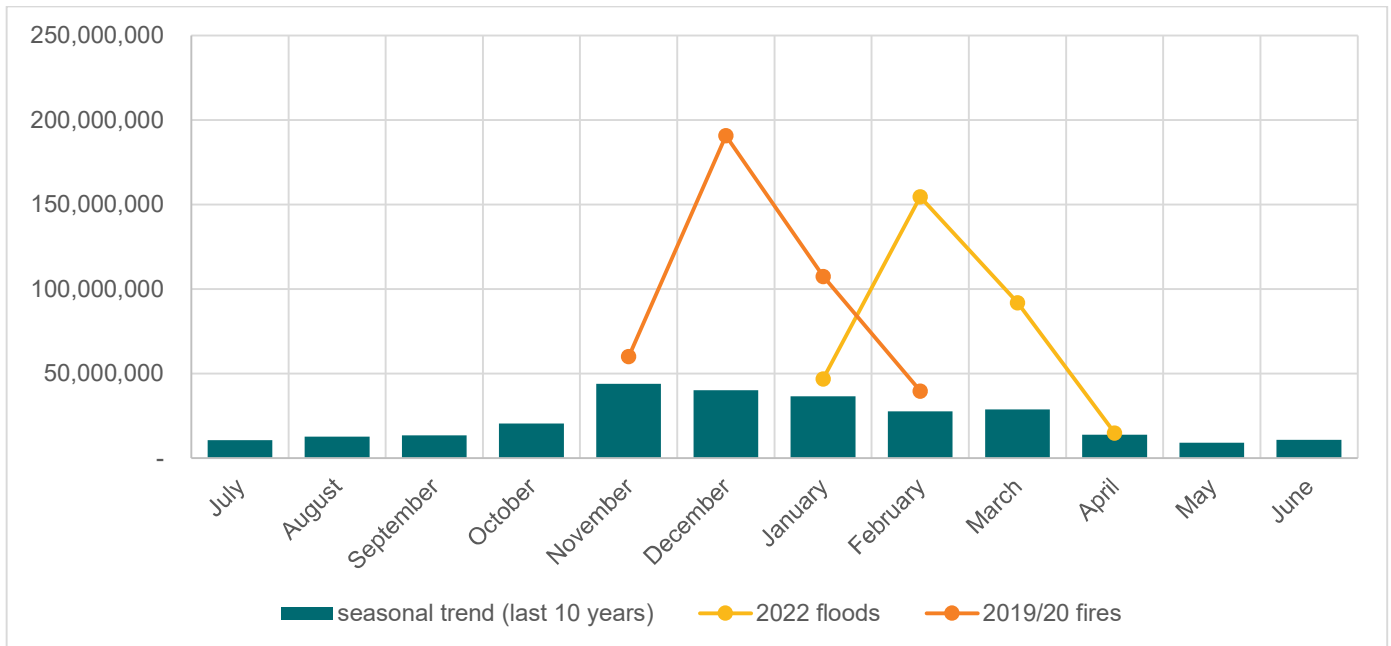
As a result of the damage to Essential Energy’s infrastructure, there were major outages across the network in flood-affected areas. A total of 69,603 Essential Energy customers were affected by associated power outages. Of these affected customers, 1,408 were life support customers.¹

During and after the flooding, 7,043 properties were deenergised for safety considerations; 5,274 properties have since been reenergised following a safety inspection.²

Over the course of the flooding event, Essential Energy had four Major Event Days (MEDs) which is unprecedented.³ On average, there are normally three or four MEDs each year across the Essential Energy network.

Across the total Essential Energy network, almost 155 million customer minutes were lost due to unplanned outages in February (compared to a seasonal average of 27 million minutes) and almost 92 million minutes in March (compared to a seasonal average of 29 million minutes).

Graph 1: Unplanned customer minutes lost across network



The customer impact of the floods in terms of minutes lost did approach but did not exceed that of the 2019/20 bushfires. Power supply to around 104,000 premises was impacted by the 2019/20 bushfires whereas around 69,603 premises had power outages due to floods.

¹ Life support customers are classified as those customers who have someone at their residence with a medical condition that relies on a continuous supply of electricity to run critical medical equipment.

² Data up to date as of 12/05/22

³ Major Event Days are declared through a trigger which is calculated in accordance with IPART Licence Conditions for NSW distributors. The declaration of MEDs can be variable year to year and are highly correlated to severe natural disaster events, such as storms, flood, and bushfires.

Essential Energy Response

Deployment of crews

Essential Energy was able to deploy 210 local employees to flood-affected areas to help with an immediate response. By the end of the first week, once roads started to open and the weather improved, Essential Energy brought in additional employees to assist with the crew already on the ground. A total of 215 additional crew travelled to the region from over 30 locations.

One of the challenges with deploying resources was the ability to provide housing and food. Essential Energy could have deployed more resources, however there were constraints with finding these employees local accommodation and, during the first week, there was limited food available in the region. Essential Energy needed to ensure the health and safety of employees while also being mindful of the impact on local community members, many of whom were also requiring accommodation and food. Essential Energy therefore relied on trucking supplies to crew members while also locating and transporting crew members from the Tweed region and the Gold Coast to overcome this challenge. It should be noted that this did not delay restoration as in the early days of the response access to flood impacted areas was limited as well as many areas being too unsafe to deploy teams into (landslips, road infrastructure damage etc).

Network restoration works

Essential Energy's response to the flooding event was immediate. Once it was safe to do so, Essential Energy began undertaking works to restore power supply across affected areas.

Temporary repairs were made to get the power back on at the South Lismore zone substation, with temporary switch boards arriving by semi-trailer. It will take over 12 months to completely repair the zone substation with permanent works to ensure a robust and long-term power supply.

Through skilled planning and support from Engineering and System Control, Essential Energy teams worked to bypass the secondary systems to restore supply to both the Lismore University and East Lismore Zone Substations within four days of the water receding, ensuring power for many rural customers and key areas of Lismore

In contrast to normal outages, Essential Energy was able to restore outages in less populated areas more quickly than in the more populated areas. The Lismore CBD was a key focus area for Essential Energy with the entire underground network underwater for many days. It took some time for the water to recede to enable access to the underground infrastructure to inspect and undertake and repairs. Every asset needed to be checked, tested, repaired or replaced. This also had to be repeated across the overhead network, which is unique in the Lismore CBD as parts of the overhead network is positioned under building awnings. Given the age and location of this infrastructure, Essential Energy concluded it would be difficult to repair the existing aged network and instead arranged for the mains to be rerouted, which required specialist teams to undertake the work. More than 50 padmount, chamber stations, switching units and cabinets were tested, repaired, or replaced along with 98 under-awning main boxes, cable runs and cubicles.

Essential Energy utilised various types of equipment to restore energy supply across other impacted areas of the network. One of the biggest challenges with restoring the network was gaining access to locations. Many sites were difficult to access due to floodwater, landslides, damaged roads and bridges, or dangerous terrain – these conditions persisted for some time, even following recession of floodwaters and improved weather.

While Essential Energy utilised specialised equipment including sucker-trucks, excavators and all-terrain vehicles where viable, there were still frustrating delays with getting pieces of equipment to where was needed due to limited ability to gain access.

Helicopters and drones proved to be instrumental in Essential Energy's response by providing access and assisting with restringing powerlines in many rural areas. Essential Energy promptly arranged for multiple helicopters to be deployed and was also able to provide a helicopter to the State Emergency Service for their use. However, getting helicopters in the air was hampered for some time due to poor weather conditions and visibility. The arrival of the Defence Force later on in the response was helpful to Essential Energy's as it provided an additional source of information about the accessibility of various locations.

Another challenge was the outages to communications networks. In Lismore, the main Lismore Telephone Exchange was inundated and needed repair. With no access to telecommunications, Essential Energy crews needed to communicate via radio networks, and switch the network manually which impacted the efficiency of our operations. It also made it more difficult to communicate with customers and the broader community about safety, restoration times, and other customer issues including reconnection processes.

Essential Energy deployed dozens of medium to large generators for critical loads, including evacuation centres and the Telstra exchange in the Lismore CBD, to provide power while crews worked to restore power on the network.

Second flooding incident

In late March 2022, a second flooding event occurred in much of the North Coast and Mid North Coast areas. This event caused further delays to restoring power supply in some areas as Essential Energy needed to wait until water receded. Given Essential Energy had already mobilised crew and equipment to the area, power was able to be restored as quickly as possible.

Reconnection works

In addition to restoring the power supply across the network, Essential Energy also needed to be mindful of the safety of having power supply to individual premises which had been impacted by flooding and water damage. Essential Energy needed to deenergise 7,043 properties after flooding due to safety concerns (generally stemming from flood inundation of their switchboards or entire installations). Once these properties had been disconnected, customers needed to follow a three-step process to enable reconnection:

1. Engage a licensed electrical contractor to inspect their premises for safety and compliance and make any necessary repairs to the premises' switchboard and internal wiring,
2. Once the contractor has completed the inspection, they would log a Certificate of Compliance for Electrical Work (CCEW) with Essential Energy and leave a copy with the customer; and
3. Call Essential Energy to have power restored or arrange for a Level 2 Accredited Service Provider (ASP) to restore power to the property.

As of 12 May 2022, 5,274 properties have been reconnected following the completion of this process.

Reconnection timeframes

Essential Energy heard from some customers about frustrations with the timeliness of this process. Essential Energy recognises the importance of having electricity restored to help people begin the recovery process but is also responsible for ensuring that the safety of customers, community, contractors and employees is the priority.

Accordingly, Essential Energy sought to streamline the reconnection process as much as possible.

Essential Energy also monitored the availability of electrical contractors to conduct safety and compliance checks as well as tracked the time it took for power restoration requests to be actioned by Essential Energy following the submission of the CCEW. There was never more than 150 people waiting for Essential Energy to action power restoration requests.

It is Essential Energy's view that the sheer geographical scale of these floods and the extent of households and businesses affected, as well as the challenge of getting access to many premises, meant that some delays to the reconnection process were unavoidable. In some communities, especially smaller communities, electrical contractors were difficult to find as most were impacted directly from the flooding or inundated with customer requests for assistance. In Lismore, electrical contractors set up hubs which provided Essential Energy with a channel for information-sharing enabling a more efficient process.

The Electrical Trades Union (ETU) also collaborated with Essential Energy and provided free labour and equipment which was helpful for reconnecting customers.

Stand-alone generators

While Essential Energy did deploy stand-alone generators to some customers, considerations needed to be made about where it was appropriate to do so. There were not enough generators for all customers, but also deploying generators is quite time-consuming and not always the optimal use of Essential Energy resources or the best solution for the customer. Deploying generators requires the delivery of generators, training customers on the safe use of the generator, having access to fuel, and collecting the generators when no longer required. Again, it also requires access to premises.

As such, Essential Energy set some parameters for where to deploy generators. Generators were deployed for:

- > Critical loads e.g. evacuation centres
- > Customers in areas of network outages lasting 10 days or more
- > Life-support customers

Additionally, Essential Energy implemented a generator support package for business customers where our teams were continuing with repairs. Under the package Essential Energy reimbursed the full cost of generator hire, fuel and labour to connect the generator to their installation for impacted businesses.

Customer initiatives

During and following the flooding, Essential Energy has been focused on ensuring best outcomes for customers who are experiencing a very difficult situation. As Essential Energy was able to deploy crew in the affected areas, the business was able to begin providing immediate on-the-ground assistance to customers and the community.

Customer hubs were set up in East Lismore, Lismore CBD, Ballina and Coraki where people could seek assistance in person directly from Essential Energy employees. Essential Energy also visited evacuation centres and community hubs to provide in-person customer service support. Essential Energy also increased staffing levels across our contact centre to support customers calling in with queries and made calls to all life support customers in areas of network outages to do a welfare check.

Essential Energy also introduced a number of initiatives for customers to minimise financial impacts, including:

- > Waiving \$350 reconnection fee out for flood-affected customers
- > Pausing all Disconnections for Non-Payment in flood affected areas whilst the Natural Disaster continues
- > Pausing customer communications for Private Asset defects in flood affected areas
- > Repairing or replacing any private assets which have been damaged or destroyed by flooding on a like for like basis at our cost
- > Contributing \$600 towards supporting customers in the cost to re-connect to our network (eg if their house is total loss) for flood impacted customers within our network for a period of two years
- > Providing generation to businesses, vulnerable and life support customers where the customer's premises is ready to connect, and network supply remains unavailable due to network damage.

Essential Energy ensured customers, communities and stakeholders were kept informed about power restoration works and customer initiatives. Essential Energy provided daily operational updates to stakeholders and media, participated in 24 media interviews and shared daily public updates on social media.

Essential Energy also installed 14 electronic signboards in prominent locations around the flood affected areas to assist customers with specific information associated with power outages. These proved to be extremely beneficial given many customers' challenges with accessing digital media because of limited cellular coverage, especially in the early days of the event.

Essential Energy also developed hard copy fact sheets and hand distributed throughout the flood recovery area, including to evacuation centres and recovery hubs. The fact sheets covered a range of information, including safe generator use, cleaning up with excavators and bobcats, 'Look Up and Live' safety message, and reminders to stay away from fallen powerlines. Additionally, a widespread communications campaign was implemented about safety via radio, social media, message billboards and on-the-ground staff.

Resilience of network

No electricity network can be 100% resilient against extreme weather events, particularly not in a one-in-1000 year flood events such as that which took place on the North Coast. However, network safety and reliability remain the key priorities for Essential Energy during extreme weather events. Essential Energy recognises that electricity plays a critical role in everyday life and electricity is a vital support for other services that people rely on such as communications and water/sewerage.

Disaster preparedness

Essential Energy, as part of its business-as-usual disaster preparedness processes, continually evaluates flood risk and has in place robust flood management plans. While Lismore has been regarded as an area of flood risk, the sheer scale of these 2022 flood events meant these plans were inadequate.

Essential Energy considers the business's fault and emergency response capability and demonstrated performance is strong. It is not economically efficient to resource up to a peak emergency event because for most of the year those additional resources would not be utilised. Instead, Essential Energy has adopted a model which draws upon our skilled workforce spread throughout regional NSW.

This model has resulted in a very strong fault and emergency capability because:

- > Essential Energy has a large network of depots distributed across NSW from which resources can be drawn when required, which provides the additional benefit of managing fatigue.
- > Essential Energy's field employees are multiskilled and can be deployed to most fault and emergency events. This contrasts with some distribution networks who operate with specialised crews that can only perform certain functions.
- > Strong relationships with partnering contracting businesses that provide timely and quality support to Essential Energy teams in events supporting with specific service offerings, equipment and capabilities.
- > Essential Energy has undertaken recent initiatives to increase our underlying fault and emergency capability including:
 - Field portal - digital capability provides instant access to information and significantly assists non-local employees responding to events.
 - Fleet support – provides overnight servicing and support which increases productivity and safety.
 - Drones – help identify damaged assets in inaccessible areas.
 - Stores upgrade –allows quicker supply of required materials.
 - NEARA – Use of LiDAR data to understand topology and support network rebuild.

Essential Energy has not required line worker support from other electricity networks over the last few years. In fact, Essential Energy has helped other distribution networks during major network incidents not only within Australia, but also internationally. This demonstrates that not only are current resource levels adequate to maintain reliability, but Essential Energy is also extremely well positioned to respond to extreme events impacting our network.

Essential Energy did receive offers of support from other distribution network businesses which was appreciated and considered. Endeavour Energy was able to provide some unique equipment to Essential Energy which enabled much faster repairs to a substation.

Investment in resilient infrastructure

There can be a trade-off between swift restoration of power and rebuilding infrastructure for a more resilient future. It is clear there are expectations for Essential Energy to deploy appropriate power restoration solutions quickly, and at scale, during disaster response. However, extreme weather events which damage infrastructure also provide an opportunity to replace infrastructure with a more resilient solution.

Following any network damage, Essential Energy wants to avoid rebuilding lines and other infrastructure which will be in place for many decades when another technology is available, which is capable of delivering a more reliable, resilient supply of electricity at a lower cost.

However, generally customers need power restored as soon as possible which does not always allow Essential Energy to put in place new solutions that may be more complex or time consuming to install. This requires Essential Energy to make decisions in real time, without the benefit of more detailed analysis about which is the optimal solution.

In addition, some solutions for resilience may not always be in the customers' best interests. For example, while underground networks are subject to less frequent faults compared to overhead networks, they can still be damaged in bushfires or floods, and can take longer to repair due to locating faults, delays associated with sourcing specific assets, and possible civil works. Power restoration was delayed to the Lismore CBD as Essential Energy needed to wait until water receded and it was safe to inspect and repair the underground network. One Essential Energy customer was happy for Essential Energy to replace a damaged underground network on their property with an overhead network because it meant that power supply would be restored much more quickly.

Replacing overhead powerlines with underground networks would see a significant reduction in affordability for our customers. Essential Energy has estimated that undergrounding the existing network would see customers' bills increase six-fold.

Stand Alone Power Systems (SAPs) may be another tool for Essential Energy to deliver a more resilient power supply to some customers. In areas prone to extreme weather, difficult to access and/or are on the fringe of our network, SAPs may enable a more reliable power supply for some customers. Essential Energy is currently trialling a number of SAPs across the network to understand where they are the optimal solution. Again, SAPs are not 100% resilient against extreme weather events, and can take longer to repair.

One of the challenges with resilience against extreme weather events is the uncertainties involved with knowing where to target investments aimed at improving resilience.

Essential Energy is currently engaging with customers on their preferences for investment in resilience initiatives as part of the development of Essential Energy's 2024-29 Regulatory Proposal which will outline investment priorities over this period. This engagement so far has confirmed customers do see resilience as a priority; the next phase of engagement will seek customer feedback on what level of investment Essential Energy should make to improve resilience of the network in the next regulatory period (2024-29). Understanding customers' preferences on this issue is vital given Essential Energy has an obligation to ensure expenditure decisions are prudent and efficient so that customers pay no more and no less than required. Careful assessment and consideration of available options to inform expenditure decisions is required to achieve this obligation.

Costs

As the North Coast floods inflicted widespread damage to Essential Energy assets, it has and will continue to impose unforeseen costs on the business. It is estimated that the North Coast floods will cost Essential Energy approximately \$38.6 million in total restorations costs, of which up to \$12.1 million may be recoverable through insurance. As of early May 2022, Essential Energy had incurred \$23.9 million to date.

Area of network impact	Amount (\$M)	Insurance Status
Zone Substation Rebuild/Repairs (2)	5.0	Insured
Recloser/Regulator Repair/Replacement (70)	1.0	
Distribution Padmount Transformer Replacement	2.0	
Labour - 200 FTE for 4 weeks @ 12 hours / day	5.0	
Accommodation and Sustenance	2.8	
Fuel	0.8	
Customer support - de-energise and re-energise 5,000 customer premises	2.5	
Mobile Generation	1.0	
Repair Damage to our Telco Network	1.0	
Aerial Support - 4 Helicopters, 5hrs/day, 2 weeks	0.5	
Vehicles destroyed at Depot (8)	1	Insured
Murwillumbah Depot Damage	1	Insured
Lismore Depot (Total Loss)	15	Insured for \$5.1M
Total	38.6	
Total Uninsured	26.5	Pending damage assessment
Total Insured	12.1	Pending damage assessment

Essential Energy insures its assets where possible and has insurance via iCare (Treasury Managed Fund) that covers most large value fixed assets, but not poles, wires, underground network and padmount substations. Variable costs such as mobilising a significant labour force to respond to an event are often difficult to claim. The costs that are not covered by any insurance need to be recovered through other channels. There are two options available to Essential Energy:

1. Cost pass through application: The regulatory framework allows distribution networks to recover costs for events that were unexpected at the time of their five-yearly Regulatory Proposal process if the costs are material (more than ~\$10M in one year for Essential Energy). Networks are also required to consult with their customers on the proposed costs to be recovered and demonstrate that the costs are truly incremental to operations and were prudently spent. Distribution networks then make an application to the Australian Energy Regulator (AER) for those costs to be passed through to customers via higher network charges in future years following the event.⁴
2. Government support: To avoid passing the costs back to customers after a major event, State and/or Federal governments could provide direct funding to Essential Energy to cover the insurance shortfall from flood costs.

Essential Energy is conscious of the customer impact of passing through flood costs onto network charges. Customers continually tell us that our services must remain affordable and as a result, Essential Energy has committed to placing downward pressure on network prices. It is also apparent that the current economic environment will see further increases to the cost of living and wholesale energy prices for at least the near future, which is likely to compound customer concerns of any bill increases which would occur via a cost pass through.

⁴ Essential Energy filed a cost pass-through application to the AER to recover remediation costs after the 2019-2020 bushfires. The AER approved a total of \$31.3M that will see residential customer bills increase by \$11 per year and small business customer bills increase by \$42 per year, over the 2022-2023 and 2023-24 pricing periods.

Lessons

Communications outages

The outages to the telecommunications network had a significant impact on Essential Energy operations during the restoration and recovery process. Crews needed to rely on radio to communicate with each other which was less efficient and had greater limitations. Crews were also unable to utilise our current switching capability using cellular networks which hampered network restoration and required teams to manually switch the network and communicate to our control rooms via our radio network. Outages to the telecommunications network also made it more difficult for Essential Energy to communicate with crews from other organisations such as the SES, police etc as well as customers.

Some of these outages were caused by power outages to the communications towers. Essential Energy recommends that telecommunications providers employ back-up batteries and generation for critical infrastructure such as communications towers. While every endeavour is made to keep power on to these sites, in extreme weather events it cannot be guaranteed. The location of the communication towers is often in remote areas with difficult terrain, meaning any restoration work may be difficult, costly, and take some time due to lack of access. It is also vital that this back-up generation is inspected regularly and maintained as required, given these events generally happen with little warning.

It would also be advantageous for telecommunications providers to provide Essential Energy with a list of their critical infrastructure to assist us to prioritise restoration efforts to support the community. This request was made of telecommunications providers during this event, however the information was delayed and inaccurate which was challenging.

Data limitations

Essential Energy found that having limited access to data and modelling impacted on Essential Energy's response. Essential Energy needed to rely on real-time river height gauges which reduced the ability of Essential Energy to understand which areas of the network would be impacted and when. Having access to more detailed and sophisticated data and modelling would enable Essential Energy to better respond to flooding emergencies.

Emergency Operations Centre

On the whole, the Emergency Operations Centres (EOCs) provided an excellent forum for knowledge sharing, communications, and joint planning.

To improve the efficacy of the joint responses, the organisational representatives deployed to the EOCs should be empowered to be decision makers. Essential Energy noted that various decisions need to be sent elsewhere for final approval which delayed response times. This could easily be overcome if the EOCs are staffed with representatives that are empowered to make decisions in real time. Additionally, telecommunications providers were notably absent from the EOC.