Resilient Communities—Adelaide Hills

What happened; what were the consequences; and how can we improve things for the future

Review of the extreme weather event and subsequent power outage 27/28 December 2016 from the community perspective

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Executive summary

This review looks at the consequences of the extreme storm that buffeted the Adelaide Hills and the mid-North of South Australia at the end of December 2016. The extreme weather caused damage resulting in a power outage that lasted in some townships up to five days. The consequences of the power outage included lack of access to water and inability to use septic systems, as many Adelaide Hill's communities do not have mains water. By far the most alarming consequence was the lack of communication, both from and to communities. What this meant was that residents were unable both to access emergency warnings, but were also unable to initiate warnings. As these townships are at high risk of bushfire, this increased their vulnerability.

However, at the outset it is vital to point out that this review is not intended to point any blame. In fact, quite the opposite: it is intended to provide some understanding such that a similar event might provide better outcomes for residents in the area.

2016 was an unfortunate year in regard to extreme weather events. In late September 2016, tornadoes ripped through the mid-north, tearing down electricity pylons, causing a state-wide blackout—a System Black. Former police commissioner, Gary Burns, was requested to present an 'Independent Review of the Extreme Weather Event South Australia 28 September –5 October 2016' (Burns, Adams & Buckley, 2017) to the Premier of South Australia. Included in the report's recommendations and pertinent to this review from Resilient Communities—Adelaide Hills are the following:

Recommendation 33
Develop practical policy outcomes to support resilience (e.g. the 72-hour model) and promote this broadly to community through media, awareness campaigns, policies etc. Research should be undertaken to gain insight into the types of messaging and activities that have the most impact on sustained behaviour change within the community before committing to a particular model.

Recommendation 60
Develop a State Relief and Recovery Plan as a distinct part of the State Emergency Management Plan which should include: a) potential locations for suitable facilities for relief and recovery centres which: are in locations safe from hazards such as flooding and bushfire; and, have appropriate access and suitable ablutions; b) formalisation of roles and capabilities of non-government organisations such as Red Cross.

This review includes the voices of many Hills' residents and business owners who either attended the community meeting held in Mylor on 12 January 2017 or who contributed in writing later. Their voices appear in text boxes where relevant throughout the review. Many of the sentiments expressed echo those of the 'Burns Review'.

Introduction—the context

In addition to the larger townships of Mt Barker, Stirling, Aldgate and Bridgewater, the Adelaide Hills is home to a number of small communities, most of which are only 25–30 kms from the Adelaide CBD. The larger townships, all of which hug the South Eastern freeway, are fully serviced with essential services: electricity; mains water and sewerage; landline (currently being replaced by nbn); and mobile coverage. However, many of the smaller communities, of which Mylor is one, lack some of these services, in particular, mains water and sewerage.

Notable is that the Adelaide Hills are located on the outskirts of Adelaide, the capital city of the driest state on the driest continent. There is, therefore, an ever present danger of bushfire for residents and properties. Taking this together with the lack of mains water, smaller communities within the Adelaide Hills could be considered particularly vulnerable.

This review, although written by a Mylor resident, captures the voices of many Hills dwellers, particularly those that reside in smaller communities.

Essential services

Power, water and sewerage services are all considered to be essential services under the Essential Services Commission Act 2000 (*Essential Services Commission Act 2002)*.

In addition to power, water and sewerage services, it could well be argued that telecommunications is also essential: indeed, as will be shown later in this paper, the SA State Government considers it to be so, particularly in an emergency situation.

Power

Whilst the take up of solar panels has been enthusiastic, few residents are self-sufficient. Most remain connected to the grid and therefore reliant on SA Power Networks (SAPN). Power outages are frequent in the Adelaide Hills, particularly in the smaller communities. Falling tree limbs, storm damage or possums on the wires can all cause a power outage that may last between a few seconds to a few days (the longest I can remember over the last 20 years prior to December 2016 was 2½ days). Residents are increasingly purchasing generators in order to power their homes in an extended outage.

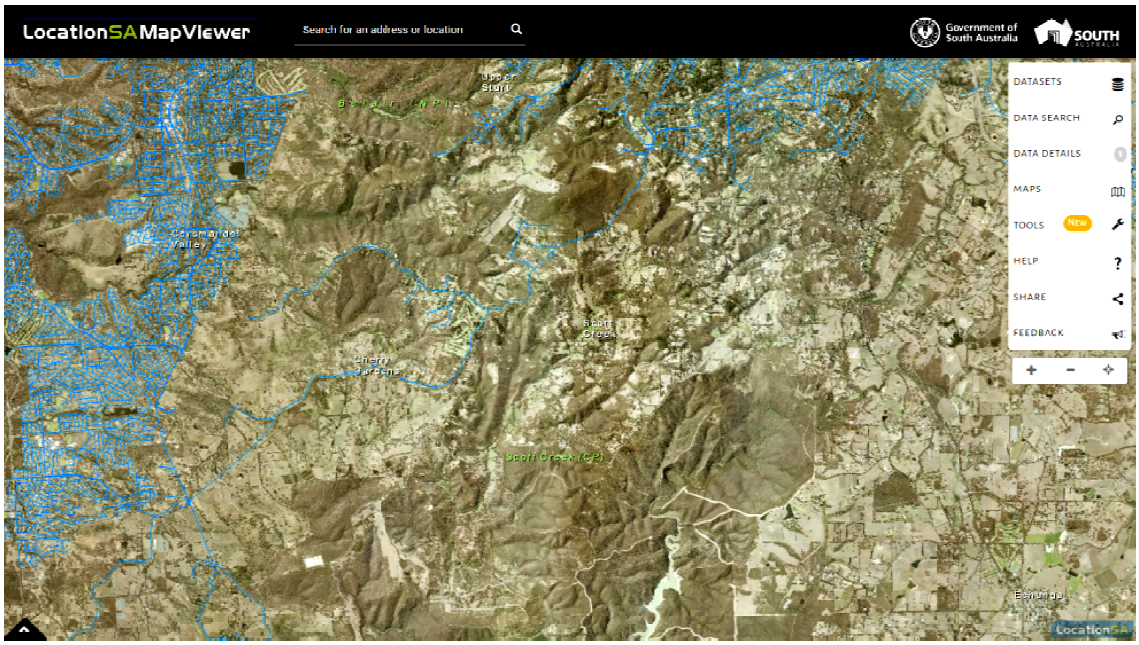
Any power outage will cause disruption, but most residents are prepared for and can cope with an interruption to supply if the duration is no more than a few hours and—significantly—they are accurately advised of anticipated power restoration. However, any power outage is acutely felt by residents of the smaller townships, as without power they cannot use electoral pumps to access water.

> *Today's modern, digital and highly technical society involves complex networks, communications and infrastructure, which are often linked and interdependent. Electricity is, with few exceptions, integral to all our systems, needs and requirements as a modern society.*
>
> *The loss of power quickly impacts upon essential services, critical infrastructure and the very fabric of our society. Electrical power is often taken for granted but modern society (at all levels) is heavily reliant and dependent on it (Burns, Adams & Buckley, 2017, p.13).*

Water and sewerage

In contrast to the larger townships, small communities in the Adelaide Hills have neither mains water nor mains sewerage services (see figure 1). The blue lines on the map below indicate water mains infrastructure (Government of South Australia, undated).

Figure 1: Water—just out of reach!



Mylor is fairly typical of Hills' townships: the nearest mains water supply is about 5kms away. With no available mains water, householders are responsible for harvesting, storing and pumping their own rainwater supplies to the residence. This requires power.

Dealing with household sewage is also a responsibility of the Hills householder. Whilst SA Water boasts of 488kms of wastewater mains pipes and nine wastewater treatment plants across the outer metro area, the smaller Adelaide Hills communities are not serviced by this system. Some older properties may still utilise 'run off' septic systems. However, if these need to be replaced—and certainly in the case of newer properties—installation of an environmentally friendly domestic septic system is mandatory in order to protect the unique Hills environment. These systems also require a pump—and therefore power—in order to dispose of waste. Because sewerage is, quite rightly, a health issue, domestic septic systems are often closely monitored by local councils.

In summary, power is essential, both to access water and to dispose of waste.

Communications

In the 21st century, not only are we acclimatised—at a minimum—to connecting with family and friends, but also being informed of the world around us and the influence and impact that might have on our lives. When that access is denied, not only are we unable to connect with and check up on friends and family—including those who may be vulnerable and for whom we have responsibility—but we also lack access to emergency messaging which might be vital to our safety. Thus communications must also be regarded as another essential service.

Communicating in a connected world—via telecommunications or over the internet— relies not only on having a personal power supply within the premises (a charged-up mobile, a power connected router), but also network accessibility: powered mobile base stations and telephony exchanges

beyond the premises. Mobile base stations have back-up battery power, but it is limited to a few hours, dependent also on traffic. Battery back-up also exists at telephone exchanges, although they last considerably longer than mobile base stations.

Landlines have always been a reliable form of communication for as long as our oldest residents can remember. As long as premises retain a corded landline, the service is not interrupted by a power outage provided the battery backup at the exchange does not run out of power. Many people have replaced corded with cordless landlines, which require power to the residential base station. Thus, in any power outage, cordless landlines will no longer operate.

Mobiles are a relatively recent technology. Because of the high cost of line rental for landlines, many people are now opting to discontinue landline services in favour of mobiles. However, reception across the hills is unreliable and there are still a number of black spots. Mobile phone technology requires power, both at the base stations and for the handset.

Communications become essential when responding to emergencies. The SA Government stresses in its State Emergency Management Plan that keeping the community informed is key to reducing the risk to communities. It is worth re-iterating this in full:

> *Providing information to the community is a key aspect of emergency management. It can assist to prepare the community for an emergency and lead to safer environments and the development of appropriate community and individual plans. Providing information at the right time in the lead-up to an emergency can ensure that community and individual plans are implemented so as to reduce the risk to the community. Timely and accurate information provided to the community during an emergency can ensure that plans are applied appropriately, with the aim of minimising the loss of life and property. Providing information after an emergency can assist with the recovery of the community and reduce the ongoing effects of the emergency.*
>
> *If an emergency has occurred or is occurring, the control agency will issue emergency information or warnings to communities. These warnings may include specific advice or directive actions that need to be taken. The South Australian Government manages the Alert SA website and the Emergency Alert service which may be used in an emergency to warn or alert the community. (State Emergency Management Committee, 2016a, p.15)*

What is stressed here is the accuracy and timeliness of emergency information: unreliable or outdated information has no currency. Because emergency messaging is sent via mobiles and modems, power becomes critical. Once power is lost, neither computers nor modems will work. Mobiles will only work if charged and—critically—as long as the mobile base station continues to have power: once power is lost, towers are reliant on limited battery backup[1]. So, if the mode of messaging relies on power then, in an outage, there is no guarantee that messages will be received, making messaging sent via mobile apps and websites redundant. This leaves warning information and emergency messaging to emergency broadcasters, such as ABC 891: Hills residents are well trained in reaching for their battery-powered radios in order to receive critical emergency information.

[1] The Australian wiki 'Whirlpool' is a community led forum and includes discussions concerning telecommunications and nbn. One discussion concerned how long uninterruptable power supply (UPS) lasted during the System Black in SA in September 2016: http://forums.whirlpool.net.au/archive/2570391

Summary

Clearly power—itself an essential service—is essential in providing other services on which communities depend for their health and safety.

Some residents own generators, allowing them to draw on and dispose of water. Others don't have this luxury, but from long experience know they have 'one flush' left in the toilet and that they should keep fridge and freezer doors closed until the power returns.

However, generators provide no advantage in facilitating communications: not only is there the potential in an extended power outage for deterioration of health and safety, of greater alarm is the loss of communications, placing vulnerable communities at further risk.

Furthermore, it should be noted that SAPN may turn off power in a bushfire situation.

> *Mains-fed electricity can be interrupted due to a fault, damage to the network caused by fire, or because supply has been turned off to minimise the risk of fire ignition. (Legislation introduced after the Ash Wednesday bushfires allows SA Power Networks to turn off power to reduce the possibility of a fire starting from the interaction of the environment with the distribution network) (SAPN, undated).*

Given that power was lost for five days, as described over the following pages, this is a timely reminder to communities, emergency services and policy makers to consider whether current responses are sufficient to keep communities safe.

Extreme weather event December 2016

Shortly before midnight on 27th December 2016, fierce storms raged around the Adelaide hills and parts of the mid-North for a number of hours. Winds of up to 120km/hour brought down trees into homes and onto power lines, whilst torrential rain caused flooding in a number of catchment areas, leaving 183,000 households without power for extended periods. The damage was so severe that many communities were left without power for up to five days, longer even than the outage experienced by Eyre Peninsula communities during the state-wide blackout in September 2016.

Despite community resilience, a power outage of this duration was unprecedented and left many individuals having to cope with storm damage (many were unable to access or leave their properties); a lack of water and sewerage; and no access to telecommunications.

Thus the nature of the event was exacerbated by storm-associated problems compounded by loss of power and the multitude of consequences. Spokesman for SA Power Networks stated:

> *This is the worst storm we have ever experienced in terms of minutes of supply lost for customers and in terms of the amount we will need to pay in Guaranteed Service Level payments. (Langenburg, 2017)*

SAPN continued by explaining that most of the damage had occurred in the Mount Lofty Ranges and the Mid North and they acknowledged that the outage would be extensive.

On New Year's Eve, four days after the storm event, the following communities were still without power: most also had no mains water or ability to run their septics.

Chapel Hill	Basket Range
Echunga	Ashbourne
Paechtown	Lenswood
Totness	Summertown
Bradbury	Heathfield
Longwood	Mylor
Scott Creek	Aldgate

A number of Mylor, Mt George and Stirling residents remained without power into the fifth day.

Indeed, it took a number of days for CFS, SES and local council staff to clear the storm damage in order that SAPN might reconnect the power. Delays often occurred because emergency personnel had to wait for SA Power Networks to make fallen powerlines safe before crews could clear fallen trees and limbs. Similarly, SAPN could not access some of their equipment until emergency personnel had cleared trees and limbs. SA Power Networks explains why the repairs took so long in its press release.

> *Sections of the network were significantly damaged by fallen trees, tree limbs and vegetation and other debris as a result of winds gusting up to 125kmh. To ensure their safety, crews were instructed to wait until it was safe to access equipment.*
>
> *The damage to the poles and wires was significant and required complete rebuilding of parts of the network. In some areas this work could not proceed until trees and debris were cleared from power lines.*
>
> *We had to replace a number of poles, transformers and other equipment and restring fallen power lines – jobs that took time and required careful coordination. (SAPN, 24 March, 2017)*

Disruption to essential services

All essential services—power, water and sewerage, and telecommunications—were lost to householders in the smaller Hills' communities, in many places for up to five days.

The Essential Services Commission of South Australia (ESCOSA) conducts reviews of severe events that have a major impact on the distribution network. This has been considered one such event: the review is currently underway (ESCOSA, 2017) and will be released in June 2017[2].

The extreme weather event was, unarguably, unprecedented:

> *On Tuesday 27 and Wednesday 28 December 2016, severe and sustained storm activity caused some of the worst damage ever seen to the electricity network in the Adelaide Hills, impacting 183,000 customers. This was the largest power outage event ever recorded on the SA Power Networks system - in terms of average minutes of lost supply (SAIDI) and subsequent Guaranteed Service Level payments (totalling more than $19 million). In fact, that single event resulted in more minutes of lost supply to customers than the SA Power Networks distribution network typically experiences in a whole year.*
>
> (Energy Networks Australia, 2017b)

Across the Hills, residents experienced problems, not only with access to their own properties, but also to neighbouring townships, impeding their ability to purchase vital supplies.

There is a real problem with powered gates and roller doors in a power outage.
There were no street lights
Storm water running into houses and causing potholes in roads
CFS powered doors were not opening
There was a fuel shortage for cars and generators
Service stations couldn't pump fuel
No access to money as banks and ATMs not working

Whilst residents can prepare themselves for an emergency, they are rarely prepared for such a long lasting one. The elderly and more vulnerable community members were placed at particular risk.

The shops ran out of candles.
Food spoilage
No cooking facilities
Care alert system not working
No power for air conditioning, required for those with medical conditions
Medical devices need power: nebulisers, CPAP and BIPAP (oxygen) machines
Pharmacies, shops and doctors were unavailable
Meals on Wheels had two weeks of meals in freezer

Landholders with animals faced particular challenges:

Safety and security of stock was compromised as electric fencing stopped working.
Lack of pumping stations for livestock troughs
There was no water for animals and pumping systems couldn't be operated

[2] Confirmed in telecon with ECOSA 30 May 2017

The power outage also had an economic cost. Many businesses were forced to close. Some communities, such as Mylor, have a small but vital retail outlet. These small 'corner stores' not only lost stock but lost the ability to supply local communities. The economic costs to business are discussed later in this review.

The extended power outage was further exacerbated by the damage and destruction of the storm and the constraints placed on volunteer emergency responders who were overwhelmed by the enormity of the response task.

Roads closed due to downed trees, power lines and stobie poles
Downed wires were not adequately marked
Signage for road closures needed improvement: signage needs to be before the road closure and at a junction...some roads only had red and white tape with no road closure sign—difficult to see and could be dangerous if unexpected

Rapid deterioration

What became clear and is demonstrated in figure 2 is the affect of the extended power outage on other essential services.

Figure 2: Affects of power outage on communities (ie without mains water)

	Day 1	Day 2	Day 3	Day 4	Day 5
Water					
Sewerage					
Mobile phone					
Landline					
Alarms: personal, fire, security etc					

It may be surprising to recognise how quickly a home becomes unliveable without water and a waste system. Clearly, without electricity for pumps, one can neither access nor dispose of water and waste. Water must be sourced from somewhere, which means filling and carting receptacles. This poses an enormous strain on the frail, the elderly or those with young children. Furthermore, five days with no access to water and sewerage poses a particular strain when neighbouring townships may also be struggling with the same plight.

Septic systems started deteriorating

Continuing to use domestic septic systems when there is no power to operate pumps is ill advised, as the system is then easily damaged.

> *If you continue to use water by flushing toilets, washing dishes, or even taking showers, the septic tank continues to fill. When effluent doesn't get pumped to the drainfield, the pump tank becomes full and effluent may back up into the house! (King Country, 2016)*

> *A period of as little as two days without power can cause a total breakdown of the treatment process, resulting in blocked pipes or worse still, above ground irrigation of untreated raw sewerage. (Advance Enviro-Septic, 2015)*

Even those systems that appear to be designed for an extended period, do not claim to last for five days in the event of a power outage:

As the Ecosafe plant has only one mechanical component and adequate built-in storage, in the event you may continue to dispose of household wastewater as usual for up to 3-4 days. (EcoSafe Wastewater Treatment, undated)

Furthermore, the Australian Government Department of Health advise that with no operating sewerage system, diseases can be caused by germs, including from:

- bacteria: salmonellosis, shigellosis, diarrhoea, trachoma, melioidosis;
- viruses: gastroenteritis, Hepatitis A and
- parasites: giardiasis; dwarf tapeworm, threadworm or hookworm infection; strongyloidasis.

Clearly, for the health of individuals and the community, the maintenance of septic systems is imperative.

Many of the hardships residents face during an extended power outage can be alleviated with a generator, which can run not only fridges and freezers, but permit access to water and allow usage of residential septic systems.

> We stayed in our home, knowing we were well equipped with a generator, kerosene lamps, camping supplies and a dual fuel cooker. What we hadn't anticipated is losing communications, particularly the landline. As it was, we had a sick child—if she had got worse, we would not have been able to call the doctor, but would have had to take her to the emergency department.
> It was only after the power returned that we remembered we shouldn't have used the envirocycle—it didn't smell too healthy for a number of weeks. But we've been lucky—if it had lasted another day, we could have been forking out $10,000 in repairs.
>
> Mylor resident

Because of the preponderance of significant storm events in 2016 (although none to match this event), a number of residents who were capable of doing so had already purchased generators and were thus able to preserve perishables, access their water and sewage, and preserve medications requiring refrigeration.

However, for many people, purchasing a generator is not an easy option.

I am looking at generators but have no idea what I need.

There are a number of older long-term residents who have not experienced these unprecedented storms and subsequent power outages. Yet, considering this cohort, as well as others who may be frail, in financial difficulties, or in other ways challenged: Are they financially able to invest in a generator? Would they be capable physically of maintaining a generator? Would they have the capacity to have fuel on hand (given the shelf-life of diesel)? Would they know how to start a generator, or would they need to outlay further finances for an automatic starter? Would they know which generator to purchase?

...choose a generator that is too small, you won't be able to run your essential appliances. What's more, overloading the generator may lead to its breakdown as well as damage to all appliances that are using its power. (Connolly, 2014)

Ultimately, the capacity to acquire and maintain a generator becomes a social inclusion issue.

Increasing isolation

As with previous lengthy power outages, mobile coverage was lost after about 4–6 hours. 'SOS' calls remained available, presumably because not all towers exhausted battery backup simultaneously and emergency calls could be made by 'roaming' across other carriers. Nevertheless, all towers failed within 24 hours, leaving the community with no mobile coverage and, significantly, no access to Triple 000 or other emergency lines.

The bushfire risk increases with no communications.

What was unique with this storm event was that the landlines also failed: Adelaide Hills' communities have experienced losing mobile coverage in the past due to power outages but even the oldest of our community members cannot remember a time when the landlines ceased to operate.

On the second day of the storm the exchanges ran out of battery, coinciding with the time the mobile phone 'SOS' feature dropped out. Consequently the community was unable to communicate with the outside world: if there had been a car accident, a medical emergency or a bushfire, there would have been no means to report it. Similarly, it was not possible to report infrastructure damage to SAPN.

Living without fresh water, sewerage, telephone became especially difficult for those who live alone, who are elderly, or who have a medical condition
Making medical appointments was difficult without a phone line
Inability to inform SAPN due to loss of communications

Additionally, once the mobiles ran out and given that no-one had internet, warning sms messages could not be received and Alert SA became redundant as an emergency warning system.

Furthermore, SA Power Network's 'Power at my place' advisories of anticipated restoration times—when they could be received—tended to obfuscate rather than inform. Examples of messages are as follows (Figure 3):

Figure 3 SAPN 'Power at my place'

A message from SA Power Networks: Power outage update for MYLOR
Dear Susanne
The estimated power restoration time for MYLOR has been revised and is now approximately Wed 16:15.
We apologise for the inconvenience and will send updates if there are any further changes.[3]

Inaccurate and mixed messages—when they could be received—added to the misery of residents who hung on in the hope that power would soon be restored, believing this would only be a short term outage. Messages included those informing communities that power would be restored within a few hours or even that their power had been restored when it clearly was not. This incorrect messaging impacted decision-making: had residents been given a more accurate indicator of the true restoration time, they may well have enacted alternative options and emergency plans instead of staying in their homes.

SA power networks need to be more realistic about their estimations, not just adding small amounts of hours, which was not helpful. People can then plan more.

[3] The above email message, received on Wednesday 28 December at 3.22am, was the first of 17 messages sent during the prolonged outage to indicate restoration time after power had been lost just prior to midnight on Tuesday 27 December. The message suggests that power will be restored within 13 hours. Whilst this is a lengthy outage, it is not unprecedented. A subsequent message arrived 6 hours later and indicated restoration would be another 14 hours...and so it went on, with the power finally restored in the early hours of Saturday 31 January. Of course, as emails, these messages were only received once the power was restored! Early text messages could be received but these too were undeliverable when mobile coverage was lost.

Deficient, inaccurate, inconsistent advice from SAPN regarding duration and restoration times for outage

SAPN have recognised that their messaging failed in providing accurate information.

> *We have heard very clearly and understand and accept the criticism from customers regarding our messaging and predicted restoration times...In response we are undertaking a detailed review to see what alternative communications solutions we can develop, both short-term and for the longer term.*[4]

If residents could not gain accurate information from SAPN, they hoped it might be available via other channels, in particular, radio stations tasked with broadcasting emergency messaging, such as ABC 891. However, this system failed too, with the station broadcasting little more than an indication of the number of customers without power.

We are used to turning to battery powered radios in times of emergency when there are no other communications but there was little to no information.
We all have our battery powered radios, but they are no use to us if it is only programs as usual.
Media reports were poor
Internet warnings are useless with no power
Lack of information from media

The community had a distinct feeling of being forgotten. With no way of accessing further warning messages and with no relevant local information through the media—particularly the designated emergency service broadcaster, ABC 891—communities began to feel increasingly isolated and forgotten. More tailored information was needed about local impediments and what might be available in the way of assistance.

Without this vital information, it was impossible to make informed decisions. For example, it was impossible to determine whether to evacuate to friends and family. By the same token, the food stock that was lost in small retail outlets might have been saved had there been accurate information so that stock could be moved to fridges and freezers outside the power outage area.

This feeling of isolation was not new: residents on the West Coast had expressed similar sentiments after the state-wide blackout.

> *There was a strong feeling of isolation on the Eyre Peninsula and feeling like they had been forgotten and 'out of sight, out of mind'. (Burns et al, 2017, p.81)*

In response to community queries, the ABC explains that the emergency broadcasting team—as is standard practice during the emergency season—may be based interstate. Because funding is limited, there is a reliance on a national service.

> *At this time of day, and this time of year, many agencies, including our own, do not retain daytime staffing levels overnight.*[5]

Furthermore, due to staffing and resource constraints:

> *Given the number of communities hit by this storm and the many issues arising, it would be extremely difficult to provide very localised coverage to everyone. (idem)*

[4] SAPN written response to community questions, 31 January 2017
[5] Email from Graeme Bennett, Executive Chair ABC SA, to the author, 13 February 2017

The ABC must also rely on emergency agencies and government institutions for accurate information and because there was no escalation of the event, no information was provided by emergency agencies.

> *During this event, our overnight team provided information to the audience based on what was being received from our partners via email and social media channel.*. [In events deemed to risk life and property] *emergency agencies contact ABC Adelaide management personally to request the commencement of local broadcasting on an ongoing basis. That was not the case on December 28.* *(idem)*

Limited individual capacity

However hard individuals try to be resilient, they can only do so much: whilst residents can—at an individual household level or as a support at the community level—purchase generators in order to maintain some of the essential services, there is still a great deal that remains beyond the capacity of the individual, as outlined in Figure 4. Of particular concern is the dissemination of information if the telecommunications channels are down.

What this potentially suggests is that responses to emergencies should focus not only on repairing the damage—extinguishing the fire, restoring the power—but also on assessing and addressing the needs of the community, particularly those needs that are beyond the capacity of individuals and communities to address themselves.

Figure 4: Capacity of individuals to influence their resilience to power outages

Summary	Essential service	Availability	Affect on population	Comments
No power Having a generator will mean being able to power essential items such as fridge/ freezer and having access to water and sewage. It will make no difference to telecommunications, unless the towers, exchanges or nodes are powered by batteries or generators	water	Mains water	No affect from loss of power	**Potential solution: Individual homes purchase generators** **Issues** 1. safety 2. affordability 3. knowledge and confidence (esp in elderly living alone) 4. maintenance (ditto) 5. fuel on site
		No mains water	With generator—OK	
			Without generator—no water, no septic—potential health risk	
	Telecom-munications	Mobile—battery backup at towers lasts +/-4 hours	Loss of mobile after 4 hours	**No solution at the individual level** Telco and nbn providers must ensure they provide longer battery backup and/or provision of generators for vulnerable areas (high bushfire risk). **NB** 1. Power outage is likely in a bushfire event! 2. SEMP relies on communication with the public via Alert SA and emergency sms messages **Potential wider solution** Telcos' core business is not storm recovery. Emergency Services to include in its definition of 'emergency' restoring communications in extended power outages to vulnerable communities.
		Copper landline—battery backup at exchange lasts +/-36 hours	Loss of copper landline after 36 hours	
		Nbn—fixed line via node means no phone without power	Immediate loss of phone line	
		Nbn—fixed wireless (via tower) and satellite—copper landline remains	Landline subject to copper network telco providers maintaining infrastructure and providing backup at exchange	

Financial losses

Quite apart from the costs to insurers and the over $19m in payout from SAPN for Guaranteed Service Level payments (Energy Networks Australia, 2017b), there was a cost to householders and local businesses. Both householders and local businesses had to dump vast amounts of food

A large supermarket lost power for five days, although a generator was secured late on the fourth day.

> *We lost all the perishables in the fridges and freezers, which amounted to about a $150,000 loss. Of course, that meant that these items were not available for customers to purchase. Nor were there any candles or batteries left in the store. Because we were losing stock, we had no need for all the night fill staff, so 3 or 4 people lost their shifts. And, when the power came back on, we had dumping costs for three large skip bins.*
>
> *Fortunately we had a generator to power the IT systems and provide a half-light in the store. This also meant we could maintain the tills and the EFTPOS machines, although the batteries on the machines were destroyed by the intermittent power and we had to replace them.*
>
> Store manager, local supermarket chain

As mentioned earlier in this review, had business owners received accurate and timely information, they might have made alternative arrangements. Whilst there are recommendations for businesses to have contingency plans (Burns et al, 2016, p.80) in the face of power outages, business owners are not going to activate these if they are not correctly informed. This is particularly so for small family owned businesses who may not have the staff to both shift stock to fridges and freezers outside the power outage area and simultaneously keep their store open. This small business suffered proportionately far more than the large supermarket chains.

> *We lost power for over 95 hours. One of the major issues was not receiving accurate information as to the restoration of power and in hindsight if we had known it would be so long we would have made very different arrangements about the stock.*
>
> *As it was, we lost over $2,200 in frozen and refrigerated stock, much of it purchased for the holiday trade and lost over $3,000 in trade: in total it was about $5,500. Of course, to insure for such an event over the four years we've owned the shop would amount to still more—and we'd have to pay $600 excess and risk having our premiums increased, so that's not worth it. Just like householders, we received an 'inconvenience' payment from SAPN for $605.*
>
> Local deli owner

Whilst some local businesses lost perishable foods, others lost medicines, placing members of the public at risk when could not acquire vital medications. A local pharmacist, in one of the larger Hills' townships, was without electricity for over three days.

> *We were badly affected by the storm damage, with 90% of the carpet damaged due to flooding. We couldn't open the shop because the carpets were dangerously slippery and we couldn't clean the carpets as we had no power.*
>
> *In addition, our vaccinations and refrigerated medicines were no longer in the 'cold chain'—they must be kept in temperature controlled fridges from the supplier to the customer—so we had to throw them out. This also meant that the community couldn't get vaccines or medications they needed—one customer urgently needed insulin which we couldn't supply: he tried numerous pharmacies across the Hills with no success, as they too were without power.*

Because of our obligation to customers, we still had to be here, even if we were not strictly open for business, so that we could supply those customers for whom we make up their scripts. That meant keeping staff on, even though we had no trade.

Our computers didn't work, so we had to get our partner chemist, who were also without power, but at least had a safer workplace, to handwrite all the labels and repeats. All in all, between the two pharmacies, we lost $17,000 in medications and were all up at least $35,000 out of pocket due to loss of trade.

Local pharmacy manager

All businesses received no more than $605 in 'inconvenience' payments from SAPN.

Had it not been for the fact that the storm occurred between Christmas and New Year, when many businesses were still closed, the financial cost to the region could have been far greater.

Concerns for the future—nbn

What is particularly concerning is the advent of the National Broadband Network (nbn).

Will nbn nodes require power? Do they have battery backup? For how long?
Is the nbn fit for high risk bushfire areas if it is based on fibre to the node and thus reliant on power?

In an nbn connected world, both internet and 'landline' are conducted—at least in the Adelaide Hills—via fibre to the node (FTTN). However, power is required both at the node and in the premises. Both internet and phone lines will be disrupted in a power cut unless residents have purchased a backup power supply. Nevertheless, regardless of whether there is a backup supply, the landline will only last for a limited time.

Whilst the nbn advises residents to ensure their mobiles are charged in the event of a power cut, it is clear that communication could only be provided via mobiles for the duration of batteries to power the base station. Additionally, Telstra are adamant that this is not the role of mobile sites.

Telstra's mobile sites are reliant upon mains power to operate. Mobile sites are not meant nor designed as a backup to NBN or fixed line services. While we have onsite battery backup and undertake regular maintenance activities and performance monitoring, we cannot provide a commitment to uninterrupted service in the case on major power outages such as the one we experienced. [6]

So, while the State Emergency Management Plan (SEMP) suggests that key to any successful management of emergency situations is communication, this cannot be unfailingly achieved if it is reliant on wi-fi and thus consistent power. In fact, to do so places lives and communities at risk.

The role of all communications including mobile tele-communications during emergencies is critical. Mobile phone towers have limited backup power or may be overwhelmed which can result in communications difficulties and inability to access services such as Triple Zero (000). The National Broadband Network may add further complications to home users during emergencies due to the handset's reliance on electrical power. (Burns et al, 2017, p xii)

[6] Telstra response to community questions (It should be noted that other mobile telcos were not approached for responses to questions.)

Striving for community resilience

Due to the extraordinary commitment of local volunteer CFS and SES members, as well as SAPN lines men and women, power was gradually restored across the Adelaide Hills. In Mylor power returned after 90–110 hours, but not before a strong feeling across the community that we had been let down and forgotten.

Key to determining ways in which responses might be improved is recognising which understandings and expectations are shared. The State Emergency Management Plan defines an emergency in its glossary as:

> *an event (whether occurring in the State, outside the State or in and outside the State) that causes, or threatens to cause—*
>
> *(a) the death of, or injury or other damage to the health of, any person; or*
>
> *(b) the destruction of, or damage to, any property; or*
>
> *(c) a disruption to essential services or to services usually enjoyed by the community; or*
>
> *(d) harm to the environment, or to flora or fauna*
>
> (State Emergency Management Committee, 2016b, p.54)

Clearly there was a disruption to essential services and that disruption placed communities at a high level of risk, both from a health and a safety perspective. However, communities perceived that no adequate emergency response had been enacted in order to provide rapid restoration of services, in particular, communications.

Overwhelmingly, there was anger, frustration and bewilderment: had the response been adequate? Was the level of response indicative of what we might expect in future emergencies, or should we, as communities, take measures to become more resilient in order to take care of ourselves and our neighbours?

Townhall meeting

On 12 January, the small communities from across the Adelaide Hills met at the Mylor Hall to discuss the December storm and how communities could become more resilient in the face of such events. Over 100 community members attended, as well as local Federal and State members, local mayors and councillors, and executives from SAPN and Telstra. Despite inclement weather, residents travelled from 17 communities across the Hills to voice their opinions, including from:

Aldgate
Bradbury
Bridgewater
Carey Gully
Crafers
Echunga
Heathfield
Macclesfield
Mt Barker Summit
Mylor
Piccadilly Valley
Scott Creek
Stirling
Summertown
Upper Sturt
Uraidla
Verdun

Residents worked in community groups to identify the challenges they had faced in their community, potential solutions, and what resources would be required to enact solutions. Finally, residents submitted questions they wanted posed to elected members and suppliers of essential services.

Residents were angry with SAPN, suggesting that the delay in restoring power was due to a cut back in staff.

Why did it take 4 days to restore power? Was this because there were insufficient maintenance crews?
Do utilities have sufficient crews to deal with such emergencies?
SAPN should have more workers to deal with high demand in exceptional circumstances
Wires down for 3 days after storm in multiple areas in Aldgate
More SAPN trained personnel and trained reserves on standby for emergencies

SAPN, in response to written community questions, denied they had insufficient crews, stating that there has been a 44% increase in staff since 2003. However, they also admit that resourcing is based on day-to-day workloads, rather than to cater for rare extreme weather events.

Communities were convinced that extreme weather events such as this one were highly likely to reoccur and that it would be as well to prepare for greater resilience in the future. However, if communities were to become more resilient, it would be important to identify the gaps in response and recovery and determine whether communities had the capacity to fill those gaps. In other words: what were the current procedures and who was responsible for them? Numerous questions were outstanding around why the response to our emergency had been so poor—questions that were later posed to all three levels of government and essential service providers. What has become clear, both during the community meeting and subsequently, is that there is little understanding—or maybe even faith—in how emergencies should and will be responded to: there was a general consensus amongst the community that—whilst only 25kms from the Adelaide CBD—we had been forgotten.

Community members were frustrated at the response of the state government. Many expressed the view that the state government had been negligent in its duty of care. There was a strong feeling that the government had abdicated in its responsibilities, possibly because they had not understood the enormity of the crisis.

Why was this event not declared a natural disaster? Huge resources would then have become available.
Why was the State Emergency Centre not opened?

In particular, having seen the state response to the System Black event in September/October 2016, communities wondered why additional resources had not been allocated to this event. Local CFS and SES attendees echoed the same sentiments.

More trained reserves should be on standby for emergencies
Why did the government not provide additional help, eg army or reserves?
Response should have moved from local volunteers to MFS to army (Woodside Barracks)
Council contractors should have been called in

The state government's responses to these community concerns, submitted in writing following the meeting, were as follows:

> *Factors that are considered when determining whether to make a declaration [of a major incident or a major emergency] include:*
>
> - *Whether additional powers are required by key agencies*
> - *To signify seriousness of the event (public confidence)*
> - *Supply of further resources*
> - *Support to recovery operations*

The Natural Disaster Relief and Recovery Arrangements provide the framework for Commonwealth assistance to the states in the event of a natural disaster. There are a range of categories of assistance available, and a series of guidelines and thresholds that must be met to access that assistance. The 27/28th December event did not reach those thresholds.[7]

Furthermore:

The State Coordinator assesses whether the nature or scale of an emergency that has occurred, is occurring or is about to occur is such that it should be declared. A disaster can only be declared by the Governor and such a declaration remains in place for up to 30 days (and can only be extended by a resolution of both Houses of Parliament).[8]

However, a declaration is not necessary in order to open the State Emergency Centre:

It is not necessary to declare a major incident, a major emergency, or a disaster pursuant to the Emergency Management Act 2004 in order to activate the State Emergency Centre.

(idem)

This has been further confirmed by the Director of the State Recovery Office, who confirmed that a declaration is not necessary in order to open the State Emergency Centre. However, had the Centre been opened in recognition of the unfolding crisis, there would have been more response agencies gathered together, including Functional Support Groups, who might have responded to the consequences of the outage rather than the outage itself.

It is clear from his communications that at some stage the Minister for Energy was briefed:

In terms of delays to power restoration, a key factor to consider in the 27 - 28 December 2016 severe weather event is that it hit the Adelaide Hills region particularly hard. This meant power restoration in several instances was further hampered by flooding, sodden and inaccessible terrain, and where other issues presented themselves (e.g. the removal of felled trees and clean-ups of coolant oil spillage from the downing of some pole-mounted transformers). Also, for community safety reasons, SA Power Networks prioritised the 350 jobs involving downed wires.[9]

What seemed to have escaped the Ministers and emergency services was the implications and consequences of the power outage on communities. Of particular concern was loss of communications. Despite the fact that government recognise how vital it is to keep people informed, they had not appreciated the lack of information critical to decision-making.

Why were the fixed line exchanges allowed to lose power?
Why were the mobile base stations and towers allowed to lose power? When nbn is rolled out, some properties will be relying on 4G

[7] Response from Hon Peter Malinouskas MLC, Minister for Emergency Services, to community questions, 15 February 2017

[8] Response from Hon Tom Koutsantonis, Minister for Energy, to community questions, 16 February 2017

[9] Response from Hon Tom Koutsantonis, Minister for Energy, to community questions, 16 February 2017

For example, when it was pointed out to the Minister for Emergency Services that there was a failure in communications, he assured us that

> *Both SES and SAPN spokespeople provided numerous briefings to the SA community through various media outlets during this particular severe weather event.*[10]

What the Minister failed to recognise was that none of these mediums were accessible to an information-hungry and highly anxious community without power.

If community action plans exist, why weren't they actioned and what can be done to overcome blockages? *Can we use the emergency services levy to help with the situation in the hills?*

This lack of understanding was equally apparent at the Federal government level. The local Federal member, Hon Rebekha Sharkie, at the request of her constituents, asked the Prime Minister in Question Time how communications could be guaranteed during a blackout, particularly for communities at risk of bushfires. The Prime Minister disingenuously diverted the question away from damaged transmission infrastructure due to an extreme weather event to one of electricity generation via renewables.

Indeed, when a response was received to the community's concerns from the Minister for Communications and the Arts, Senator the Hon Mitch Fifield, regarding loss of communications and the potential increase of risk due to the rollout of the nbn, the only solution offered was to ensure residents kept their mobile phones charged. In other words, there was a complete lack of understanding that mobile base stations have a limited battery life; that 000 calls, whilst they can be transmitted via any carrier, will also fail to work when the last mobile base station has lost power; that messages via the Alert SA website and mobile apps could not be received; and that the ABC failed to provide up-to-date relevant information.

However, the Minister for Communications and the Arts' office does provide a glimmer of hope, although the tone suggests this might be little more than aspirational:

> *You may be interested to know that all nbn fixed wireless sites have a minimum of eight hours battery backup. In addition, if the power outage is protracted, a contractor is sent to the site to connect a generator before the batteries are exhausted, provided it is safe to attend the site.*[11]

Whilst this is welcome news to those with nbn fixed wireless, it offers no hope for those with fibre to the node (FTTN), which is the technology installed in the Mylor township.

Voices of concern

What became clear was that there has to be a better way of responding to and recovering from an extreme weather event when it affects so many individuals and communities for such an extended length of time.

[10] Response from Hon Peter Malinouskas MLC, Minister for Emergency Services, to community questions, 15 February 2017

[11] Response from Assistant Director, Broadband Implementation, on behalf of the Minister for Communications and the Arts, Senator the Hon Mitch Fifield, 19 April 2017

Whilst there was nothing but praise from the community for the dedicated efforts of CFS and SES volunteers, as well as the tireless work undertaken by SAPN lines men and women, there was considerable anger towards authorities in their lack of response.

What more could have been done? Complications arise because of the differing levels of responsibility that come from various jurisdictions and the public/private sector:

- Communications are regulated at the Federal level.
- Emergency services is the overall responsibility of the State Government
- Power and communications providers are private companies.

Thus a cohesive and coordinated approach to rectifying the issues which led to the isolation of a number of communities is harder to achieve.

What are we trying to achieve? It is well recognised that in such an extreme weather event, the storm damage was so extensive that the power could not have been restored sooner. Residents had a number of suggestions, both for the State government and for SA Power Networks.

The State should buy back the network
SA Power need to invest more in improving the infrastructure
We need to underground the powerlines in vulnerable areas

This last point was taken up by Energy Networks Australia:

> *SA Power Networks has consistently stated that undergrounding of power lines costs between three and nine times the cost of installing overhead infrastructure. In response to media inquiries in recent weeks, SA Power Networks has conservatively estimated a cost of between $30 billion and $40 billion to fully underground the SA electricity distribution system (Energy Networks Australia, 2017a).*

As a vulnerable community, could Mylor have a permanent generator within the transformer site to provide power as normal (given that some locations would probably need to be isolated)?

SA Power networks responded as follows:

> *For even a small substation like Mylor the customer peak demand would require a relatively large diesel power station (approx. 3,000 kilowatts), to supply all customers. The location of such a power station is problematic, due to is size, noise and exhaust emissions, and storage of adequate fuel supplies. Even if such a power station did exist and could be installed next to the Mylor substation, it would not be effective in managing downstream failures on the high voltage customer lines supplied from the Mylor substation, and so in an extreme storm event would be of little value to maintenance of supply to the Mylor township.*[12]

Power self-sufficiency

On the other hand, residents were also keen to discuss ways in which they could be more resilient in the face of extreme weather events, for example, by purchasing generators to power pumps enabling access to water and utilisation of septic systems. Nevertheless, they were also aware of the financial costs involved.

[12] SAPN responses to community questions, 31 January 2017

Many residents talked of Uninterruptable Power Supplies (UPS), such as generators, being made available at a subsidised rate to vulnerable communities, if not at the household level, then at least for a central community location.

Can we have a generator purchase scheme for Adelaide Hills people to be a bit more affordable and less reliant on SA power networks?
We need generators for CFS, Telstra exchanges, mobile towers and a community site—and we need sufficient personnel to fix repairs in a timely manner.
There should be government rebates for pumps and generators
We need community generators
We need a centralised community information point with a generator, fridges/freezers, air con, toilets/showers, food and water, information from and to services. This should be funded by local/ state/Federal governments in each community.

On the other hand, there was concern that not all residents have the capacity or the knowledge to purchase generators.

Need an info pack on generators: petrol/diesel, push button/cord start, output—what are recommendations for elderly people?

Many people were understandably frustrated that they were unable to draw on the power being generated by their own solar panels.

We need to be able to access the power generated from our own solar reserves
Inverters should be allowed so that solar panels can be used in extended power outages.
Government should provide subsidies for battery backup for solar power and inverters that support self-sufficiency

There was also concern expressed that many residents had not adequately understand the health risks of a power outage when it impacts on water and sewerage, nor did they understand actions they might also be able to take themselves.

Council should warn people of the health risks of using environcycles when power pump not working
People to install gravity fed water, taps on tanks & solar hot water services

Communications—beyond our control

Of greatest concern was the loss of communications: residents expressed both frustration and anger that telecommunications providers were not prepared for such a weather event.

Telecommunications suppliers need to accept more responsibility with loss of power
What penalty is there for a provider when either the fixed line or mobile phone go down?

Telstra responded to these community questions:

> *In the case of severe weather events such as was experienced in South Australia in late 2016, Telstra is granted an exemption to these timeframes and seeks to undertake repairs as quickly as possible. A notice of this exemption was published in public notices section of the Adelaide Advertiser.*

Requests for compensation are considered on a case by case basis. We ask any Telstra customer who has a request to please contact us.[13]

It was also clear that the community had a perception that Telstra had either not known that their infrastructure was no longer providing service or, if they had known, that they had not responded in a timely manner.

Should there be a system so that the Telstra exchange alerts you to the exchange running low on battery power to prevent landlines running out? *Telstra should have responded with battery back up* *Telcos should extend the battery life for mobile towers and exchanges.*

In response, the telco stated:

Telstra's fixed line and mobile telecommunications infrastructure and services rely on the continued supply of mains power, and as a result the prolonged power outage that impacted Mylor also caused disruptions to telecommunications services in the area.
In Mylor, in the event of an interruption to mains power, we have battery back-up power sources for our sites. These back-up power sources are is designed for temporary or short term outages of a handful of hours, not extended periods of up to 96 hours that impacted parts of Mylor.

Faced with unprecedented circumstances, Telstra proactively mobilised additional staff and portable generators to a number of impacted sites, but given the vast area impacted it was not possible to maintain all Telstra facilities and services throughout the power disruptions.
(idem)

With regard to mobiles, people were frustrated again with the short duration of battery power at the base stations, particularly given the vulnerability to bushfires experienced in communities.

There should be a mobile network emergency switch, allowing all mobile users to use all towers. *Extra batteries should be added to communications towers to increase duration* *5 day generator backup for power to mobile phone towers and exchanges in the Adelaide Hills* *Telephony services should have longer battery power in towers to enable time for a generator to be be switched on*

Again, Telstra responded to these questions:

In the instance of a power failure at a Telstra site, all sites have an onsite reserve electricity capacity (either in the form of batteries or a generator at larger exchange sites) to provide power until the issue can be identified and resolved by a technician. Deployment of a portable generator may be one solution to the loss of power to the site.

Battery life depends on a variety of factors, including number of batteries onsite, the age of the battery and the amount of infrastructure it is required to power. In some cases battery life lasted much longer than four hours, at other sites it lasted less.

Telstra manages over 1300 properties in South Australia, including 650 mobile base stations and over 220 exchanges. Generators at all these sites is not a viable option and in most cases battery backup has proven to be an adequate safeguard in events of power loss.

[13] Telstra response to community questions 16 February 2017

Use of solar panels have been previously investigated but limitations in terms of energy capacity, energy storage and available space limit their usefulness at this current time.

(idem)

With regard to the nbn, there was frustration that the selected technology was not based on the needs of communities who might be at potential risk.

There should be 5 day generator/battery backup for all FTTN cabinets (nodes) in high fire danger/storm danger areas.
Nbn should have had longer battery power in towers to enable access so that a generator could be switched on
Nbn selected modes of connection should be based on need and vulnerability rather than cheapest option, ie, why is Mylor township fixed line (copper to the node) when that means losing copper telephony which could be vital in an emergency?
What legislation will there be to ensure the maintenance of the copper network?

The Community Affairs Manager for the nbn in South Australia addressed a community meeting in Mylor, responding to and acknowledging the concerns of residents, particularly communications security during an emergency if power is lost.

His follow-up email confirmed that battery backup, lasting between 8–12 hours depending on network traffic, would be installed at the nodes, fixed wireless towers and satellite earth stations. This would, theoretically, allow sufficient time to deploy generators to these sites. However, power would also be required at the premises, so a resilient power supply would be needed to power equipment to the network. He also confirmed that residents connected to the nbn via fixed wireless and satellite would be able to retain their copper network landlines.

Because of community concerns, a submission has been provided to the Joint Standing Committee on the nbn. This can be found in Appendix A or viewed (submission #150) at: http://www.aph.gov.au/Parliamentary_Business/Committees/Joint/National_Broadband_Network/NBN/Submissions

Asking questions

A number of meetings were arranged by the author to determine whether the existing system of response had maybe failed or whether this was, indeed, the level of response that communities should anticipate. In order to become more resilient, communities must know the 'gaps' in response that they themselves must fill.

South Australian Power Networks (SAPN)

SAPN had been unaware that a number of Adelaide Hills' communities rely on power for other essential services, such as water and septic systems.

In order to maintain better communications with communities and gain a greater understanding of their expectations, SAPN have established a community reference panel. With membership from Resilient Communities, there will be a conduit between vulnerable Adelaide Hills' communities and the state's power supplier.

State Recovery Office, Department of Communities and Social Inclusion (DCSI)

The Director of the State Recovery Office explained that, whilst she had been working between Christmas and New Year, no call had been received in her office about the incident. When asked about the triggers that would escalate a response, she went on to explain that the State Emergency Centre (SEC) is opened when an incident is serious enough, when resources are affected and when a multi-agency approach is required. No declaration of an emergency needs to occur in order to open the SEC.

However, had the SEC been opened, there would have been a wider group in the room, including Engineering Functional Support Group, to discuss what needed to happen to create better outcomes. Functional Support Groups operate within the State Emergency Centre. (State Emergency Management Committee, 2016b, p.28)

> *Functional Services are a group of agencies that perform functional roles that support response and recovery activities during an emergency, as specified in the State Emergency Management Plan. Functional Services contribute to the coordination role of the State Emergency Centre (SEC). A State Controller heads each functional service. (SAFECOM, 2016)*

The Engineering Functional Support Group (EFSG) sits within SA Water. Its role in emergency management is:

> *1. Coordinating the protection and restoration of essential infrastructure including:*
> - *water supply and sewerage*
> - *public and private buildings, including structural assessment, demolition and shoring-up*
> - *telecommunications, gas and power infrastructure*
>
> *2. Coordinating engineering support to other Control Agencies, Support Agencies and Functional Support Groups once own capabilities have been exhausted or as required.*
>
> (State Emergency Management Committee, 2016b, p.31)

The recommendation from the Director of the State Recovery Office was to contact:

- the Chief Officer of the State Emergency Services to question why the emergency response had not been escalated; why a different approach had been taken to this storm than to others; and what arrangements had been made to support the community?

- the State Manager Engineering Functional Support Group to query if they had been contacted as part of a state-based response.

Furthermore, she wondered who it might be that communities could contact if they needed further help.

SA Fire and Emergency Services Commission (SAFECOM)

SAFECOM are engaged in working on the National Strategy for Disaster Resilience (NSDR), which may include supporting councils in updating their emergency management plans which may involve an element of community involvement.

Adelaide Hills Council

AHC contracted Red Cross to run a Resilient Leaders workshop in the AHC council area. In addition to understanding far more about emergency management, including preparation for, responding to and recovering from a range of emergencies, it provided an opportunity to meet with other community leaders who had played significant roles during the Sampson Flat bushfires.

At a further meeting with senior Council staff we discussed the Council's role in supporting communities to develop resilience and plan for recovery from emergencies. Whilst AHC will take its own actions to incorporate resilience and emergency recovery planning, conversations on how to do so in collaboration with community are still to occur.

Engineering Functional Support Group (EFSG)

A phone conversation and follow-up email from the Deputy State Manager of the Engineering Functional Support Group clarified that EFSG is not responsible for restoration of power: this rests with SAPN.

He indicated that whilst the EFSG had received an informal briefing of the event, together with BOM notifications for severe weather and damaging winds, there was no formal activation. Although the State Emergency Centre was on partial standby and short notice recall, the EFSG was not contacted by the state emergency service agencies for any assistance with the restoration and maintenance of essential utility services.

From Deputy State Manager's experience with other emergencies, such as the Pinery Fires and on the Eyre Peninsula during the System Black, the core of the problem is loss of communications. Just like our experience in December 2016, communications had also been lost during these events due to insufficient battery backup at mobile base stations and exchanges.

State Emergency Services (SES)

The SES were not convinced that any other response would have resulted in restoring power to communities any more speedily. However, they were keen to hear of the resilience work in the community and provided a number of links to resilience tools.

Local emergency service responders

There was concern expressed by local CFS volunteers that emergency management systems for CFS and SES are different, causing delays and misunderstandings in incident management due to duplication of jobs, triaging and dispatch.

Red Cross

Red Cross have a long history in helping communities to prepare for, respond to and recover from emergencies. The Resilient Leaders course, commissioned by Adelaide Hills Council, provided a wealth of materials, skills and knowledge to implement at the community level.

The Rediplan (Australian Red Cross, 2017) outlines how communities can:

1. Get in the know
2. Get connected
3. Get organised
4. Get packing

This is already an extremely useful resource that communities can use in their preparation for emergencies and disasters and could be the basis for community work in preparing emergency management plans.

In any program to increase community resilience, Red Cross, from their vast experience and knowledge, could be integral.

Black System Event risks/consequences assessment workshop

A number of personnel from government and emergency services, including SA Police (SAPOL), Metropolitan Fire Service (MS), Country Fire Service (CFS), State Emergency Services (SES), South Australian Fire and Emergency Services Commission (SAFECOM) and Department of Premier and Cabinet (DPC), met to clarify both a Black System event and other major power outages and to understand better how to respond to the consequences. What became clear is that conversations between decision-makers working in the emergency services sector and communities is vital in order to established agreed understandings. This extremely useful work is still ongoing.

ABC

In an email and telephone exchange with the ABC, disappointment was expressed at the lack of emergency information for communities when radio became their only means of receiving it.

> *I can fully appreciate the concerns of the Mylor community and a level of disappointment at the broad response from a number of agencies including the ABC. I want to assure you that your contact with us will be discussed and used to improve our ability to assist our communities to be resilient in the face of events such as this.*
>
> Email from Graeme Bennett, Executive Chair ABC SA, to the author, 13 February 2017

Exploring options

There are many options that could be explored: these come immediately to mind.

SAPN two way messaging

One of the frustrations experienced during the power outage was the lack of communications, including an inability to receive updates from SAPN or inform them of infrastructure damage.

Responding to damage to SAPN infrastructure relies on the public. Damage to the low voltage network—which feeds into homes and premises—only comes to the attention of SAPN once they have been notified by the public. This is not widely known in the community.

Notifying SAPN of a power outage through the message service 'Power @ my place' (via smart phone or web) can be quite onerous. Not only does one need to advise the name of the town or suburb, but also the National Meter Identifier printed on your electricity account. This means finding the bill, which might prove difficult if the outage is at night and one has no lighting.

Having notified SAPN, the Power Network advises customers in the locality that they are aware of an outage. The customer, recognising that SAPN is now aware, has no further obligation. Meanwhile, although SAPN is aware there is an outage, it may not know the cause and/or location of damage to equipment. This is where the general public could once again help in advising of damage.

With the advent of smart phones, there are a range of mobile incident reporting apps. For example, Snap Send Solve will allow you to take and upload a photo, identify your location, identify the incident type and upload the report to the relevant authority.

Mobile incident reporting could reduce response time as well as provide more accurate messaging to customers.

We need a centralised satellite phone

Serval mesh

One of the most alarming aspects of the power outage was losing communications. It is therefore worth investing some time and energy into looking for alternatives in emergencies.

> *Using mesh technology, the Serval Project has created a way for mobile phone users to stay connected to each other even when the infrastructure of the regular phone network is not working. This means users of the smartphone application will have the ability to communicate amongst themselves in the midst of a disaster when they need it most.*
>
> (Randall, 2013)

The app is currently only available for Android phones although there are assurances that it will be launched on other platforms.

Resilient Communities

Essential is that individuals, families and communities have a far greater awareness of preparing for, responding to and recovering from emergencies. This begins by having an understanding of the type of emergencies they might encounter and how to prepare for them.

Whilst communities may be keen to increase their resilience, they may not necessarily know how to do so. Increasing understandings, both of what to expect from State government and emergency services and how to become more resilient, is therefore essential.

Emergency management—a shared responsibility

The '2014 South Australian Emergency Risk Assessment' states that

> *In South Australia both Storm and Flood damage often have higher average annual costs than bushfires. (Disaster Resilient Australia, undated, p.11)*

There is no reason to doubt this: however, having a more coordinated response that involves all levels of government and engages communities, supporting them to become more resilient, must therefore be seen as a cost saving.

It is worthwhile reiterating that in this review of what occurred in late December 2016, the Hills' community is not asking for compensation. Whilst the community is extremely concerned at the response to the storm and whether this was as expedient as it might have be, communities lay no blame nor seek compensation. Instead it is to examine if better outcomes might have been achieved and, if so, how do we implement them. What roles are there for individuals and communities working in conjunction with different levels of government and emergency services? On the other hand, what is beyond the capacity of individuals or the community?

> I have learned that I can't rely on the telephone system, the internet, and constant power supply: my local fuel station, supermarket, baker, butcher, greengrocer etc can't be relied on.
> We have travelled in time and I had to carry buckets of water to flush the toilet, have a wash, and water my animals. A camp stove cooked my dinner and heated my water, to bathe in and wash dishes and clothes. Candles lit my night, but I was very lucky to have a job where I could charge my phone.
> Please take this time to think about how you need to be prepared for a storm, flood, fire etc
> I have learnt this year that I need to be more prepared: I've bought fire protection goggles, p2 masks, attended a bushfire survival plan meeting.
> I've learnt that I really do need an AM radio because even though I had alert SA, CFS and AM Adelaide on my ipad, my ipad doesn't get internet once it loses power.
> We need to have spare fuel because we have to run fire fighting pumps. How many people today got caught out with no fuel?
> We can't rely on AGL, ETSA, Telstra, Coles or Woolworths because all they provide are services: they don't control the weather.
> We have to be prepared. The CFS, MFS, SES, police and ambulance services are just that: services made up of people helping just like you and me. They can't be everywhere or do everything: they just help. So people—while you wait for your power to be restored, think about not what others can do to help your situation, but what can you do better to be prepared?
>
> Adelaide Hills Community member

Responding to emergencies is widely recognised as having four stages: prevention, preparedness, response and recovery. Preventing an extended power outage caused by an extreme weather event such as this one is unlikely without expensive adaptations, such as undergrounding power lines. As stated above, this would be at an unacceptable cost.

Nevertheless, if the power cannot be immediately restored, the consequences of the power outage can be mitigated through preparation and responded to in a more timely manner.

Key to a successful response is collaboration: sharing the thinking and hearing all voices to determine best ways forward. The time has passed when communities can just be 'responded to': they need to be engaged in all steps of emergency management. Communities should be encouraged that resourcing resilient communities is being addressed.

> *The Commonwealth, South Australian and local governments are committed to building safer, more sustainable and resilient communities across South Australia. Together with non-government and volunteer organisations they will contribute in excess of $8 million between now and 2018/19 for projects that build disaster resilience and provide sustainable community benefits. (Government of South Australia, 2017, p.12)*

We should have localised disaster plans held by CFS
What can we learn from FNQ and NT in their cyclone management?

At the Federal government level

One of the greatest failings during the extreme weather event and subsequent extended power outage was communications. Communications, as has already been outlined, is key to successfully managing any emergency situation.

As the experiences related in this review demonstrate, telecommunications will fail after a limited time due to insufficient battery backup in a power outage due to storm damage of this magnitude. This left the public without emergency information; unable to inform authorities of the damage; and, most importantly, unable to call for help in an emergency.

Furthermore, emergency broadcasting stations failed to broadcast relevant, useful and timely messages.

What can the Federal government do?

Both telecommunications and broadcasting come under Federal government legislation.

1. All levels of government, including emergency services, should adopt the community engagement model to work actively with community, recognising them as stakeholders, in developing appropriate ways of responding to emergencies, including supporting communities in every way to become more resilient, based, in principle, on the 72-hour model.
2. All levels of government should work with communities to determine the minimum level of uninterrupted power supply (UPS) required for emergency services and a community site.
3. Federal government, through the Joint Standing Committee on the nbn and Senate Estimate Committees, should determine in those communities vulnerable to bushfires, floods and storms, whether the current method of nbn roll out places those communities at further risk.
4. Should it deem that the risk does increase, action must be taken to resolve this. This includes legislating to ensure that for fixed line technology, battery backup at the nodes is of sufficient duration to allow for a generator to be deployed. The deployment of a generator to operate indefinitely until power is restored would form part of this legislation to ensure that vulnerable communities do not lose communications.
5. In addition and as a backup, because nbn telephone handsets become redundant in a power outage, Federal government should work with telco providers to ensure that similar backup procedures, via batteries and generators, are undertaken at mobile base stations and towers in vulnerable communities.
6. Federal government, through legislation, must ensure that Telstra maintain the copper network as a backup form of communications in areas with high risk of bushfires, floods and storms.

At the state government level

Relates to South Australian State Strategic Plan goal:
Government demonstrate strong leadership working with and for the community
We are prepared for natural disasters

The State Emergency Management Plan is quite clear about the role of state government:

> *The South Australian Government has primary responsibility for responding to an emergency in this state. (State Emergency Management Committee, 2016b, p.7)*

There is also an expectation that:

> *'Governments [will] step in at times to reduce risk in society. Clearly they have a role when it comes to dealing with catastrophic events that impact on individuals or on whole*

communities, for example in the aftermath of natural disasters such as major floods, cyclones and bushfires.' (National Commission of Audit, undated)

What's more:

'Australians believe governments can and should play an important role in the functioning of society...Australians expect governments will provide a social safety net which helps protect the poor, the vulnerable, the elderly and the truly disadvantaged.' (idem)

Why did the government not provide additional help, eg army or reserves
Response should have moved from local volunteers to MFS to army (Woodside Barracks)
Why was the State Emergency Centre not opened?

To the communities' frustration, the response to community questions from the Hon Peter Malinouskas, Minister for Emergency Services, was:

In relation to the 26/27th December event it was determined that no briefing or SEC activation was required.[14]

There was a strong feeling that the government had abdicated in its responsibilities, possibly because they had not understood the enormity of the crisis. It is not unreasonable for community members to think in this way and reach these conclusions. State Emergency Management is complex, bureaucratic and procedural, as it must be. Perhaps the lack of understanding was exacerbated by the hopelessness many individuals felt in their capacity to respond in meaningful ways. Perhaps it was compounded by the communication breakdown and the Minister for Emergency Services being unaware that messages to an information-hungry and highly anxious community could not be received without power.

What was also misunderstood was the risk individuals and communities were placed under through having no means to communicate in the event of a medical emergency, a car accident or a bushfire. Hansard records the Minister's response to The Hon. T.A. Franks, who posed questions to him on behalf of the Adelaide Hills communities in the South Australian Legislative Council to determine his level of support for community resilience:

Despite having an incredibly well-resourced sector, [emergency services] *can't be everywhere all of the time, so there is a need for community members themselves to try to have a degree of resilience in order to be able to deal with situations that may not be life-threatening. For those events that occur that do result in a life-threatening impact, then of course those people will be responded to very quickly by our emergency services sector. But for those non-life-threatening occurrences, having a degree of resilience is important for the community. (Hansard, 2017)*

This would suggest that the Minister had not been sufficiently briefed on the consequences of the power outage on such a large number of SA residents over such a length of time.

Nevertheless, we would agree with the Minister that communities need a degree of resilience. As pointed out in the Burns report,

...if individuals and communities are self-sufficient (e.g. they can support themselves for 72 hours following an emergency), authorities can focus their resources on where help is really needed (Burns et al, 2017, p. 82)

[14] Response from the Hon Peter Malinouskas MLC, Minister for Emergency Services, to community questions, 15 February 2017

This is a reference to the '72-hour model', used extensively in New Zealand and Canada, as a model for community disaster preparedness. Through this model, individuals and communities are supported to understand the different risks for the region in which they live; make appropriate plans at the household and community level for different emergencies; understand what will and will not be undertaken by emergency agencies; and put together a basic emergency kit which will allow self-sufficiency for 72 hours.

Hills Communities are already conversant with fire plans: this would be a further step, but would take an all hazards approach. Essential would be emergency services, supported and funded by state government, engaging with communities to hear their voices; providing opportunities for community education in an all-hazards approach to safety; and providing ongoing two-way communication between governments, emergency services and communities. This is, in principle, agreed to:

> *The government has considered the Review in considerable detail and is committed to further strengthening our emergency management arrangements. We acknowledge that this requires close engagement with local councils and community groups and we will work even more closely with them in the future as we progress the implementation of the Review recommendations.*
>
> *We have accepted and commenced implementation of 46 out of 62 of the recommendations. Recommendation 33 – resilience, has been accepted in principle with funding allocated for the development of an all hazards disaster resilience strategy. (Government of South Australia, 2017, p.7)*

In particular, the Minister for Emergency Services stated in parliament:

> *I commend the Hills community: of course, any ideas that come out of their working group, as a community organisation, we are happy and keen to hear about. (Hansard, 2017)*

The community organisation certainly hopes that the Minister will keep his word, as this review indicates there are a number of ideas for improvement of response.

In addition, with regard to emergency messaging, Part 3: 'Guidelines and Frameworks' of the State Emergency Management Plan has an Annex (C) devoted to Public information and warnings. Within this sits a table which considers different message dissemination methods, together with advantages and disadvantages of each method. Of the listed methods, over half are reliant on power being available to the receiver and yet there is no mention of this in the list of disadvantages for each method. (Government of South Australia, 2016c, p.12)

State government should also explore the means of promoting through ABC and local radio for people the location of emergency services centres to those people in need of assistance for all emergencies, just as in bushfire emergencies.

What can the State government do?

7. State government should recognise that active engagement with and empowerment of the community is central to achieving resilience over the long term.
8. State government, emergency services and local government should work with communities, especially those at risk, recognising them as stakeholders when supporting them to determine their capacity for resilience in an emergency. This includes supporting communities to understand the concept of resilience; to recognise the emergencies they may need prepare for; and to create community action plans for a range of potential disasters.

9. State government and emergency services need to ensure they recognise the risks posed not only by the immediate emergency, but also the consequences that emanate, particularly when those consequences place communities and individuals at risk.
10. State government and emergency services need to revise their approach to emergency messaging, recognising the disadvantages of websites and apps in a power outage and updating the SEMP Annex C: Public information and warnings to reflect this.
11. State and local governments should collaborate to explore newly emerging communications technologies to provide alternative messaging for the public in times of emergencies.
12. State governments need to do everything within their power to return communities to normality as quickly as possible, at least within 72 hours.
13. State governments should provide funding to local governments in areas vulnerable to bushfires, floods and storms to employ a Resilient Communities coordinator to coordinate and collaborate with individual communities in prevention, preparedness, response and recovery from emergencies.
14. State government, together with local councils, should establish a small-scale method of recurrent funding to vulnerable communities for the maintenance of community emergency equipment, such as community generators.

At the local government level

Relates to AHC Strategic Plan
Goal 1: People and business prosper: Strategy 1.12: We will seek opportunities to increase the wellbeing and resilience of our community to withstand, recover and grow in the face of challenges.
Goal 3: Places for people and nature: Strategy 3.10: We will investigate 'off grid' power opportunities for facilities and households in our community. We're open to the idea of whole townships doing the same.

The State Emergency Management Plan states that:

> *Local governments play a fundamental enabling role in emergency management because of their strong relationship with their local community networks and knowledge of locally available resources. ...Principal roles...may include:*
>
> - *ensuring an adequate local council emergency response capability is in place, including resources for the local volunteers*
> - *participation in recovery operations as per SEMP – Part 2 –Arrangements – Local Government Role in Recovery*
> - *ensuring appropriate local resources and arrangements are in place to provide and support emergency relief and recovery services to communities*
> - *participating in post -emergency assessment and analysis. (State Emergency Management Committee, 2016b, pp7–8).*

Many residents queried the role local government played in responding to the December emergencies, particularly in light of their statement in the Adelaide Hills Council Strategic Plan:

> *'Council plays an important role in mitigating the risks posed by natural hazards such as fire, flood and extreme weather events. When such events do occur, we respond and assist the community in recovery.' (Adelaide Hills Council, 2016, p.23)*

How can community action plans be community/council-centred so that each township sets up its own actions to keep things more local and accessible?

Adelaide Hills Council frequently invites community-led approaches—not just concerning emergencies—recognising that community engagement can achieve great community outcomes.

> *'Everyone should have the opportunity to participate and influence decisions that affect them and be empowered to create change.' (p.26)*

The role of local government in emergencies has recently changed: whilst they have always played a role in responding to emergencies, with the creation of the Local Government Functional Support Group, their responsibilities will be more clearly defined 'building on existing emergency management arrangements to...ensure a more formal coordinated approach' (Local Government Association of South Australia, 2017). Currently local governments are working to create a framework for emergency management.

There are a number of roles that local government could take on in supporting communities in preparing for, responding to and recovering from extreme weather events. In line with the 72-hour model, local government, working in conjunction with emergency services and state government, would be well placed to support the coordination of community groups in planning for emergencies by facilitating or supporting the facilitation of community forums to increase knowledge and understanding of responding to some aspects of personal and community emergency management, for example on:

- buying and maintaining generators
- responding to power outages if one has a residential septic system
- working with communities to write localised and tailored emergency response plans.

Above all, because communities are far closer to their local governments than to State government, local governments are in a unique role to act as conduits between communities and other branches of government and agencies to ensure collaboration for successful outcomes. Funding to allow for these functions to occur will be paramount.

What can local governments do?

15. Local government should recognise that active engagement with and empowerment of the community is central to achieving resilience over the long term.
16. Local government, supported by state government and emergency services, should work with communities, especially those at risk, recognising them as stakeholders in determining their capacity for resilience in an emergency. This includes supporting communities to understand the concept of resilience; to recognise the emergencies they may need prepare for; and to create community action plans for a range of potential disasters.
17. Local government should invite communities to contribute to local government emergency management plans, as each community has different needs and understandings.
18. Local government should support communities in identifying community respite centres in times of power outage and by communicating these locations to residents.
19. Local government should play a role in providing learning and education to residents about maintaining generators and envirocycles.

At the community level

Relates to South Australian State Strategic Plan goal:
People in our community support and care for each other, especially in times of need.

Relates to AHC Strategic Plan
Goal 1: People and business prosper: Strategy 1.12: We will seek opportunities to increase the wellbeing and resilience of our community to withstand, recover and grow in the face of challenges.

It may well be that community sits at the heart of successful emergency management. Communities in the Adelaide Hills, because of their proximity to the city, are attracting new residents who work in the city. Often their children are at Adelaide schools and, unless they choose to make a concerted effort, they may know few of their neighbours. This poses a problem for community safety. One of the most critical aspects to successful emergency management is community members knowing one another.

With so many 'tree changers' unaware of the disasters that could befall our communities, a further step is to bring people together to recognise and prepare for a range of disasters so that people recognise different appropriate responses and can plan for them. In the Mylor community, we are already alerting our community through our newsletter and considering how we might utilise the Red Cross 'Rediplan'. This is the beginnings of becoming a more resilient community.

The State Emergency Management Plan states that:

> *Non-government and community organisations ... provide advice and support during an emergency, as well as assistance in the recovery process.*

However, communities also need to be supported in providing advice and support at the preparation stage.

The National Strategy for Disaster Resilience, as reported in the Burns review, describes a disaster resilient community as one where:

- *people understand the risks that may affect them and others in their community*
- *people have taken steps to anticipate disasters and to protect themselves*
- *people work together with local leaders using their knowledge and resources to prepare for and deal with disasters*
- *people work in partnership with emergency services, their local authorities and other relevant organisations before, during and after emergencies*
- *emergency management plans are resilience-based, to build disaster resilience within communities over time*
- *the emergency management volunteer sector is strong*
- *businesses and other service providers undertake wide-reaching business continuity planning that links with their security and emergency management arrangements*
- *land use planning systems and building control arrangements reduce, as far as is practicable, community exposure to unreasonable risks from known hazards, and suitable arrangements are implemented to protect life and property, and*
- *following a disaster, a satisfactory range of functioning is restored quickly.*

Burns p.80

There is a lot to aspire to from the above dot points, but community would embrace working in partnership with organisations and government agencies to create emergency management plans that recognise and support community resilience when preparing for, responding to and recovering from disasters. It would be fair to say that the final dot point of this aspirational list was by no means achieved.

As part of the National Strategy for Disaster Resilience, the Community Engagement Framework (Figure 5) provides a model that 'recognises active engagement with and empowerment of the community as central to achieving resilience over the long term'. (Attorney-General's Department: Australian Emergency Management Institute, 2013, p.3)

Figure 5: Community Engagement Framework

Whilst in no way divesting government or agencies of their responsibilities, it salutes community engagement as 'stakeholders working together to build resilience through collaborative action, shared capacity building and the development of strong relationships built on mutual trust and respect'. (idem, p.2)

Adelaide Hills' communities are proud of their spirit of cooperation and collaboration. They have a strong history of supporting neighbours in times of crisis. The notion of planning better ways to support one another, particularly those who may be elderly or frail, was strongly supported.

Looking out for others in the community and helping where able
We should create a register of vulnerable people in the community
Need a register of elderly and vulnerable people who need to be contacted—this could be coordinated by the Hut, Red Cross or a local group
We should create firesafe groups on each street to check on one another

One proposal that was unanimously embraced was the notion of each township having a central respite centre where community members can access water, use toilets, provide critical refrigeration for medicines, warm baby food and provide a gathering point over a cup of tea to provide reciprocal support.

We need a centralised community information point with a generator, fridges/freezers, air con, toilets/showers, food and water, information from and to services. This should be funded by local/ state/Federal governments in each community.

Mylor community has already identified suitable premises on the Mylor oval, with a generator, ample water, public toilets and a heating/cooling system. The premises are managed by the Mylor Oval Sports Committee who have agreed to open the premises if any power cut extends beyond 12 hours.

With all the will in the world, communities will still need support. In the case of the Mylor community, the generator is already owned by the sports committee and generously offered in times of an emergency. But funding will be needed to maintain and fuel the generator. Nevertheless,

communities exercising resilience to support one another could well provide a cost benefit to governments and agencies.

> *Installing small emergency generators at critical customer locations is likely to be the most practicable, and reliable solution to an extreme storm event. These generators would not maintain supply to most customers, but would allow maintenance of supply to any common critical community services.*[15]

Mylor Community do not have the authority nor the desire to manage community relief centres for other communities. However, the community could be supported to conduct a pilot study which could be adapted and tailored for other communities across the state, based on the 72-hour model.

What can local communities do?

20. Local communities, with the support of other agencies, should identify their capacity for resilience and employ strategies to increase community resilience, for example, by ensuring neighbours know one another and by establishing 'fire safe' groups (that could also work as information conduits in other disasters)
21. Communities should identify a community building which can be powered with a generator and act as a community respite centre. After 12 hours of a power outage, the building will be opened up to the community to provide as many critical facilities as possible, including water, toilets and refrigeration for medicines, as well as providing a gathering point for residents.
22. Communities, in conjunction with local government and community organisations, should create a register of elderly and vulnerable people in the community and be aware of their needs in a power outage (and other emergencies).
23. Communities work in partnerships with organisations and government agencies to create emergency management plans that recognise and support community resilience when preparing for, responding to and recovering from disasters.
24. Communities need to recognise that they too have a part to play and a responsibility in preparation for, response to and recovery from emergencies.

At the individual level

Ultimately it is individuals that are the greatest stakeholders, but also those who must embrace responsibility for their own safety. The State Emergency Management Plan still sees this through the lens of communities being 'done to':

> *Individuals can assist in the emergency management process by taking responsibility to draw on the guidance, resources and policies of government and the community groups working toward the reduction of emergencies in the community.(p.8)*

Far more appropriate would be to adopt a community engagement model, as outlined above. Residents did not shy away from taking responsibility for themselves and their families in the recent storms. Hills residents are familiar with planning for bushfires, but have not in the past considered other emergency events. Once again, support, education and timely communications are critical in this.

Everyone should have a plan of what they will do and where they will go
Individual action plans—individual house supplies of water and food for one week: what does your own house need that would get you through without power?

[15] SAPN written response to community questions, 31 January 2017

What can individuals do?

25. Individuals, particularly those in vulnerable communities, should take responsibility for their own safety and survival by preparing for emergencies, including understanding local risks, having plans for what to do in different emergencies and being equipped to be self-sufficient for up to 72 hours.

Private companies

In a corporate world, in which essential services are now managed by private companies instead of governments, there is an obligation that providers will ensure the safety and wellbeing of customers.

What can Telstra and other telcos do?

26. Telstra and other telcos should provide battery backup with sufficient longevity to allow for generators to be activated at mobile base stations in vulnerable communities to avoid disruption to communications which place communities at further risk.
27. Telstra should provide generators to telephone exchanges in vulnerable communities to avoid disruption of communications which place communities under further risk.
28. Telstra should provide an assurance that they will maintain the copper network, at least within those communities at risk of bushfire.

What can SA Power Networks do?

29. SAPN should be given a timeframe during which they must implement a reliable, timely and accurate messaging system to inform the public of power interruptions and restoration times.
30. SAPN should mount a community information campaign to inform members of the public that SAPN relies on them for information on low voltage infrastructure damage and, just because SAPN is aware there is an outage, the public can still assist in determining both the extent and the cause.
31. SAPN should explore newly emerging technologies that incorporate geotagging as a way of improving notifications from the public in order to decrease response and recovery times.

Full list of recommendations

1. All levels of government, including emergency services, should adopt the community engagement model to work actively with community, recognising them as stakeholders, in developing appropriate ways of responding to emergencies, including supporting communities in every way to become more resilient, based, in principle, on the 72-hour model.
2. All levels of government should work with communities to determine the minimum level of uninterrupted power supply (UPS) required for emergency services and a community site.
3. Federal government, through the Joint Standing Committee on the nbn and Senate Estimate Committees, should determine in those communities vulnerable to bushfires, floods and storms, whether the current method of nbn roll out places those communities at further risk.
4. Should it deem that the risk does increase, action must be taken to resolve this. This includes legislating to ensure that for fixed line technology, battery backup at the nodes is of sufficient duration to allow for a generator to be deployed. The deployment of a generator to operate indefinitely until power is restored would form part of this legislation to ensure that vulnerable communities do not lose communications.
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6. Federal government, through legislation, must ensure that Telstra maintain the copper network as a backup form of communications in areas with high risk of bushfires, floods and storms.
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24. Communities need to recognise that they too have a part to play and a responsibility in preparation for, response to and recovery from emergencies.
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26. Telstra and other telcos should provide battery backup with sufficient longevity to allow for generators to be activated at mobile base stations in vulnerable communities to avoid disruption to communications which place communities at further risk.
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Appendix A: Submission to the Joint Standing Committee on the nbn

Summary

The rollout of the nbn in Adelaide Hills communities is likely to place them at risk. This is an area with frequent power outages, which could result in loss of communications, particularly as the mobile towers provide an extremely limited backup service.

Since these communities are highly at risk from bushfires, storms and flooding, their vulnerability is considerably increased if communications fail. Since communications are vital to not only alert emergency services to an incident, but also to warn residents of any impending danger, it is vital that the safety of individuals and communities be considered by the Joint Standing Committee on the nbn when considering suitable technologies for the rollout and what other contingency plans might be necessary.

Background

The Adelaide Hills are home to a number of small communities. Despite being only 25 kms from the Adelaide CBD, many of these communities lack the essential services taken for granted in other parts of Australia. For example, because they are not on mains water, residents must supply their own potable water and install domestic septic systems, both of which are reliant on power.

Given that the Adelaide Hills, with its heavily treed gullies and hills, is in the driest state on the driest continent, the threat of bushfire poses a major risk to residents and properties. Taking this together with the lack of water, smaller communities within the Adelaide Hills could be considered particularly vulnerable. Communications is vital in an emergency—both outgoing from communities and incoming from the outside world.

Outgoing communications

In an emergency, whether a bushfire threat, a car accident or a health emergency, it is vital to have the means to call for help. Until recently landlines have provided an unsurpassed failsafe method of communications. However, many residents, because of increasing line rental costs, are replacing or supplementing landlines with mobile phones. There are, however, a number of black spots in the Hills.

Gradually the nbn is being rolled out across the Adelaide Hills. In the township of Mylor, this is a fixed line service, tapping into the copper network and thus replacing the existing landline. For those of us outside the town boundary, nbn will provide fixed wireless to the mobile towers or, if that is not possible, nbn via satellite. In these latter two instances, the existing copper landline will remain, so long as it continues to be maintained.

Both mobile phones and nbn require power beyond the premises. In other words, regardless of whether residents have generators or backup power supplies to charge mobiles and power modems, if the towers or the nodes do not have power, phone communications become redundant.

Incoming communications

Digital communications are now the preferred form of broadcasting emergency warnings. Because of GPS, warnings can be targeted and timely. To that end, mobile phones are becoming an essential personal commodity. There are a number of websites and mobile apps that government agencies and providers of essential services use to warn the community of emergencies, for example, Alert SA.

Isolated communities

As can be seen, power is essential for both incoming and outgoing communications. However, power outages are frequent in the Adelaide Hills, particularly in the smaller communities. Falling tree limbs, storm damage or possums on the wires can all cause a power outage that may last between a few minutes to many hours.

Once power is lost, neither computers nor modems will work. Mobiles will only work if charged and if the mobile base station also has power: once power is lost, towers are reliant on battery backup, which lasts for approximately 3–6 hours. With no outgoing or incoming communications, communities quickly become isolated and face increasing risk.

Extreme weather event December 2016

Shortly before midnight on 27th December 2016, fierce storms raged around the Adelaide hills and parts of the mid-North for a number of hours. Winds of up to 120km/hour brought down trees into homes and onto power lines, whilst torrential rain caused flooding in a number of catchment areas, leaving 155,000 households were without power for extended periods.

SA Power Networks (SAPN) claimed,

> *This is the worst storm we have ever experienced in terms of minutes of supply lost for customers and in terms of the amount we will need to pay in Guaranteed Service Level payments.* (The Advertiser, 2017)

In fact, the damage was so severe in some locations that many communities were left without power for up to five days whilst volunteer emergency services personnel struggled to clear the storm damage in order that SAPN might reconnect the power.

As a consequence, essential services—power, water, sewerage, and telecommunications —were also lost for up to five days. This had major consequences on day to day life, particularly for elderly and vulnerable people: food was spoilt, many people couldn't cook, petrol stations could not pump fuel and ATMs could not dispense cash.

No power = no communications

The biggest concern by far was the failure of communications: mobile phone towers worked for 4–6 hours before battery backup ran out. 'SOS' calls remained available, presumably because not all towers exhausted battery backup simultaneously and emergency calls could be made by 'roaming' across other carriers. Nevertheless, all towers failed within 24 hours, leaving the community with no mobile coverage and, significantly, no access to Triple 000 or other emergency lines.

What was unique with this storm event was that the landlines also failed: Adelaide Hills communities have experienced losing mobile coverage in the past due to power outages but even the oldest of our community members cannot remember a time when the landlines ceased to operate. Nevertheless, on the second day of the storm, the exchanges ran out of battery, coinciding with the time the mobile phone 'SOS' feature dropped out. Consequently the community was unable to communicate with the outside world: if there had been a car accident, a medical emergency or a bushfire, there would have been no means to report it—neither could we report infrastructure damage to SAPN.

Living without fresh water, sewerage, telephone became especially difficult for those who live alone, who are elderly, or who have a medical condition (Carey Gully resident)
Making medical appointments was difficult without a phone line (Mylor resident)
Inability to inform SAPN due to loss of communications (Bridgewater and Echunga residents)

When communications fail, not only are we unable to connect with and check up on friends and family—including those who may be vulnerable and for whom we have responsibility—but we also lack access to emergency messaging which might be vital to our own safety: once the mobiles ran out and given that no-one had internet, warning sms messages could not be received and Alert SA became redundant as an emergency warning system.

Power cuts in a bushfire

What is vital for the Committee to understand is that SA Power Networks may turn off power in a bushfire situation.

> *Mains-fed electricity can be interrupted due to a fault, damage to the network caused by fire, or because supply has been turned off to minimise the risk of fire ignition. (Legislation introduced after the Ash Wednesday bushfires allows SA Power Networks to turn off power to reduce the possibility of a fire starting from the interaction of the environment with the distribution network).* (SAPN, undated)

Having a form of communications that is independent of power is therefore vital for the safety of Hills communities. The rollout of the nbn and subsequent loss of copper network could well impede this safety.

The bushfire risk increases with no communications (Upper Sturt resident)

Vulnerable communities and the nbn

In seeking further information for our communities, the nbn Community Affairs Manager for South Australia spoke at our community meeting in order to address our concerns. His follow-up email confirmed the following:

- In fixed wireless and satellite areas, there would be no loss of copper network. Residents with this type of connection will therefore be able to maintain their copper landline, as long as the copper network continues to be maintained
- In areas connected to the nbn via fixed lines, residents will lose their landlines.
- All technologies, including nodes, towers and satellites, will have 8–12 hours of battery backup, depending on how heavily the network is used. 'Theoretically', this provides sufficient time to deploy generators.
- Those areas in which fixed lines are deployed (and who are therefore reliant on nbn for phone communications), residents will also need an uninterruptable power supply or generator in the premises in order to use the handset.

Residents who were affected by the extended power outage and therefore also lost communications came from a number of different townships. Below is a table to indicate the range, based on attendees at a community meeting in response to the emergency. Beside their location is the type of technology they will receive in order to connect to the nbn.

Township	Nbn technology
Aldgate	Fixed line
Bradbury	Fixed wireless
Bridgewater	Fixed line
Carey Gully	Fixed wireless
Crafers	Fixed line
Echunga	Fixed wireless
Heathfield	Fixed line
Macclesfield	Township fixed line
Mt Barker Summit	Fixed wireless
Mylor	Township fixed line
Piccadilly Valley	Fixed line
Scott Creek	Fixed wireless
Stirling	Fixed line
Summertown	Fixed line (some)
Upper Sturt	Fixed line
Uraidla	Fixed line (some)
Verdun	Fixed line

As is evident, residents in 12 of the 17 listed townships stand to lose landlines in a power outage.

nbn advises its customers to ensure their mobiles are charged in the event of a power cut. In other words, it abdicates responsibility to mobile telcos. What became evident in December 2016 was how rapidly mobile coverage failed.

In other words, if no intervention is taken, the rollout of the nbn, coupled with a limited battery backup at mobile base stations, means communities may well lose communications after only four hours and remain without communications for many days.

Furthermore, Telstra are quite adamant that this is not the role of their mobile sites:

> *Telstra's mobile sites are reliant upon mains power to operate. Mobile sites are not meant nor designed as a backup to NBN or fixed line services. (Telstra, February 2017)*
> Telstra written response to community questions—available on request (It should be noted that other mobile telcos were not approached for responses to questions.)

This same concern for community safety was expressed in the Independent Review of the Extreme Weather Event South Australia 28 September – 5 October 2016:

> *The role of all communications including mobile tele-communications during emergencies is critical. Mobile phone towers have limited backup power or may be overwhelmed which can result in communications difficulties and inability to access services such as Triple Zero (000). The National Broadband Network may add further complications to home users during emergencies due to the handset's reliance on electrical power.*
>
> (Burns, Adams & Buckley, 2017)

Joint Standing Committee's Terms of Reference

With regard to the committee's terms of reference, I refer to the Committee's responsibility to report on

> *2a. rollout progress with particular regard to the NBN Co Limited Statement of Expectations issued by Shareholder Ministers on 24 August 2016*
> and
> *2b. utilisation of the national broadband network in connected localities in both metropolitan and regional areas, and the identification of opportunities to* ***enhance*** *economic and* ***social benefits***

The NBN Co Ltd Statement of Expectations 24 August 2016 reads as follows (my emphasis):

> *The National Broadband Network ('the network') aims to foster productivity and provide a platform for innovation in order to deliver economic and* ***social*** *benefits for all Australians.*
>
> *... nbn should ensure that its wholesale services enable retail service providers to* ***supply services that meet the needs of end users...****using the technology* ***best matched to each area of Australia****.* (NBN Co Ltd, 2016, p.1)

As it stands, with a rollout that removes a reliable communications mode, the nbn does not enhance social benefits, but rather reduces them. Whilst traditional landlines do fail after a given length of time if no uninterruptable power supply is provided, there is at least a 24–36 hour window of opportunity to summon help. This opportunity will no longer exist if the nbn is installed and a power outage removes the capacity to make phone calls, particularly if the mobile phone towers fail after only a few hours.

Furthermore, the Statement of Expectations provides guiding principles and goals for the rollout, including:

> *... service quality and continuity for consumers; certainty for retail service providers and construction partners; and achievement of rollout objectives as cost-effectively and seamlessly as possible* (idem)

The Statement continues by discussing risk management and government expectations that 'nbn will actively manage risk' (idem, p.2). Both of these statements indicate that quality and continuity, together with the management of risk, are critical elements of the expectations.

Summary

Adelaide Hills' communities experience frequent power outages. They are also some of the most vulnerable communities in South Australia, subject to risk from bushfires, storms and flooding. The ability to make outgoing calls is vital for the safety of individuals. As nbn fixed line will mean that nbn communications will be lost in the event of a power outage and given that mobile communications provides insufficient duration of backup, it is imperative that the Joint Standing Committee consider individual and community safety as paramount in any rollout. Furthermore, mobile coverage is essential, not only as a backup, but also in order to receive emergency warnings.

Recommendations

1. Federal government, through the Joint Standing Committee on the nbn and Senate Estimate Committees, should determine whether the current method of nbn rollout places vulnerable communities at further risk.
2. Should it deem that the risk does increase, action must be taken to resolve this. This includes legislating to ensure that for fixed line technology, battery backup at the nodes is of sufficient duration to allow for a generator to be deployed. The deployment of a generator to operate indefinitely until power is restored would form part of this legislation to ensure that vulnerable communities do not lose communications.
3. In addition and as a backup, because nbn telephone handsets become redundant in a power outage, the nbn will work with telco providers to ensure that similar backup procedures, via batteries and generators, are undertaken at mobile base stations and towers in vulnerable communities.
4. Federal government, through legislation, must ensure that Telstra maintain the copper network in areas with high risk of bushfires, floods and storms as a backup form of communications.

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