# Victoria's Critical Infrastructure All Sectors Resilience Report

## 2017

VICTORIA

State Government

**Acknowledgement to Country**
The Victorian Government acknowledges Aboriginal and Torres Strait Islander people as the Traditional Custodians of the land. The Victorian Government also acknowledges and pays respect to the Elders, past and present.

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# Ministerial foreword

Every day, we all rely on the services provided by critical infrastructure. These services are essential to Victoria's wellbeing, social cohesion and economic viability.

It is with much pleasure that I present Victoria's Critical Infrastructure Resilience Report 2017. This Report highlights the importance of Victoria's critical infrastructure to every one of us. It shows us how industry and government are working together to enhance the resilience of Victoria's critical infrastructure, so that we can continue to benefit from the services provided.

All societies are challenged by emergency events. This Report details the resilience improvement initiatives that industry and government have completed and propose for the upcoming year. This year a significant number of initiatives were completed. As a result, Victoria is better placed to respond to future stressors and shocks on its critical infrastructure.

This is the second annual All Sectors Resilience Report. The Report recognises the strong collaboration between industry and government, and the achievements of Victoria's critical infrastructure Sector Resilience Networks. These networks are coordinated by government and comprised of industry members.

As Minister for Emergency Services, and on behalf of all Victorians, I would like to acknowledge and thank all of the industry members who give of their time voluntarily to work with government on building the resilience of Victoria's critical infrastructure. As Victorians, we benefit from the expertise, contribution and commitment from critical infrastructure industry members.

I also take this opportunity to thank my ministerial colleagues and the Victorian government departments who work with industry to help to build the resilience of Victoria's critical infrastructure. Collaboration and partnerships between industry and government is the key foundation to the critical infrastructure framework the Victorian Government introduced in 2015. It is pleasing to see such significant achievements in the short time since then.

**James Merlino MP**
Minister for Emergency Services

# Executive Summary

Critical infrastructure is essential to Victoria's wellbeing, social cohesion and economic viability.

Each day, Victorians rely on the services provided by critical infrastructure owners and operators: water and sewerage, food, transport, health services, energy for homes and industry, access to banking, finance and government services, and global communications networks. It keeps individuals, families, communities, government, industry and business functioning.

Victoria's Critical Infrastructure All Sectors Resilience Report (the Report) summarises the resilience of Victoria's eight critical infrastructure sectors, identifies key emergency risks and resilience improvement initiatives by industry and government.

This is the second All Sectors Resilience Report. The first was released in December 2016. These reports are a key part of Victoria's Critical Infrastructure Resilience Framework (the Framework), a major reform introduced by the Victorian Government in July 2015. The Framework recognises the importance of critical infrastructure to the community. It is designed to minimise disruption of the supply of these services due to emergency events by building critical infrastructure resilience.

The Report explores the resilience approach adopted by Victoria's critical infrastructure sectors and the ongoing work of industry and government. This is in addition to existing risk management programs and practices.

This Report reflects upon the critical infrastructure resilience improvements made by industry and government during the year, and reviews the impacts of significant emergency events this year. It also points to future key risks and proposed resilience improvement initiatives industry and government will complete to continue to strengthen resilience.

Most of Victoria's critical infrastructure is privately owned or operated. A cornerstone of the Framework is the collaboration between industry and government through Sector Resilience Networks. The work completed by the Sector Resilience Networks, is effective because of the expert consideration, dedication and voluntary participation of industry.

Industry and government continue to strengthen their collaboration by expanding sector networks and participating in planned resilience initiatives across different critical infrastructure sectors.

Victoria increasingly faces a variety of emergencies every year. Infrastructure failure can have devastating effects on communities and significant negative impacts on economic wellbeing.

Climate change and increased terrorist activities world-wide continue to pose threats to critical infrastructure. An increasing reliance on interconnected technologies and systems increases the risk of system failure. Victoria's all emergencies resilience approach supports industry and government focus on dealing with the acute shocks and chronic stresses that impact upon community resilience. During the year, the Victorian Government introduced Victoria's Climate Change Adaption Plan 2017-2020 to plan for a changing climate and to support businesses and communities in adapting to the impacts of climate change.[1]

[1] Victoria's Climate Change Adaption Plan 2017-2020, Department of Environment, Land, Water and Planning

# Critical Infrastructure in Victoria

Victoria's critical infrastructure provides the most basic, everyday requirements — safe drinking water, food, reliable transport, accessible public health services, energy for homes and industry, access to banking, finance and government services, and global communications networks to connect Victorians socially and in business. Critical infrastructure includes those physical facilities, supply chains, systems, assets, information technologies and communication networks which, if destroyed, degraded or rendered unavailable would significantly affect social and economic wellbeing. The reliable, high quality service provided by critical infrastructure owners and operators reflects their commitment to resilience.

Water

Food & Grocery

Transport

Health

Energy

Banking & Finance

Government

Communications
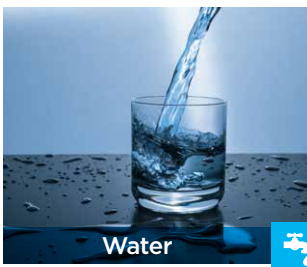
## Victoria's Critical Infrastructure All Sectors Resilience Report

The first Report was released in December 2016. This second one reflects upon industry and government resilience improvement initiatives over 2016-17. It shows how both are collaborating to improve the resilience of Victoria's critical infrastructure and manage emergency risks to it. This report reviews the impacts of significant emergency events on critical infrastructure over the past year and looks ahead to key future risks and how industry and government can continue to build resilience.

# Victorian Critical Infrastructure Resilience Framework

Victoria is Australia's only state with a comprehensive set of arrangements focused on critical infrastructure resilience. This builds on international best practice drawn from the UK and the USA.

Victoria's framework includes:

**Part 7A Emergency Management Act 2013**

- **Legislation** to assist identify and assess what Victoria's critical infrastructure is and record this on a Register. For the most important infrastructure assessed as vital, owners and operators are required to complete emergency risk management planning.

**Victoria's Critical Infrastructure Resilience Strategy**

- **Policy** outlining critical infrastructure arrangements and why Victoria focuses on critical infrastructure resilience.

**Critical Infrastructure Regulations**

- **Regulations** to support the implementation of legislation and set out standards that must be met regarding the assessment process and conduct of exercises.

**Critical Infrastructure Ministerial Guidelines**

- **Guidelines** to assist industry and government, and promote consistency by detailing requirements and processes through templates.

## Victorian Critical Infrastructure Resilience Model

**Continuously improving the resilience of critical infrastructure to better ensure the continuity of essential services, requires effective partnerships between the owners and/or operators of infrastructure and government.** Victoria's Critical Infrastructure Resilience Strategy[2]

### Shared responsibility

The Victorian Critical Infrastructure Resilience Model (the Model) is underpinned by industry and government collaboration with clearly delineated roles and responsibilities. As the owners and operators of critical infrastructure, industry has a responsibility to provide these services, which are essential for the functioning of the Victorian community. Government has responsibility to assure the community that key emergency risks likely to result in significant service disruptions have been identified, considered and where possible mitigated.

[2] Critical Infrastructure Resilience Strategy, Emergency Management Victoria (EMV) 2015

## All emergencies resilience approach

Victoria's approach recognises that different emergencies can lead to similar consequences. For example, both heatwaves and storms can lead to loss of electricity.

Recent national and international events show the importance of resilient critical infrastructure systems. For example, South Australia's storms and extreme weather in September 2016, which caused a state-wide power outage - a black system event, shows why working towards critical infrastructure resilience is important. This unprecedented emergency event resulted in the majority homes without power, interruptions to pumping of household water and sewerage, loss of access to ATMs and fuel at petrol stations.  The blackout also impacted business, with the losses running into the hundreds of millions of dollars.[3]

Victoria defines resilience as: "the capacity of individuals, communities, institutions, businesses and systems to survive, adapt and thrive no matter what kind of chronic stresses and acute shocks they experience".[4]

A resilience approach accepts that despite collective best efforts, emergencies can challenge the supply of essential services.  It assists us to recognise key risks and, where possible, mitigate or limit their impact and consequences.

## Resilience approach – organisational and sector focus

Victoria's framework advances organisational resilience by requiring:

- Government to assess which water, energy and transport infrastructure is critical to Victoria's economic and social wellbeing
- Government to categorise critical infrastructure importance as either: vital, major, significant or local
- Owners and operators of critical infrastructure assessed as vital to complete emergency risk management planning to identify key risks, potential remediation and test preparedness.
- Government to maintain a Critical Infrastructure Register.

Victoria's Framework advances industry sector resilience by:

- creating a framework that seeks the expert contribution from industry
- recognising shared responsibility for sector resilience
- promoting partnerships and contribution in recognition of a shared responsibility
- identify resilience improvement initiatives through its eight Sector Resilience Networks — each comprised of industry members and coordinated by government.

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[3] Burns, G. et al (2017), Independent Review of the Extreme Weather Event South Australia 28 September – 5 October 2016
[4] Community Resilience Framework for Emergency Management, Emergency Management Victoria (EMV), 2017

## Victoria's Sector Resilience Networks

Engagement between industry and government in Victoria is key to the successful implementation of the critical infrastructure resilience arrangements and outcomes. Joint planning and information sharing are core activities that the Sector Resilience Networks undertake to improve the sector resilience.

Victoria has eight Sector Resilience Networks:

Table 1 Sector Resilience Networks

| Sector | Responsible department |
| --- | --- |
| Water | Department of Environment, Land, Water and Planning |
| Food and grocery supply logistics | Department of Economic Development, Jobs, Transport and Resources |
| Health | Department of Health and Human Services |
| Energy | Department of Environment, Land, Water and Planning |
| Transport | Department of Economic Development, Jobs, Transport and Resources |
| Communications | Department of Economic Development, Jobs, Transport and Resources |
| Banking and finance | Department of Treasury and Finance |
| Government | Department of Premier and Cabinet |

Each network is coordinated by a government department. Victoria benefits from the contribution and expertise of owners and operators through the Sector Resilience Network meetings and each network's Sector Resilience Plan. These Plans are provided to the State Crisis and Resilience Council — Victoria's peak crisis and emergency management advisory body. They highlight to government the planning initiatives each sector is undertaking to continue to improve the sector's resilience, and its challenges and ability to supply services to the community.

Importantly, Victoria's Critical Infrastructure Resilience approach is in addition to existing risk management programs and practices including:

- risk and safety management under various Commonwealth and Victorian legislation and regulations
- international, Australian, Victorian and industry standards and policies including emergency resilience, safety, preventative maintenance and quality management
- existing industry networks, for example the Commonwealth Trusted Information Sharing Networks
- individual owner and/or operator initiatives including preventative maintenance regimes, service continuity and emergency response plans, contractual requirements and environmental certification
- an increased focus by organisations and communities adopting a resilience approach.
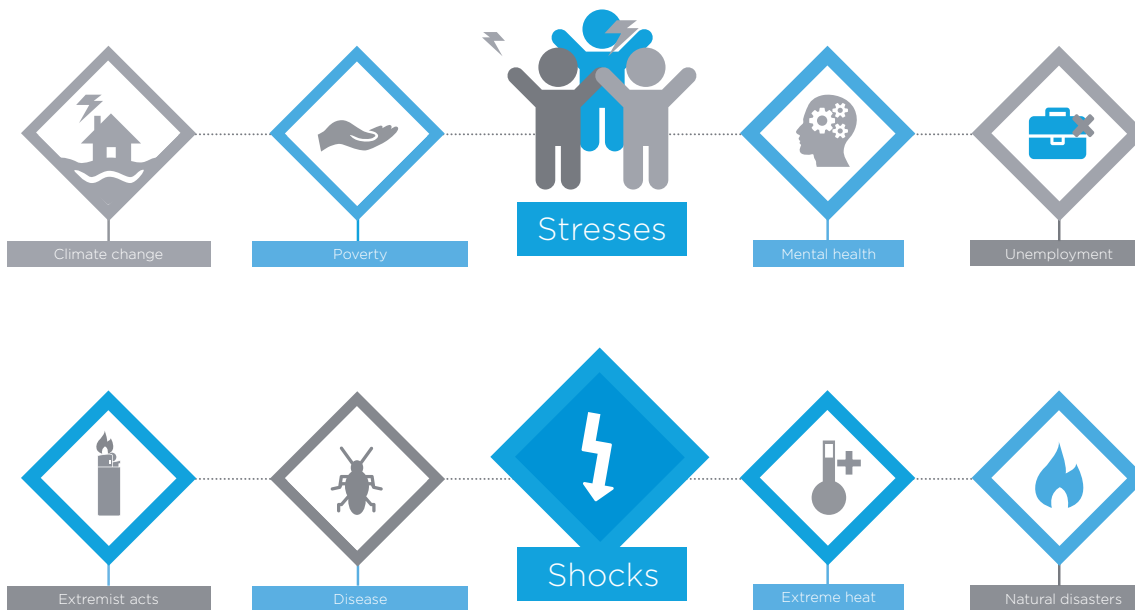
# Resilience in Victoria

Shocks and Stresses



Figure 1.  Shocks and stresses. Adapted from 100 Resilient Cities[5]

# Impacts of emergencies on Victorian Critical Infrastructure 2016-17

Sudden, sharp events threaten a city, community or system, while stresses weaken a system's fabric on a daily or cyclical basis. Over the past year, several emergency events (shocks) have tested the resilience of Victoria's critical infrastructure. These have resulted in deaths, significant injuries, impacts to community safety and economic viability.

 A review of the impact of four of these events on critical infrastructure highlights:

- industry's key role in reducing service disruptions and negative impacts on communities
- the importance of agile practice and redundancies employed by owners and operators
- the need for an all emergencies resilience approach
- the collaboration between industry and government and value of industry as a key partner in Victoria's emergency management arrangements to respond and recover from emergencies
- the importance of learning and sharing between industry and government as part of continuous improvement and better preparedness for the future.

[5] Community Resilience Framework for Emergency Management, Emergency Management Victoria (EMV), 2017

**Bourke Street incident – 20 January 2017**

**A car driven through Melbourne's CBD struck pedestrians before stopping at the corner of Bourke and William Street. Six people were killed, over 30 hospitalised and many witnesses were traumatised. Victoria Police confirmed the incident wasn't terrorism related.**

| Critical Infrastructure sector | Key challenge to Critical Infrastructure service providers | Key response by Critical Infrastructure service providers |
|---|---|---|
| Transport | • 92% of tram network disrupted | • Yarra Trams redirected the tram network to maintain service and enable commuters to leave the CBD |
| Health | • Immediate treatment to the injured<br>• Providing psychosocial services to individuals, families and community members directly and indirectly affected | • Public and private hospitals treated patients<br>• Counselling and support services provided by health services |
| Government | • Potential for medium and long-term disruption to local business, retailers, tourism and the economy | • Melbourne CBD Protective Security Measures working group established to advise government about how to mitigate risks of hostile vehicle attacks |

**Thunderstorm asthma event of 21-22 November 2016**

**This event affected the health of thousands of Victorians. It is possible that nine deaths may be attributed to this event and Victoria's State Coroner is investigating those circumstances.**

Thunderstorm asthma event of 21-22 November 2016[6]

| Critical Infrastructure sector | Key challenge to Critical Infrastructure service providers | Key response by Critical Infrastructure service providers |
|---|---|---|
| Health | • Unprecedented surge in demand for urgent respiratory care services in a condensed time, across a large area<br>• Emergency service organisations and agencies activated to assist health services to provide pre-hospital medical assistance<br>• Rapidly escalated scale of operations to respond to Triple Zero calls, linking community with emergency services agencies | • Rapidly escalated scale of operations to treat patients, more than 9000 presenting with asthma and in respiratory distress over 24 hour period, as well as 48% increase in calls to Nurse-on-Call service<br>• Enhanced industry and government preparedness and response to future health emergencies<br>• Enhanced real time monitoring of hospital emergency departments<br>• Enhanced community awareness of thunderstorm asthma phenomenon and public communications |
| Government | • Managing unforeseen and unprecedented wide scale circumstances | • Review by Inspector-General for Emergency Management to identify learnings |

**Extreme weather of September-December 2016**

**A series of extreme weather, wide-spread flooding and supercell thunderstorms impacted Victoria's critical infrastructure sectors. Two people died, 20 were hospitalised, 155,000 properties lost power and property damage was extensive.**

| Critical Infrastructure sector | Key challenge to Critical Infrastructure service providers | Key response by Critical Infrastructure service providers |
|---|---|---|
| Transport | • Inundation, debris on and deterioration of roads and rail infrastructure<br>• Landslides closed Great Ocean Road | • Rectification works to return services to normal |
| Health | • Reduced access to several Victorian rural health services, including Maryborough Hospital<br>• A rise in mosquito numbers and increased risk of vector borne diseases | • Adaptation of Maryborough Hospital processes to maintain services<br>• Enhanced program for monitoring Murray Valley encephalitis, Barmah virus, Ross River virus and Kunjin virus |
| Energy | • Extensive damage to electricity poles and wires<br>• Encroachment of key energy infrastructure supplying the Albury community | • Distribution companies repaired transmission lines and restored power to the network |
| Government | • Emergency service organisations and agencies activated to manage incidents and rescue community members<br>• Public communications to warn people or raise community awareness<br>• Evacuation of residents where required | • Enhanced arrangements for responding to severe weather events, better gathering of incident intelligence for decision making |

**Essendon Fields Aircraft Crash - 21 February 2017**

**A chartered aircraft collided into the Essendon Fields Discount Factory Outlet during morning peak hour, causing five fatalities. Structural damage occurred before the aircraft came to a standstill adjacent to the inbound lanes of the Tullamarine Freeway.**

| Critical Infrastructure sector | Key challenge to Critical Infrastructure service providers | Key response by Critical Infrastructure service providers |
|---|---|---|
| Transport | • Debris on, and proximity of the Tullamarine Freeway<br>• Traffic management during morning peak commute hours | • Managing closure of major road arterials |
| Government | • Potential community safety impacts | • Emergency service organisations and agencies incident management<br>• Public communications to raise community awareness |

# Victoria's Critical Infrastructure sectors: Key Emergency Risks and Dependencies

**Critical Infrastructure Resilience Improvement Initiatives 2016-17**

During 2016-17, Victoria's Sector Resilience Networks focussed attention on a range of resilience improvement initiatives aligned to key identified risks. These initiatives addressed four common themes. These are listed below together with an example for each theme.

## Better understanding of cross-sector dependencies and testing preparedness

Increasing reliance on advanced, automated and interconnected technologies and systems increases the risk of systemic failure, as failure in one sector cascades to others. The following resilience improvement initiative demonstrates the effectiveness in further understanding cross sector dependencies and testing preparedness.

### Case Study

Members of the transport, health and government networks assisted in the planning of the multi-agency 'Exercise Galaxy'. This exercise tested the preparedness of emergency management response and recovery arrangements to a terrorism event. It included industry and government participants from the Sector Resilience Networks.

## Strengthening and establishing new collaborative relationships

Over the past 12 months, sector networks have matured and expanded their membership and information sharing across sectors.

### Case Study

Established in 2016, the Food and Grocery Supply Logistics Network has met four times, including for a tour of Victoria's State Control Centre.

## Increasing consequence and emergency management awareness

This year the Sector Resilience Networks conducted various activities to increase emergency management awareness, and their role in managing potential or actual consequences to Victorian communities when an emergency disrupts service delivery.

### Case Study

'Exercise Vital' tested the response of members of the Water Sector Resilience Network to an earthquake. Participants included Yarra Valley Water, South East Water, City West Water, Western Water and Melbourne Water (and the Department of Environment, Land, Water and Planning, as observers).

## Encouraging knowledge sharing

During the year, several Sector Resilience Networks undertook resilience measures targeted at knowledge sharing.

### Case Study

The Transport Sector Resilience Network developed and convened a multi-sector Transfer of Control workshop. Participants included members from the different sector networks and emergency services organisations. This included a case study (Calder Freeway truck rollover accident, May 2016) and panel discussion to improve participants understanding of incident control arrangements.

# Victoria's Critical Infrastructure sectors key emergency risks and dependencies for 2017-18

Identifying, evaluating and understanding each sector's key emergency risks enables them to make more informed emergency management planning decisions to strengthen sector resilience. In 2017-18 the Sector

Resilience Networks considered the key emergency risks for their sector's infrastructure, systems, assets and ability to supply services to the community. Key risks identified were:

» animal disease
» major asset failure
» cyber-attack
» earthquake
» electricity disruption
» extreme weather
» fire
» flood
» gas supply disruption

» hazardous materials
» heatwave
» human resources disruption
» liquid fuel shortage
» mine failure
» pandemic
» plant disease
» security threat or event
» storm

» telecommunications loss
» transport emergency
» water supply disruption
» drought
» logistic network disruption
» food supply disruption

# Overview of Victoria's Critical Infrastructure sectors

## 📟 Banking and finance

This sector facilitates financial transactions, the protection of financial loss through insurance services and leveraging of assets to create wealth. These services are delivered by multiple global, national, regional and community based financial institutions that are interconnected and operate on an international platform. With services delivered from and reaching far beyond Victorian borders, the sector is regulated by Commonwealth legislation and coordinates sector resilience building initiatives at the national level.

### Sector overview

» over 40 financial sites identified as operationally important in Victoria and hosts the headquarters of two of Australia's major four banks

» services include payments, consumer electronics, settlements, foreign exchange, equities and derivatives trading, money market and debt securities, cash supply management, call centres, claims processing, core risk management, general ledger and insurance

### Key stakeholders

» financial institutions

### Key assets and infrastructure

» primary data centres, back-up data centres, call centres, corporate headquarters, operations/processing centres and trading centres

### Key risks

» highest concerns are loss of electricity, water and gas supply
» loss of telecommunications

### Key dependencies

» electricity, water, gas and telecommunications

## Key Resilience Improvement Initiatives completed in 2016-17

• Victorian representation on the Trusted Information Sharing Network Banking and Finance Group project to further understand this sector's critical business functions and what common systems support them
• further analysis of appropriate measures to maintain the availability and continuity of banking services supported by critical functions
• shared insights from the Trusted Information Sharing Network to help improve the Victorian Government critical infrastructure resilience arrangements
• Victoria's network continued to engage through participation at the national Banking and Finance Trusted Information Sharing Network
• commenced clarifying and assessing crisis roles and coordination requirements to address critical events
• reviewed terms of reference and membership to better reflect the sector's emerging challenges and to ensure its membership represents all stakeholders

## Key Resilience Improvement Initiatives proposed for 2017-18

• process to assist in expanding the network membership across the country to include jurisdictional participation
• further engage with Victorian financial agencies
• participation in multi-sector activities
• explore interdependencies affected by cyber incursion
• more detailed national contact arrangements between the sector and various stakeholders nationally including law enforcement and emergency services agencies

# Communications sector

The communications sector, which includes information technology, facilitates business and societal social communications and is a foundation for economic and social development and stability. Internet, phone, radio, television, online transactions and business operations all involve the exchange of data and information through an interconnected communications network. With many of the service providers nationally or internationally owned and regulated at the Commonwealth level, Victoria's communications sector works closely with Commonwealth partners on resilience initiatives.

## Sector overview

» the communications sector is regulated by the Australian Government—the Department of Communications and the Arts sets national policy
» the Australian Communications and Media Authority regulates broadcasting, the internet and radio communications following Government policy and the national Telecommunications Act 1997
» the telecommunications sector in Victoria encompasses voice and data services provided over fixed and mobile networks, including infrastructure for fixed and mobile customer access networks, backhaul and transmission networks

## Key risks

» fire, flood, storm, extreme weather, pandemic, heatwave, security, electricity disruption, cyber security, redundancy asset failure and disruption of underground cables

## Key stakeholders

» Victorian communities and businesses, including other dependent critical infrastructure sectors
» Victorian Government (particularly Emergency Management Victoria and the Department of Economic Development, Jobs, Transport and Resources)
» NBN Co, Optus, Telstra, Vodafone and VicTrack

## Key assets and infrastructure

» copper networks, hybrid fibre-coaxial networks, fibre-optic cable networks, mobile telephone and wireless internet towers (3G/4G) and satellites, exchanges or points of interconnect (POI's), data centres
» Victoria's backhaul infrastructure that transfers high data volumes to and from the core network is complemented by eight intercontinental submarine cables between onshore nodes in Australia and other countries

## Key dependencies

» electricity, human resources and government especially emergency management

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## Key Resilience Improvement Initiatives completed in 2016-17

• participation in forums, activities and meetings as part of their Communications SRN membership
• EnergySafe Victoria presentations regarding vegetation clearance around infrastructure near powerlines
• EMV presentation on the Emergency Management Common Operating Platform information tool
• participation in resilience improvement activities through national networks like the Trusted Information Sharing Network Communications Sector Group
• information sharing and awareness raising initiatives at network meetings and cross sectoral forums including a presentation by the communications sector regarding the impacts of the SA blackout at the All Sectors Resilience Network Forum

## Key Resilience Improvement Initiatives proposed for 2017-18

• further develop the maturity of the network membership
• participation in multi-sector activities
• explore interdependencies affected by cyber incursion
• develop understanding by the network of Victoria's emergency management arrangements and tools
• further improve the Victorian Government's understanding of the communications sector to support requirements in emergencies
• at network meetings, share relevant lessons and case studies
• develop the 2018-19 Communications Sector Resilience Plan

# Energy sector

The sector provides Victorians with energy for personal and business use and enables all other critical infrastructure sectors to function. Victoria's energy is mainly sourced from non-renewable sources and the sector has three privately owned and operated subsectors – electricity, gas and liquid fuels. These subsectors are part of national networks that import and export energy to and from other States. Victoria's energy sector industry owners and/or operators are also active participants in sector resilience building initiatives at the Commonwealth level. The co-chair of the Trusted Information Security Network - Energy Group is from Victoria's energy sector.

## Sector overview

- » covers raw materials, processing plants, energy production/generation facilities, storage facilities, and transmission and distributions networks
- » Victoria's electricity, gas and liquid fuels are owned and/or operated by multiple privately owned organisations.
- » sector is currently undergoing rapid change which presents challenges and opportunities for improving resilience

## Key risks

- » fifteen key events that pose a risk to reliable supply of energy to Victorian communities, including:
  - » fire, severe weather, earthquake, cyber security breach, energy input supply failure, workforce disruption, liquid fuel shortage, power supply disruption, threat against person, property or environment, loss of telecommunications, major plant failure, major industrial accident, injury or rescue, mine batter collapse, major pipeline damage and hazardous materials incident.
  - » interdependencies between subsectors can mean disruption to supply in one subsector can result in disruption to others.
  - » impact of climate change on weather patterns, which are predicated to change significantly in the next 25 years

## Key stakeholders

- » Victorian communities and businesses, including other critical infrastructure sectors
- » producers and distributors of electricity, gas and liquid fuel products and services to Victoria.
- » the energy markets and the Australian Energy Market Operator
- » Government regulators and the commonwealth government
- » storage, import and export infrastructure owners and operators

## Key assets and infrastructure

- » electricity: generators, high and low voltage transmission systems and distribution systems
- » gas: production, receiving, processing and storage facilities, transmission and distribution systems
- » liquid fuels: production and import facilities, fuel refineries, storage, distribution system (pipelines and transport) and retail outlets.

## Key dependencies

- » strategic inputs, activities and outputs required to deliver energy services and infrastructure in Victoria including: human resources (specialist staff), energy supply for operations, water, supporting infrastructure, transport infrastructure, production infrastructure, information technology and communications (ICT), transport including transmission and distribution, management systems, plant and equipment.

## Key Resilience Improvement Initiatives completed in 2016-17

- participation in cross sector resilience building forums and workshops
- conduct of, and participation in, a number of exercises to test the preparedness of the energy sector to different emergencies and explore cross sector dependencies
- participation in external agency exercises
- lessons sharing established as standard agenda item for network meetings
- case studies and lessons analysis relevant to the sector
- presentations from external agencies and lessons analysis at network meetings
- shared initiatives for building organisational and infrastructure resilience

## Key Resilience Improvement Initiatives proposed for 2017-18

- exercises to improve operational processes and response
- exploration of interdependencies within the sector and across sectors and sub-sectors
- share learnings from exercises and case studies
- focussed themes for network meetings, including energy load shedding, curtailment arrangements, and cyber security
- contribution to development of state emergency management and resilience planning including sub plans for electricity, gas and liquid fuels and the department's Emergency Management Plan and State Response Plan
- develop an Energy Supply Action Plan for summer preparedness
- engagement with emergency management staff in the Department of Environment, Land, Water and Planning regions

# Food and grocery supply logistics sector

This essential sector provides fresh, refrigerated and packaged food and groceries to Victorian communities and businesses. Maintaining food and grocery supply continuity relies on assets and functions held by multiple large aggregators, retail outlets and key industry associations that operate over multiple modes of transport and infrastructure. These privately owned, individual businesses maintain a national network and participate in the Trusted Information Security Network – Food and Grocery Group.

## Sector overview

» a national network with multiple suppliers, processors, manufacturers, aggregators, distributors and retailers
» focussed on continuity of supply of perishable products from emergency impacted areas, and continuity of supply of food and groceries to Victorian communities during emergencies
» food supply chain consists of production, processing and packaging, distribution and retail networks
» maintains a high level of redundancy within the food supply chain, which increases sector resilience
» operates under the Australian Competition and Consumer Commission  and the Competition and Consumer Act 2010

## Key risks

» disruption to major producers, logistics networks, storage and distribution centres, as well as transport and energy infrastructure
» disruption of essential food supply to communities isolated by an emergency event
» an emergency event that prevents producers delivering product to market

## Key stakeholders

» Victorian communities and businesses, including other critical infrastructure sectors
» aggregators and distributors: Aldi, Coles, Metcash and Woolworths
» industry associations: Dairy Australia and Victorian Farmers Federation (United Dairyfarmers of Victoria)

## Key assets and infrastructure

» assets and functions held by individual businesses used to maintain food and grocery supply continuity
» large warehousing and distribution centres, complex logistics networks, and multiple modes of transport

## Key dependencies

» electricity supply, human resources, liquid fuels, produce and transport infrastructure

## Key Resilience Improvement Initiatives completed in 2016-17

• four network meetings including joint meeting with the national Food and Grocery Trusted Information Sharing Network
• review network membership to further include relevant industry members
• multi-sector Transfer of Control workshop participation
• interface protocol between the sector and the Victorian Government for times of emergency

## Key Resilience Improvement Initiatives proposed for 2017-18

• increase members' understanding of, and access to, Victoria's Emergency Management – Common Operating Picture
• participation in multi-sector activities
• progress understanding of the criticality of key food and grocery sector infrastructure in Victoria
• review network membership to further include relevant industry members
• increase understanding of potential risk of food supply issues during emergencies
• provide the Victorian Government with further understanding of food supply risks and potential issues
• develop Food and Grocery Supply Logistics Sector Resilience Plan 2018-19

## Government sector

Victorian Government Departments and systems are essential to the effective governance of the State. The Victorian Government delivers and regulates services to communities that include education, public safety, transport, communications, social security and welfare, public health and land management services. In addition to this, Victorian Government departments provide advice to ministers and support high-level decision making.

Departments and Victoria Police work together to foster greater resilience through promoting, facilitating and coordinating effective emergency risk management for the continuity of Victorian government services.

### Sector overview

» provides high-level strategic advice on resilience risks, opportunities and priorities within the Victorian Government departments of Premier and Cabinet; Treasury and Finance; Environment, Land, Water and Planning; Economic Development, Jobs, Transport and Resources; Justice and Regulation; Education and Training; Health and Human Services; and Victoria Police
» focusses on government sector coordination of risk management practices, sharing best practice, and developing a consistent approach to government sector resilience and consistent benchmarking

### Key risks

» terrorism, increased security threat environment, increasing cyber security threat, ability to provide appropriate resources in response to a prolonged emergency event

### Key stakeholders

» Victorian community
» State Crisis and Resilience Council
» Victorian Secretaries Board

### Key assets and infrastructure

» staff, contractors, IT systems, primary CBD departmental and Victoria Police office locations, including all essential services (power, water) supplied to these sites

### Key dependencies

» energy, water and telecommunications

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### Key Resilience Improvement Initiatives completed in 2016-17

- network meetings included lesson sharing and presentations from network members and external agencies to assist government departments in planning and preparing for an emergency
- provided reporting on areas for improvement within the government sector
- developed tools to assist departments to assess and address risks
- strengthened sharing of business continuity documents, reports, insights and learnings between government departments

### Key Resilience Improvement Initiatives proposed for 2017-18

- engage with the government Cyber Security Unit to update network members on cyber security arrangements and Strategy
- explore scenarios and plans in place for high-risk disruptive events
- provide reporting on areas for improvement within the government sector
- develop tools to assist departments to assess and address risks
- network meetings to include lesson sharing and presentations from network members and external agencies to assist government departments in planning and preparing. for an emergency

## Health sector

The Department of Health & Human Services (DHHS) is the lead portfolio agency for the Victorian health sector. Consisting of a network of public and private providers, locations and supporting mechanisms, the health system has a complexity which is unavoidable when providing a multi-faceted approach to meet the health needs of all Victorians. A sample of the breadth of providers include medical practitioners, nurses, midwives, allied and other health professionals; hospitals, pre-hospital and ambulance services; mental health, community and dental health services; community pharmacies; public health and preventive health.

### Sector overview

» network of public and private providers, locations and supporting mechanisms
» flexibility and spread of its skilled workforce—technology and infrastructure allows redundancy within the system

### Key risks

» there is an inherent risk that all emergencies may affect individual's health and well-being
» such as bushfires and floods, heatwaves and pandemic influenza may affect health services ability to provide health services to the community, security incident (protests or criminal action), cyber-threat on critical systems, terrorism, hazardous material incident and communicable diseases.
» significant power outage, water shortage or liquid fuel supply disruption

### Key stakeholders

» service providers for: acute health, pre-hospital care, mental health, aged and home care, primary, community and dental health, drug and alcohol support and Red Cross Blood Service
» expanded membership this year to include broader representation of Victoria's acute metropolitan and rural hospitals, a private hospital spokesperson and community based health services
» Primary Health Networks, specialist health professional colleges and organisations, and the Pharmacy Guild of Australia

### Key assets and infrastructure

» highly diverse mix of staff and skills in both public and private settings
» hospitals, primary and community health centres and private practices

### Key dependencies

» energy, water, transport and communications

## Key Resilience Improvement Initiatives completed in 2016-17

- 'Exercise Galaxy' participation to test preparedness for a mass casualty incident
- network membership review and expansion
- representation at the Victorian Hospital Emergency Managers Association
- incident learning sharing, Organised Thunderstorm Asthma Symposium, over 200 experts gathered to build on their understanding of thunderstorm asthma
- development of ability to issue Thunderstorm Asthma community warnings
- multi-agency debriefs and lessons analysis of actual emergency events
- level Three Incident Controller training for department staff
- 'Code Brown' guidance note developed to assist health services and facilities to prepare external emergency plans
- training for health professionals to further build capability and capacity to respond to emergencies
- SMS-based narrowcast system implemented to enable fast and consistent messaging to hospitals at all hours
- Extreme Weather Alert System developed to provide early notification to homelessness organisations and their partners
- review of the State Health Emergency Response Arrangements commenced
- Emergency Incident Casualty Data protocol implemented to improve tracking of persons presenting to health services following an incident

## Key Resilience Improvement Initiatives proposed for 2017-18

- enhance connections between health services and emergency management organisations
- in partnership with the Bureau of Meteorology, develop system to monitor and forecast thunderstorm asthma
- improve ability to monitor and respond to health sector demand on Ambulance Victoria and health services
- expansion of health sector emergency capacity to be inclusive of primary health networks, community pharmacies and Nurse on Call
- clarify activation triggers for State Emergency Management Centre, Ambulance Emergency Operations Centre, State Control Centre and/or Hospital Code Brown plans
- explore opportunities to better capture and assess criticality of infrastructure within the health sector
- information sessions on thunderstorm asthma and its consequences
- real-time Emergency Department Presentations trending system developed and introduced across metropolitan and regional hospitals

## Transport sector

Victoria's transport sector supports the State's economic and social functioning. It has a highly developed, complex network of infrastructure that moves people and freight within and beyond the state. It's locally coordinated and many of the public and privately owned entities that manage its assets, systems and infrastructure are focussed on resilience building initiatives.

### Sector overview

» local, state, national and privately owned and operated assets and infrastructure
» transport network includes trams, passenger and freight trains, ships, cars, trucks, planes, buses, taxis and motorcycles, as well as the posts, airports, roads and rail lines that are used by these vehicles

### Key risks

» highest: human resources disruption, electricity supply disruption, liquid fuel, transport infrastructure emergency, major non-transport infrastructure disruption security event,
» medium: pandemic, fire, heatwave, storms, floods, earthquake
» low: emergency animal disease, plant disease, hazardous material incidents

### Key dependencies

» electricity supply, telecommunications (signalling/real-time information), liquid fuels, water and sanitation, human resources, infrastructure supporting transport operations
» road and rail (tram and train) infrastructure: road and rail network closures, road network, bridges and rail tracks

### Key stakeholders

» members of the Victorian communities and business, including other critical infrastructure sectors, and the Victorian Government

### Key assets and infrastructure

» public transport systems: metropolitan train, tram, rural train, metropolitan and rural bus, intermodal hubs (Southern Cross station) and ferries
» freight and logistics: logistics infrastructure and service provider's assets
» road and rail infrastructure: Westgate Bridge, Bolte Bridge and raised roadways, CityLink Tunnels, EastLink Tunnels, VicRoads Arterial Road System, rail managed by the Australian Rail and Track Corporation and rail managed by V/Line
» airports and marine ports: Port of Melbourne, Port of Geelong, Port of Portland, Port of Hastings, Victorian Regional Channels Authority, Melbourne Airport and Avalon Airport

## Key Resilience Improvement Initiatives completed in 2016-17

- exercises conducted by industry members and industry groups to test sector preparedness for different emergencies
- each network meeting included a lesson sharing agenda item in relation to exercises, domestic and international case studies or emergency events
- hosted the multi-sector Transfer of Control workshop
- convened the Public Transport Resilience Coordination Group as a sub-group to the SRN to assist in the delivery of emergency management improvement within the public transport sector
- Exercise Hydra, conducted by the Public Transport Resilience Coordination Group
- convened an Industry Accountable Officers forum for members with responsibilities under Part 7A of the Emergency Management Act 2013
- review of major events including floods and landslides and participation by operators in multi-agency debriefs and lessons processes following real time events
- engagement between government and industry to assess the criticality of transport infrastructure
- participation in the All Sectors Resilience Network Forum

## Key Resilience Improvement Initiatives proposed for 2017-18

- undertake exercises, including arranging a whole of sector exercise
- explore interdependencies affected by cyber incursion
- develop a sector cyber security plan
- conduct a cyber desktop exercise, followed by a gap analysis and discussion
- develop a multi sector activity to explore independencies affected by cyber incursion
- conduct an Industry Accountable Officer forum for senior industry members with responsibilities under Part 7A of the Emergency Management Act 2013
- share learnings from exercises, case studies and emergency events at network meetings
- share key concerns and lessons with other sectors
- conduct relevant security briefings at network meetings
- conduct critical infrastructure site visits
- SRN member to present at the next All Sectors Resilience Forum
- develop the 2018-19 Transport Sector Resilience Plan

# Water sector

Reliable, safe water supplies are needed for drinking, sanitation and irrigation, as well as for industry, communities and the environment. The sector activities include the management of catchments, water storages, pipelines, pumping stations, treatment plants and control facilities. Members of the Sector Resilience Network for Water are key participants in many of the sector resilience building initiatives coordinated at the Commonwealth level.

## Sector overview

» 19 water corporations and the desalination plant operator manage key infrastructure and services
» Victoria's water systems are interconnected with high redundancy, which increases sector resilience

## Key risks

» highest: fire, severe weather including floods or storms, liquid fuel shortage, earthquake, drought and cyber threat
» medium: electricity supply disruption, dam safety, hazardous material incident, treatment chemical shortage, loss of telecommunications (including loss of telephones, fibre optic connectivity supervisory control and data acquisition network, disabled communication), source water contamination and human influenza pandemic
» low: threats against people, property or environment (including disruption, vandalism, terrorism and active shooter), and heatwave event

## Key stakeholders

» water corporations
» desalination plant operator

## Key assets and infrastructure

» water supply catchments, storage infrastructure, treatment facilities and transfer systems
» Victorian Desalination Plant

## Key dependencies

» communications, energy, transport, and health sectors

## Key Resilience Improvement Initiatives completed in 2016-17

• exercises by water corporations to test operation of their emergency management processes and capabilities
• exercises by government to test preparedness of network members and government regional staff
• action plan for enhanced information sharing across the water sector
• awareness development program for senior executives and board members across the 19 water corporations
• action plan to improve Victoria's preparedness and response arrangements for water sector incidents

## Key Resilience Improvement Initiatives proposed for 2017-18

• update state response plans for dam safety, water and wastewater service disruption, and blue-green algae bloom incidents
• review incident notification protocols to clarify notification triggers between industry and the Victorian Government for different levels of incidents
• exercise incident response arrangements and share learnings
• upgrade water sector information portal to enhance ability to share information across the sector
• process to assist the sector to identify and manage interdependencies
• review the sector's capacity, capability and training needs to meet Victoria's emergency management arrangements

# Sector interdependencies

Delivering services to the Victorian community, critical infrastructure owners and operators rely on advanced, automated and interconnected technologies and systems. These interdependencies increase the potential for systemic service disruption. South Australia's extreme weather event on 28 September 2016 resulted in a widespread blackout disrupting health, food and grocery, banking and finance, telecommunications, government and water supply. This event clearly shows the dependencies of sectors on electricity and disruption to service supply.

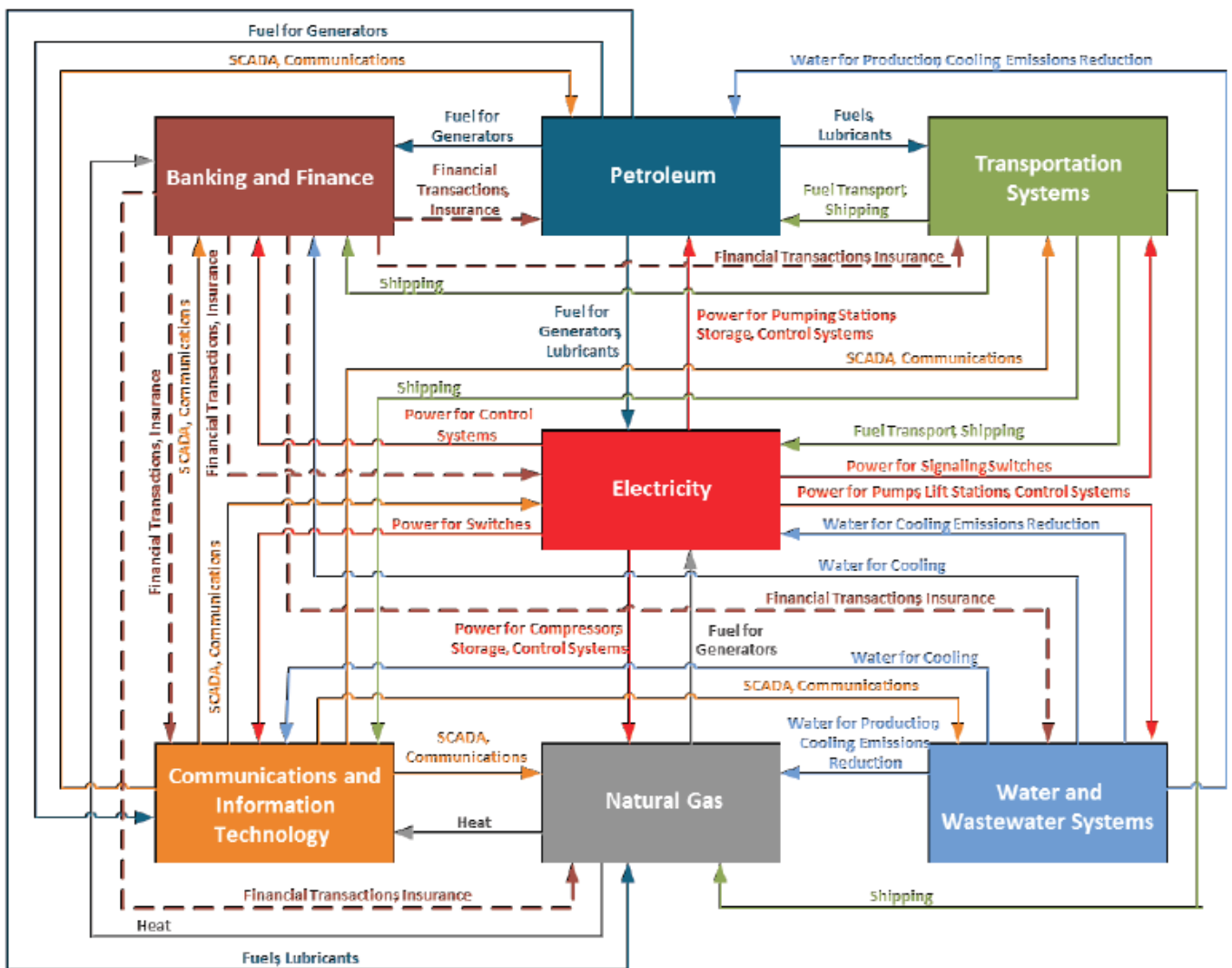The below example illustrates the interdependencies among different sectors and sub-sectors.



**Figure 2.** Example of Critical Infrastructure Interdependencies[7]

During the year, there was significant focus by all sectors on improving their understanding of dependencies and interdependencies within the critical infrastructure sectors. Cross-sector activities this year helped better understand dependencies and interdependencies. They included desktop exercises, industry specific presentations, reviews of actual emergency events and themed forums; culminating in the All Sectors Resilience Forum. Over 110 industry and government members from each sector attended the forum where they explored the upstream and downstream dependencies of a disruption to energy supply. Many of the proposed sector resilience improvement initiatives continue to further advance awareness and knowledge.

In assessing their sector's dependencies, the sectors have identified key critical dependencies for the year ahead as:

- » Electricity, Liquid Fuels and Gas
- » Information Technology and Telecommunications
- » Transport Infrastructure
- » Water and Sanitation
- » Public Health
- » Human Resources

## Conclusion

This Report provides an overview of the resilience of Victoria's eight critical infrastructure sectors, and the resilience improvement initiatives that are being made. The Framework is founded on shared responsibility and close collaboration between industry and government, the strength of which is evident throughout the Report. The Report highlights the importance of building up critical infrastructure sector resilience, particularly in an environment increasingly subject to natural and human induced emergencies. It updates Victorians on the significant progress over the year, and reinforces the commitment and dedication of industry and government to improving critical infrastructure service continuity for all Victorians.

[7] Verner, D. et al (2017), 'Incorporating Prioritization in Critical Infrastructure Security and Resilience Programs', Homeland Security Affairs, Volume 13 Article 7 (October)