

# Canterbury Engineering Lifelines Group

National Lifelines Forum  
October 2009

# Introduction

The talk today is divided into three sections; past, present and future!

- **The Past** - Christchurch Engineering Lifelines Project. John Lamb
- **The Present** - Canterbury Engineering Lifelines Group. Mark Gordon
- **The Future** - Canterbury Lifelines Utilities Group. Jon Mitchell

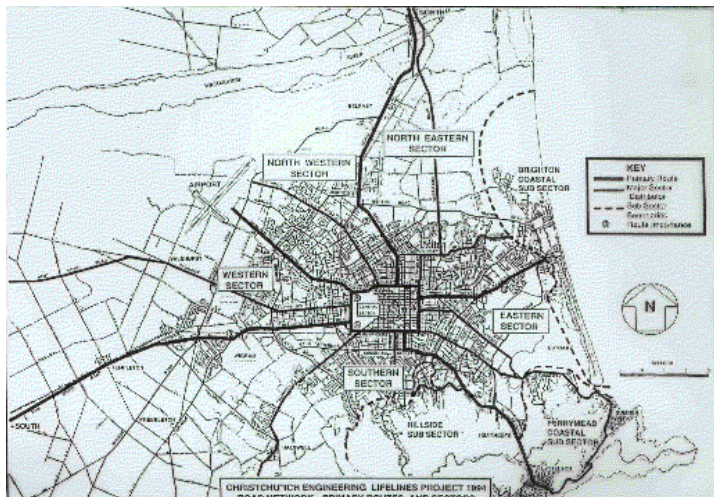
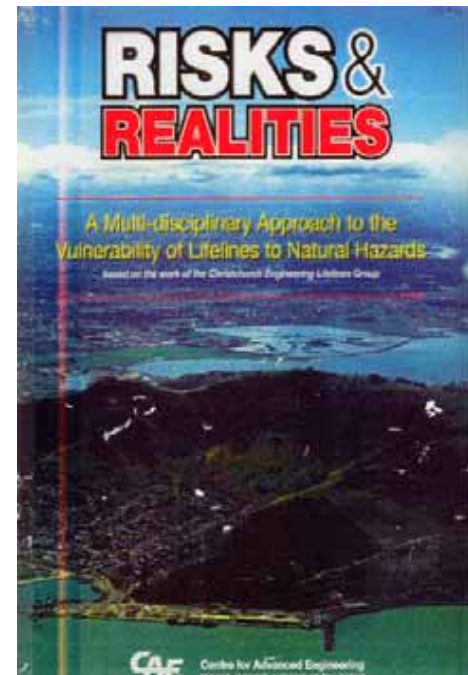
# The Past.....

Christchurch Engineering Lifelines Project  
and the  
Canterbury Engineering Lifelines Group

John Lamb

# Early Work

- Christchurch Engineering Lifelines Project was initiated in 1992 following the success of Wellington Lifelines Project



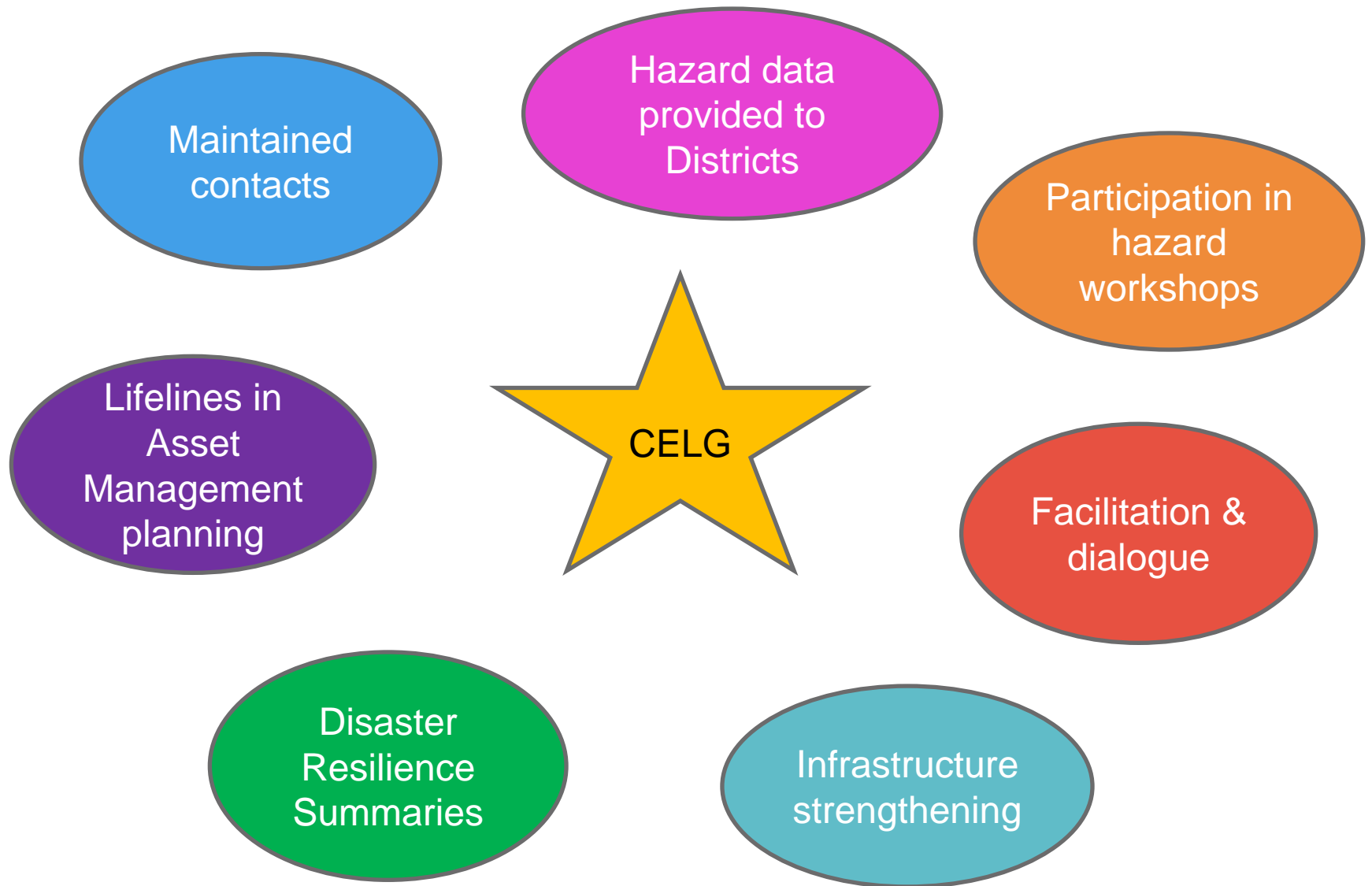
- Work started with the multi-hazard analysis culminating with Risks and Realities publication 1997
- Physical works identified continue today

# Canterbury Engineering Lifelines Group

- Table top/aerial photo review of Transit Routes
- 2004 “Canterbury Engineering Lifelines Group” – formed including “Christchurch Engineering Lifelines Group”
- Principles and methods from Risk and Realities attempted in other Lifelines Projects
- Focused on making Lifelines ‘Business as Usual’ by incorporating the principles and works in Asset Management Plans

**AMP Risk Template incorporating Lifelines now available!**

# Successes in Canterbury Region!



# Lessons Learned for Project Managers

- Lifelines work is worthwhile
- For Asset Managers it's rarely top of the "must do list"
- Be adaptable
- Keep up the contacts
- A response role in CDEM work is helpful
- Get out there and see the real thing (if you can)
- Be sure your work adds value
- A Champion is needed
- Organise a successor
- Attend National Lifelines Forums!



# Kobe





# Farewell

- Lifelines work is only a part of responsible risk management – I hope others will always remember this
- I will always have an interest in engineering lifelines work and will watch with great interest what happens in the future
- I have continued for so long because I really believe that the lifelines work is so worthwhile
- Thank you for your friendship and support. A particular big thank you to Dave Brunson

# The Present.....

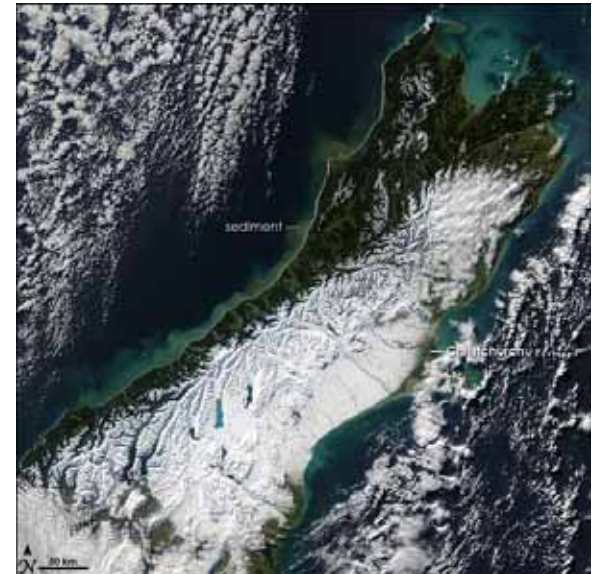
## Canterbury Engineering Lifelines Group Project Update

Mark Gordon

(John Lamb's replacement)

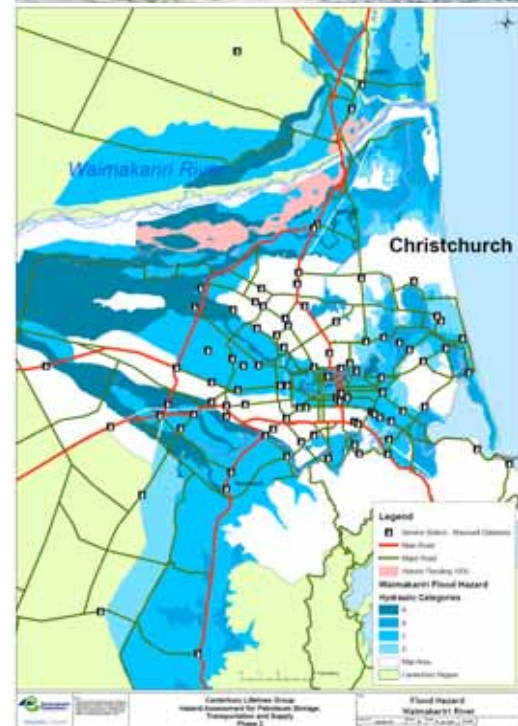
# Current & Upcoming Projects

- Hazard Assessment for Petroleum Storage, Transport and Supply – Phase 2
- Priority Routes and Sites
- Critical Infrastructure Manual Back up
- Lifelines Interdependencies
- Reconnaissance Plan
- Lifelines Engineering & AMP's



# Petroleum Study

- Investigated the effect of hazards on the storage, transportation and supply of petroleum products
  - Phase 1 - bulk storage
  - Phase 2 - transport and supply
- Both phases made a series of recommendations which included:
  - Lifeline interdependencies
  - Fuel Interagency Planning Group
  - Increased communication
  - Mutual aid agreements
  - Contingency planning for power loss
  - Increased resilience at service stations
- Waiting for **national fuel contingency plan**



# Priority Routes and Sites

A map of the Christchurch and Ashburton region in New Zealand. The map shows a network of roads and routes. Green lines represent priority routes, and orange lines represent routes at risk from known hazards. Small orange dots indicate priority community and infrastructure sites. The map is overlaid with a semi-transparent text box containing a list of bullet points.

- Aims to;
  - Identify and map priority community and infrastructure sites across region
  - Map priority routes to serve these sites and identify routes at risk from known hazards
- Surveyed organisations to identify key infrastructure service requirements
- Highest levels of dependency on power, roads, fuel supplies and telecommunications
- Restoration of road access to power and fuel sites will be most critical
- Now identifying infrastructure ‘hot spots’ and critical bridge vulnerability
- Provide the planning and response lead for utilities

# Lifelines Interdependencies

- Aims to prompt utilities in Canterbury to consider interdependencies and cascade failure
- Tool and scoring mechanism developed to identify key dependencies between critical infrastructure providers
- Banking and Fast Moving Consumer Goods included
- To date:
  - May 2008 workshop
  - Further refinement and overseas research
  - Waimakariri District trial to test the methodology
  - Stage 2 output report uses case studies to demonstrate the proposed methodology
- Draft interdependencies method is a work in progress and is to be finalised by the working group

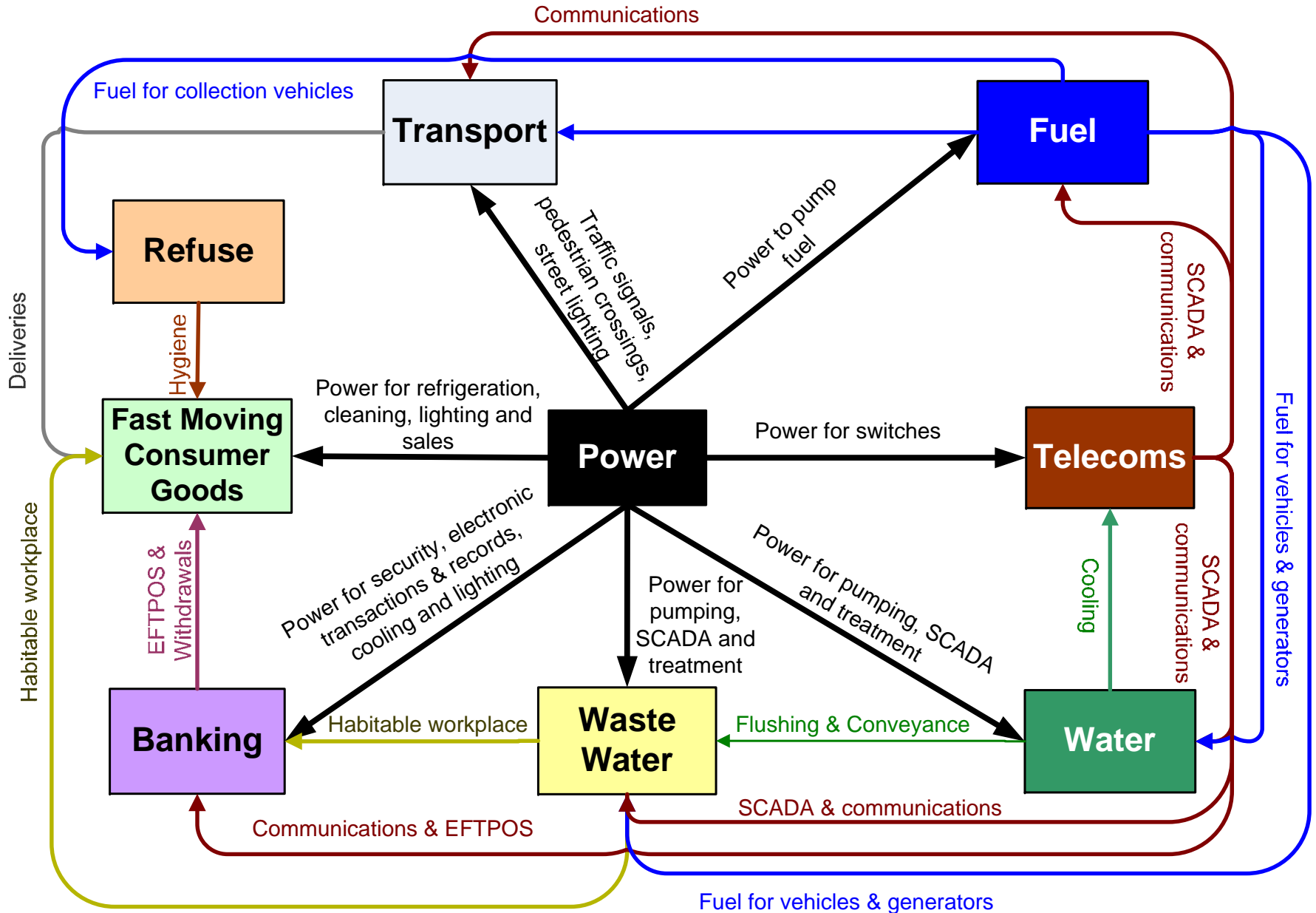
THESE ARE DEPENDENT ON THESE ←

↓

	Water Supply	Sanitary Drainage	Storm Drainage	Mains Electricity	Standby Electricity	VHF Radio	Telephone Systems	Roading	Railways	Sea Transport	Air Transport	Broadcasting	Fuel Supply	Fire Fighting
Water Supply		2	•	•	•	•	•	•	•	•	•	•	•	3
Sanitary Drainage	•		•	•	•	•	•	•	•	•	•	•	•	•
Storm Drainage	•	2		•	•	•	•	•	•	•	•	•	•	•
Mains Electricity	2	3	2		•	3	3	•	2	•	3	1	•	•
Standby Electricity	3	3	2	•		3	3	•	•	•	3	3	2	•
VHF Radio	1	1	2	3	•		3	2	2	2	2	2	•	3
Telephone Systems	2	1	•	1	1	•		•	•	•	1	3	1	2
Roading	2	2	2	3	2	2	2		2	3	3	2	3	3
Railways	•	•	•	•	•	•	•	•		•	•	•	•	•
Sea Transport	•	•	•	•	•	•	•	•	•		•	•	•	1
Air Transport	•	•	•	1	•	•	•	•	•	•		•	•	•
Broadcasting	1	2	•	•	•	•	1	1	•	•	•		•	1
Fuel Supply	3	2	1	•	3	2	1	3	2	•	1	1		3
Fire Fighting	•	•	•	•	•	•	1	•	•	•	2	•	•	1
Equipment	3	3	2	3	3	2	3	3	3	3	3	2	2	2

Note: 3 = High Dependence  
 2 = Moderate Dependence  
 1 = Low Dependence  
 • = No Dependence

# Cascading Impacts of Power Failure



# Waimakariri District Trial

Utility	
Roading	Stormwater
Telecom (land)	Power
Fuel	Vodafone
Transpower	Wastewater
Banking	

Utility	
Mainpower	Wastewater
Stormwater	Fuel
Banking	Telecom
Water	Vodafone
FMCG	Transpower

**Caltex (liquid)**

Utility	D2	D1 X D2
FMCG	3	9
Telecom	3	9
Transpower	3	9
Wastewater	3	9
Power	3	9
Roading	3	9
Water	2	6
Stormwater	2	6
Vodafone	2	6
Banking	1	3

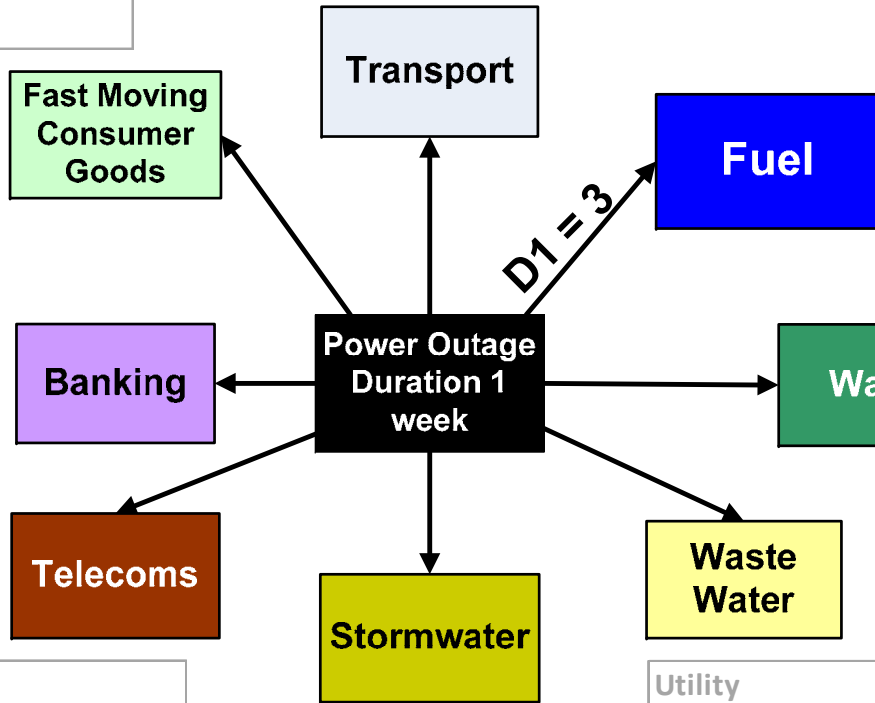
Utility	
FMCG	
Fuel	
Wastewater	
Water	
Roading	
Stormwater	
Transpower	
Telecom	
Vodafone	

Utility	
Wastewater	Vodafone
Banking	Transpower
Fuel	Roading
Telecom (land)	Stormwater

Utility	
Water	Wastewater
Banking	FMCG
Roading	Fuel
Vodafone	Transpower
Stormwater	Telecom (land)

Utility	
Roading	Telecom (land)
Mobile	Wastewater
Water	Banking
Mainpower	Transpower
FMCG	Fuel

Utility	
Water	Finance
Fuel	Mainpower
Stormwater	Roading
Vodafone	Telecom
Transpower	FMCG



- 3 = Red – Highly Dependent**
- 2 = Amber – Some functionality**
- 1 = Green – Little dependency**
- 0 = White – No dependency**



# Critical Infrastructure Manual Backup

- Assesses vulnerability of key infrastructure to control systems failure and level of manual back up
- A range of utilities were contacted about their dependence on control systems
- Findings include:
  - Sites are usually stand alone for control purposes
  - Redundancy and back up arrangements
  - Power failure is the most common cause of failure
  - Less of a problem than expected
  - Personnel availability and knowledge could be an issue



# The Future.....

Canterbury Lifelines Utilities Group

Jon Mitchell

Regional EMO Manager

(Acting Regional Council Operations Director)

# From Engineering Lifelines to Lifeline Utilities!

- Name change to reflect CDEM Act language
- Chairperson from membership:
  - Away from implied regional council control
  - Chair as industry-based Lifeline Utilities champion
- Projects from and for utilities
  - Reduced dependence on Emergency Management Office
  - Lifeline Utilities Group Steering Committee = Project Governance
  - Projects initiatives from member organisations

# From Engineering Lifelines to Lifeline Utilities!

- Funding Shift:
  - Encourage member “ownership “of the Lifeline Utilities Group
  - Encourage broader range of projects
  - Enhanced collaboration
  - Future-proof against local government (funding/structural) reform
- Enhanced Lifelines Response Coordinator

# Lifeline Utilities Response Coordination!

- Response Coordinator integrated into ECC
- Trained to:
  - ECC2 Intermediate
  - ECC3 Functional
    - » Operations
    - » Planning Intelligence
- ECC Emergency Management Team training
- Involved in all relevant exercises
- Recovery workshops

# Lifeline Utilities From 2010

- Building on past successes
- Managing (within) Change
- Learning from experiences elsewhere
- Incorporating Increasing Risk
  - Increased interdependencies
  - Growing population
  - Heightening expectations
  - Climate change