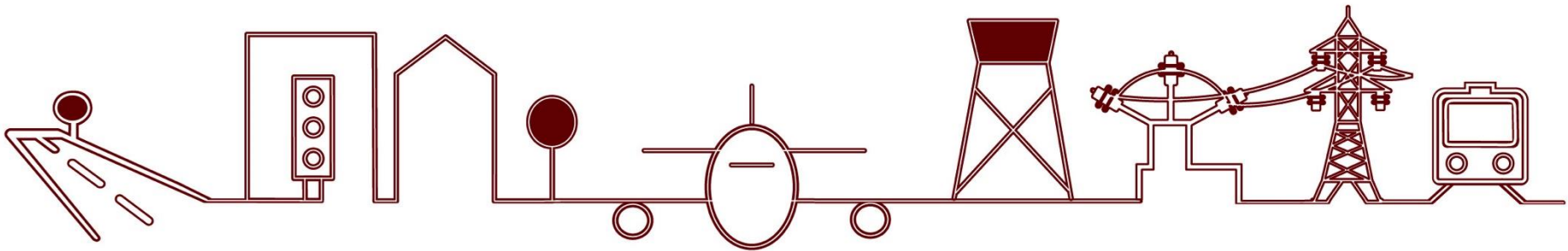


Jacquelyn Lamb, Climate Risk

The Cross Dependency Initiative – Integrated Risk and Collaborative Adaptation



CrossDependencyInitiative



What is the Cross Dependency Initiative?

How did we get here?

- AdaptWater
- AdaptRoads Manly Project // AdaptInfrastructure

Partners: Current, future and **past**

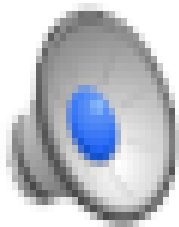
- Sydney Water
- NSW OEH
- NSW Transport; Roads & Rail
- City Of Sydney
- NBN
- Telstra
- Optus
- ENA
- WSAA
- National Water Utilities
- Manly Council
Northern Beaches Council



Sydney Water Case Study – ECL

Very high winds and heavy rain lashed the coast for 2 days.

The impact



The consequences



AdaptRoads Key Learning: Bushfire

\$165 billion: that's the value of local government roads in Australia...

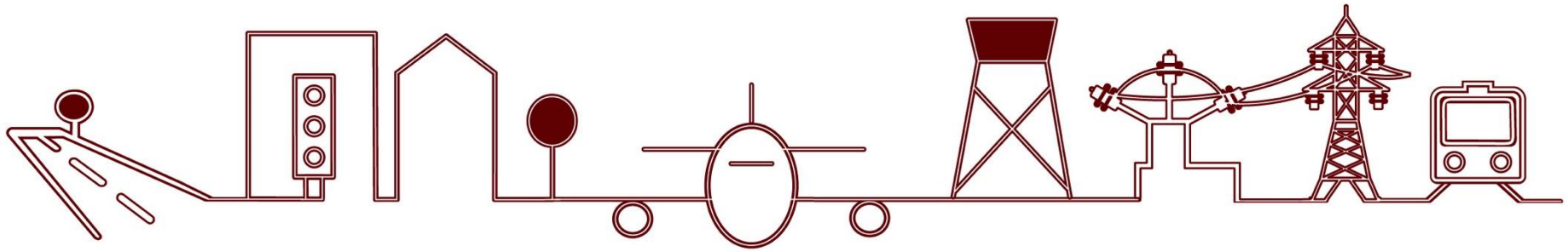
There are 911,418 km of councils are responsible for approximately 670,000 km.



“If this theory could be proven then this could change the way in which local governments treat roads in the post fire recovery stage and it could be beneficial to test and reseal effected roads as part of normal practice after this type of event.”

Rhett Hahn, BMCC





**WHAT ARE WE TRYING TO ACHIEVE?
HOW ARE WE GOING TO ACHIEVE IT?
FUTURE CHALLENGES?**





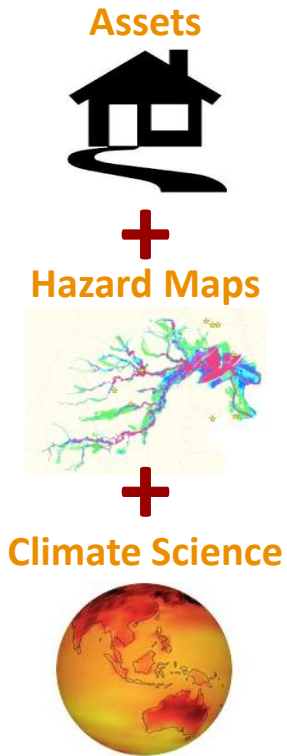
A brief overview of the XDI system

HOW DOES XDI WORK



CrossDependencyInitiative

About impacts and adaptation



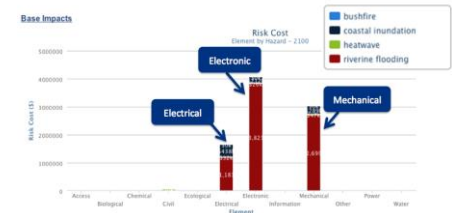
Resilience Engines



Risk Cost and Asset Failure Projections



Vulnerability Diagnostics

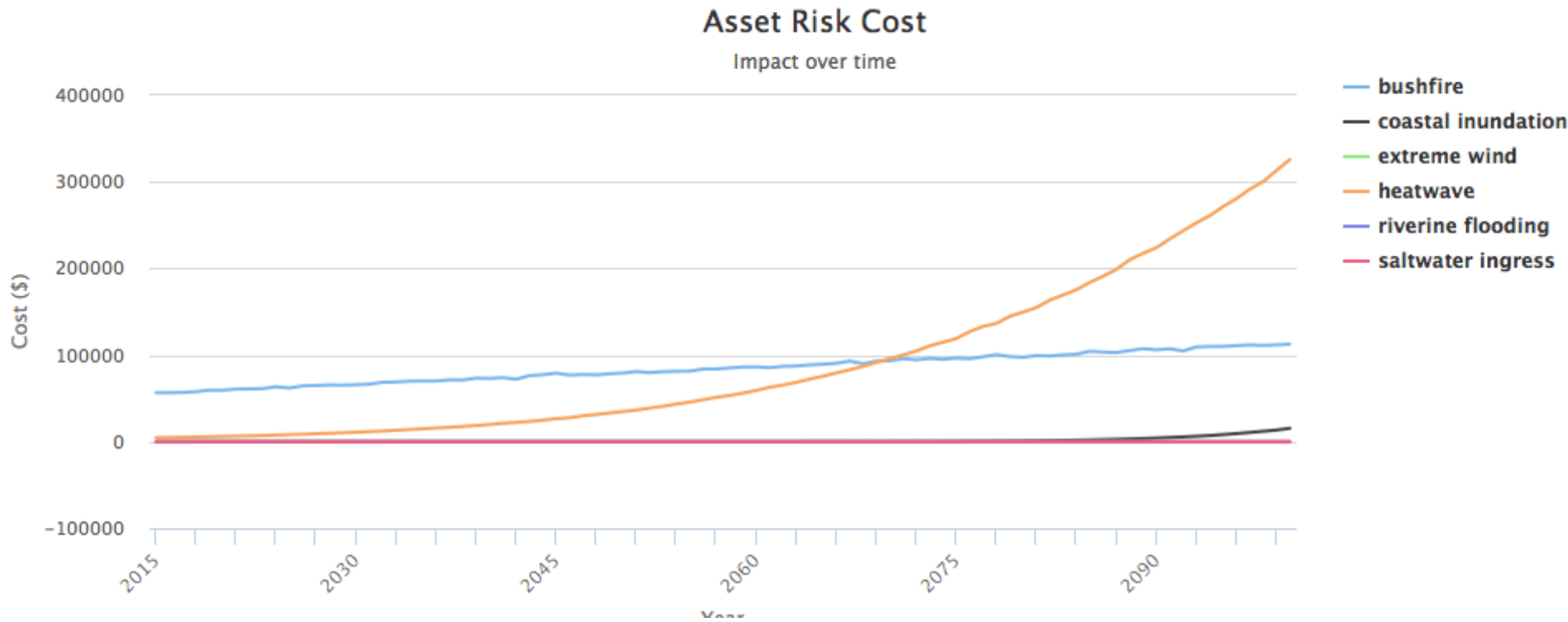


Adaptation Planning, Cost Benefit Analysis



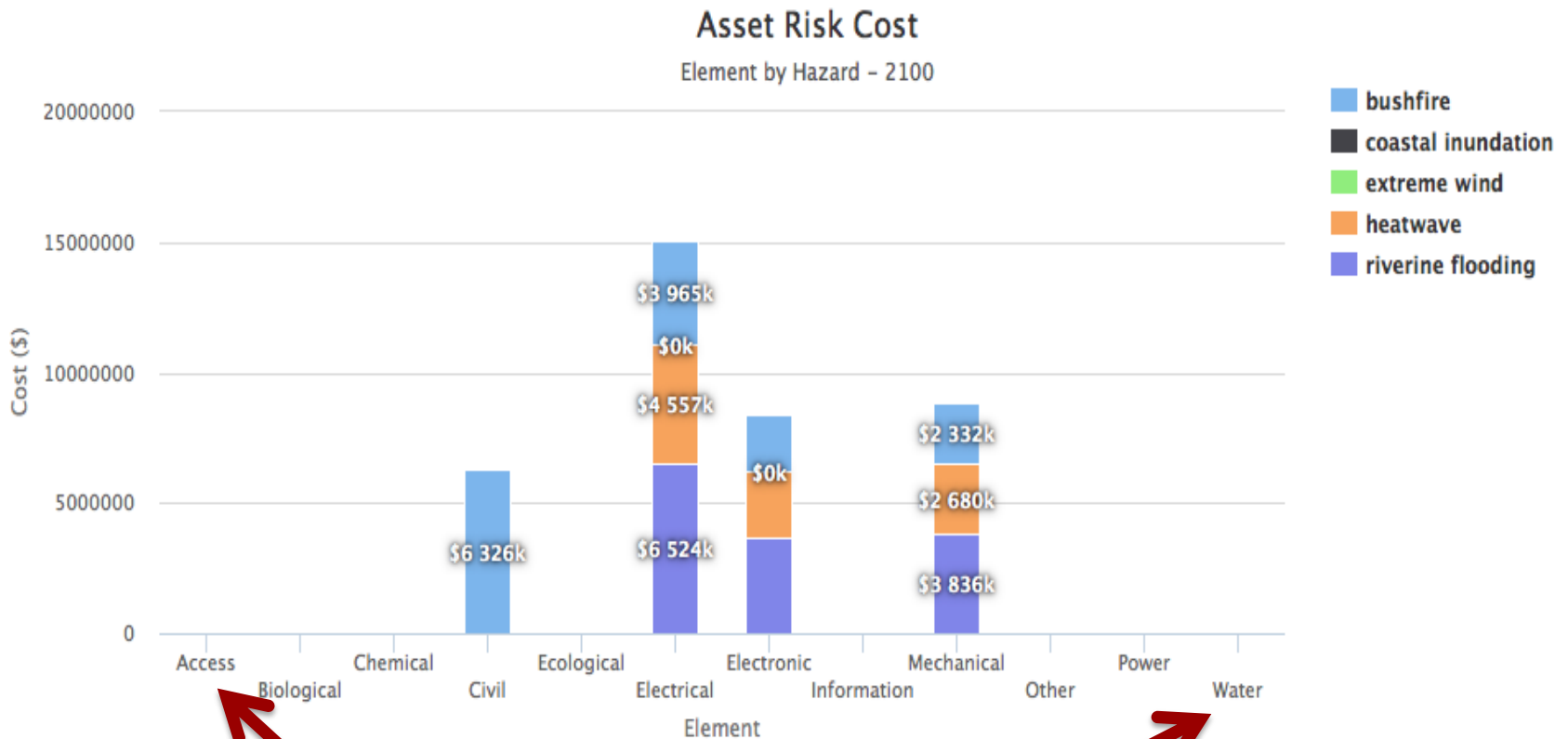
Compute risk today & in future...

Base Impacts



Find where, and why risk occurs:

Base Impacts



And X-dependency causes of risk

Highchart:



Summary Table

Per asset breakdown of results

Base Impacts

Group By: Asset sub class

Asset

Upstream Risk

Asset Risk

Failure Risk

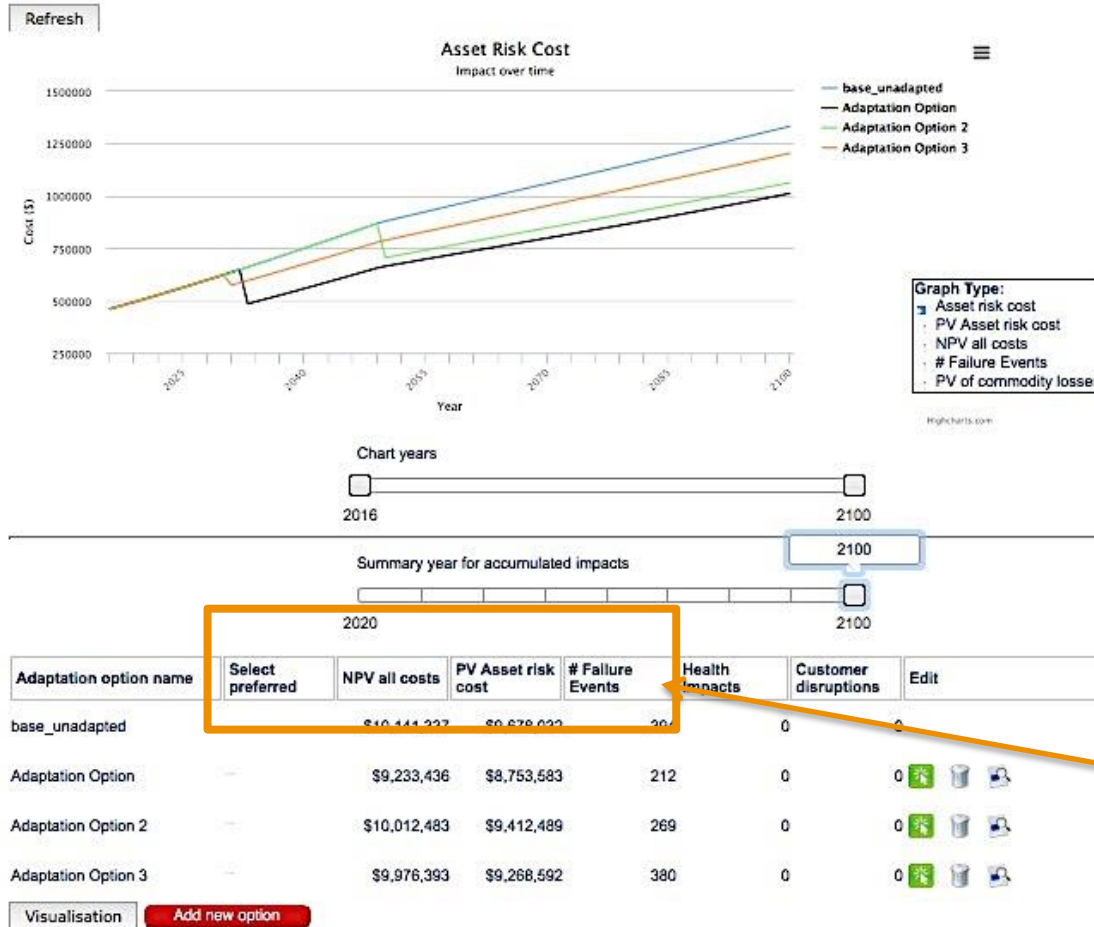
Per Asset Impacts													
Sub-class	Year	Asset name	Bushfire	Coastal inundation	Extreme wind	Riverine flooding	Dry weather overflows	Supply disruption	Water quality breach	Asset risk cost	Asset risk	Upstreams	Failure risk
SFP F1													
SFP F1	2100	MIRKWOOD ST-6092	2.9%	0.0%	0.1%	0.0%	0.0	0.0	0.0	\$2,797.0	3.0%	0.0%	3.9%
SFP F1	2100	PALM AVE-22662	0.0%	27.9%	0.1%	31.4%	0.0	0.0	0.0	\$212,369.0	59.4%	0.0%	60.7%
SFP F1	2100	JUDITH ST-33830	3.0%	0.0%	0.1%	0.0%	0.0	0.0	0.0	\$5,859.0	3.0%	0.0%	4.0%
SFP F1	2100	PERONNE AVE-33921	0.0%	3.1%	0.1%	0.0%	0.0	0.0	0.0	\$6,495.0	3.2%	0.0%	4.1%
SFP F1	2100	JUDITH ST-39372	2.9%	0.0%	0.1%	0.0%	0.0	0.0	0.0	\$2,854.0	3.0%	0.0%	4.0%
SFP F1	2100	LAKESIDE CR-44656	0.0%	31.2%	0.1%	30.3%	0.0	0.0	0.0	\$183,844.0	61.6%	0.0%	62.9%
SFP F1	2100	BURNT ST-49891	2.9%	0.0%	0.0%	0.0%	0.0	0.0	0.0	\$2,458.0	2.9%	0.0%	3.0%
SFP F1	2100	JUDITH ST-50582	0.0%	0.0%	0.1%	0.0%	0.0	0.0	0.0	\$395.0	0.1%	0.0%	1.0%
SFP F1	2100	PALM AVE-66088	0.0%	30.9%	0.1%	31.5%	0.0	0.0	0.0	\$194,859.0	62.6%	0.0%	63.9%
SFP F1	2100	LAKESIDE CR-71463	0.0%	38.3%	0.1%	28.7%	0.0	0.0	0.0	\$162,592.0	67.1%	0.0%	68.3%
SFP F1	2100	PITTWATER RD-153939	0.0%	30.1%	0.1%	25.4%	0.0	0.0	0.0	\$82,663.0	55.6%	0.0%	56.9%
SFP F1	2100	ALTO AVE-158164	0.0%	0.0%	0.1%	0.0%	0.0	0.0	0.0	\$296.0	0.1%	0.0%	1.0%



Adaptation Pathways

Adaptation Options

Compare results of adaptation option assessment and select a preferred option.



Cost benefit analysis of hypothetical pathways.





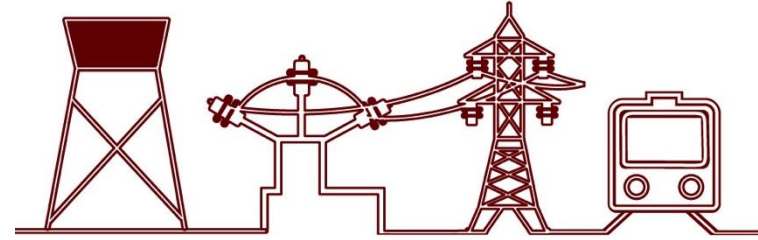
WHAT ARE WE TRYING TO ACHIEVE?

Infrastructure is highly interdependent & future collaborative adaptation is essential.



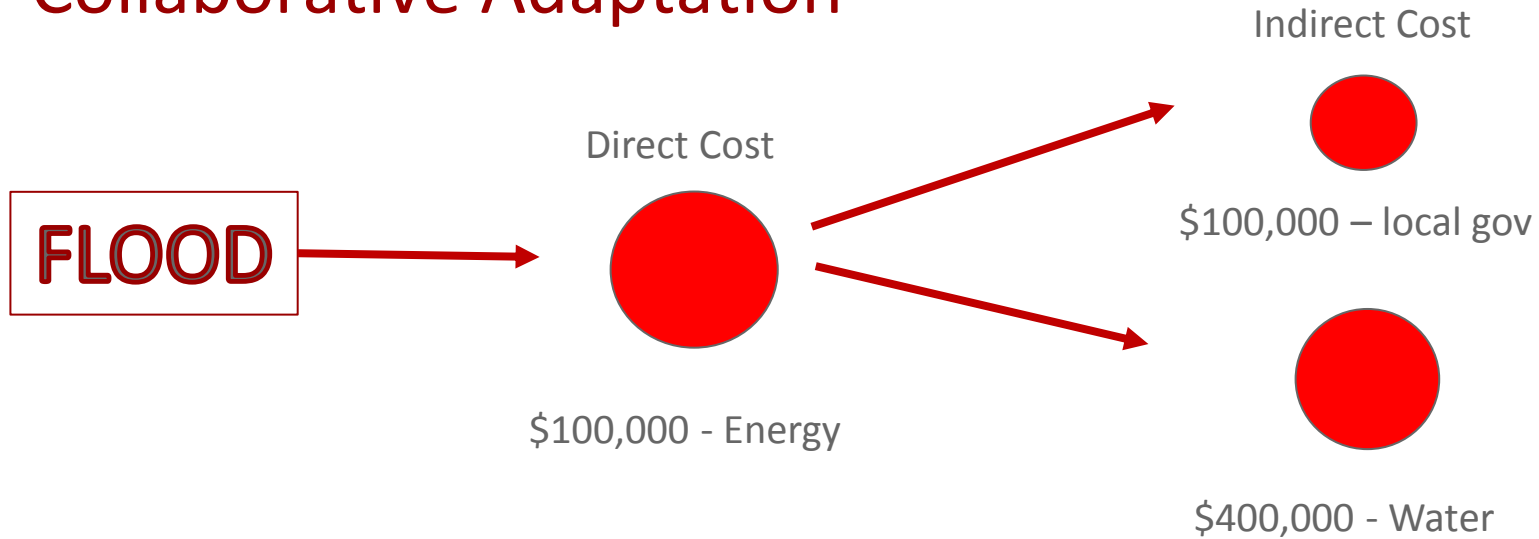
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Interdependent Infrastructure

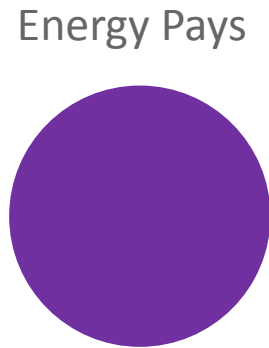


- **Electricity Utilities:** under pressure to reduce energy price, therefore reducing network redundancy, increasing the probability of major supply chain risk transferral.
- **Local Government:** under resourced but in the best position to implement adaptation strategies.
- **Water Utilities:** highly dependent on other utilities within their supply chain – roads (local and state government), power (electricity provider), phone and satellite feeds (telcomms).
- **Rail:** highly dependent on electricity utilities, roads for passenger access (local government) and other transport forms to take-up capacity. Under resourced and not in a position to implement adaptations.

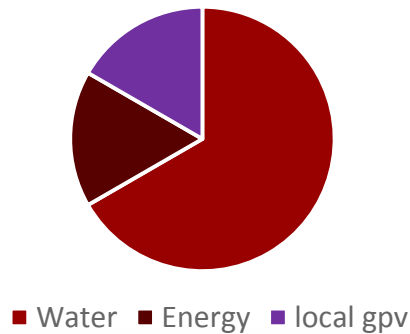
Collaborative Adaptation



Adaptation - \$1 million



Proportionate Value Payment



Collaborative Adaptation

- The Risk Engines stochastically test the cost-benefit of different adaptations, or pathways of multiple timed and costed actions.
- With multiple sectors, the system can test the average damage and consequence cost savings to down-stream assets across multiple sectors.
- The NPV might be marginal but including the risk savings to dependent infrastructure such as water pumps and buildings makes the NPV decisively positive.





FUTURE CHALLENGES FOR XDI

Questions that are yet to be answered.



CrossDependencyInitiative

Major Challenges for XDI

- Can private and public sector share data in a secure way?
- Can we integrate future planning across utilities?

Challenge 1
Communication

- How do we fund infrastructure resilience in the future if our governments don't have the funds?
- How can utilities justify spending to the regulator under increased pressure to cut costs?
- Can adaptation costs be shared across private and public sectors?

Challenge 2
Finance

- Can this kind of software enhance how we research infrastructure and how we apply research to infrastructure?

Challenge 3
Awareness



Thank you

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