



**ENERGY  
CONSUMERS  
AUSTRALIA**

# **Electricity Sector Climate Information Project**

Advocate Briefing  
David Havyatt  
28 April 2020

# 1 The Electricity Sector Climate Information Project (ESCI)



**The National Electricity Market is particularly exposed to climate change impacts. An increase in the frequency and intensity of extreme weather events can increase stress on the power system in several ways... the COAG Energy Council should develop a strategy to improve the integrity of energy infrastructure and the accuracy of supply and demand forecasting.**

**Finkel Review, 2016**

# The Electricity Sector Climate Information Project (ESCI)

- \$6.1M investment to 2021 funded from the Federal Government (DAWE). Work is being carried out through a collaboration with AEMO, BoM, CSIRO and the Department of Industry Science Energy and Resources (DISER).
- **ESCI Goal:** to improve the *reliability* and *resilience* of the National Electricity Market to the risks from long-term climate change and extreme weather.
  - Support improved planning and investment decisions for the electricity network.
  - Develop and demonstrate a best practice methodology for analysing climate change risks that can also be used by other sectors.
  - Improve information on likely future changes to extreme weather events such as heatwaves, wind, and maximum temperature thresholds, to inform analysis of long-term climate risk. A particular focus will be on concurrent and/or compounding extreme events.

# Definitions - Reliability

- Reliability hasn't been defined for the project.
- Recognised that it refers to customers not receiving energy when the switch is turned on, but project will need to break up the 'components of reliability' (to coin a term) into more detail.
- Ultimately, project will need to regard system constraints arising from system security events as reliability issues — consumers don't care why there was no power.

# Definitions - Resilience

- Resilience hasn't been defined for the project, but there was a proposition advanced by Pierluigi Mancarella that we look at CIGRE's work.
- In the paper *Building power system resilience with pumped hydro storage* AEMO used the following.
  - AEMO notes that resilience has not been prescriptively defined for the NEM yet, either in respect of the risks that threaten it or the available responses to maintain or restore it. It is not, however, a new concept, as it is good utility practice to design a resilient power system that can withstand, or recover quickly from, high impact events that threaten reliability, security, or consumer survivability. The following definition encapsulates the meaning given to resilience in the context of this ISP Insights paper.

*The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and function.*

United Nations Resolution 69/283 Sendai Framework for Disaster Risk Reduction 2015-203017
- The CIGRE paper *Defining Power System Resilience* defines resilience as:
  - *Power system resilience is the ability to limit the extent, severity, and duration of system degradation following an extreme event.*

# Project Logic

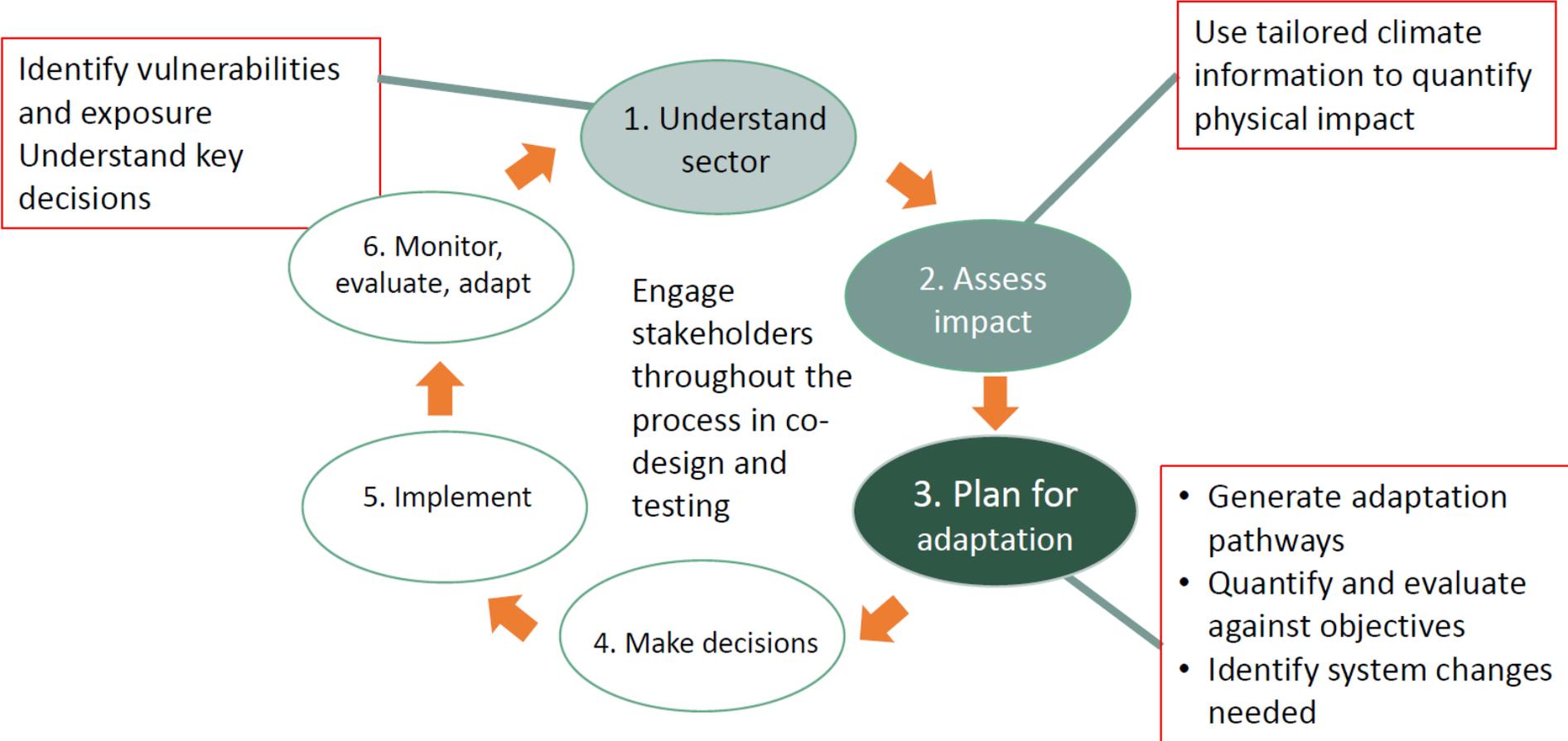
Outcomes (from Finkel Review)	Improve the integrity of energy infrastructure and the accuracy of supply and demand forecasting	
Interim outcomes	<ul style="list-style-type: none"> <li>• AEMO uses tailored climate information (integrated into supply &amp; demand models)</li> <li>• Physical risk from climate change included by T/DNSPs in business cases and accepted by AER</li> <li>• Raise awareness of climate change risks to electricity sector – make ESCI data accessible and enable support to sector (academia, consulting, investment)</li> <li>• Broader electricity sector uses consistent climate information produced by ESCI for risk analysis</li> </ul>	
Objectives (from contract)	<ul style="list-style-type: none"> <li>• Support improved planning and investment decisions for the electricity network;</li> <li>• Support decision-makers in the National Electricity Market to access and use tailored climate information to improve long-term climate risk;</li> <li>• Develop and demonstrate a best practice methodology for analysing climate change risks;</li> <li>• Contribute towards a longer-term vision for the next generation of climate projections and seamless climate and weather services;</li> <li>• Improve information on likely future changes to extreme weather events with a particular focus on concurrent and/or compounding extreme events.</li> </ul>	
Outputs	<ul style="list-style-type: none"> <li>• Standardised climate risk analysis methodology</li> <li>• Extreme weather event scenarios</li> <li>• Weather / climate data on CCiA web portal</li> <li>• Case studies for heat, wind, bushfire and hydro</li> </ul>	<ul style="list-style-type: none"> <li>• Climate risk assessment framework</li> <li>• Guidance material for target audiences</li> <li>• Communication products for target audiences</li> <li>• Capacity development, training and advice</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Vulnerability and risk analyses</li> <li>• Collaboration with other risk management programs</li> <li>• Project management, coordination and support</li> </ul>	<ul style="list-style-type: none"> <li>• Data testing and feedback</li> <li>• Collaborative partnerships</li> <li>• Stakeholder interviews and workshops</li> </ul>

## Some comments on the Interim Outcomes

- AEMO uses tailored climate information (integrated into supply & demand models)  
*This is critical as temperature drives a lot of demand (e.g. SA every 1 degree over 40 adds 100MW – when load shedding occurred in Feb 2017 3200MW demand), sunshine and wind drive generation, and rainfall affects hydro.*
- Risk from climate change included in network revenue proposals and accepted by AER  
*Response to climate risk need not be extra strengthening of network, may be better utilization of DER and better comms and fault identification*
- Raise awareness of climate change risks to electricity sector  
*Open access is one part, but so is cognitive accessibility – can humans understand it*
- Broader electricity sector uses consistent climate information produced by ESCI for risk analysis  
*Critical for informing transition*

# Climate Risk Assessment – ESCI Project

Based on ISO 14090 Adaptation to Climate Change



# Tailored climate information to support industry decision-making

## Key hazards:

- Temperature
- Wind
- Bushfire
- Precipitation

### Reliability

**Trends in key climate variables affecting supply and demand:**

Time series with high temporal and spatial resolution.

### Resilience

**High-impact Weather Scenarios:**

Quantified compound or coincident extreme synoptic weather events.

### Operating Risk

**Regional thresholds for key climate variables:**

Probability of exceedance

# 2 ESCI Reference Group (ERG)



# Role of the ESCI Reference Group

- The purpose of the ERG is to integrate end-user and next-user perspectives into the outputs of the ESCI project by contributing to the development of outputs, such as the data visualisation and the guidance material, and by providing feedback on the type and format of climate information products.
- Input is advisory only.

# Responsibilities of ESCI Reference Group

- Attendance (in person or online) at regular meetings with the ESCI team and the other ERG members to discuss the progress of the project and to help design case studies and other guidance material
- Testing and evaluating elements of the project output, such as risk frameworks and datasets, as these become available, and providing feedback to the ESCI team
- Where appropriate, raising awareness of the ESCI project at meetings that involve other potential users (noting that this does not necessarily imply endorsement)
- The ESCI team may request the ERG to undertake other activities from time to time in support of the project. There is no contractual obligation to undertake these additional tasks

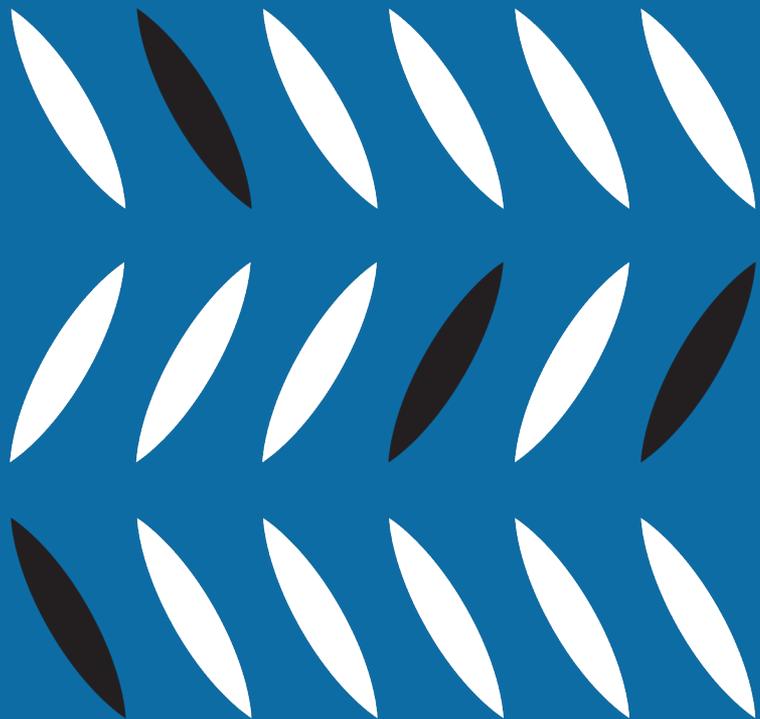
*Members of the ERG are expected to represent the interests of their sector, rather than that of their own organisation, to the best of their ability.*

# Membership of the ESCI Reference Group

Name	Organisation	Name	Organisation
Jacqueline Bridge	AusNet	David Havyatt	ECA
Jill Cainey	ENA	John Bates	Bushfire and Natural Hazards CRC
Jesse Steinfeld	Transgrid	Pierluigi Mancarella	MEI
S. Martin	Powerlink	Paul Graham, Kevin Hennessy	CSIRO
Harrison Bradley	ElectraNet	Nicola Falcon	AEMO
Oliver Nunn	AEMC	C. Reid	KPMG
Cameron Potter, Carolyn Maxwell, Colin Wain	Hydro Tasmania	Leanne Webb	CSIRO
Mark Crosswell	Ethical Intelligence	Craig Arthur	GeoScience Australia

From invitation list to first meeting – not definitive

# 3 Questions from attendees



# 4

## Questions for attendees



# Project Logic

- Are there other Activities and Outputs that the project should deliver? Does your organisation have a specific interest or need?

Outcomes (from Finkel Review)	Improve the integrity of energy infrastructure and the accuracy of supply and demand forecasting	
Interim outcomes	<ul style="list-style-type: none"> <li>• AEMO uses tailored climate information (integrated into supply &amp; demand models)</li> <li>• Physical risk from climate change included by T/DNSPs in business cases and accepted by AER</li> <li>• Raise awareness of climate change risks to electricity sector – make ESCI data accessible and enable support to sector (academia, consulting, investment)</li> <li>• Broader electricity sector uses consistent climate information produced by ESCI for risk analysis</li> </ul>	
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# ERG Objectives and Role

- Are there changes to the role and responsibilities of the ERG that you would like to see?

## Role of the ERG ( from Draft TOR)



The purpose of the ERG is to integrate end-user and next-user perspectives into the outputs of the ESCI project by contributing to the development of outputs, such as the data visualisation and the guidance material, and by providing feedback on the type and format of climate information products. Their input would be advisory only.

### Responsibilities of ESCI Reference Group

- Attendance (in person or online) at regular meetings with the ESCI team and the other ERG members to discuss the progress of the project and to help design case studies and other guidance material;
- Testing and evaluating elements of the project output, such as risk frameworks and datasets, as these become available, and providing feedback to the ESCI team;
- Where appropriate, raising awareness of the ESCI project at meetings that involve other potential users (noting that this does not necessarily imply endorsement);
- The ESCI team may request the ERG to undertake other activities from time to time in support of the project. There is no contractual obligation to undertake these additional tasks.

Members of the ERG are expected to represent the interests of their sector, rather than that of their own organisation, to the best of their ability.

# Obligations on ECA as an ERG member

- The requirement on members is to *represent the interests of their sector, rather than that of their own organisation, to the best of their ability*. ECA's sector for these purposes is all electricity consumers, not just small consumers.
- There are two specific tasks
  - *Testing and evaluating elements of the project output, such as risk frameworks and datasets, as these become available, and providing feedback to the ESCI team;*  
How should ECA test and evaluate elements of the project output?
  - *Where appropriate, raising awareness of the ESCI project at meetings that involve other potential users (noting that this does not necessarily imply endorsement);*  
Apart from this meeting, what else should ECA do to raise awareness?

**A** Suite 2, Level 14, 1 Castlereagh Street, Sydney NSW 2000

**T** 02 9220 5500

**W** [energyconsumersaustralia.com.au](http://energyconsumersaustralia.com.au)

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**ABN** 96 603 931 326

