

# Future Electricity Markets Summit:

3. Resilience

and

8. The Just Transition



# 3. Resilience

Electricity system resilience in a world of increased climate change and cybersecurity risk

- Climate Change
- The 'Internet of Energy'
- Cyber Security
- Quantum Technology
- Societal Inputs

# 3. Resilience

## Climate Change

- Climate change brings both an increased mean risk, *and* an increase in the *range* of risk of climate extremes
- Efficiency of energy use declines as temperature increases
- There is a correlation between climate risk events e.g.  
elevated temperatures + drought => increased fire risk
- Increasing the complexity of systems - e.g. redundancy of pathways – helps, but does not eliminate the risk
- A key lesson – it is important to build in new resilience measures rather than simply tinkering with old ones

# 3. Resilience

## Cyber Security

- We are moving towards the 'Internet of Energy', with millions of generators, demand responses and storage providers
- Orchestrating the future DER grid requires advanced sensing, wireless comms networks and sophisticated computing
- All of this provides greater opportunity for cyber interdiction – your fridge may be the next weak link that brings down the grid
- Multiple redundancy/pathways provide only partial mitigation
- There is an asymmetry in the threat/response time – averages 15 hours per attack, 8-9 months to detect, many years to fix

## 3. Resilience

### Quantum Technology

- The 'Internet of Energy' will rely on the secure transfer of masses of information by the Operator and by the market
- Quantum computing *will* provide unparalleled computing speed that has the potential to crack any classical code
- Fortunately, quantum communications technology exists *now* which can provide secure information transfer, and will detect the presence of eavesdroppers
- We therefore expect that quantum technology will eventually improve the security of the electricity network for those who have the capability to deploy it

# 3. Resilience

## Societal inputs

- Increasing cyber attacks erode societal trust in the system
- There is therefore a societal balance/trade-off between
  - Openness and sabotage
  - Confidentiality and espionage
  - Integrity and subversion
- Society should determine the *tolerance* on NEM resilience
  - recognizing that zero tolerance implies infinite spend
- Societal engagement is a pre-requisite for determining electricity system tolerance but:
  - Requires transparency of information to make good decisions
  - Should be evolutionary and responsive to optimize outcomes

# 8. The Just Transition

Electricity markets in flux –  
the importance of a just transition

- Vulnerable consumers
- Planning the transition
- Designing the market

# 8. The Just Transition

## Vulnerable consumers

- The most vulnerable members of society are the least able to cope with climate change or technology change
- They are also least able to adopt measures to improve their energy use e.g. *partial* subsidies for solar, insulation etc.
- Creating efficient policies can unintentionally lead to inequitable outcomes e.g. renewable energy certificates that favour those with the means to install rooftop solar
- Some policies, such as carbon pricing, do enable wealth redistribution to cope with hardship arising from the transition
- Delaying long-term solutions (carbon price) with short-term patches (regulation) can raise prices and be regressive

# 8. The Just Transition

## Technological

- It is important to take a measured approach
- There is a risk that the transition to coal and gas will dislocate workers
- Current energy production is growing at a rapid rate of 1.5% per year



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# 8. The Just Transition

## Designing the market

- Future electricity market design should ensure that society can make good choices that enhance the transition, and not create confusion that enables profiteering from imperfect markets
- Social equity should be key to market design and not simply market efficiency e.g. carbon price without wealth redistribution
- Market design needs to be complemented by measures that maintain equity e.g. means testing for insulation subsidies
- Cost-benefit analysis including societal externalities should be used to judge the effectiveness of market design

**Thank you!**

