

**SURVIVE THRIVE**



# Natural Selection

**Financial Services Forum**

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**Actuaries  
Institute**



# What will Australia's Transition to Renewable Energy Mean for Financial Services?

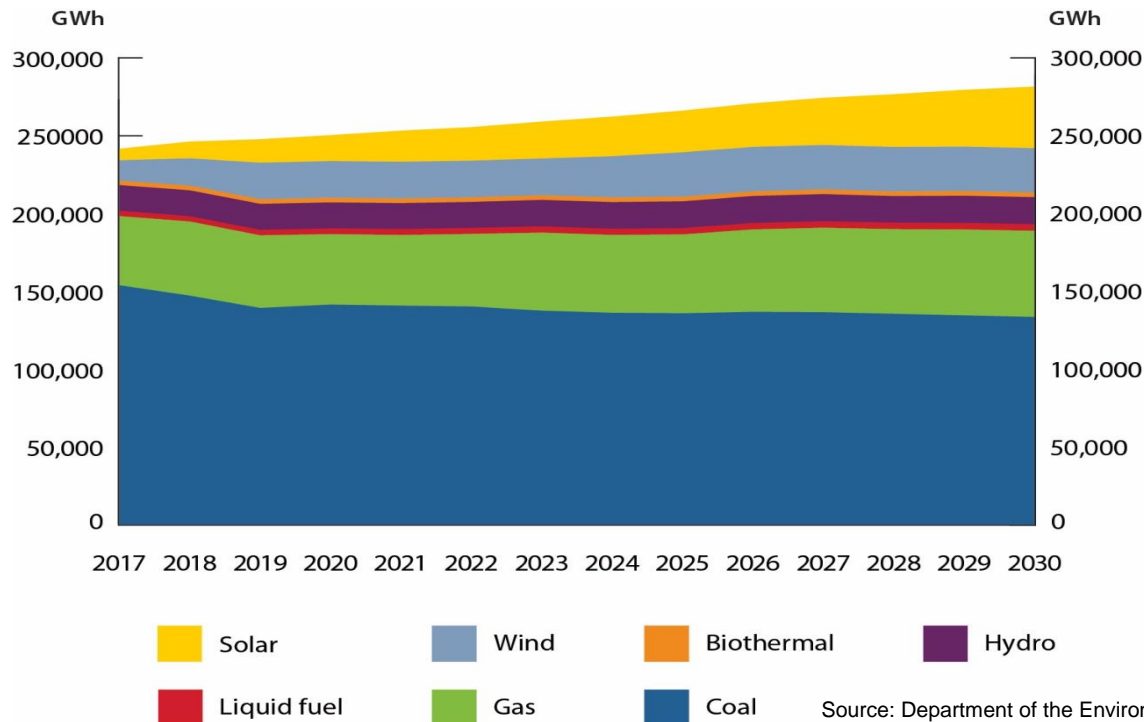
Sharanjit Paddam, James Yap and Michael Thomas

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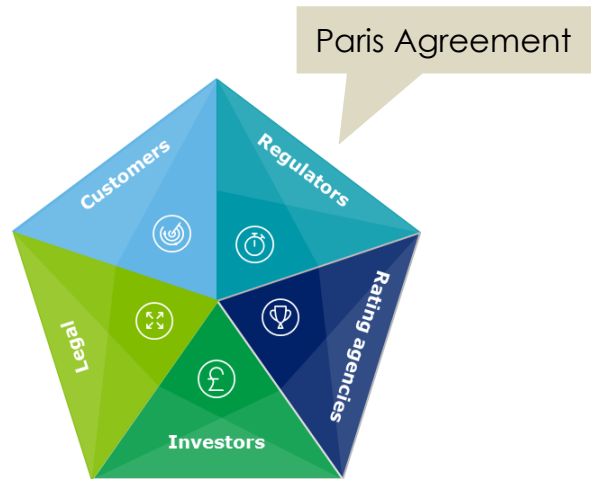
# Australia currently relies heavily on fossil fuels for energy

Projected sent-out electricity generation by fuel mix, 2017 to 2030



# However, values are changing with concern for climate/ fossil fuels

## Policy change

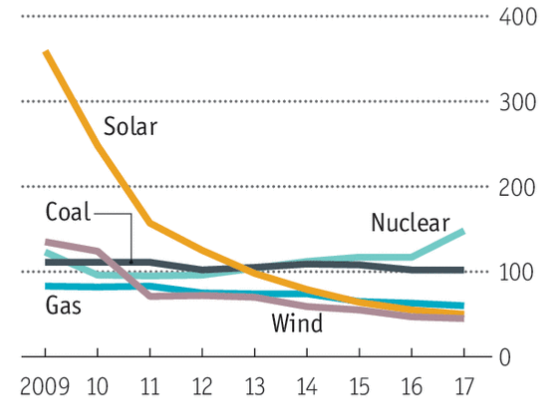


Initiatives to curb emissions

## Economic and Technology Change

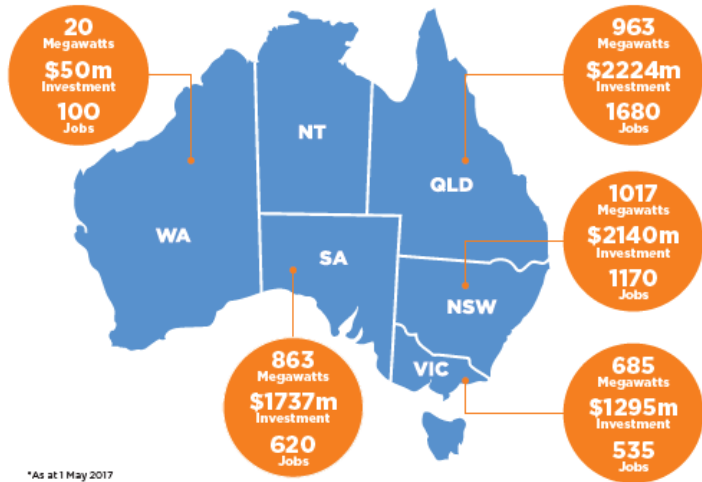
### Clean equals cheap

North America, average cost of energy  
\$ per MWh



Source: Lazard, levelised cost of energy analysis

# This drives a transition from fossil fuels to renewable energy

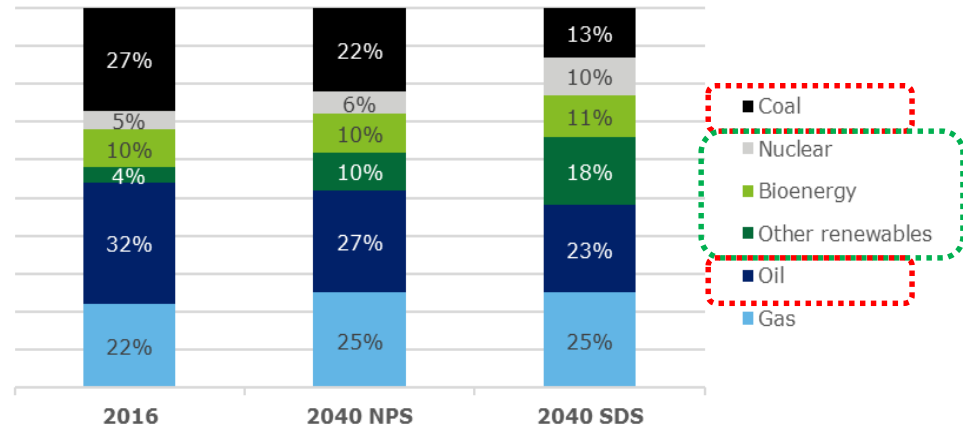


\*As at 1 May 2017

Source: Clean Energy Council 2017

South Australia launched the worlds largest battery built by Tesla in December 2017

The International Energy Agency projects the future breakdown of energy mix required to achieve carbon emission targets.

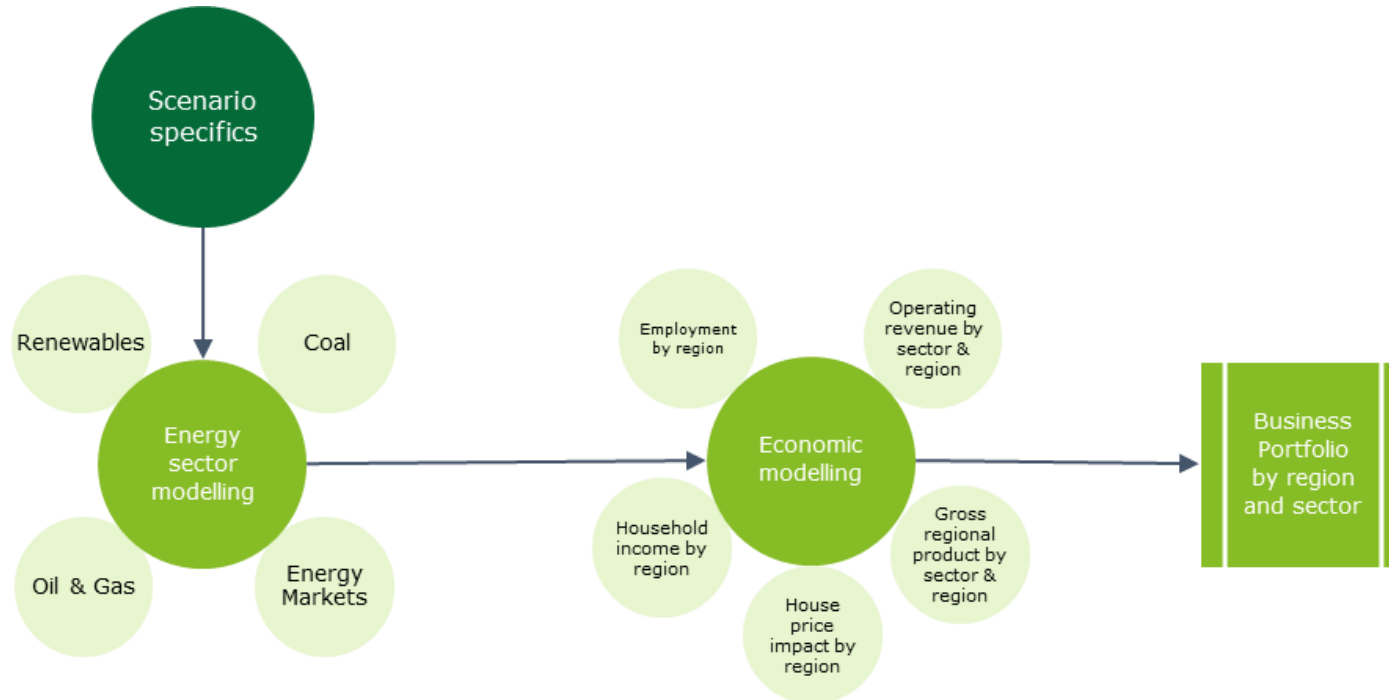


Source: IEA, World Energy Outlook 2017

# This needs to be considered by actuaries now as both current and strategic risk

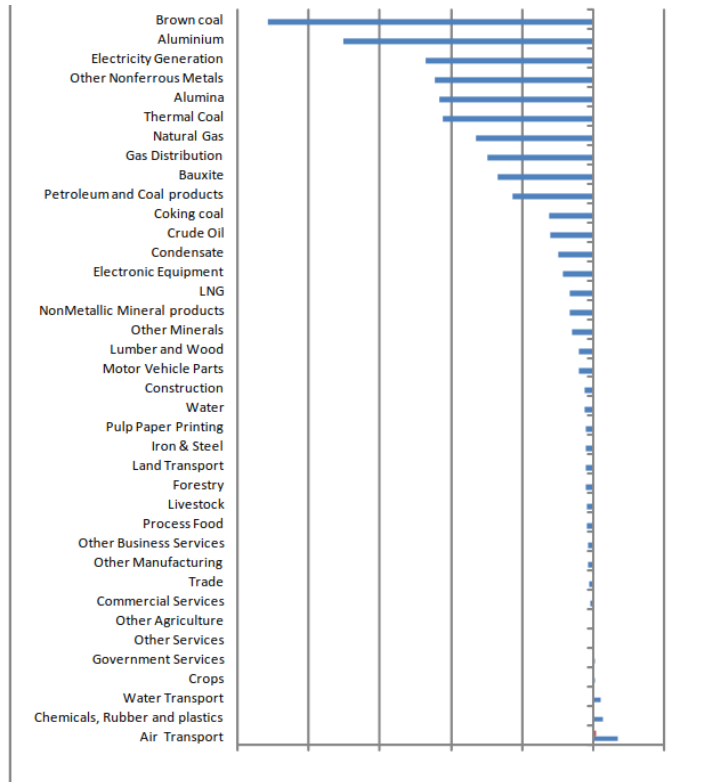


# It is complex to model, with limitations in being able to project many key pieces



# Expected impacts on output by sector

Illustrative potential impacts based on carbon-intensity of industry

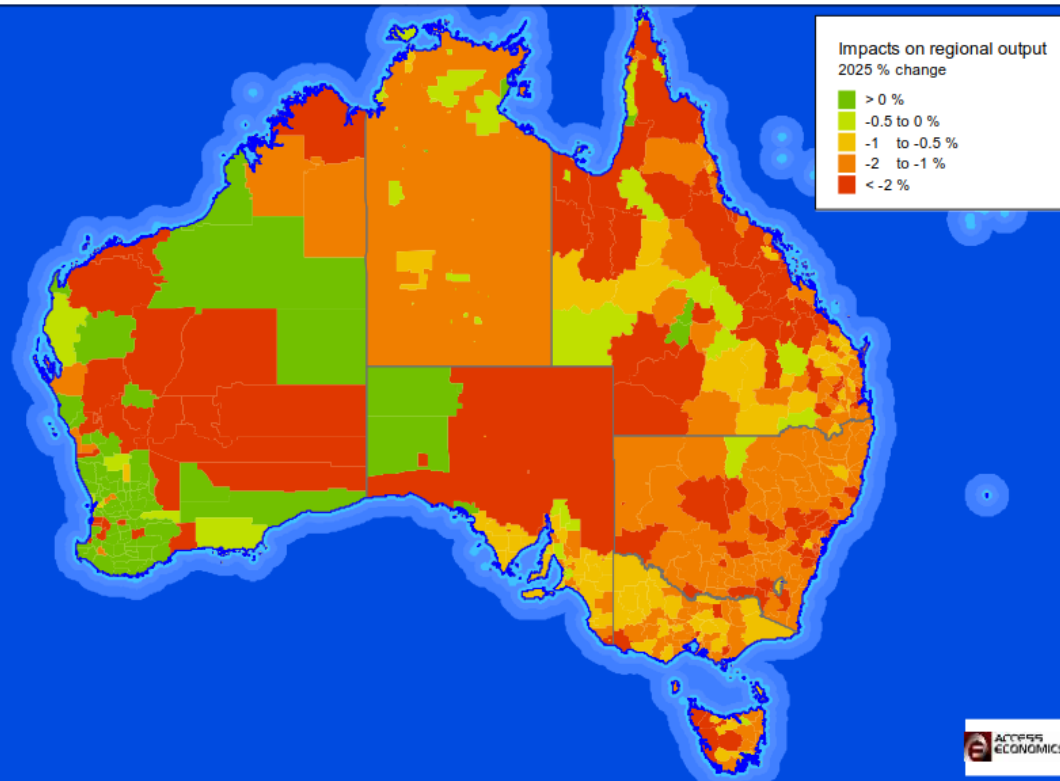


Favourable impacts on green or related industries.

Strong negative impact on industries strongly related to or dependent on fossil fuels.



# Expected impacts on output by region

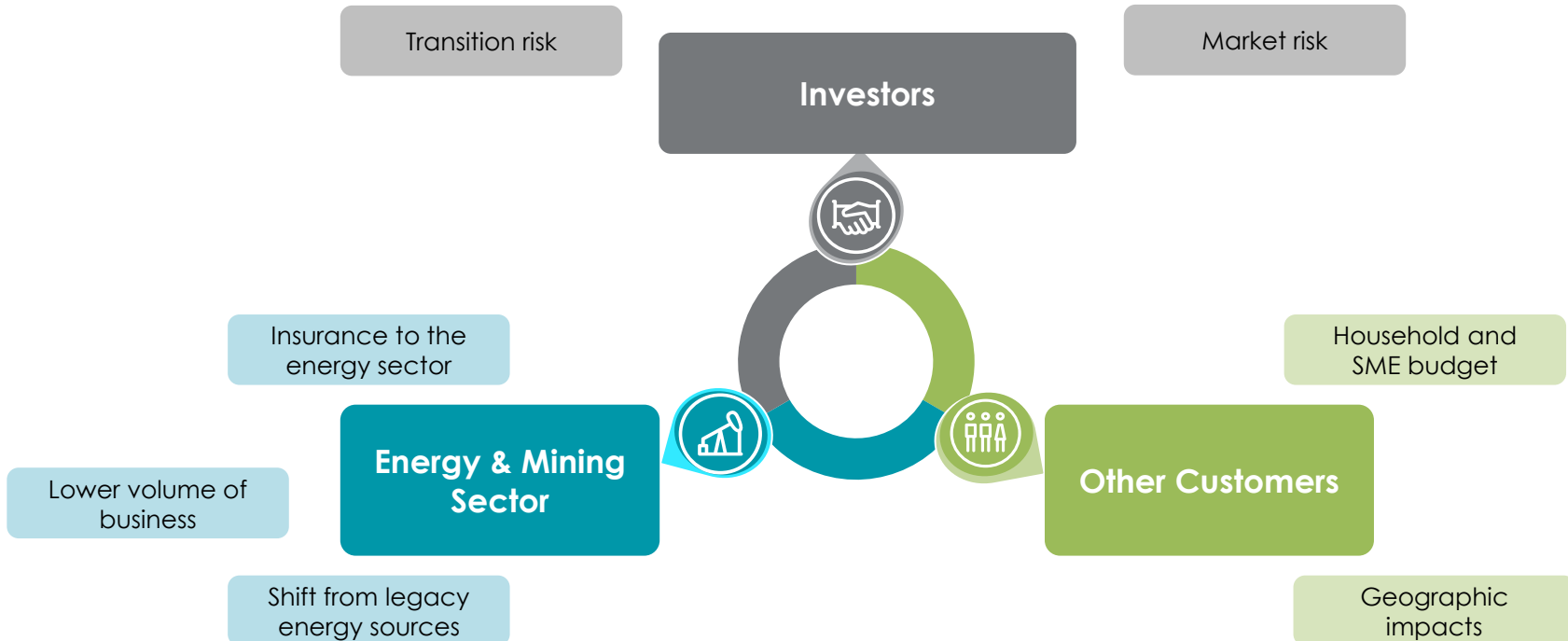


Regions with largely favourable impacts are large urban areas, including with some types of specialised manufacturing

Least affected regions are regional centres with strong manufacturing or services, surrounded by agricultural lands rather than mining

Regions suffering greatest impacts are rural areas specialising in fossil electricity generation or mining, especially mining of coal, oil & gas where residents need to drive long distances and have high heating or cooling bills

# Implications for Financial Services as Needs Change



# Green Bonds

## Benefits

- “To investors green bonds offer a stable, rated and liquid investment with long duration. To issuers, they could tap the USD100 trillion global institutional fixed income investor base.” Mark Carney, Governor of the Bank of England and FSB Chair
- Issuer benefits
- Investor benefits

**\$9.5bn  
AUD**

## Issues

- Granularity of data
- Sustainable taxonomy
- Consistent global standards
- Additional verification and monitoring costs

# Sustainable Loans



## Green Bilateral Loan

Formalized loan with a bank and a corporate guarantee

## Green Syndicated Loan

Group of banks finance an operation through a representative of the banks.



## Green Revolving Credit Facility

Without an objective to finance green projects or investments, but with interest rate charged based on ESG Score.

## Green Project Finance

Based on long term cash flows generated by the 'green' project with assets associated with the project as collateral.



# Actions for actuaries



1 >

Modelling or scenario testing transition risk for energy companies to inform investment and underwriting strategy



2 >

Pricing and designing green bonds and green or sustainable loans



3 >

Risks and opportunities affecting credit risk modelling – capital requirement impacts, strategy impacts

# Q&A

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