

REPORT STRUCTURE

Part one Essays

Essay A Stocktake of energy reform

This essay provides an overview of energy reform, and compares achievements so far with the goals of the reform program. It covers gas and electricity and touches on a range of themes including competitive neutrality issues and investment outcomes.

Essay B Reliability in the National Electricity Market

Reliability refers to the continuity of electricity supply to end users, and is a key performance indicator of customer service. This essay looks at:

- > the causes and effects of reliability issues
- > reliability standards
- > the measurement of reliability
- > the reliability of electricity supply in the National Electricity Market (NEM), from generation through to the transmission and distribution networks that deliver power to customers.

The essay shows that most reliability issues are attributable to distribution issues. In part, this reflects differences in the costs and benefits of improving reliability across each segment of the supply chain.

Part two Electricity

Chapter 1 Electricity generation

This chapter provides a brief overview of the electricity supply chain and a survey of electricity generation in the NEM. It considers:

- > the geographical distribution of generators, types of generation technology, life cycle costs and greenhouse emissions of different generation technologies
- > the ownership of generation infrastructure
- > investment in generation infrastructure
- > the reliability of electricity generation in the NEM.

Chapter 2 Electricity wholesale market

The NEM is a wholesale market through which generators and electricity retailers trade electricity in eastern and southern Australia. There are six participating jurisdictions—Queensland, New South Wales, the Australian Capital Territory, Victoria, South Australia and Tasmania, which are physically linked by transmission network interconnectors.

This chapter considers:

- > features of the NEM, including the dynamics of the market, regional demand and trade
- > spot prices, including volatility, and international price comparisons.

Chapter 3 Electricity financial markets

Wholesale price volatility in the NEM can cause price risk to market participants. One method by which participants manage their exposure to price volatility is to enter into financial contracts that lock in firm prices. This report includes a survey of electricity derivative markets in recognition of their wider significance in the energy market framework. The chapter considers:

- > the structure of electricity financial markets in Australia, including over the counter markets and trading on the Sydney Futures Exchange
- > financial market instruments traded in Australia
- > liquidity indicators for Australia's electricity financial markets, including trading volumes, open interest, changes in the demand for particular instruments, changes in market structure and vertical integration in the underlying electricity wholesale market
- > price outcomes in the electricity futures market
- > other mechanisms to manage price risk in the wholesale electricity market.

Chapter 4 Electricity transmission

The electricity supply chain requires transmission networks to transport power from generators to local distribution areas. Transmission networks also enhance the reliability

of electricity supply by allowing a diversity of generators to supply electricity to end markets. This chapter considers:

- > the structure of the transmission sector, including industry participants and ownership changes
- > the economic regulation of the transmission network sector by the AER
- > financial outcomes, including revenues and returns on assets
- > new investment in transmission networks
- > operating and maintenance costs
- > quality of service, including reliability and the effects of congestion.

Chapter 5 Electricity distribution

This chapter focuses on the low voltage distribution networks that move electricity from points along the transmission line to customers in cities, towns and regional communities. The chapter considers:

- > the structure of the distribution sector, including industry participants and ownership changes
- > the economic regulation of the distribution network sector
- > financial outcomes, including revenues and returns on assets
- > new investment in distribution networks
- > quality of service, including reliability and customer service performance.

Chapter 6 Electricity retail markets

The retail market is the final link in the electricity supply chain. It provides the main interface between the electricity industry and customers such as households and small business. This chapter considers:

- > the structure of the retail market, including industry participants, ownership changes, vertical integration activity with the generation sector and convergence between electricity and gas retail markets
- > the development of retail competition
- > retail market outcomes, including price, affordability and service quality
- > the regulation of the retail market.

Chapter 7 Beyond the National Electricity Market

This chapter surveys the electricity industry in the jurisdictions that are not interconnected with the NEM—Western Australia and the Northern Territory. Western Australia recently introduced a number of electricity market initiatives, including new wholesale market arrangements. The Northern Territory has introduced electricity reforms but at present there is no competition in generation or retail markets.

Part three Natural gas

Chapter 8 Gas exploration, production, wholesaling, and trade

This chapter surveys the gas exploration and production sector, including:

- > exploration and development activity in Australia
- > gas production and consumption and the future outlook for growth
- > gas prices
- > industry participants and ownership changes
- > gas wholesale operations and trade
- > market developments.

Chapter 9 Gas transmission

High pressure transmission pipelines ship gas from production fields to destinations such as cities and to large customers located along the route of the pipeline. This chapter considers:

- > the structure of the transmission sector, including industry participants and ownership changes over time
- > the economic regulation of the gas transmission sector
- > new investment in transmission pipelines and related infrastructure.

Chapter 10 Gas distribution

Natural gas distribution networks transport gas from transmission pipelines and reticulate it into residential houses, offices, hospitals and businesses. This chapter considers:

- > the structure of the distribution sector, including industry participants and ownership changes over time
- > the economic regulation of distribution networks
- > new investment in distribution networks
- > quality of service.

Chapter 11 Gas retail markets

The retail market provides the main interface between the gas industry and customers such as households and small business. This chapter considers:

- > the structure of the retail market, including industry participants and ownership changes
- > convergence between electricity and gas retail markets
- > the development of retail competition
- > retail market outcomes, including price, affordability and service quality
- > the regulation of the retail market.

Part four Appendixes

Appendix A Institutional arrangements

This appendix outlines the roles and responsibilities of the national, state and territory stakeholders involved in energy policy and economic regulation.

Appendix B Greenhouse gas emissions policy

This appendix outlines key Australian, state and territory government initiatives for reducing greenhouse gas emissions from the stationary energy sector.

Appendix C Australian transmission pipelines

This appendix lists Australia's main onshore natural gas transmission pipelines.

ABBREVIATIONS

| | | | |
|-------|--|-----------------|---|
| 1P | proved reserves | boe | barrel of oil equivalent |
| 2P | proved plus probable reserves | CAIDI | customer average interruption duration index |
| 3P | proved plus probable plus possible reserves | CBD | central business district |
| AASB | Australian Accounting Standards Board | CCGT | combined cycle gas turbine |
| ABARE | Australian Bureau of Agricultural and Resource Economics | CCS | carbon capture and storage |
| ABDP | Amadeus Basin to Darwin Pipeline | CLP | China Light & Power |
| ABS | Australian Bureau of Statistics | CH ₄ | methane |
| AC | alternating current | COAG | Council of Australian Governments |
| ACCC | Australian Competition and Consumer Commission | CPI | consumer price index |
| AEMA | Australian Energy Market Agreement | CSG | coal seam gas |
| AEMC | Australian Energy Market Commission | CSM | coal seam methane |
| AER | Australian Energy Regulator | DBNGP | Dampier to Bunbury Natural Gas Pipeline |
| AFMA | Australian Financial Markets Association | DC | direct current |
| AGA | Australian Gas Association | DUET | Diversified Utility and Energy Trust |
| AIH | Alinta Infrastructure Holdings | EAPL | East Australian Pipeline Limited |
| ANTS | Annual National Transmission Statement | EBIT | earnings before interest and tax |
| APS | Australian Power Strip | EBITDA | earnings before interest, tax depreciation and amortisation |
| APT | Australian Pipeline Trust (part of the APA Group) | EGP | Eastern Gas Pipeline |
| B&B | Babcock & Brown | ERA | Economic Regulation Authority of Western Australia |

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|----------|---|-------------------|--|
| ERCOT | Electric Reliability Council of Texas | NCC | National Competition Council |
| ERIG | Energy Reform Implementation Group | NECA | National Electricity Code Administrator |
| ESC | Essential Services Commission (Victoria) | NEL | National Electricity Law |
| ESCOSA | Essential Services Commission of South Australia | NEM | National Electricity Market |
| ESAA | Energy Supply Association of Australia | NEMO | National Energy Market Operator |
| EST | Eastern Standard Time | NEMS | National Electricity Market of Singapore |
| ETEF | electricity tariff equalisation fund | NEMMCO | National Electricity Market Management Company |
| FEED | front end engineering design | NER | National Electricity Rules |
| FRC | full retail contestability | NGERAC | National Gas Emergency Response Advisory Committee |
| Gas Code | National Third Party Access Code for Natural Gas Pipeline Systems | NGL | National Gas Law |
| Gas Law | Gas Pipeline Access Act | NGMC | National Grid Management Council |
| GEAC | Great Energy Alliance Corporation | NGPAC | National Gas Pipelines Advisory Committee |
| GGP | Goldfields Gas Pipeline | NGR | National Gas Rules |
| GJ | gigajoule | NGS | National Greenhouse Strategy |
| GMC | Gas Market Company | NGT | National Grid Transco |
| GMLG | Gas Market Leaders Group | NWIS | North West Interconnected System |
| GSL | guaranteed customer service levels | OCC | outage cost of constraints |
| GWh | gigawatt hour | OCGT | open cycle gas turbine |
| ICRC | Independent Competition and Regulatory Commission | OTC | over-the-counter |
| IMO | Independent Market Operator | OTTER | Office of the Tasmanian Energy Regulator |
| IPART | Independent Pricing and Regulatory Tribunal | PASA | projected assessment of system adequacy |
| JV | joint venture | PG&E | Pacific Gas and Electric |
| km | kilometre | PJ | petajoule |
| kV | kilovolts | PJM | Pennsylvania–New Jersey–Maryland pool |
| KW | kilowatt | PNG | Papua New Guinea |
| KWh | kilowatt hour | POE | probability of exceedence |
| LNG | liquefied natural gas | PPA | power purchase agreement |
| LPG | liquefied petroleum gas | PV | photovoltaic |
| MAIFI | momentary average interruption frequency index | PwC | PricewaterhouseCoopers |
| MAPS | Moomba to Adelaide Pipeline System | QCA | Queensland Competition Authority |
| MCE | Ministerial Council on Energy | QNI | Queensland to New South Wales interconnector |
| MCC | marginal cost of constraints | QPTC | Queensland Power Trading Corporation |
| MDQ | maximum daily quantity | RAB | regulated asset base or regulatory asset base |
| MSP | Moomba to Sydney Pipeline | REMC _o | Retail Energy Market Company |
| MW | megawatt | SAIDI | system average interruption duration index |
| MWh | megawatt hour | SAIFI | system average interruption frequency index |

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| SECWA | State Energy Commission of Western Australia |
| SFE | Sydney Futures Exchange |
| S00 | statement of opportunities (published by NEMMCO) |
| SPCC | supercritical pulverised coal combustion |
| SPI | Singapore Power International |
| STEM | short-term energy market |
| SWIS | South West Interconnected System |
| TCC | total cost of constraints |
| TJ | terajoule |
| TNSP | transmission network service provider |
| TW | terawatt |
| TWh | terawatt hour |
| UC | Utilities Commission (Northern Territory) |
| URF | Utility Regulators Forum |
| VENCorp | Victorian Energy Networks Corporation |
| VRET | Victorian renewable energy target scheme |
| VTS | Victorian transmission system |
| WAPET | West Australian Petroleum |
| WMC | Western Mining Company |