



Evolution of Standards in Australia

ENERGY
www.csiro.au

Dr John K Ward

Grids & Energy Efficient Systems
19 Oct 2018



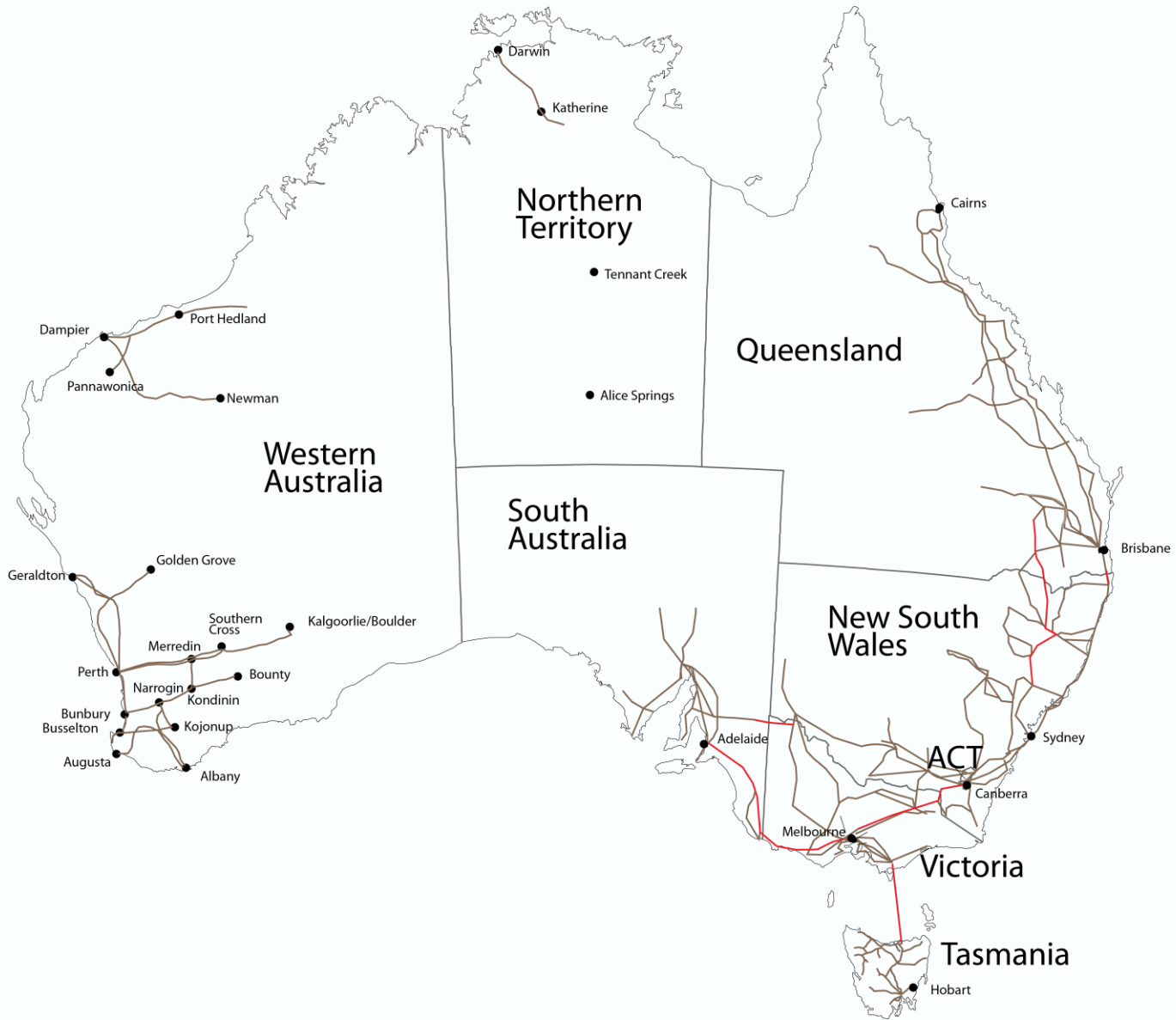
CSIRO

Commonwealth **S**cientific and **I**ndustrial **R**esearch **O**rganisation

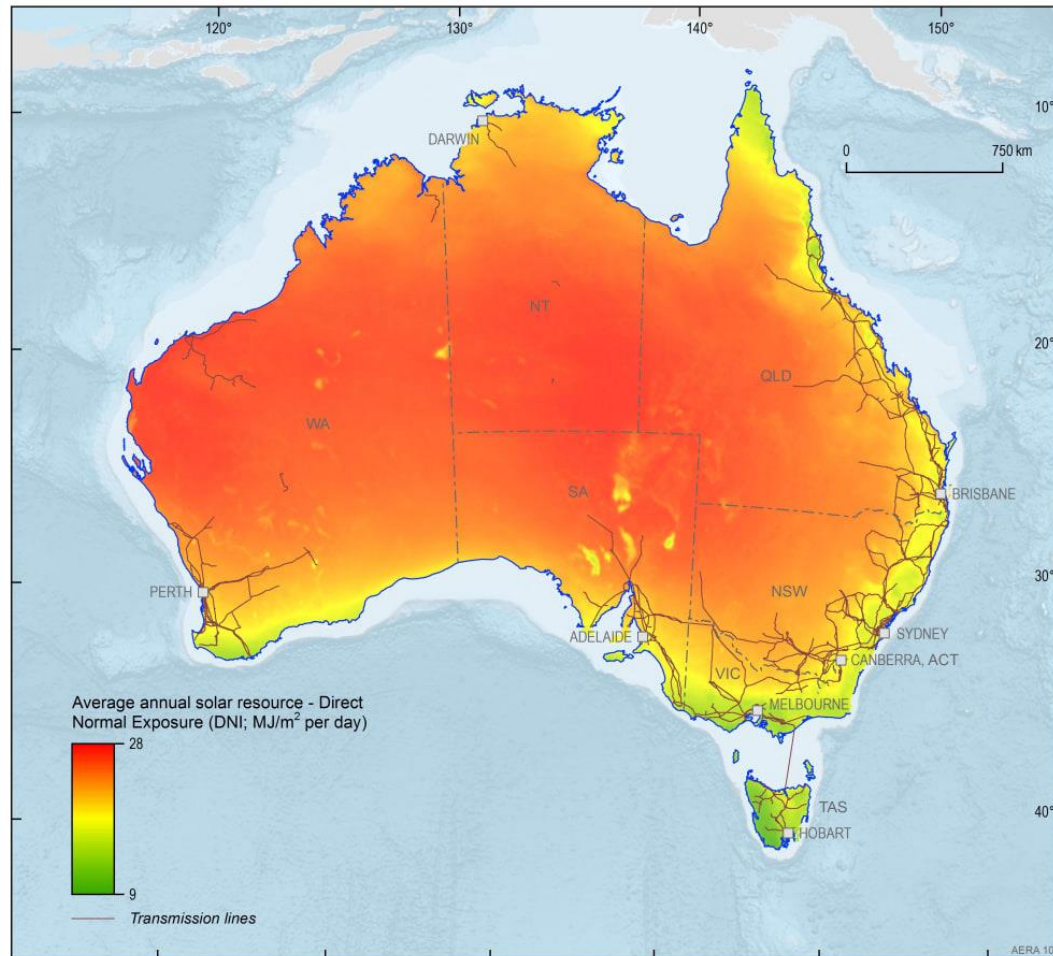
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Australia - Context



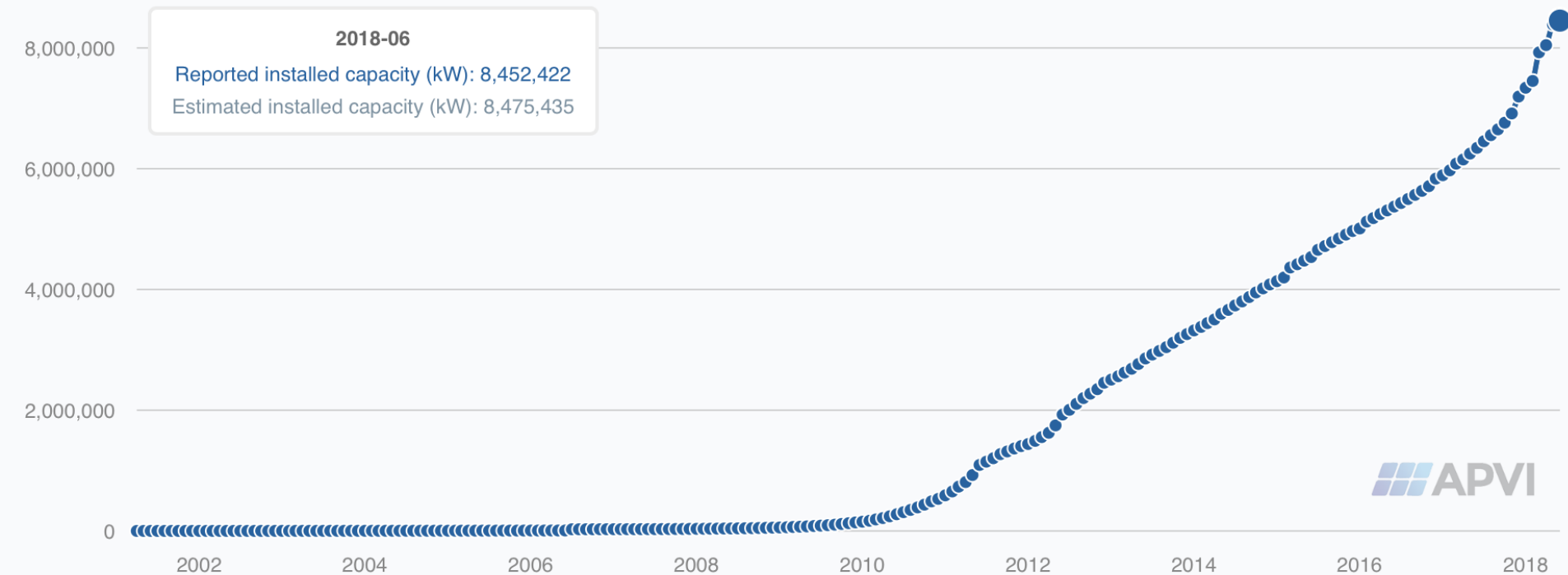
Source: Bureau of Meteorology, 2016. Solar radiation data derived from satellite imagery processed by the Bureau of Meteorology from the Geostationary Meteorological Satellite and MTSAT series operated by Japan Meteorological Agency and from GOES-9 operated by the National Oceanographic and Atmospheric Administration (NOAA) for the Japan Meteorological Agency; Geoscience Australia

Source: AERA 2018

Energy that is: Reliable - Affordable - Secure

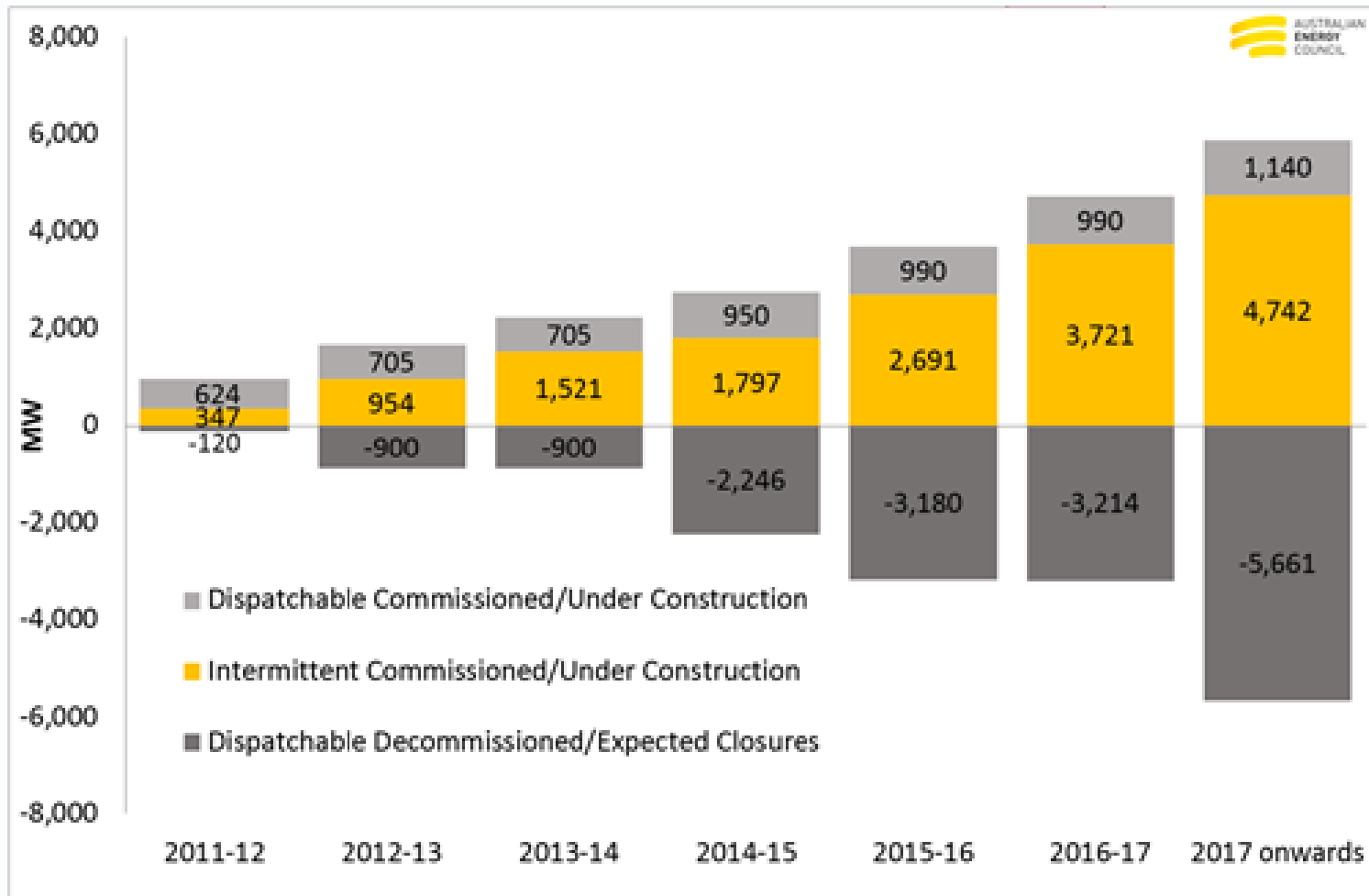
Not just technology for the sake of it

Australian PV installations since April 2001: total capacity (kW)



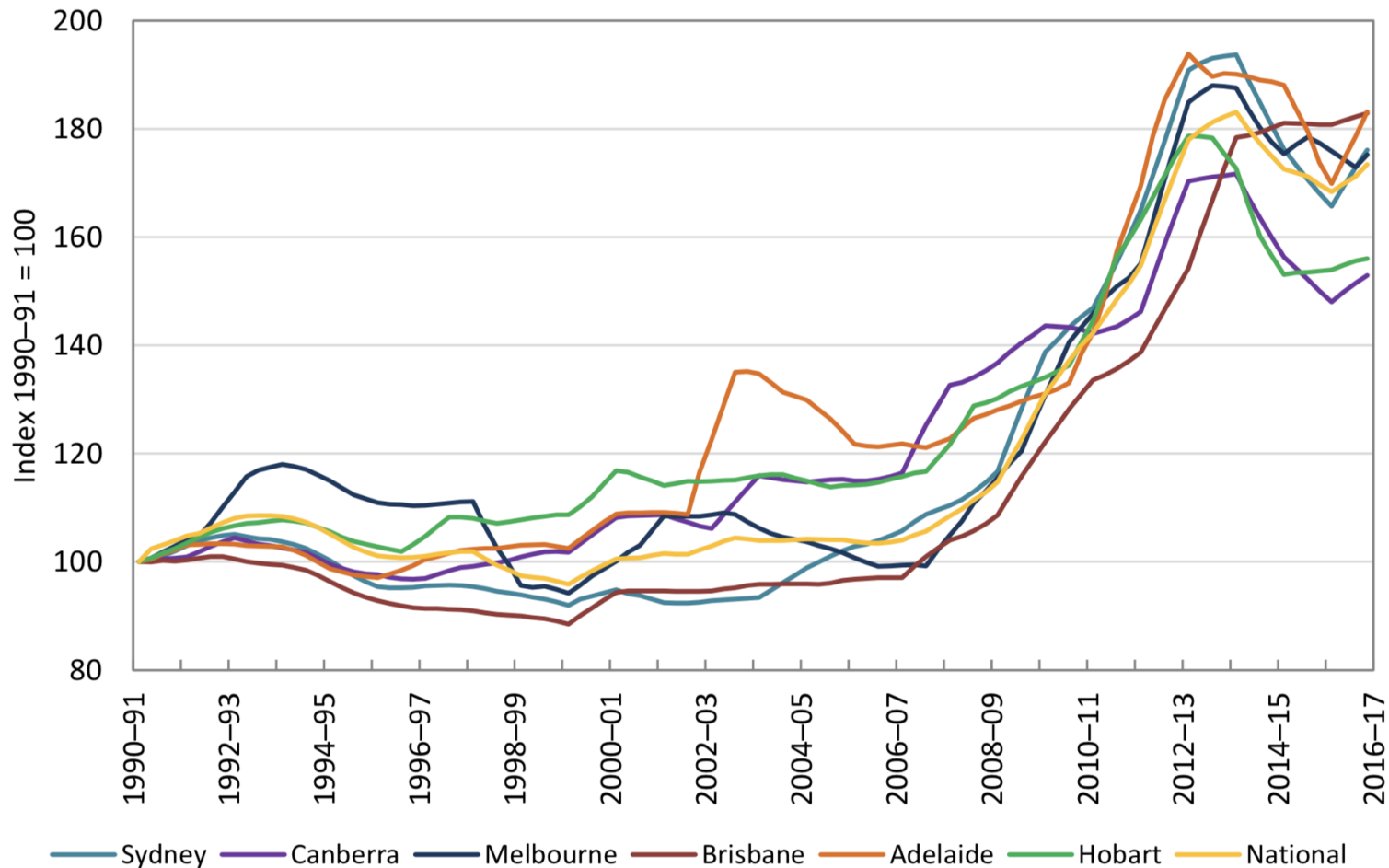
Source: APVI

Changing generation mix



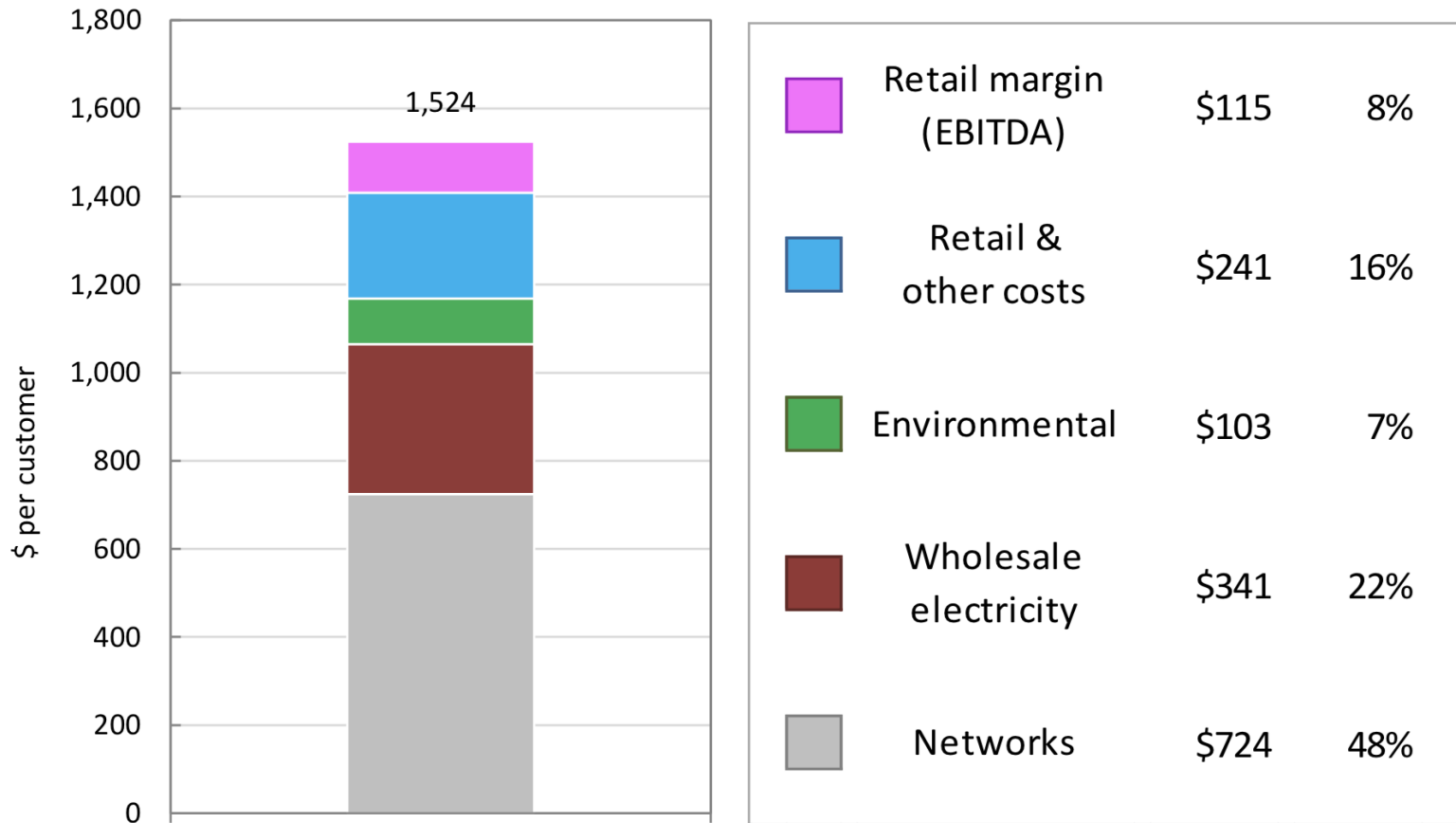
Source: Australian Energy Council

Electricity retail price index



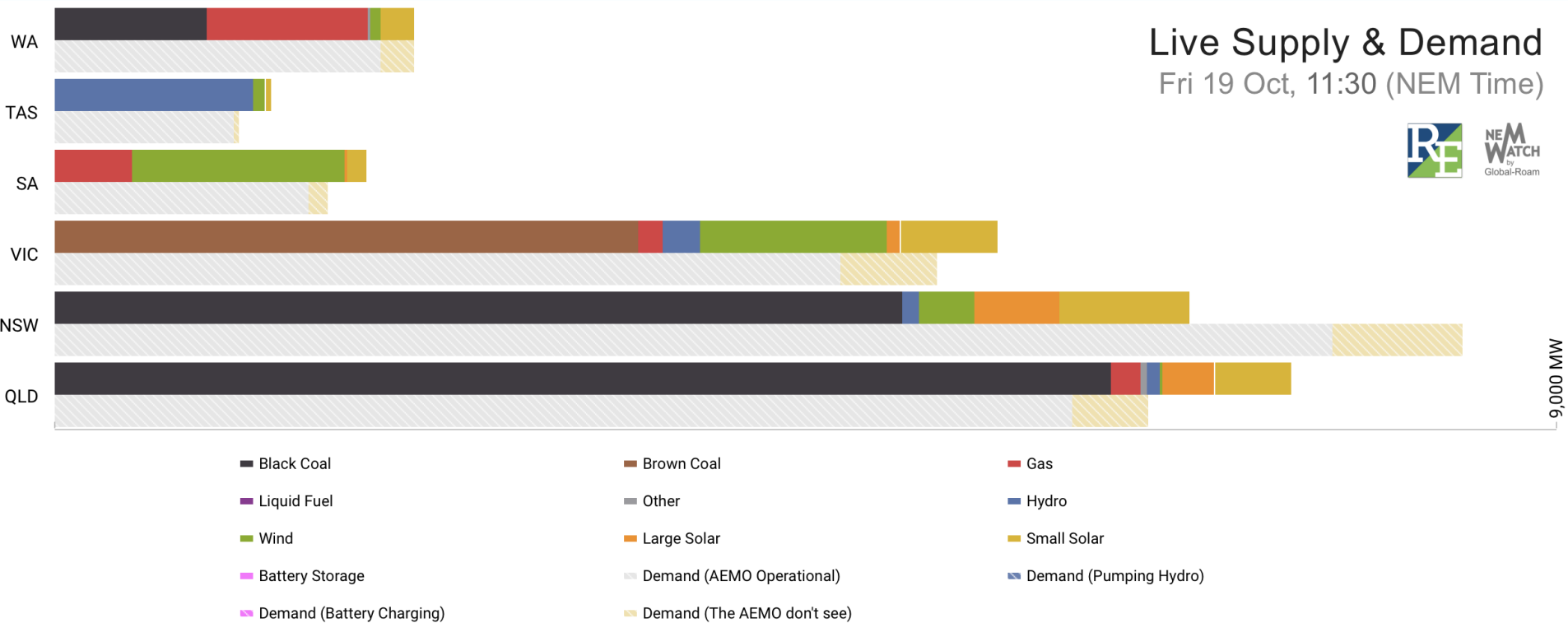
Source: ACCC Retail Electricity Pricing Inquiry – preliminary report (2017)

Average residential customer bill breakdown



Source: ACCC Retail Electricity Pricing Inquiry – preliminary report (2017)

Renewable Energy Penetration



SA: generation ~75% renewables, consumption ~86% renewables
(240MW export)

Australian Standards Priorities

MARKET SYSTEMS AND OPERATIONS

Market Systems	Electrical System Operation
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GOVERNANCE AND SERVICES

Asset management	Security	Cyber Security	Critical Infrastructure Resilience	Terminology
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GENERATION: DISTRIBUTED AND CENTRALISED

General Generation	Solar	Marine	Wind	Hydro	Thermal Power Plants
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TRANSMISSION AND DISTRIBUTION

Substations	Switchgear	Transformer	Protection Relays	Cable and LinesOverhead	Grid Size Energy Storage	Distributed Energy Coordination
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PROSUMERS

Building Management System	Customer Energy Management	Process Automation Systems	Demand Response Management Equipment	Advanced Metering	Local Energy Storage
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Electric Vehicles	Inverters	Microgrids
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SUPPORTING TECHNOLOGIES

Communications	Electromagnetic Compatibility	Power Quality
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DATA

Frameworks	Privacy
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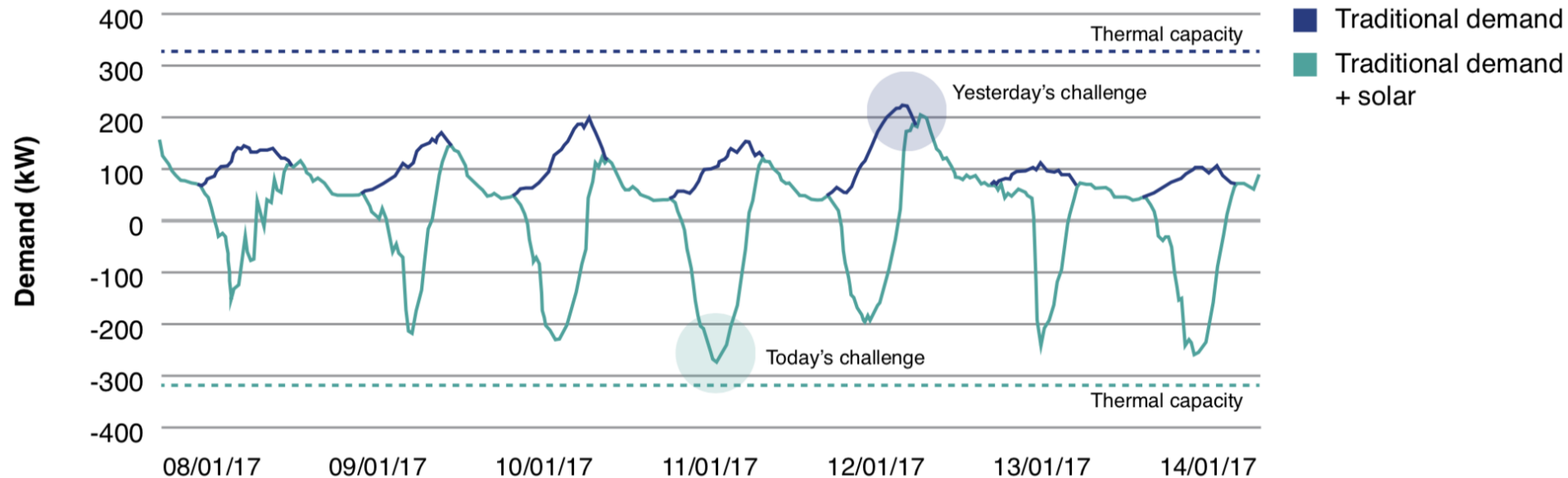
- Identified as in need of urgent work or broader participation
- Identified as in need of work
- Identified as lack of Australian activity, but consensus for work not clear
- Current Work Underway or Active Committee with broad representation
- No clear status identified or discussed

Source: Standards Australia

Some progress...

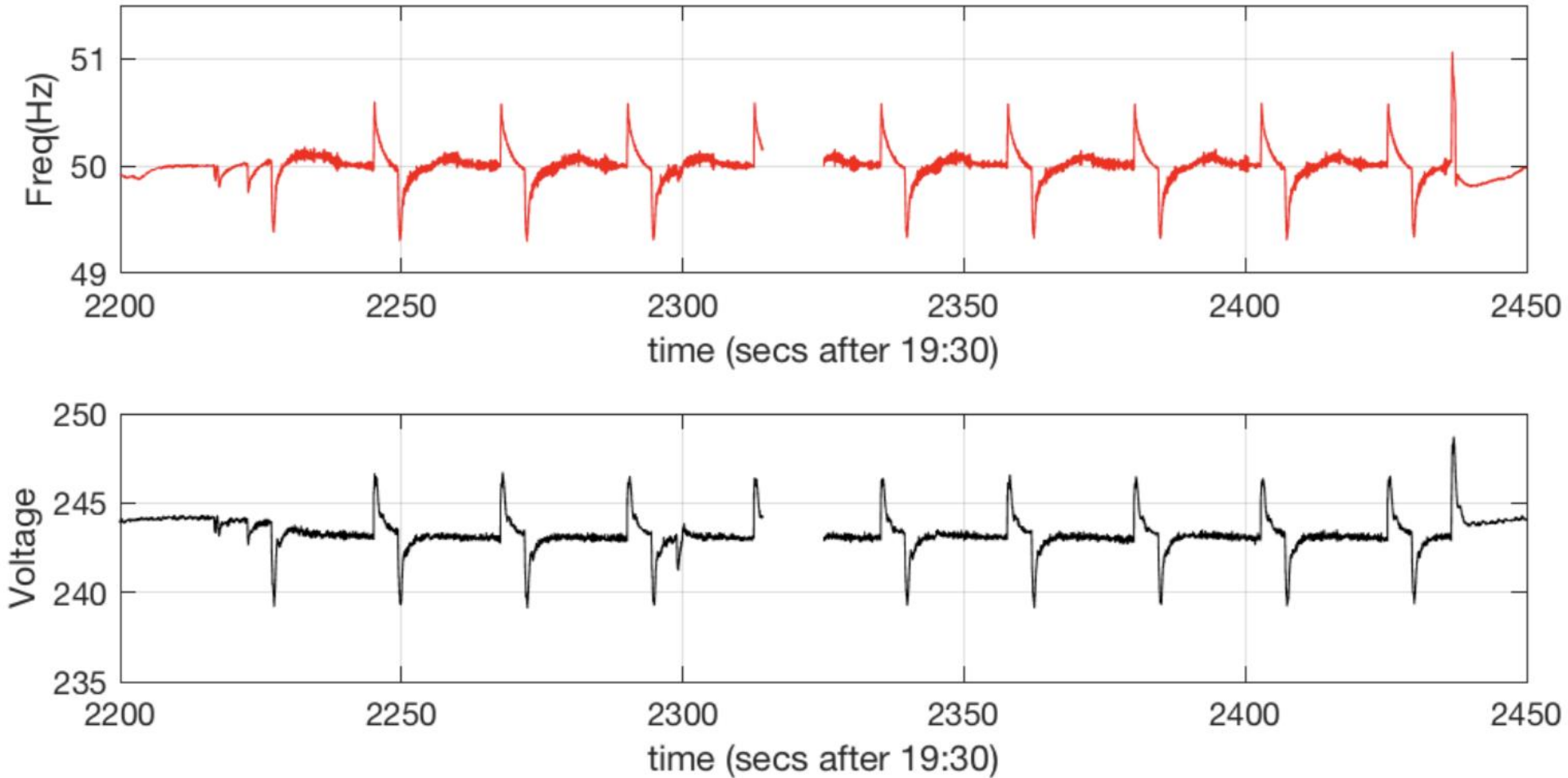
- AS/NZS 4777 (Inverters)
 - power quality, fault ride through, demand response, secure settings
 - Uniform basis for connection, but local overlays (export limits, ramps, vars,...)
- AS/NZS 4755 (Demand Response)
 - Air conditioning, Pool pumps, Hot water, energy storage
 - Power levels, reactive power setpoint
 - Communications
- AS/NZS 5139 (Energy Storage Installation)
 - Best practice guide published
 - Draft...
- Generating Systems Model Guidelines
- Open Energy Networks (ENA/AEMO)

New challenges



- Challenges are changing:
 - Coordination, capacity management, ramp rates, export limits
 - Power Quality – Voltages, vars, phase balance, harmonics, transients
 - Protection

A great testbed...



Managing Energy – 4755 Response modes

Mode	Requirement
DRM 0	Operate the disconnect device
DRM 1	Do not consume power
DRM 2	Do not consume more than 50% of rated power
DRM 3	Source VARs AND do not consume more than 75% of rated power
DRM 4	Increase power consumption (subject to other constraints)
DRM 5	Do not generate power
DRM 6	Do not generate more than 50% of rated power
DRM 7	Sink VARs AND do not generate more than 75% of rated power
DRM 8	Increase power generation (subject to other constraints)

Control Your Energy

Managing electricity demand	+
Positive Payback Program	-
Positive Payback for households	+
Positive Payback for business	+
Positive Payback for builders and developers	+
Positive Payback for retailers and tradespeople	+
Save Money & Electricity	+
Smarter Energy	+

Positive Payback for households

[Home](#) > [Control Your Energy](#) > [Positive Payback Program](#)

The Positive Payback program is about rewarding households like yours for managing their energy use efficiently.

Earn rewards simply by using energy saving technologies and switching to economy tariffs for air-conditioners, pool pumps and hot water systems.

Claim your reward

Do you have everything ready to make your claim? Login to our Customer Portal and apply for your reward today!



Air-conditioning rewards

Earn up to \$400 just by installing a PeakSmart air-conditioner.



Hot water rewards

Earn up to \$200 by connecting your hot water system to an economy tariff.



Pool rewards

Earn up to \$200 by connecting your pool pump to an economy tariff.

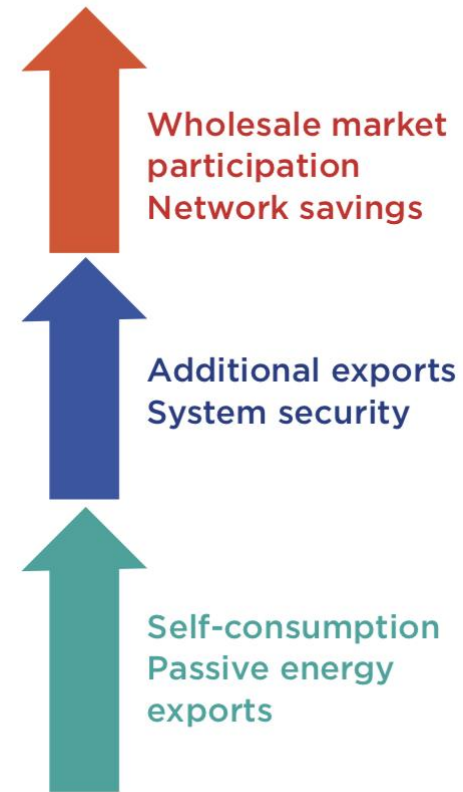
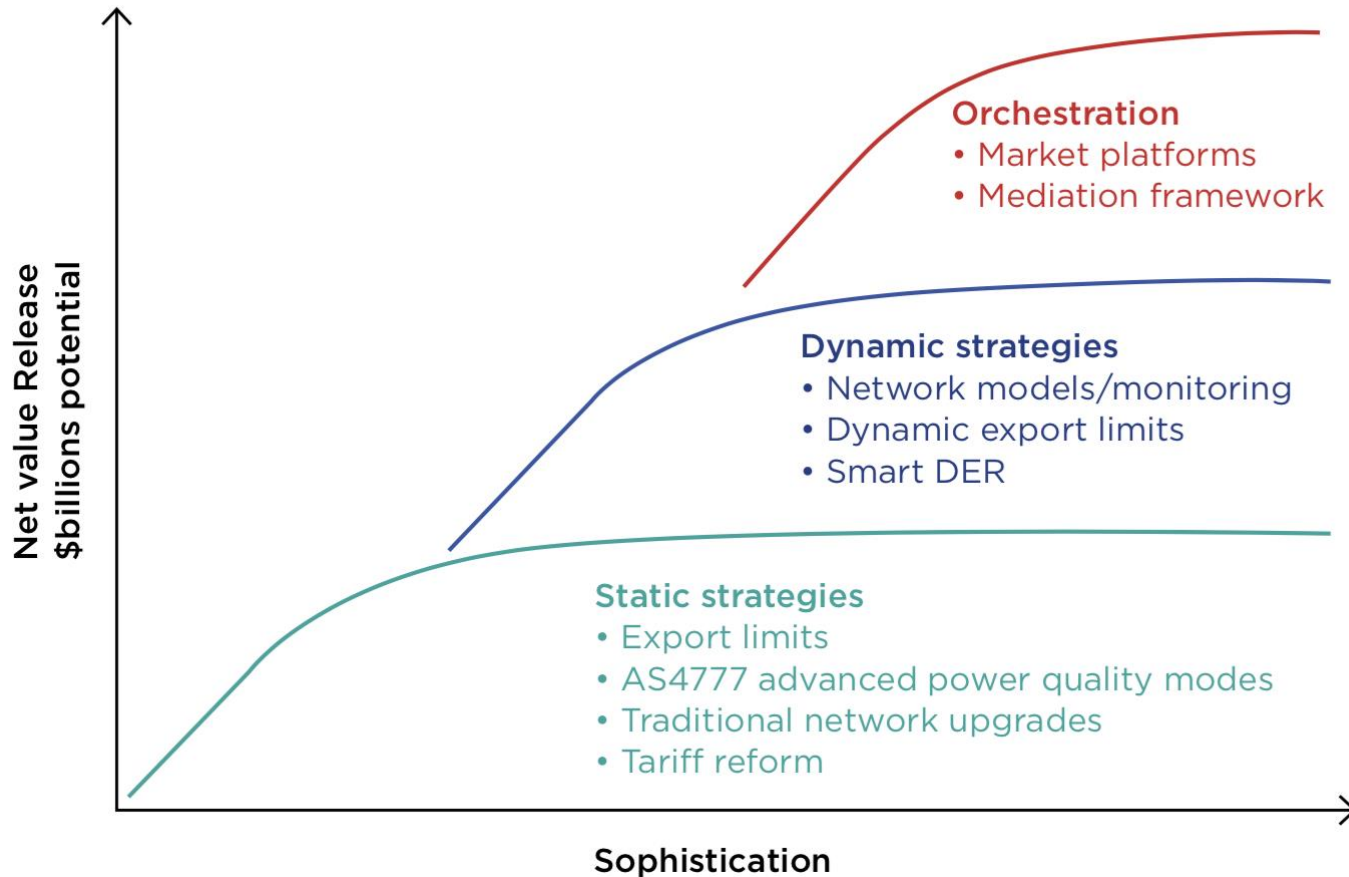


AEMO-ARENA demand response pilot



Unlocking value

Value release



Source: ENA- Open Energy Networks consultation

Thank you

CSIRO Energy

John K Ward

t +61 2 4960 6072

e John.K.Ward@csiro.au

w www.csiro.au/energy

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