HORIZON POWER

energy for life

Regional WA's Electricity Landscape and its Future.

11-May-2018

DM# 9520490

A view of regional Western Australia

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Remote communities

Marble Bar
Nullagine
Warmun
Wiluna
Ardyaloon
Beagle Bay
Bidyadanga

Camballin/Looma
Djarindjin/Lombadina
Kalumburu
Yungngora
Fitzroy Crossing
Halls Creek

- Residential customers at times experiencing financial hardship and want more control over their bills
- High rates of tenancy creating disengagement in energy management and/or barriers to DER installation

Small tourism and agricultural / mining towns

Denham
Exmouth
Hopetoun
Laverton
Norseman
Yalgoo

Sandstone
Menzies
Gascoyne Junction
Cue
Coral Bay
Meekatharra

Mount Magnet
Onslow
Wyndham

- High rates of tenancy creating disengagement in energy management and/or barriers to DER installation
- Strong seasonal or annual variation of population depending on commercial activity creating costly peak capacity to service for a short period of time

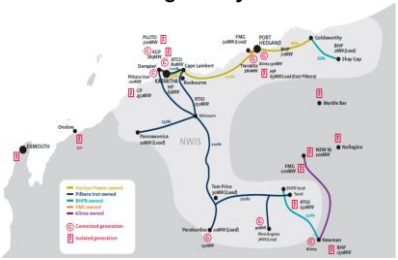
Regional centres

Broome
Carnarvon
Esperance
Karratha
Kununurra

Port Hedland

- Thriving towns replicating all the needs of capital cities at a smaller scale
- Still strongly dependant on centralised generation but present opportunities to shrink the grid around them
- Create the incentives for development of economical activities around them

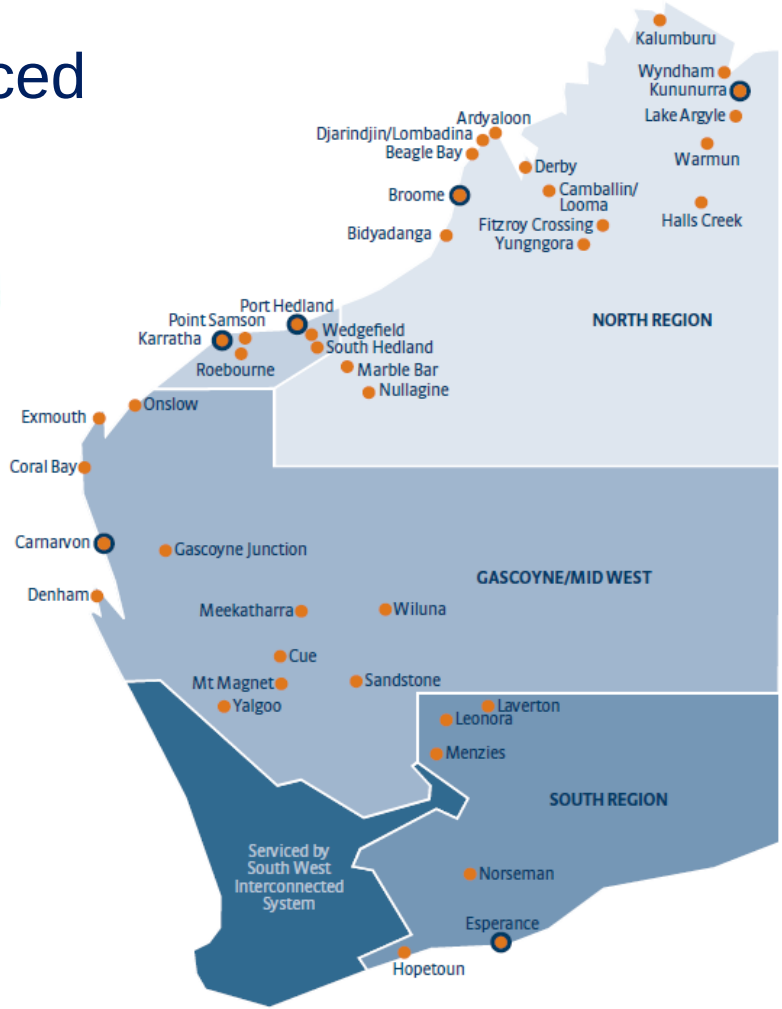
NWIS Regulatory Reform



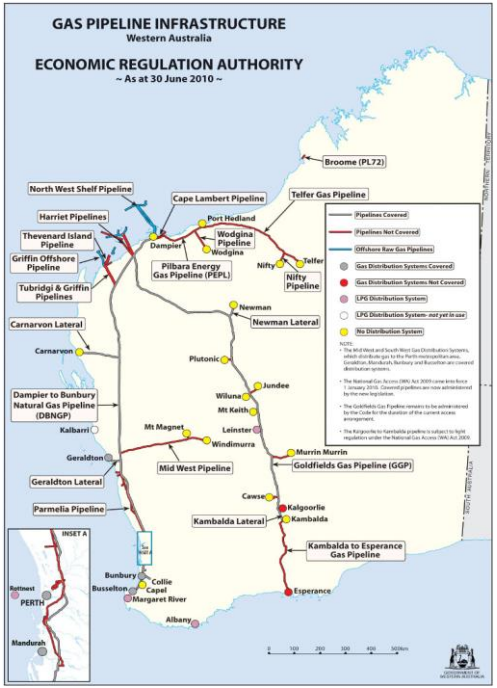
- This reform will involve increased use of Horizon Power's networks by others through a light handed regulatory regime
- Creation of the customer framework
- Changes to the funding arrangements for Horizon Power (the Tariff Equalisation Contribution) ~~and;~~
- Changes to the way in which the NWIS networks are operated role allocation for the Australian Energy Market Operator (AEMO) as the Independent System Operator (ISO).

Horizon Power is uniquely placed

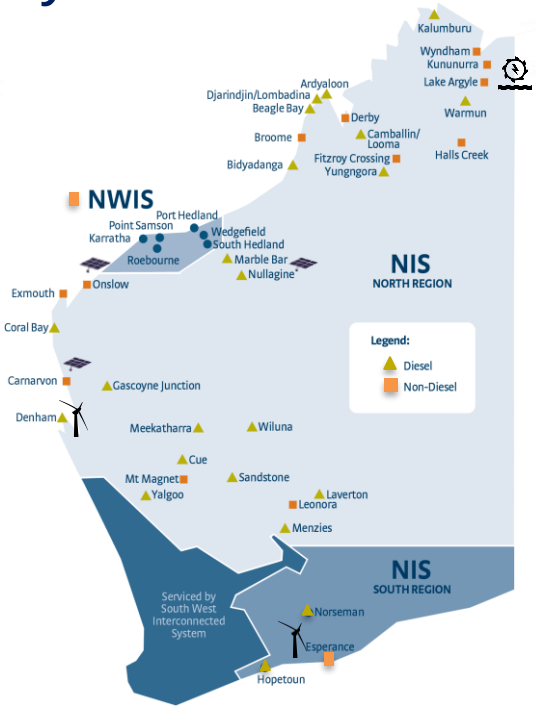
- Horizon Power is vertically-integrated
- Serves all of WA except for the South West Interconnected System
- 30+ remote microgrids
- Advanced metering
- 1 customer per 58 km^2



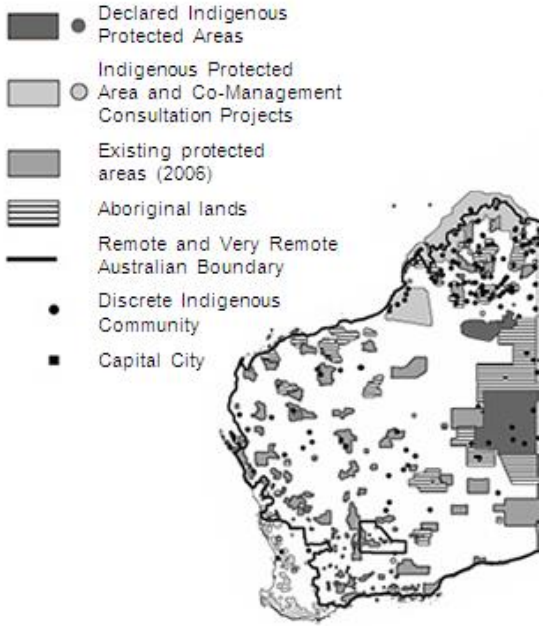
Regional energy supply



Gas pipeline infrastructure



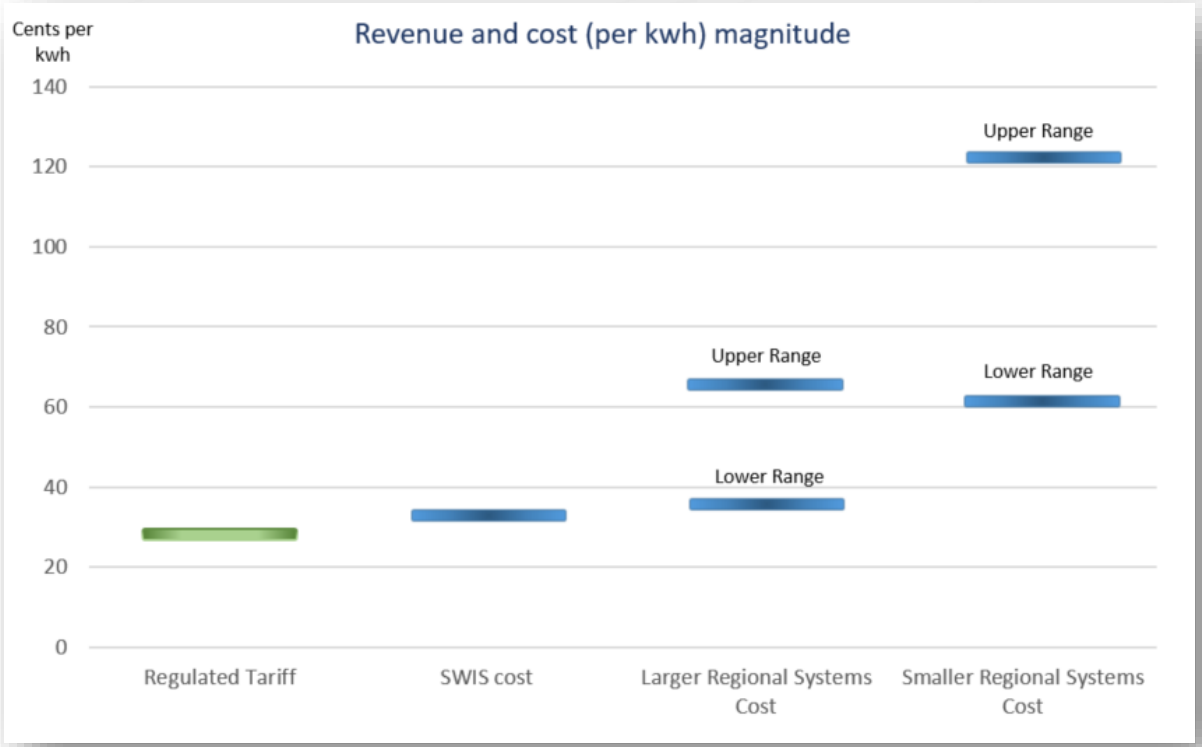
Horizon Power System Fuel Type



Jon Altman & Bill Fogarty. Indigenous Australians as 'No Gaps' Subjects Education and Development in Remote Australia The Australian National University. Available from: http://books.publishing.monash.edu/apps/bookworm/view/Closing+the+Gap+in+Education%3F/182/xhtml/part03chapter01.html

There are approximately 200 additional remote microgrids that are not operated by Horizon Power

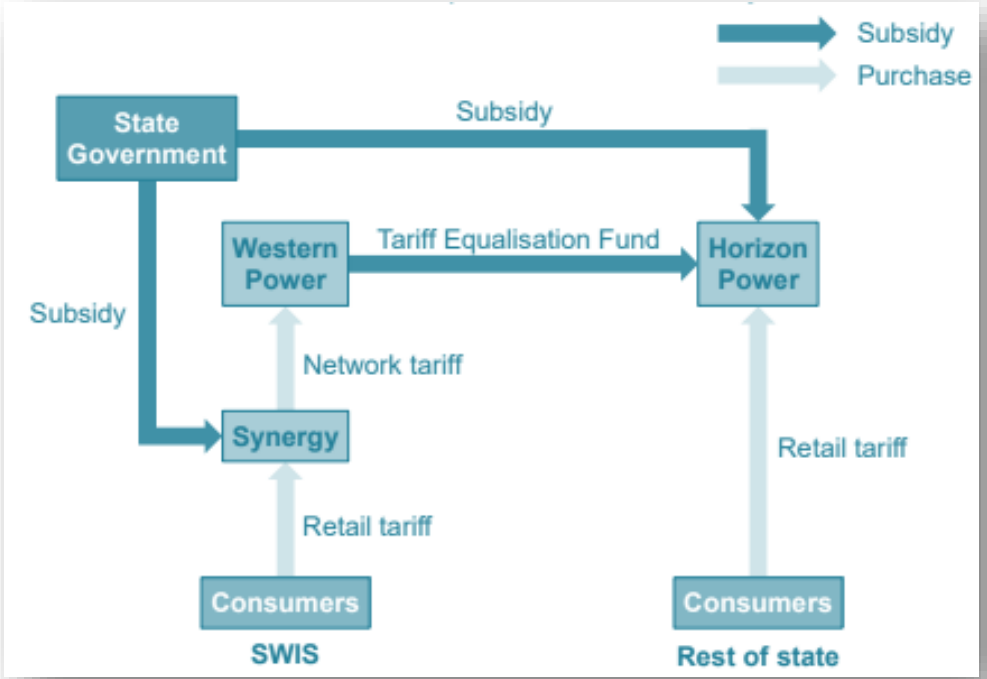
Revenue and cost to supply magnitudes



Subsidy range

- Level of subsidy depends on the system and customer type.
- System fuel mix and network size are key cost drivers.

Subsidy framework



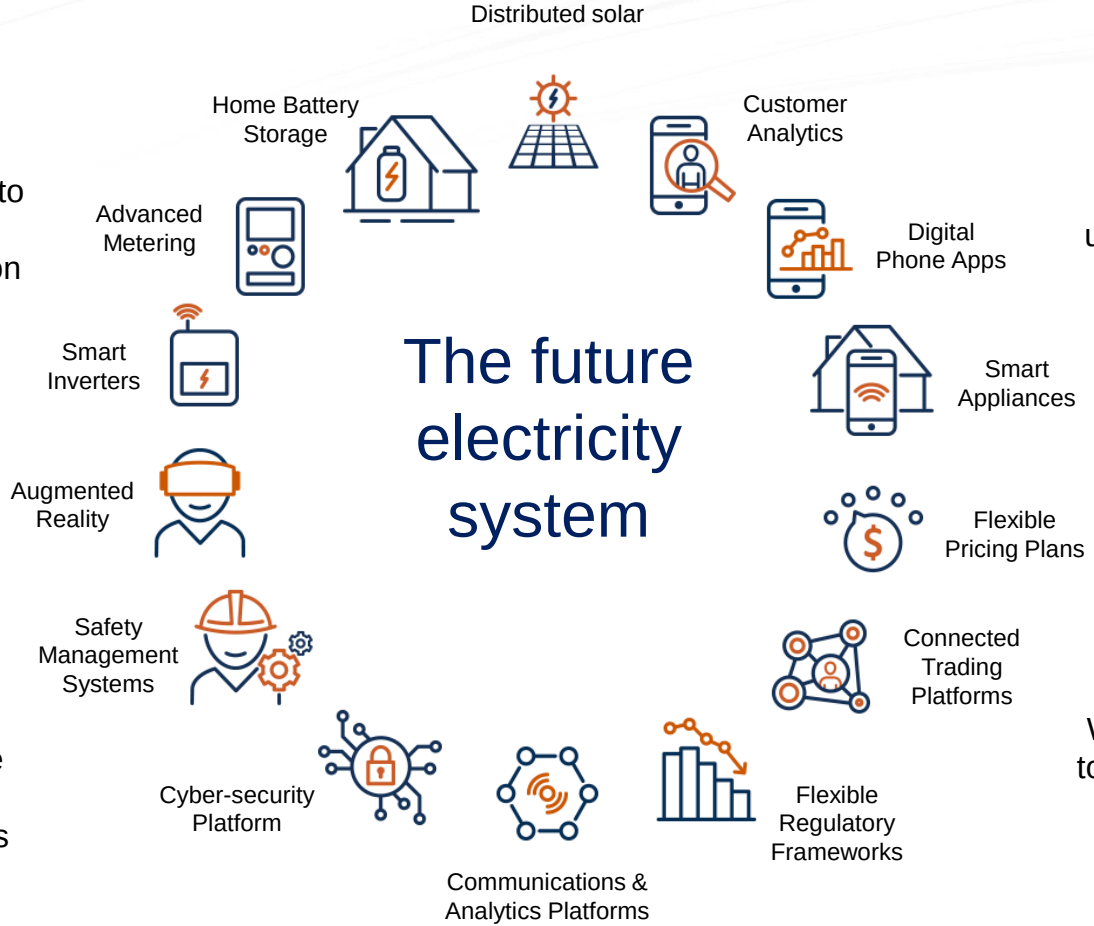
State Government pays a direct subsidy to Synergy and Horizon Power. Western Power customers pays an indirect subsidy to Horizon Power's customers through the TEF.

https://grattan.edu.au/wp-content/uploads/2015/11/831-Fair-pricing-for-Western-Australia-electricity.pdf

The future

Technology
Will be decentralised to produce, consume, store & sell low-carbon electricity locally

Networks
Will be safe, reliable, efficient & support the digitisation & automation of systems



Customers
Will be empowered to use electricity how they choose, supported by new products & services

Markets
Will use data analytics to connect & incentivise participants to drive equitable pricing

Remote high cost locations – opportunities and challenges

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Opportunities

- Digitalisation. Eg: Advanced metering infrastructure, mobile bill payments and energy monitoring
- Reduced costs by embracing renewables
- Reduced carbon emissions
- Equitable pricing
- Value added energy services

Challenges

- Small market
- Comparatively low household income
- High percentage of bills rebated or paid by a third party
- High level of transience
- Low level of owner occupiers
- Remote worker / skill shortages
- Seasonal weather events and harsh climate
- Communications infrastructure inadequacies

The rapid change is already upon us …

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Modular generation capacity

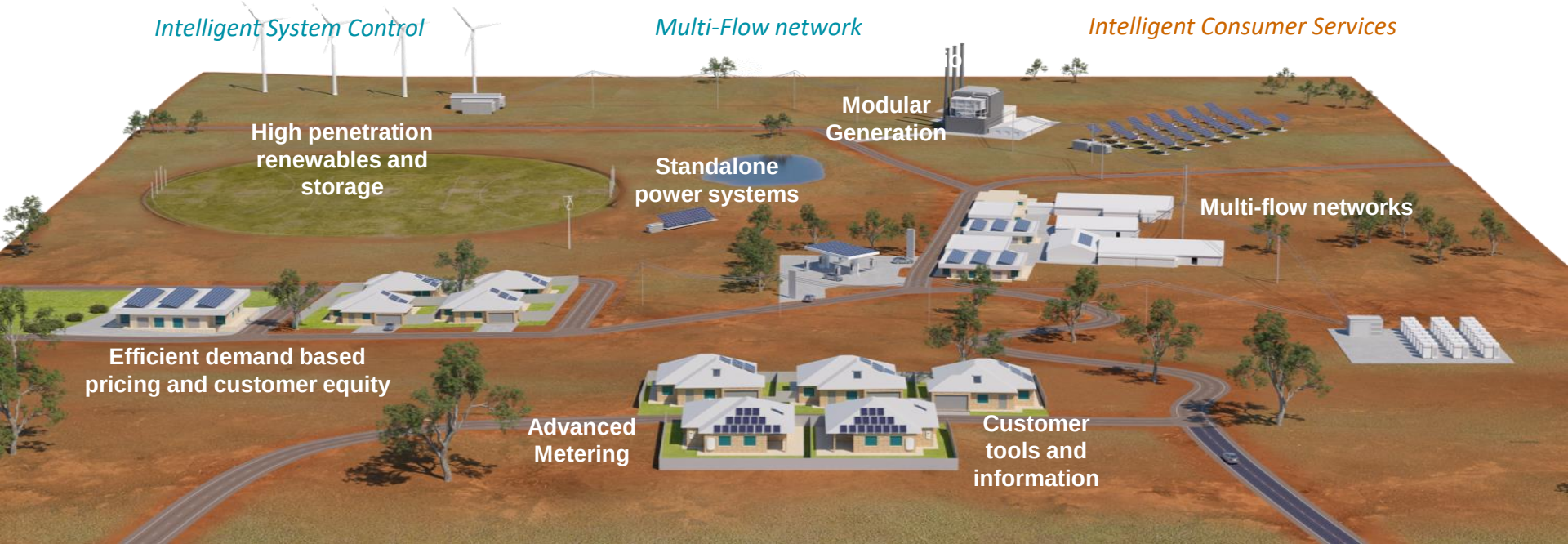
High penetration renewable energy and storage

Stand-alone Power Systems

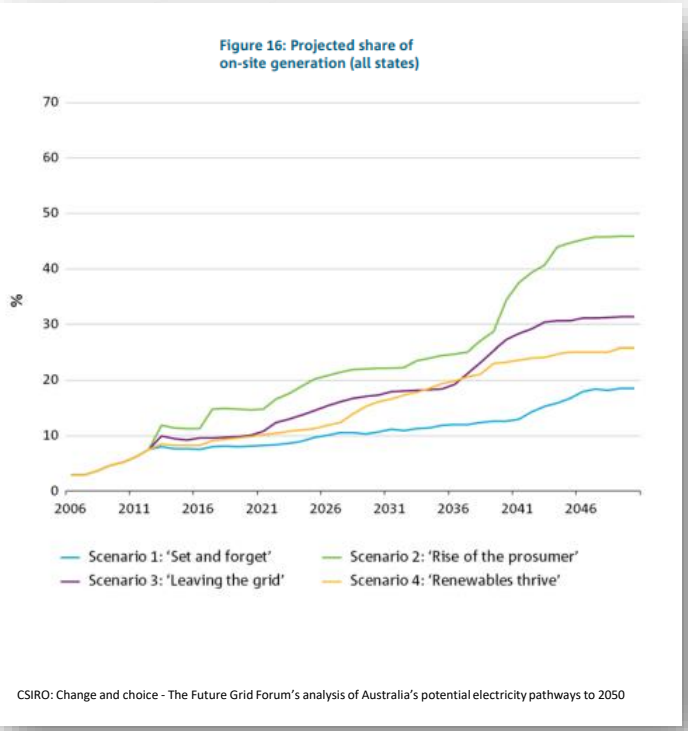
Intelligent System Control

Multi-Flow network

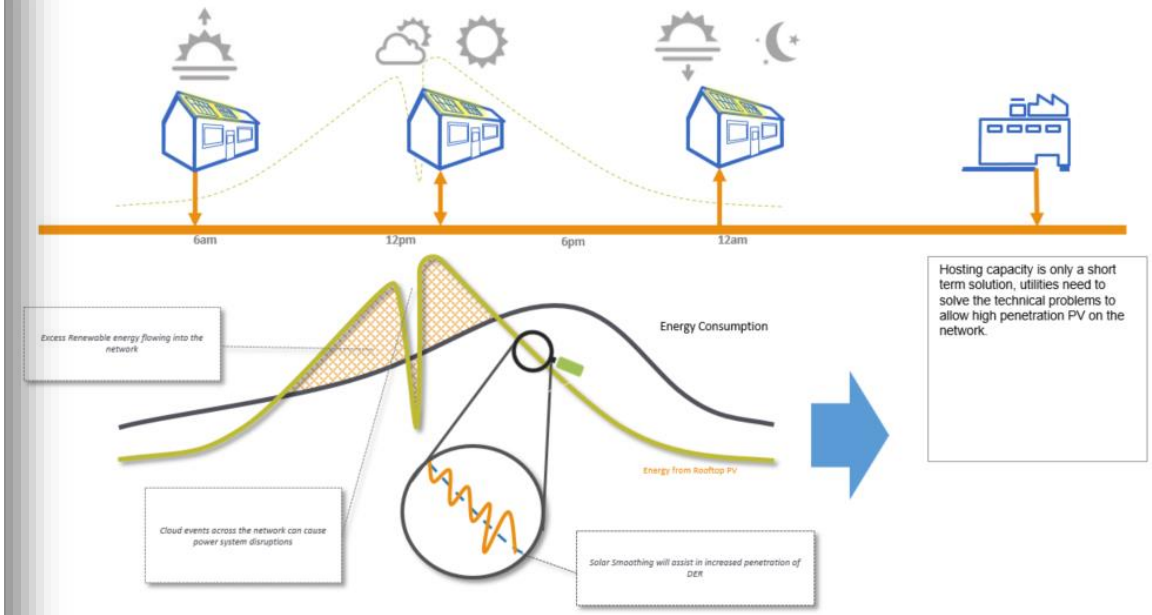
Intelligent Consumer Services



Mega Challenge- Hosting Renewables



CSIRO: Change and choice - The Future Grid Forum's analysis of Australia's potential electricity pathways to 2050



Future Challenge- many things to manage

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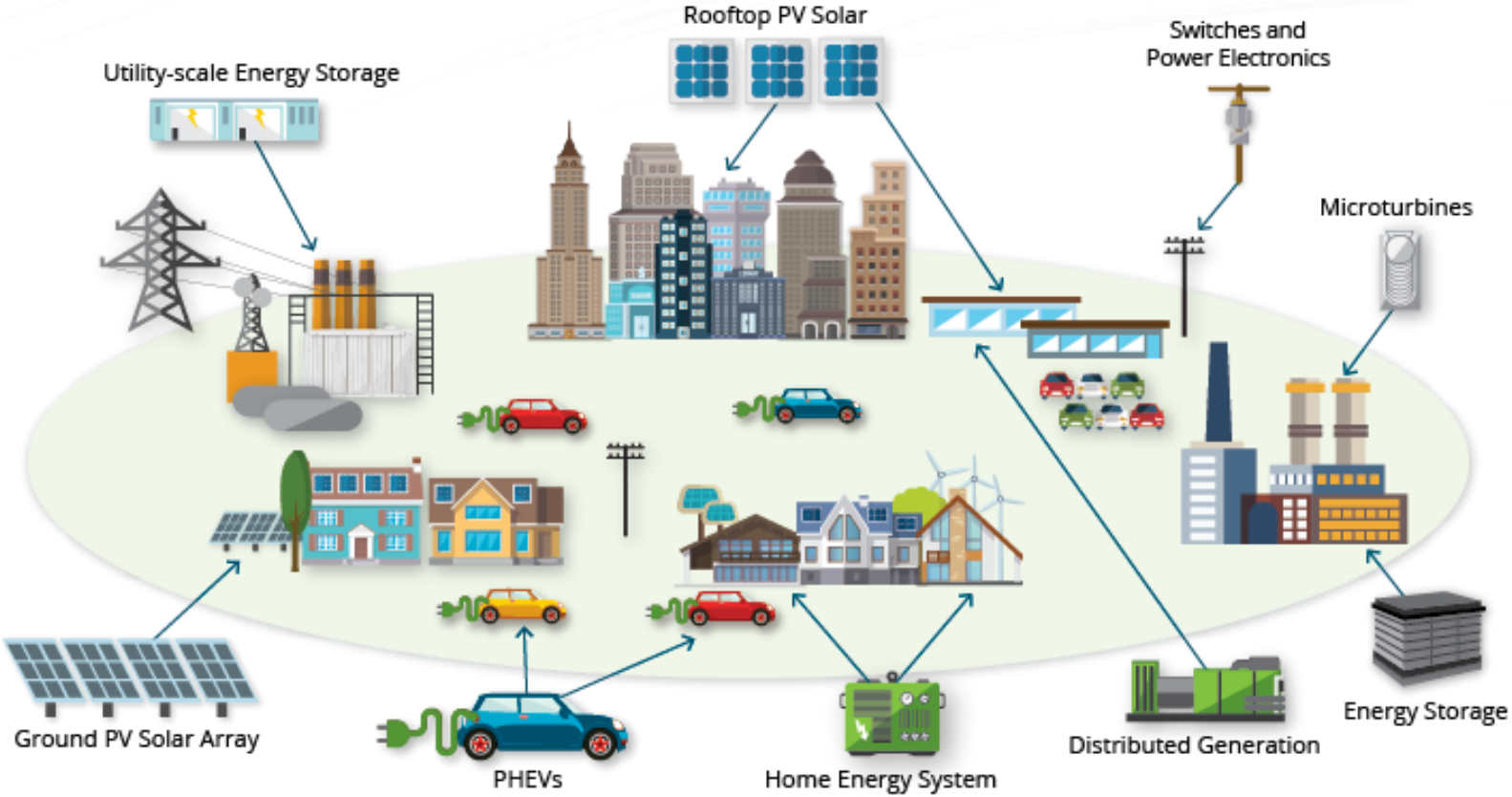


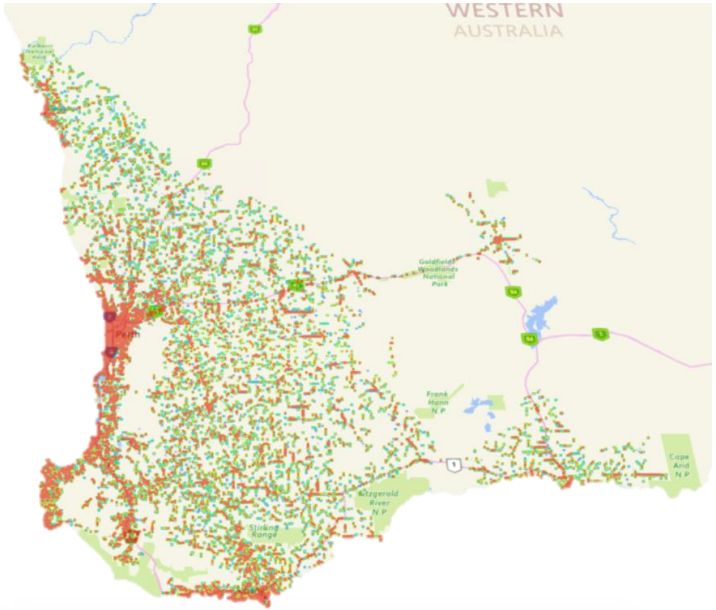
Leading the energy revolution - The Onslow Story

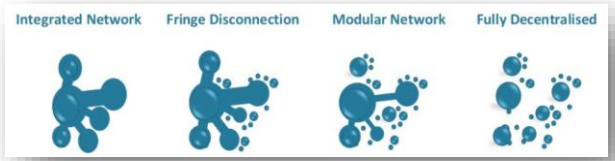
- Home to Australia's largest DER microgrid.
- 50% of the town's electricity needs to be serviced from renewable energy sources.
- Includes a mix of distributed renewables, conventional gas powered generation and energy storage.
- Will reduce cost to supply Onslow and provide more flexibility for customers

https://www.youtube.com/watch?v=m3gIvLZt_Kc

Future electricity grids may be a ‘federation’ of microgrids

- Electricity systems supplied by millions of micro-generation sources (not a handful large centralised generators) need new control architectures.
- Microgrids can provide this architecture at a local level and enable thousands of DERs to operate in harmony and constantly balance supply and demand.
- Large traditional grids may be re-architected over time for optimal efficiency as a federation of microgrids; usually functioning together but sometime independently (to minimise widespread outages).





https://reneweconomy.com.au/west-australia-flags-end-of-centralised-energy-network-64911/


Thank You