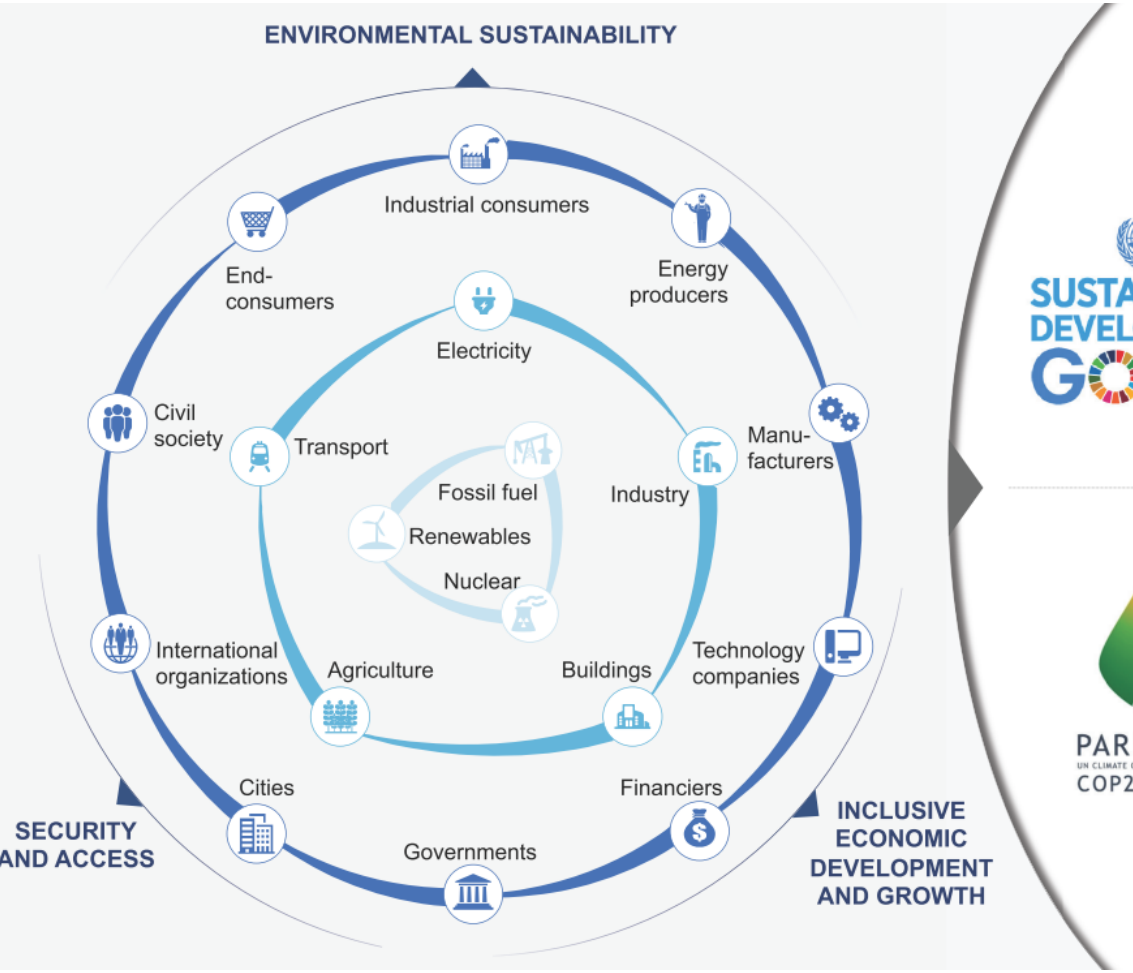
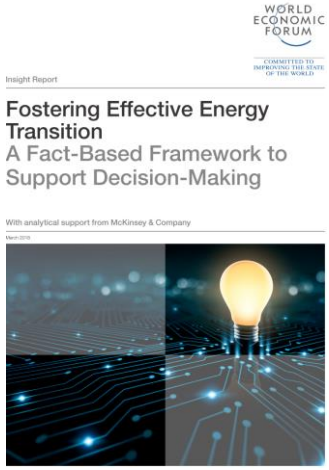
Energy transition

energy systems - sources, uses, participants, objectives, wider context

transition – ready, willing and able





SUSTAINA DEVELOPM GOAL

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Transition readiness enabling dimensions

The policy development challenge

- What is public policy?
  - "Anything governments choose to do or not to do" *ie. decision making*
- What do governments do?
  - "Tax, spend and regulate… and repeat" *(.. and sometimes own)*
- How do they choose?
  - More and less rational policy development processes to get from goals to means to delivery
- How do they do it?
  - Tax - as able; efficient, equitable?
  - Spend – directly, via agencies; on whom
  - Regulate – including 'designer' market-based mechanisms; e.g. CPRS, the NEM
- How might they do it better?
  - Clear and agreed goals,
  - appropriate allocation of autonomy, accountability across decision participants
  - Processes for managing uncertainty and risk, changing circumstances

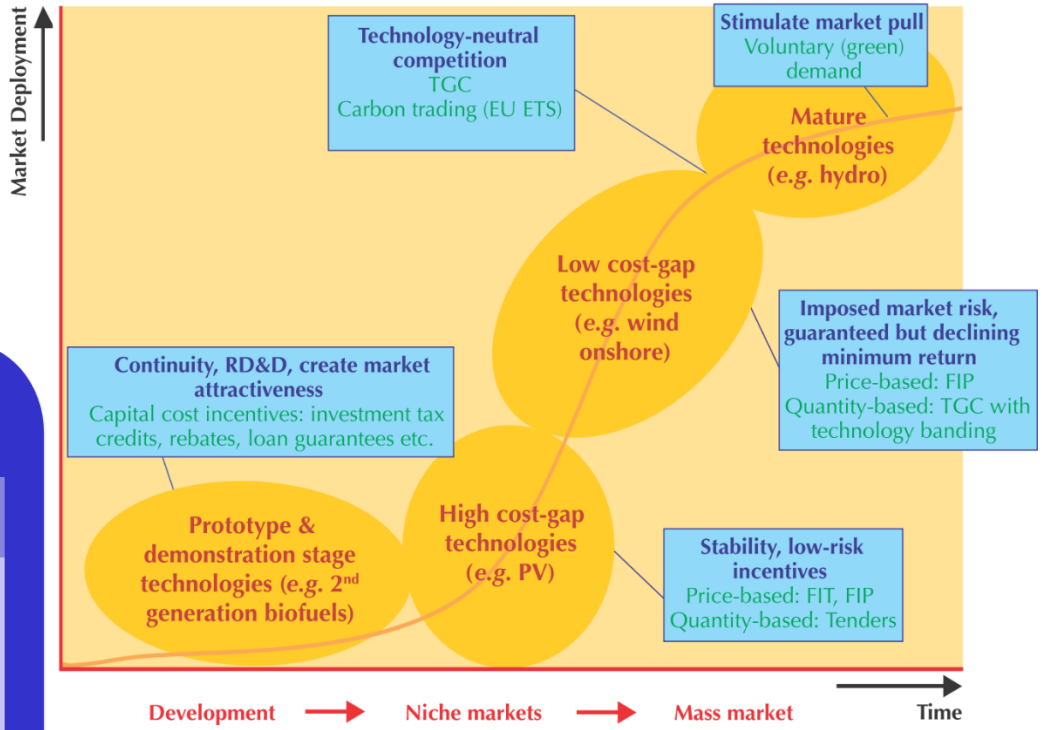
Framing renewables policy – old and new

Comprehensive and **coherent** policy development process

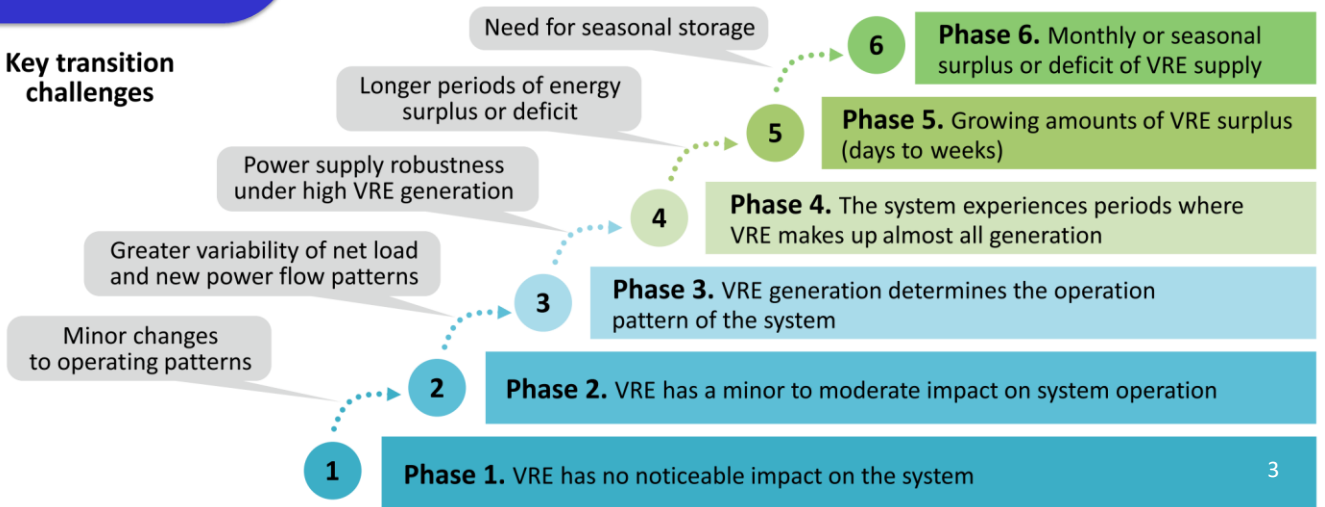
1. Regulation	2. Market Design	3. External Policy Drivers
• Transmission network planning • Distribution network planning • Grid codes	• Fundamental market design • Spot market rules • Ancillary service market rules	• Carbon policies • Renewable & energy efficiency policies • Fuel policies

Robustness and Resilience: ability to perform reasonably well under a wide range of possible futures

Figure 1. **Combination framework of policy incentives in function of technology maturity**



Key transition challenges



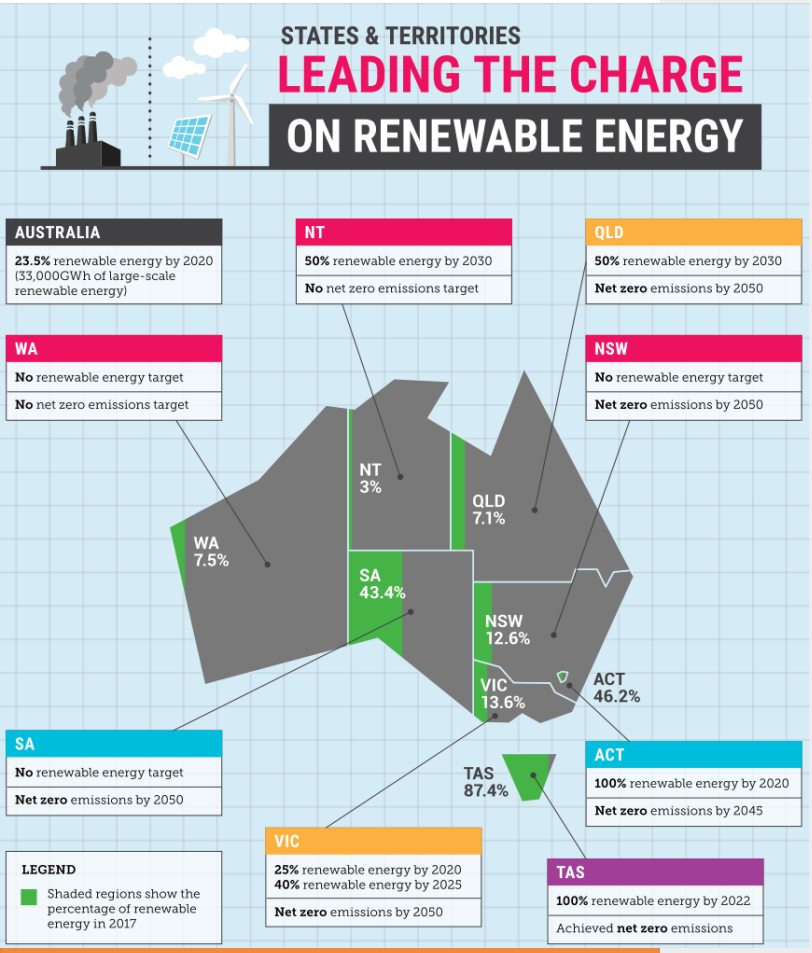
Australian RE policy status – State and Federal

Liberal-National Party: Climate Solutions Package

Australian Labor Party: Climate Change Action Plan

Australian Greens: Renew Australia 2030

Renewable Energy



Large-scale renewable energy target: At least 33,000 gigawatt-hours (GWh) of Australia's electricity comes from renewable sources by 2020.

Committed to 23.5% renewables by 2020 but do not have a post-2020 renewable energy target.

Small-scale renewable energy scheme provides a financial incentive for individuals and businesses to install small-scale renewable energy systems such as rooftop solar, solar water heaters and heat pumps. There is no limit on the amount of renewable energy that can be produced under the SRES. Scheme expires in 2030.

50% renewables by 2030. According to Labor, 50% renewables by 2030 will create more than 70,000 new jobs.

Establish an independent $5 billion Energy Security and Modernisation Fund to modernise Australia's ageing energy transmission infrastructure and enable more clean energy to feed into the grid.

Double the original investment in the Clean Energy Finance Corporation by $10 billion, supporting new generation and storage across the country.

$2,000 rebates for solar batteries for 100,000 households on incomes of less than $180,000 per year, with a target of one million batteries by 2025.

Invest $100 million in Neighbourhood Renewables Program to help renters and social housing tenants to benefit from renewable energy.

Bioenergy Strategy to boost development of this industry.

100% renewables by 2030.

Establish a new $500 million government authority, 'Renew Australia'.

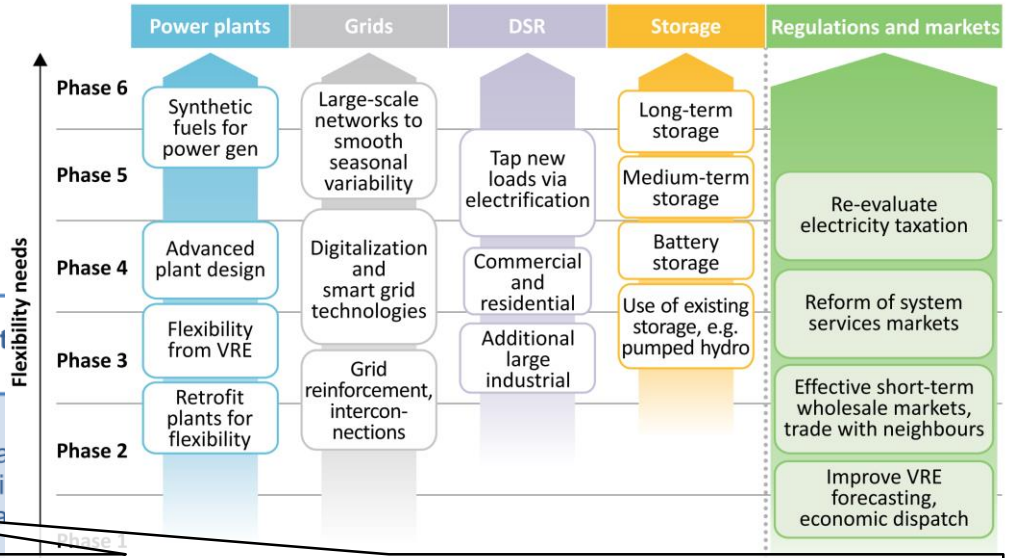
Rapidly deploy the next generation of energy generation and build transmission networks so that we can open up most renewable rich areas for new jobs and investment.

Opening up renewable energy zones right around the country, backed by a $6 billion Grid Transformation Fund.

Pledge support for households and business to use solar and batteries and the establishment of renewable energy zones.

Boost Australia's ability to store clean energy by 26.65 Gigawatts (GW), growing to 30 GW in 2040. An Energy Storage Target would be set to help meet the total 419 GWh of dispatchable power required by 2030. This would be further enhanced by a $2.2 billion in construction funding managed by AEMO and the Clean Energy Regulator over five years to contract and build energy storage at

EI transition for high renewables – NEM status, work ahead



System-friendly strategy	Policy tool	Count
System service capabilities	Grid codes that require advanced capabilities Advanced design of system services markets	Participa balanci
Location of deployment	Integrated planning of grid infrastructure and generation	Inte
	Locational signals in remuneration schemes	Mexi diff
Technology mix	Technology-specific auctions that reflect the value of each technology as determined in long-term planning	
	SV reflected in multi-technology auctions	
Economic design criteria	Partial exposure to market prices via premium systems	German and Danish market premium systems, US Tax Credits
Integrated planning, monitoring and revision	An integrated long-term plan for VRE and flexible resources, updated regularly	pla

(IEA, Next Generation Wind and Solar, 2016)

Have to ask more of all generation – new and old, large and small including DERs; non-synchronous generation penetration limits seem particularly key to high RE, FCAS needs attention, wider services

NEM improving ISP but are scenarios sufficiently 'stretched', AEMC Tx framework; what of possible strategic investment; queues for RE projects growing; Dx integrated planning required too

NEM temporal and regional pricing and use of RET means project developers see some technology, temporal and locational signalling – does State moves to auctioning reduce this? And what of DERs

NEM wholesale pricing is incomplete, misses externalities and suffers from design and structural (market power) issues. Retail markets where DER reside don't have meaningful pricing at present, and little progress

AEMO efforts valuable, but in the broader policy context, simply shambolic here in Australia at present, and gravely damaging opportunities for effective and efficient RE integration. State targets playing key role given Federal policy failure, but enough going forward?