



# NSW Generation Plan

# Liddell replacement is AGL's preferred option compared to the proposal to extend the life of Liddell



## Liddell replacement

Preferred option

**Liddell Power Station closed in 2022 and repurposed with series of investments in new, low emissions generation and upgrades to existing generation**

- Staged approach to bring new investment online ahead of Liddell retirement
- Each phase will track timing, deliverables and completion dates of each new investment



**Newcastle gas peaker**  
250MW or other NSW sites



**NSW gas peaker**  
500MW



**Renewables**  
1600MW



**Demand response**  
up to 150MW



**Bayswater upgrade**  
100MW



**Liddell battery**  
250MW



**NSW pumped hydro**  
Feasibility



**Liddell synchronous condenser**  
Inertia and reactive power

**Total capital investment: ~\$1,360m**  
(of which ~\$490m in stage 1 projects)

**Levelised cost of energy: \$83/MWh**

**Asset life: 15 to 30 years**

## Liddell extension

**Work undertaken at Liddell Power Station to enable AGL to operate the station beyond 2022**

- Extending Liddell's life by five years to deliver 1000MW of peak capacity at reduced availability
- Analysis has been done to examine the costs and other risks associated with extending Liddell



**Total capital investment: ~\$920m**

**Levelised cost of energy: \$106/MWh**

**Asset life: five years**

# Projects to replace Liddell have been staged to adapt to an evolving market



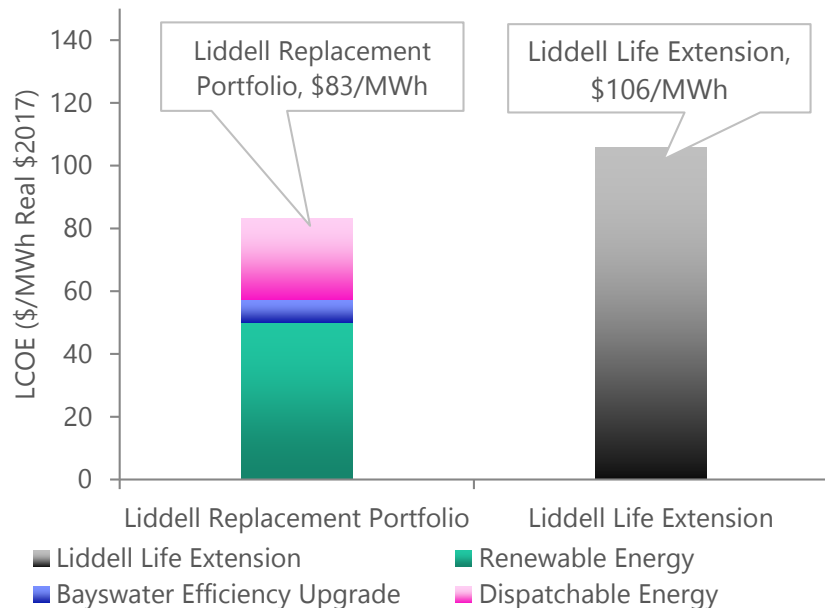
Stage	Description	Projects	Cumulative capex <sup>1</sup>	Cumulative LCOE <sup>2</sup>
Approved Projects	Projects are under construction having already achieved Final Investment Decisions	<ul style="list-style-type: none"> <li>• <b>Wind</b> <ul style="list-style-type: none"> <li>• <b>Coopers Gap</b>  453MW</li> <li>• <b>Silverton</b>  200MW</li> </ul> </li> </ul>	Committed	\$62/MWh
Stage 1 Feasibility 2019 or earlier <sup>4</sup>	Stage 1 comprises projects required to balance AGL's committed customer needs consistent with the Government's proposed National Energy Guarantee	<b>Approved in NSW Generation Plan</b> <ul style="list-style-type: none"> <li>• <b>Bayswater upgrade</b>  100MW</li> <li>• <b>Solar offtake (NSW)</b>  300MW</li> <li>• <b>Synchronous condenser Liddell</b></li> <li>• <b>Demand response</b>  up to 20MW</li> </ul> <b>Feasibility</b> <ul style="list-style-type: none"> <li>• <b>Newcastle gas peaker</b><sup>3</sup>   250MW</li> </ul>	\$490m	\$76/MWh
Stage 2 Feasibility 2020 <sup>4</sup>	Stage 1 and 2 comprise projects required to meet AGL's potential uncontracted customer demand (C&I) assuming that other market participants respond to market signals	<ul style="list-style-type: none"> <li>• <b>NSW gas peaker</b>  500MW</li> <li>• <b>Renewables</b>  500MW</li> <li>• <b>Demand response</b>  up to 50MW</li> </ul>	Stage 1 and 2 \$1,100m	\$83/MWh
Stage 3 Feasibility 2021 <sup>4</sup>	Stage 1, 2 and 3 comprise projects required to completely replace Liddell assuming no other market participants respond to the signal for investment	<ul style="list-style-type: none"> <li>• <b>Liddell battery</b>  250MW</li> <li>• <b>Renewables</b>  250MW</li> <li>• <b>Demand response</b>  up to 30MW</li> </ul>	Stage 1, 2 and 3 \$1,360m	\$83/MWh

1. Dollars are cumulative on the bundle of assets (Real \$2017, pre-tax), Solar offtake is based on a 300MW, 15 year power purchase agreement, Renewables assets are modelled using wind assets using an off-balance sheet structure like PARF with AGL contributing capital equivalent to a 20% equity share 2. Levelised cost of energy (LCOE) is the average cost per MWh of production of the cumulative bundle of assets contained within each stage of the NSW generation plan. LCOEs are based on information sourced by AGL. Dollars have been presented in real \$2017, pre-tax. 3. Newcastle gas peaker to be located at Newcastle gas storage facility or another suitable location in NSW. 4. Feasibility will be subject to financial feasibility, planning approval, EPC contract and connection agreement.

# Liddell replacement delivers a more affordable solution for customers



**Levelised Cost of Energy and portfolio contribution (by technology)<sup>1</sup>**



Weighted levelised cost of energy (LCOE, real \$2017 pre-tax) for an equivalent level of energy production is lower for Liddell replacement (\$83/MWh) than Liddell lifetime extension (\$106/MWh)

The Liddell replacement portfolio contains an equivalent amount of energy and dispatchable power to the Liddell extension to deliver a similar level of reliability

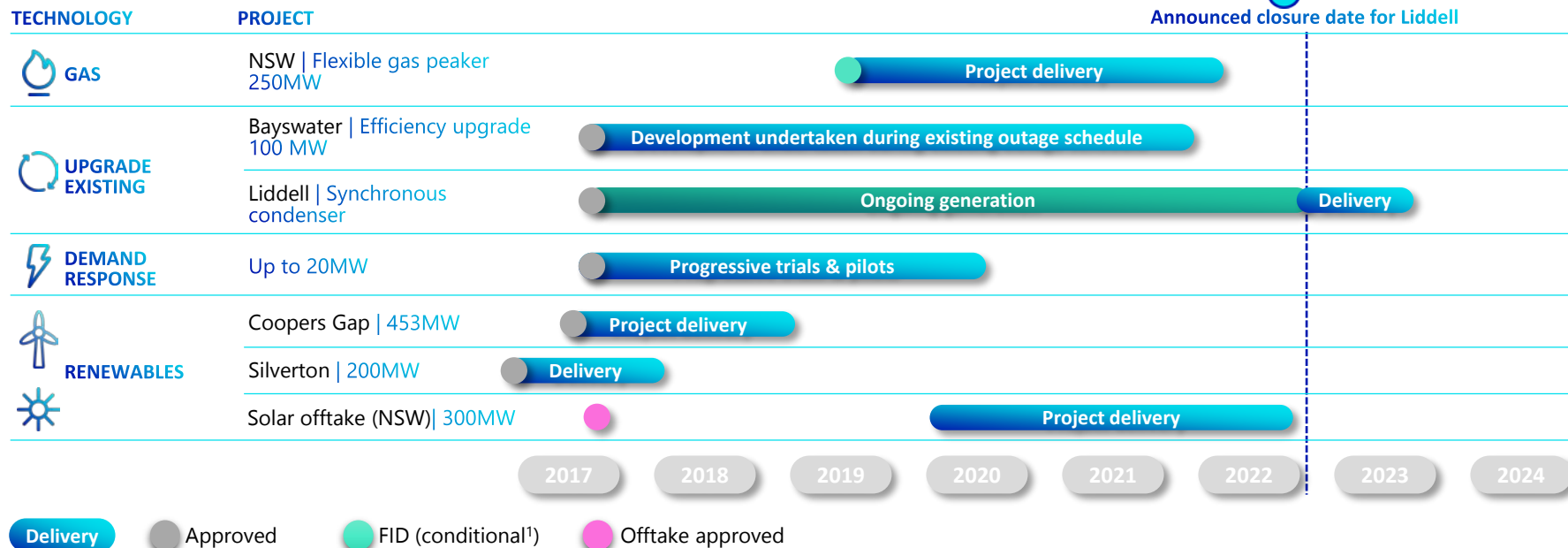
- Energy is sourced predominantly from renewable technologies and upgrades to Bayswater efficiency
- Firming is provided through high-efficiency gas peakers, the Bayswater efficiency upgrade, storage (either battery or pumped hydro) and demand response

1. Levelised Cost of Energy based on information sourced by AGL including: the capital cost of the Liddell life extension works as advised by Worley Parsons (Advisian). AGL's discount rate in line with their commercial target returns. Westpac Banking Corporation's forecast of the Newcastle coal price discounted based on the lower calorific value required for power station coal. A carbon emissions cost has been included as per AEMO's "Moderate" 2015 scenario. 2. Removal of the cost of carbon from the LCOE has the effect of reducing the Liddell Replacement portfolio to \$82/MWh and the Liddell lifetime extension portfolio to \$92/MWh.

# Plan to transform our options into commercial solutions



## Stage 1 (feasibility during 2019 or earlier)



1. Conditional final investment decisions will be subject to planning approval, EPC contract and connection agreement.

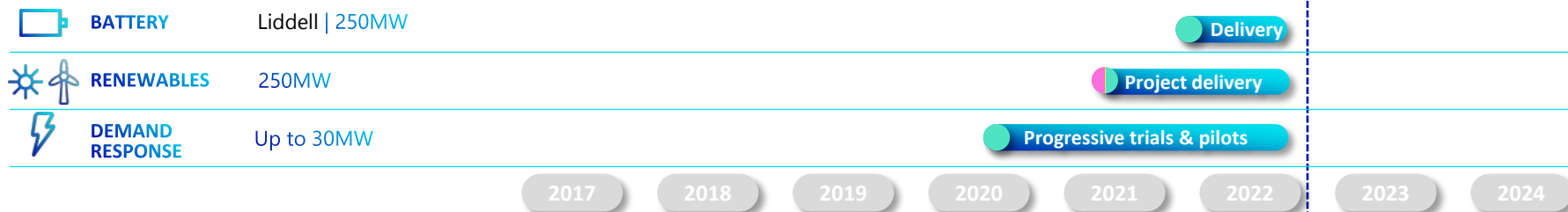
# Plan to transform our options into commercial solutions



## Stage 2 (feasibility in 2020 or earlier)



## Stage 3 (feasibility in 2021 or earlier)



*AGL is considering the feasibility of pumped hydro assets in New South Wales in Stage 2 & 3*

Delivery
 Approved
  FID (conditional<sup>1</sup>)
  Offtake approved

1. Conditional Final Investment Decisions will be subject to planning approval, EPC contract and connection agreement.