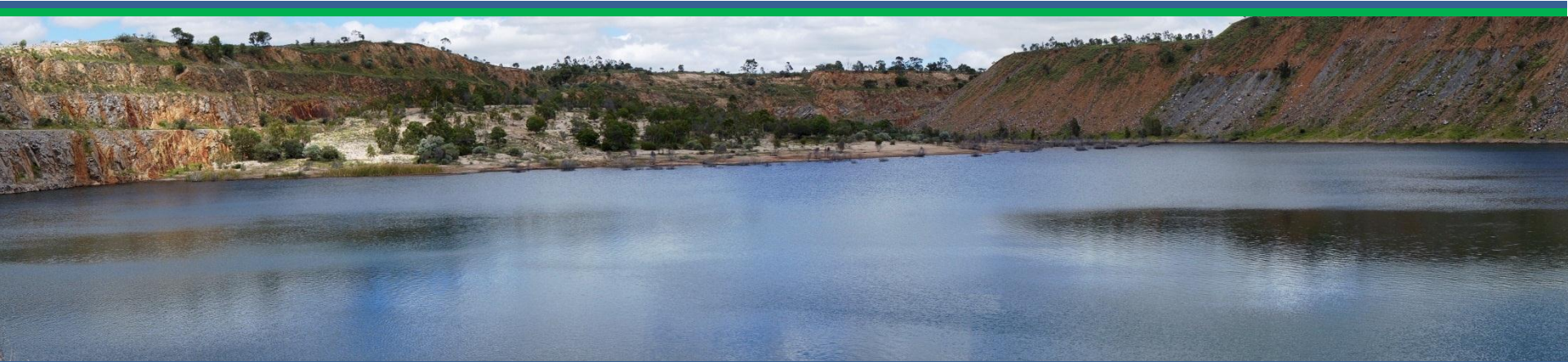




Future Potential Pumped Hydro Energy Storage in Australia

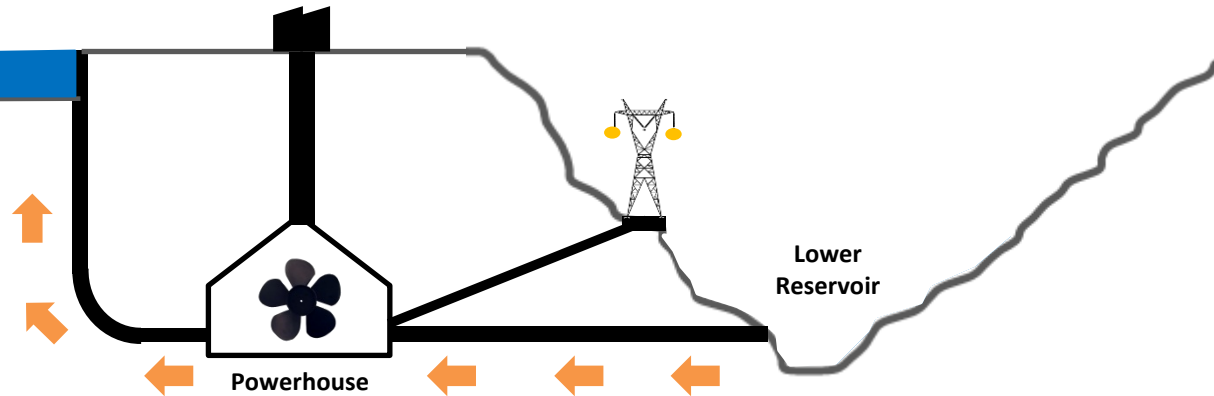


OCTOBER 2015

WHAT IS PUMPED STORAGE?

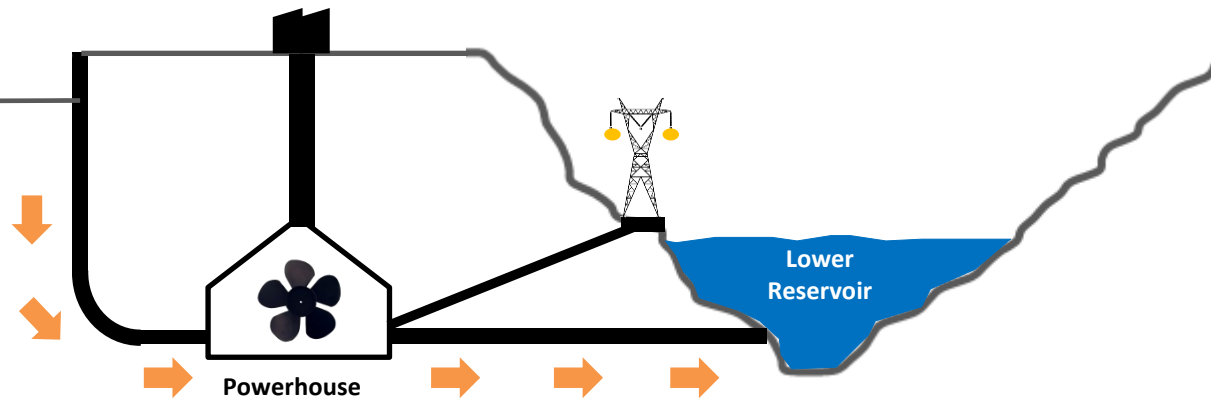
Pumping Mode

- During Off-Peak
- Wholesale prices at their lowest
- Power is drawn from the grid to pump water from the lower to the upper reservoir



Generating Mode

- During daily Peaks
- Wholesale prices at their highest
- Water is released from the upper reservoir to the lower reservoir to generate electricity



PUMPED STORAGE IN THE MARKET

Peaking power generation is usually supplied by



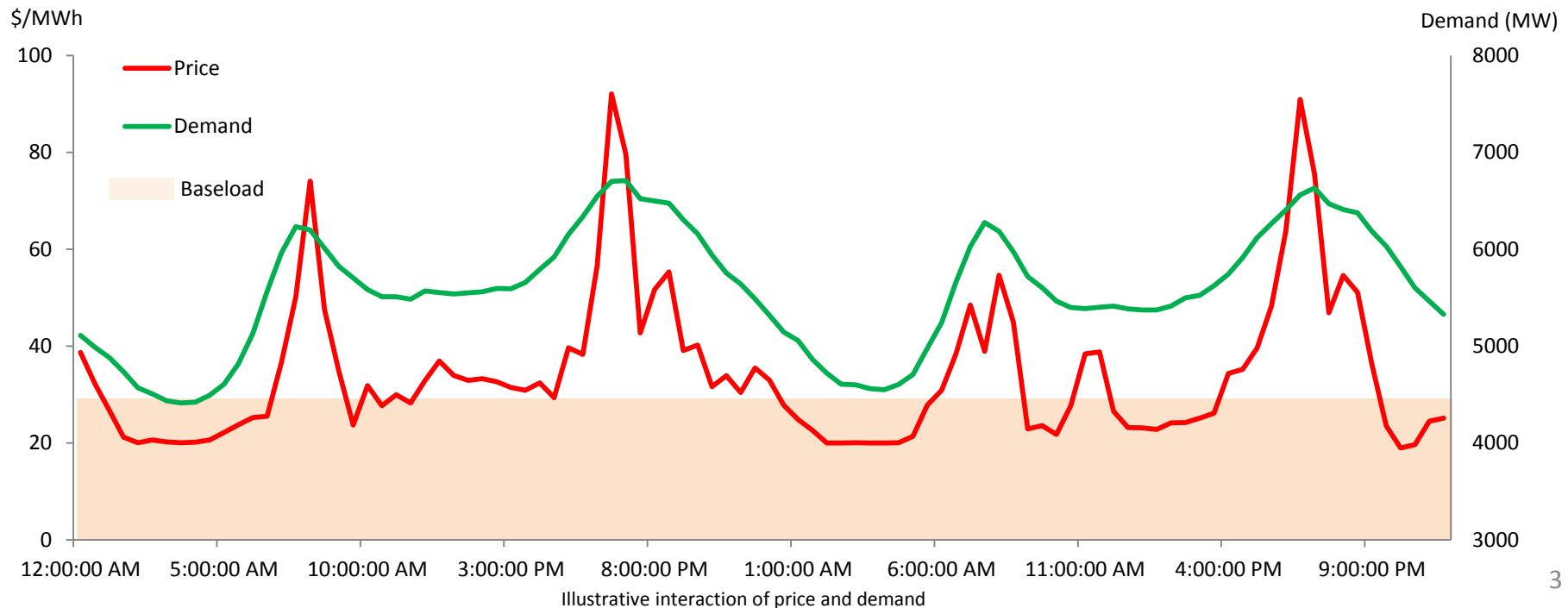
Open Cycle Gas Turbines



Diesel Generators



Pumped Hydro



PUMPED STORAGE AND RENEWABLE ENERGY

GROWTH OF RENEWABLE ENERGY GENERATION

- Intermittent generation
- Excess generation during low demand
- Need for large scale energy storage
- Potential for integration with renewable generation



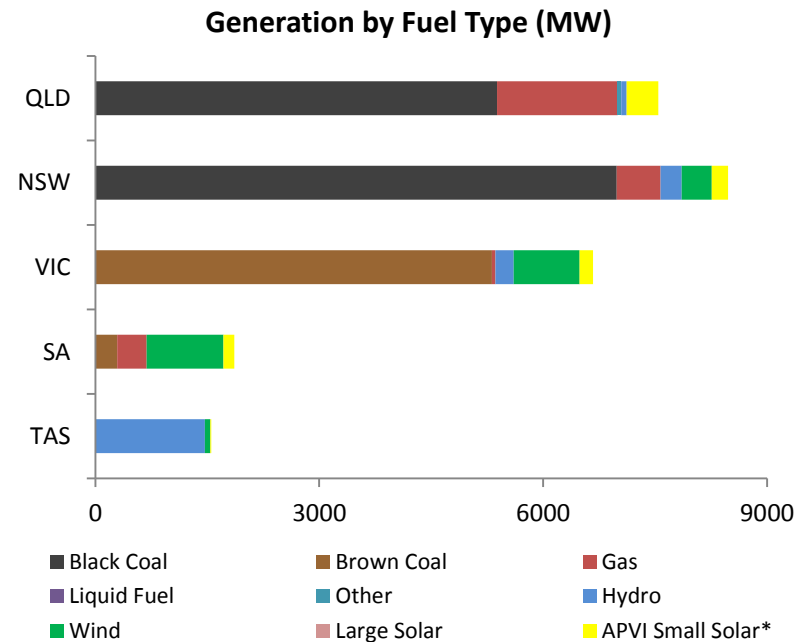
Royalla Solar Farm



Cathedral Rocks Wind Farm

UNIQUE ENERGY GENERATION MIX IN QUEENSLAND

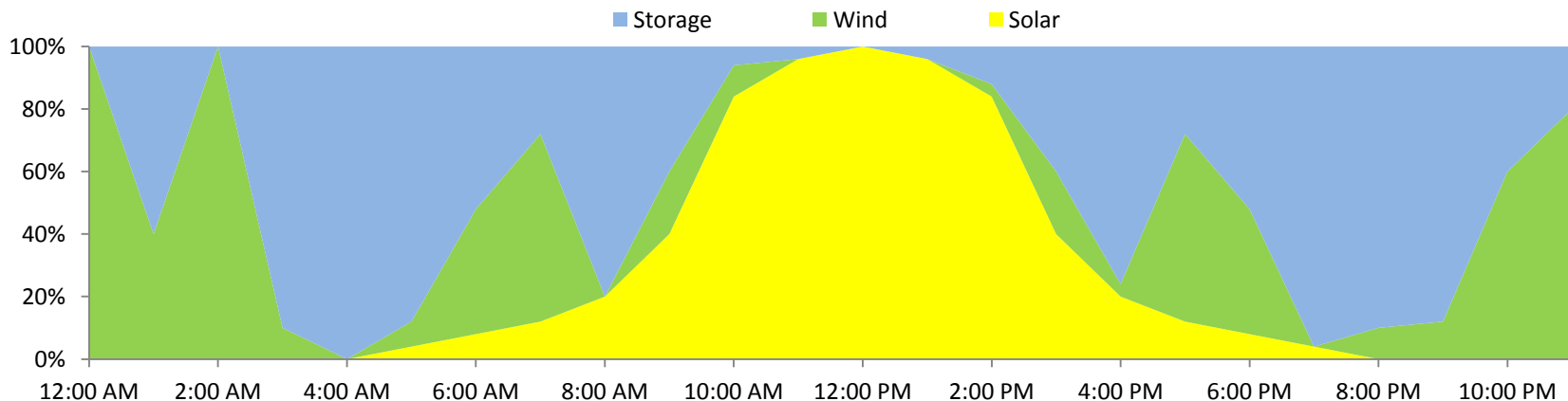
- Coal fired Baseload Power
- Gas Peaking Power
- Effect of rising gas prices on OCGTs & CCGTs
- Opportunity for low cost/low emission peaking generation



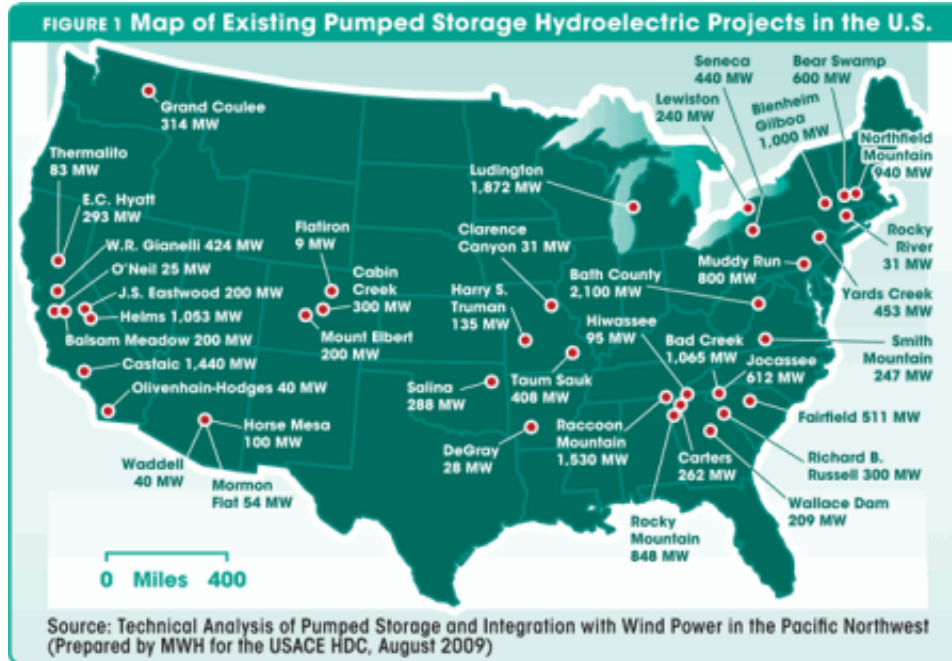
PUMPED STORAGE AND RENEWABLE ENERGY

- Solar and wind will have higher penetration in electricity market over the coming decade; leading to
- Increasing proportion of the overall generation mix being renewable sources
- Renewable generation increases volatility in the electricity Network
 - *Intermittency inherent to solar and wind, which are by nature relatively unpredictable*
 - *Intermittent generation places a burden on power system operators in managing supply and demand*
- In order to manage the intermittency issues and keep demand and supply in balance, storage capacity must also grow in line with renewable deployment
 - *Installation of large scale storage projects typically involve very long lead times*
 - *Storage options need to be "in place" rather than play "catch up" to renewable developments*

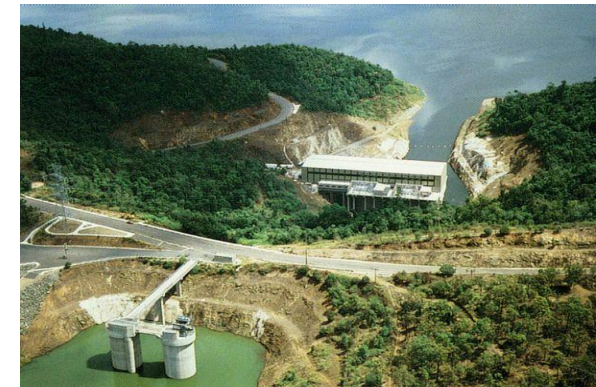
Illustrative generation pattern of renewables and storage



PUMPED STORAGE GLOBALLY & IN AUSTRALIA



Tumut 3, Snowy Hydro Scheme, NSW Australia



Wivenhoe PSP Scheme, Queensland Australia



Shoalhaven Scheme, NSW Australia

- Pumped Storage is an established technology since 1890s
- Hundreds of installed schemes around the world
- Only three pumped storage schemes in Australia
 1. Tumut 3 – 1,500MW
 2. Wivenhoe – 500MW
 3. Shoalhaven – 240MW

TRADITIONAL BARRIERS TO ENTRY

- Topography - National parks
- Significant environmental impacts
- High capex costs
- Long construction lead times
- Lengthy/complex approvals process



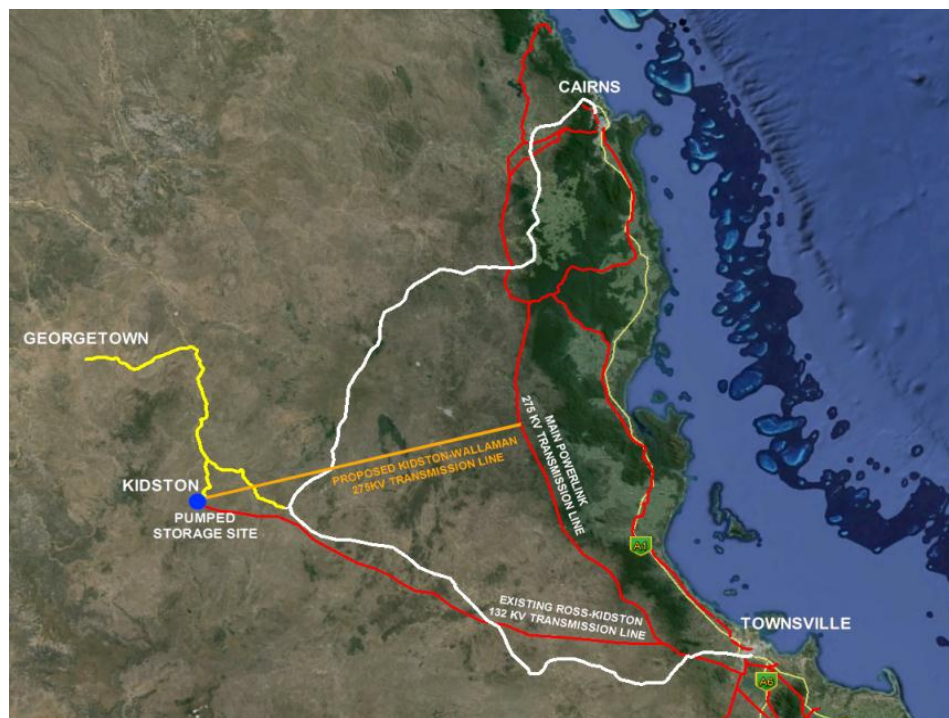
GENEX'S KIDSTON PROJECT

Company Summary

Focus	Renewable energy and storage
Project Location	North Queensland
IPO	8 July 2015
Current Shareholders	>420

Project Summary

Project Status	Feasibility commenced
Max Generation Capacity	330MW
Continuous Generation	5 hours
Max Storage Capacity	1,650MWh
First Generation Target	2019
Capital Cost Estimate	\$282 million

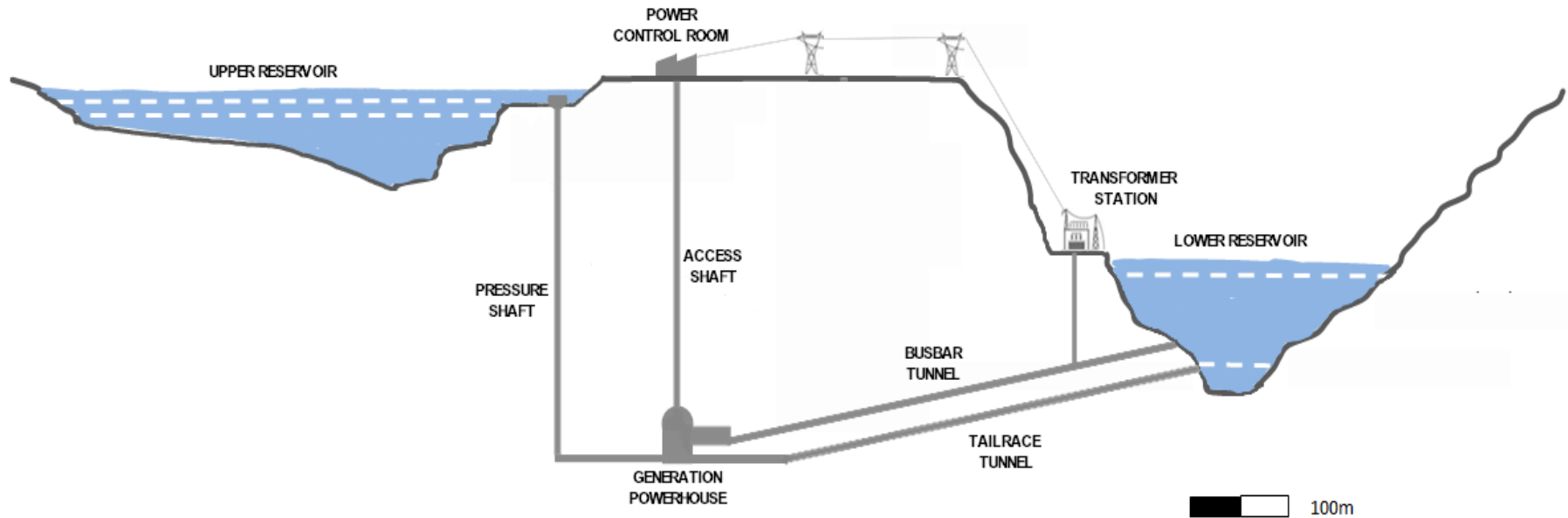




The Kidston Site

- Two large adjacent pits
 - *52ha and 54ha respectively*
 - *Lower Reservoir 300m deep*
 - *Approximately 400m apart at surface*
- Site substantially rehabilitated since mine closure in 2001
- Water license in place for top up water
- Site 100% held by Genex Power
- Site covers 1,237ha
- Bankable Feasibility Study underway

GENEX'S KIDSTON PROJECT



Pre-Feasibility Outcome

Nameplate Capacity	330MW	First Generation Target	2019
Continuous Generation	5 hours	Total CAPEX Estimate	\$282m
Cyclical Efficiency	~82%	Transmission Losses	3-4%

GENEX'S KIDSTON PROJECT

Tangible Assets	Intangible Assets	
Fixed Assets	Licenses and Permits	Data and Information
<ul style="list-style-type: none"> ✓ Existing Reservoirs 	<ul style="list-style-type: none"> ✓ Term lease in place for land over Kidston Mine Site 	<ul style="list-style-type: none"> ✓ Water Quality
<ul style="list-style-type: none"> ✓ Onsite building materials and infrastructure 	<ul style="list-style-type: none"> ✓ Council supportive of Development Application 	<ul style="list-style-type: none"> ✓ Rainfall/Runoff
<ul style="list-style-type: none"> ✓ Access to existing 132kV transmission line 	<ul style="list-style-type: none"> ✓ Pastoral Lease extinguished 	<ul style="list-style-type: none"> ✓ Geological/Historical Drilling
<ul style="list-style-type: none"> ✓ Ergon substation on site 	<ul style="list-style-type: none"> ✓ Native Title extinguished 	<ul style="list-style-type: none"> ✓ Surveys and mapping
<ul style="list-style-type: none"> ✓ In-situ water in pit 	<ul style="list-style-type: none"> ✓ Environmental Authority (EA) in place 	<ul style="list-style-type: none"> ✓ Hydrology
<ul style="list-style-type: none"> ✓ Access to Copperfield Dam (water top up) 	<ul style="list-style-type: none"> ✓ Water License in place with allocation of 4,650ML p.a. 	
<ul style="list-style-type: none"> ✓ Genex owned water pipeline from Copperfield Dam 		

GENEX'S KIDSTON PROJECT

Key Risks	Mitigating Factors
Water	<ul style="list-style-type: none">✓ Closed loop system✓ Top up water supply available from nearby dam✓ Project located in tropical North Queensland
Counter Party	<ul style="list-style-type: none">✓ State and local government support✓ No private land owners at site
Environmental	<ul style="list-style-type: none">✓ Environmental Authority in place✓ Site is already disturbed due to previous mining operations
CAPEX	<ul style="list-style-type: none">✓ Third Party cost estimates used in Pre-Feasibility Analysis



Top Up Dam – connected to site by Genex pipeline (overflowing in 2015 wet season)

PUMPED STORAGE ACROSS AUSTRALIA

- Potential for duplication across Australia



Mount Leyshon Queensland



Old mine site in Queensland



Mount Morgan Queensland

PUMPED STORAGE ACROSS AUSTRALIA



<https://www.youtube.com/watch?v=rn5f3NGWbok>

THE GENEX ENERGY HUB

- Genex engaged in planning a large scale “Energy Hub”
- Integration with large scale solar ~150MW

