



# Battery Energy Storage System Presentation

Approved by the Board of Genex Power Limited

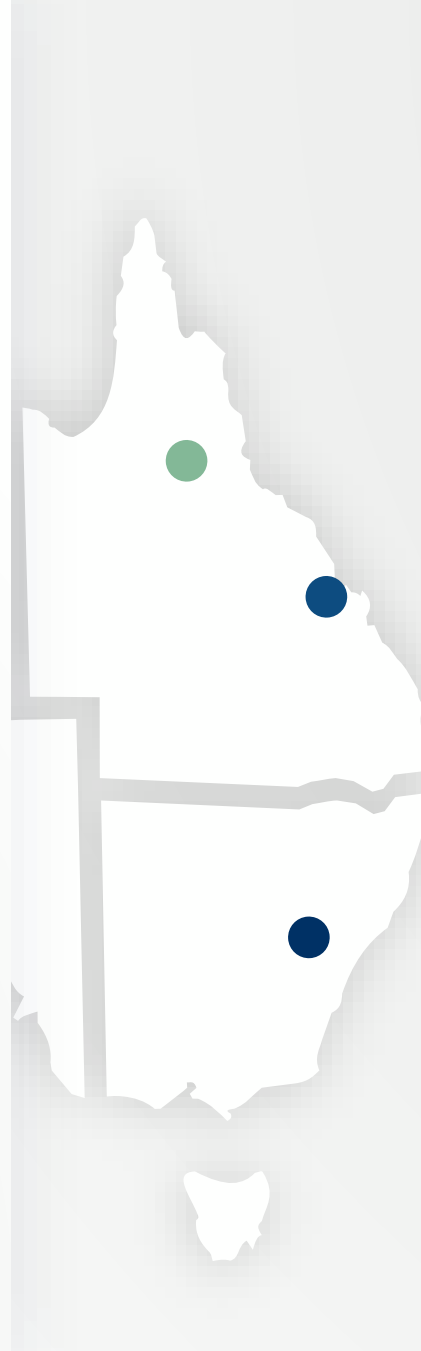


# Diverse renewable energy base

## Portfolio of renewable energy generation and storage projects

## Revenue substantially underpinned by long-term contracts

- 100MW of operating assets
- 250MW in construction
- 470MW of pipeline assets



### KIDSTON CLEAN ENERGY HUB



50MW Kidston Solar Project (Operating)



250MW Kidston Pumped Storage Hydro Project (Construction)



150MW Kidston Wind Project (Development)



Up to 270MW Kidston Stage Two Solar Project (Feasibility)

### BOULDERCOMBE BATTERY PROJECT (BBP)



50MW Large-Scale Battery Energy Storage System (Development)

### JEMALONG SOLAR PROJECT (JSP)



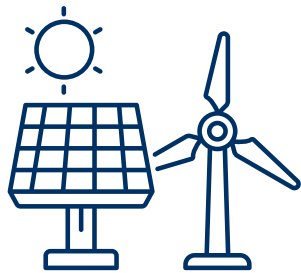
50MW Jemalong Solar Project (Operating)

# Delivering a portfolio of renewable energy generation and storage projects

## Renewable Energy Generation

Challenges of intermittent renewable energy:

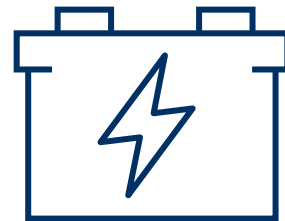
- Oversupply of power in prime generation conditions (irradiation and wind)
- Leading to volatile pricing
- Decreasing system stability
- Solar not available in peak demand times



## Energy Storage

The benefits of batteries:

- Stores energy for use in peak time
- Balances out the pricing dynamic
- Quick release of power when required
- Increase system stability



## Genex Power

Genex's diverse portfolio of renewable energy generation and storage projects provides:

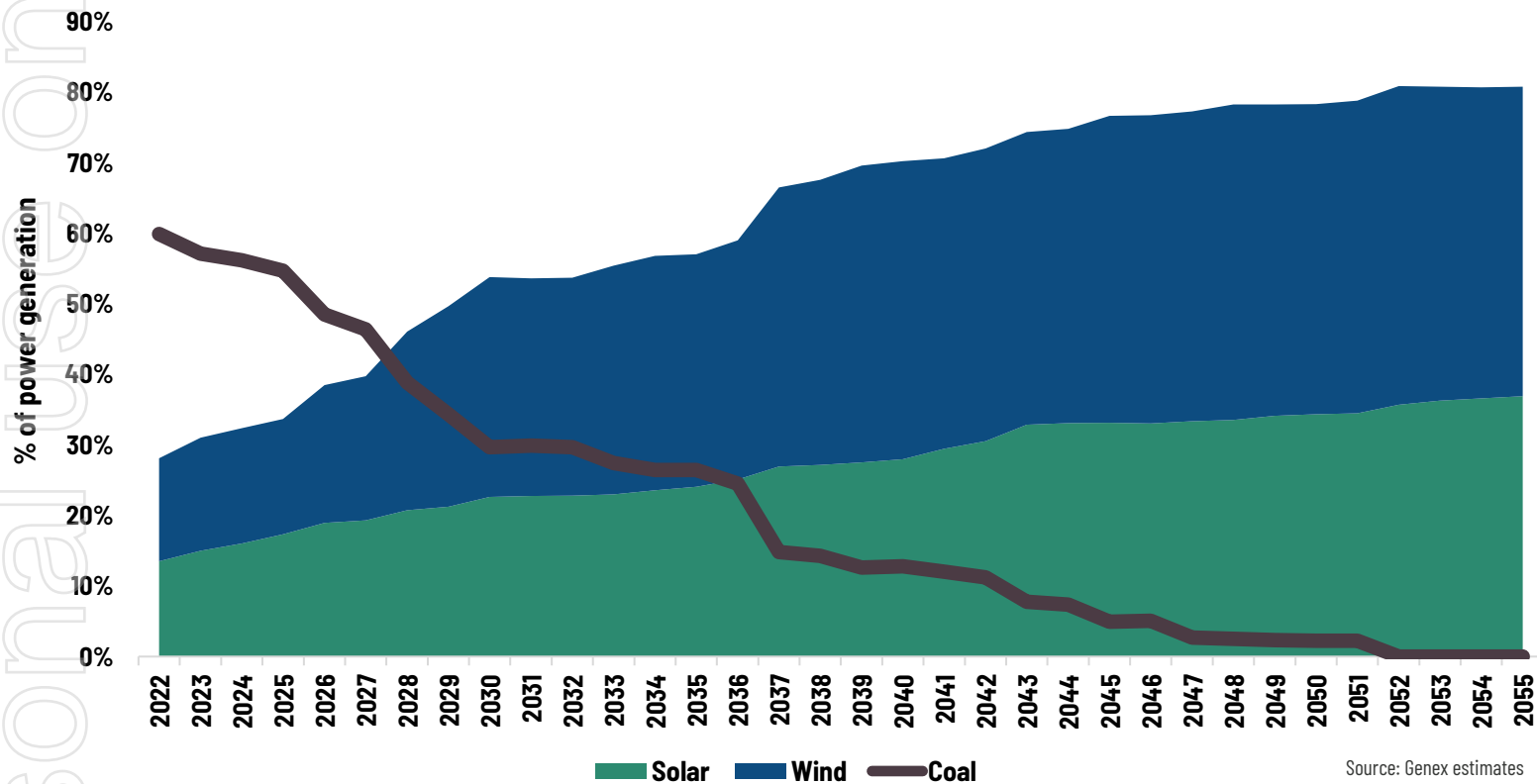
- Increased renewable energy availability to the grid
- The ability to optimise energy sales revenue
- Enables shareholder value accretion as the NEM transitions
- Maximise power prices received from energy sales



# Renewable energy growth

## The need for storage

### Generation capacity forecast for NEM



Renewable energy is expected to increase to 83% of NEM total power supply in 2055



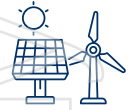
Growing penetration of renewable generation **underpins** the business case for **storage**



Large-scale storage will maximise renewable energy availability (particularly solar)

# Evolving energy market

## – the need for storage



Growth of intermittent wind and solar creating volatility in the market



Need for low-cost, large-scale storage to facilitate high penetration of renewables and maintain reliability requirements



5 minute settlement from 1 October likely to increase price volatility



Large-scale batteries can respond to the market in under a second

Genex is addressing the need for energy storage via:



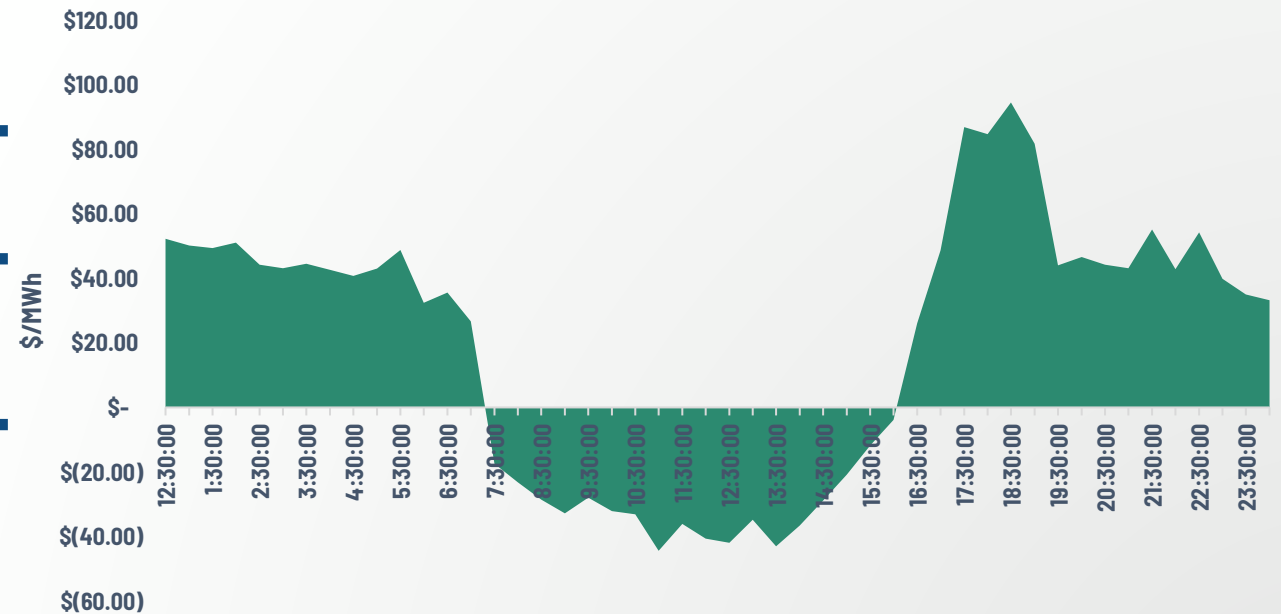
250MW Kidston Pumped Storage Hydro Project; and



50MW Bouldercombe Battery Project.

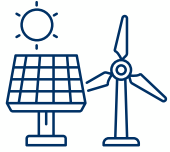
## Paid to Charge / Paid to Discharge QLD Retail Electricity Price

Queensland Electricity Prices - 11 September 2021



Source: AEMO

# The benefits of large-scale storage



**Allows for further deployment of intermittent generation (wind & solar)**



**Ability to provide much needed system strength services**



**Batteries can take advantage of low spot prices and excess renewable energy supply when charging**



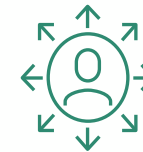
**Batteries can store low cost renewable energy to support peak demand events**



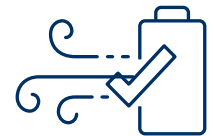
**Rapid construction and deployment flexibility**



**Significant technology advancement and decreasing capital costs**



**Batteries can provide premium peaking service to meet high periods of demand**



**Advanced technology – ability to react to market signals in milliseconds**

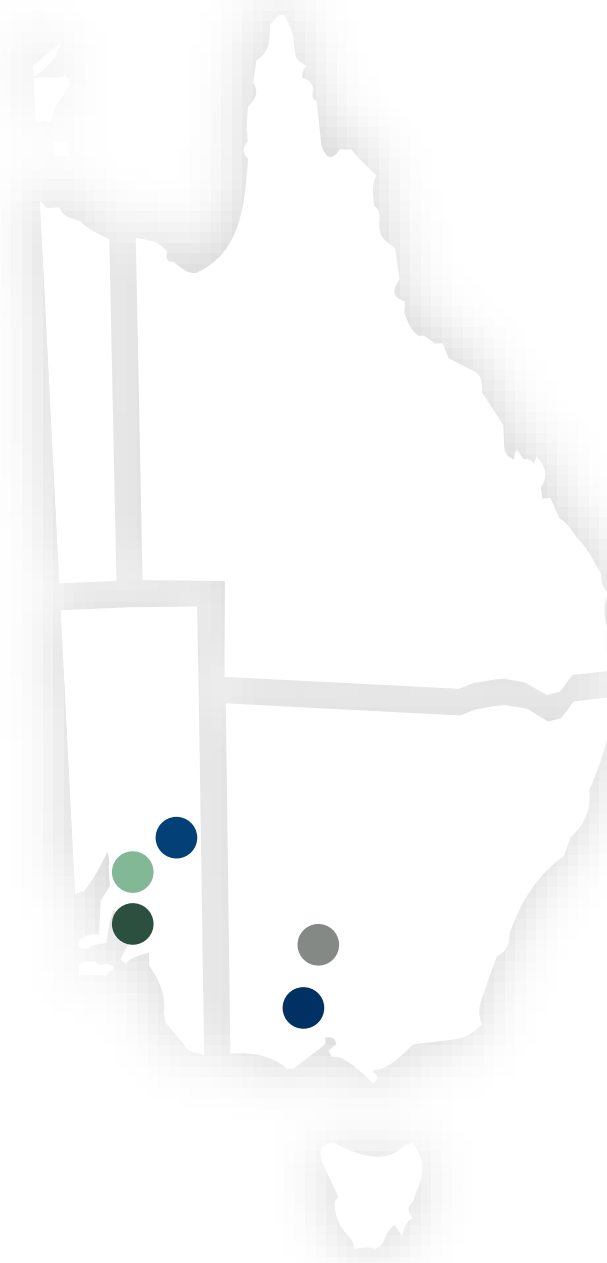
# Australian's operational large-scale battery landscape

Batteries have the ability to operate in all 9 markets (energy market + 8 FCAS markets)

Currently no large-scale batteries generating in the Queensland market

Genex set to leverage the strong arbitrage business case due to growing solar generation in the electricity market

BESS have the capability to address system security issues caused by rapid deployment of intermittent generation



**Site:** Hornsdale (2017)  
**Supplier:** Tesla  
**Capacity:** 100MW/129MWh

**Site:** Ballarat (2018)  
**Supplier:** Fluence  
**Capacity:** 52MW/25MWh

**Site:** Lake Bonney (2018)  
**Supplier:** Tesla  
**Capacity:** 52MW/25MWh

**Site:** Gannawarra (2018)  
**Supplier :** Tesla  
**Capacity:** 30MW/30MWh

**Site:** Dalrymple (2018)  
**Supplier:** ABB & Samsung  
**Capacity:** 8MW/30MWh

# Australia's battery growth

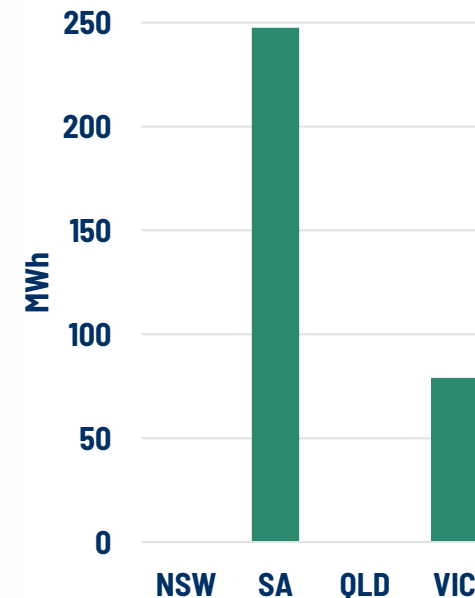
There is a requirement for significant BESS battery roll out along the east coast of Australia

Approximately 123GWh of capacity needed by 2040

The only operating BESS's in Australia are located in SA and VIC

Batteries inserted into renewable energy zones fill the gaps in dispatchable supply allowing renewable generation to be used more effectively

Current Operating BESS



Source: AEMO

Required BESS by 2040

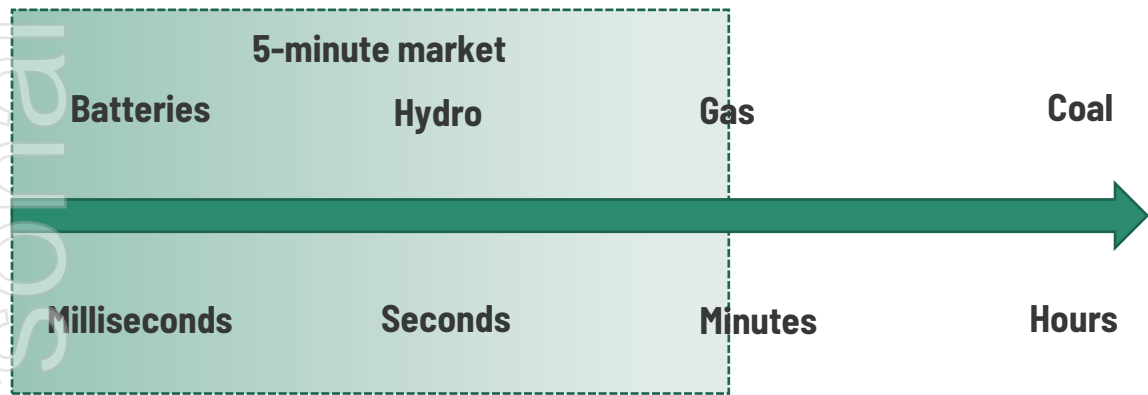


Source: Genex estimates

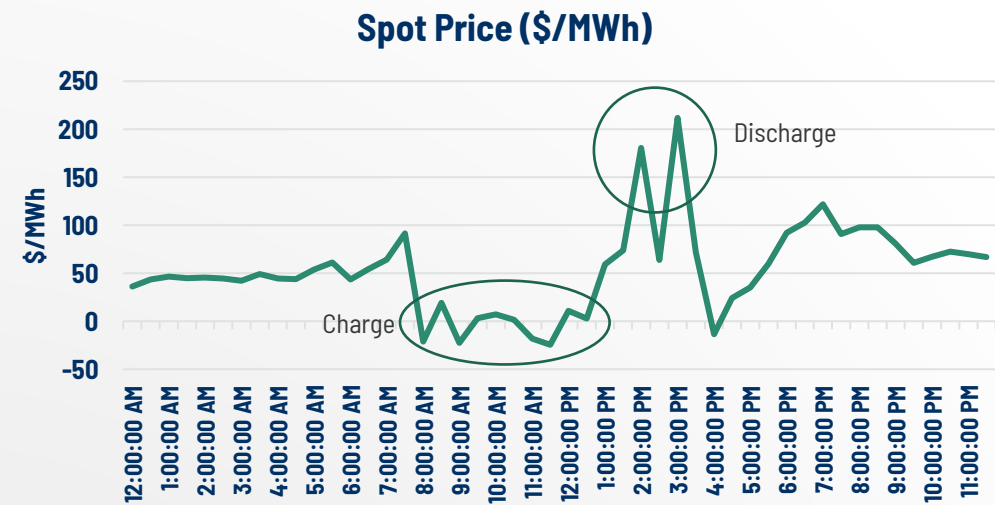


# Large-scale batteries & 5-minute settlement

- ✓ The introduction of the 5 minute pricing market in the NEM rewards the rapid provision of power into the grid
- ✓ Historically pricing was on a 30 minute basis (average of 6 by 5 minute intervals)
- ✓ Recent change has distinct 5 minute pricing blocks
- ✓ The ability to rapidly enter (and withdraw) power will provide the power source with better ability to capture peak discharge prices (and take advantage of trough prices to recharge)
- ✓ Battery technology, with the ability to discharge power in millisecond and pumped hydro (seconds) are well positioned to benefit from the change in market dynamics



## QLD Wholesale Electricity Price – September 2021



### 5 minute settlement impact on pricing (1MW/1MWh)

Time interval	Discharge price (\$/MWh) 1:00pm to 3.00pm	Charge price (\$/MWh) 8:00am to 12.00pm	Total Cycle Price (\$/MWh)
30min	196	-22	218
5min	263	-175	438

Notes to table: stylist representation of a charge and discharge cycle (energy only market)

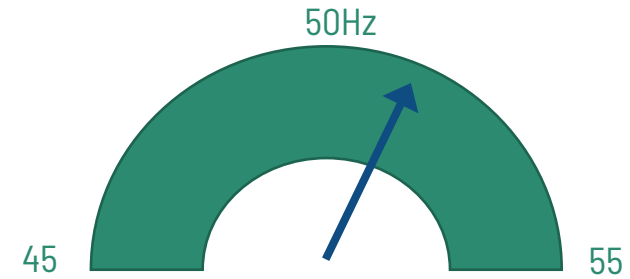
# Large-scale batteries & the FCAS market

- ✓ Frequency Control Ancillary Services (FCAS) are a group of services that help maintain the NEM at a stable frequency of 50Hz
- ✓ Short term imbalances between supply and demand can cause frequency instability, which can ultimately lead to system failure and blackouts
- ✓ The intermittent nature of renewables increases potential instability
- ✓ Historically coal fired power stations provided FCAS given their size and considerable inertia
- ✓ Batteries are ideally suited to provide FCAS to the NEM given their ability to charge and discharge in milliseconds
- ✓ The NEM pays operators to provide FCAS services

**Coal retirements will reduce the supply of FCAS**

**Intermittent renewables will increase the demand for FCAS**

## Supply exceeds demand

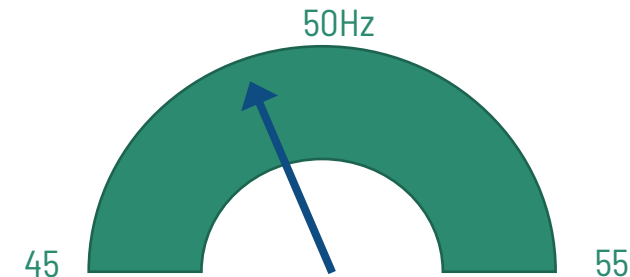


Example: sudden increase in wind velocity

NEM frequency rises >50Hz

Battery rapidly charges to increase demand, frequency falls back to 50Hz

## Demand exceeds supply



Example: sudden decrease in solar radiation

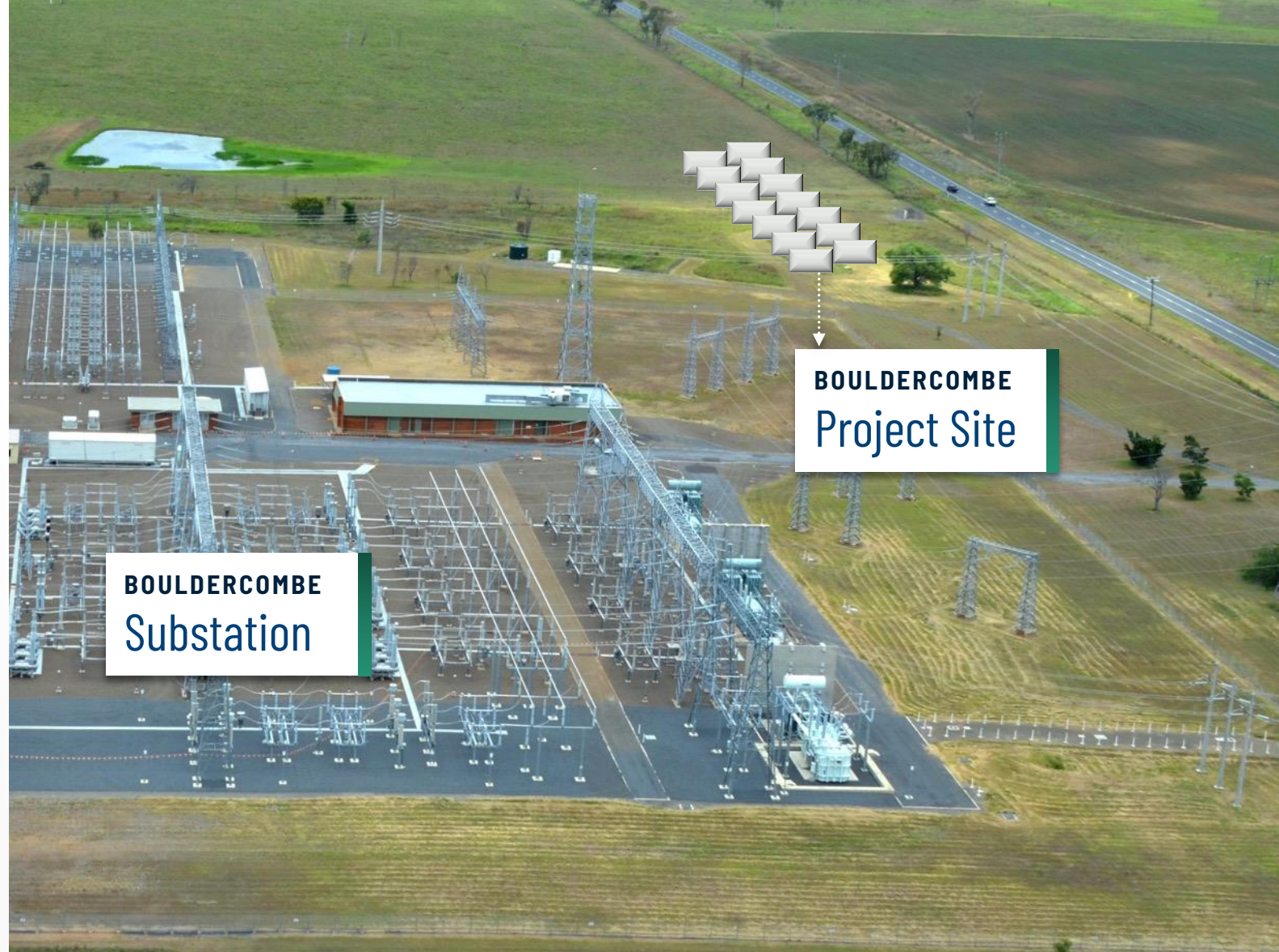
NEM frequency falls <50Hz

Battery rapidly discharges to increase supply, frequency rises back to 50Hz

# Bouldercombe Battery Project

**50MW BESS located in Bouldercombe,  
Rockhampton in Queensland**  
- adjacent to the Powerlink substation

- ✓ Genex's first battery project
- ✓ Land to be secured under 30 year leasing arrangement next to Powerlink's Bouldercombe substation
- ✓ Connection and Generator Performance Standard (GPS) process well advanced
- ✓ Funding discussions with potential lenders and strategic investor
- ✓ Tesla selected as the battery supplier and integrator
- ✓ Offtake arrangements well progressed





# Tesla technology

## Megapack 2.0

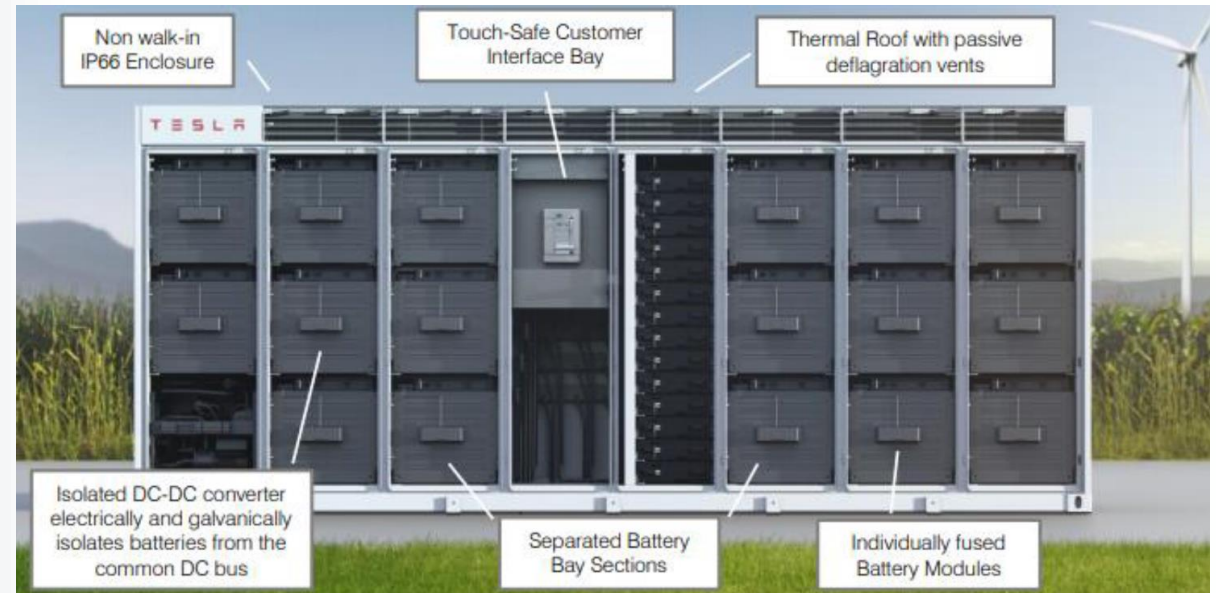
The Megapack is an all-in-one utility-scale energy storage system optimised for cost and performance

- All Megapack components pre-installed and tested within a single enclosure
- Battery architecture consists of battery modules and an integrated liquid cooling and heating system for thermal safety, enhanced performance and increased reliability

Each Megapack is shipped from Tesla's Gigafactory fully-assembled and factory tested.



TESLA

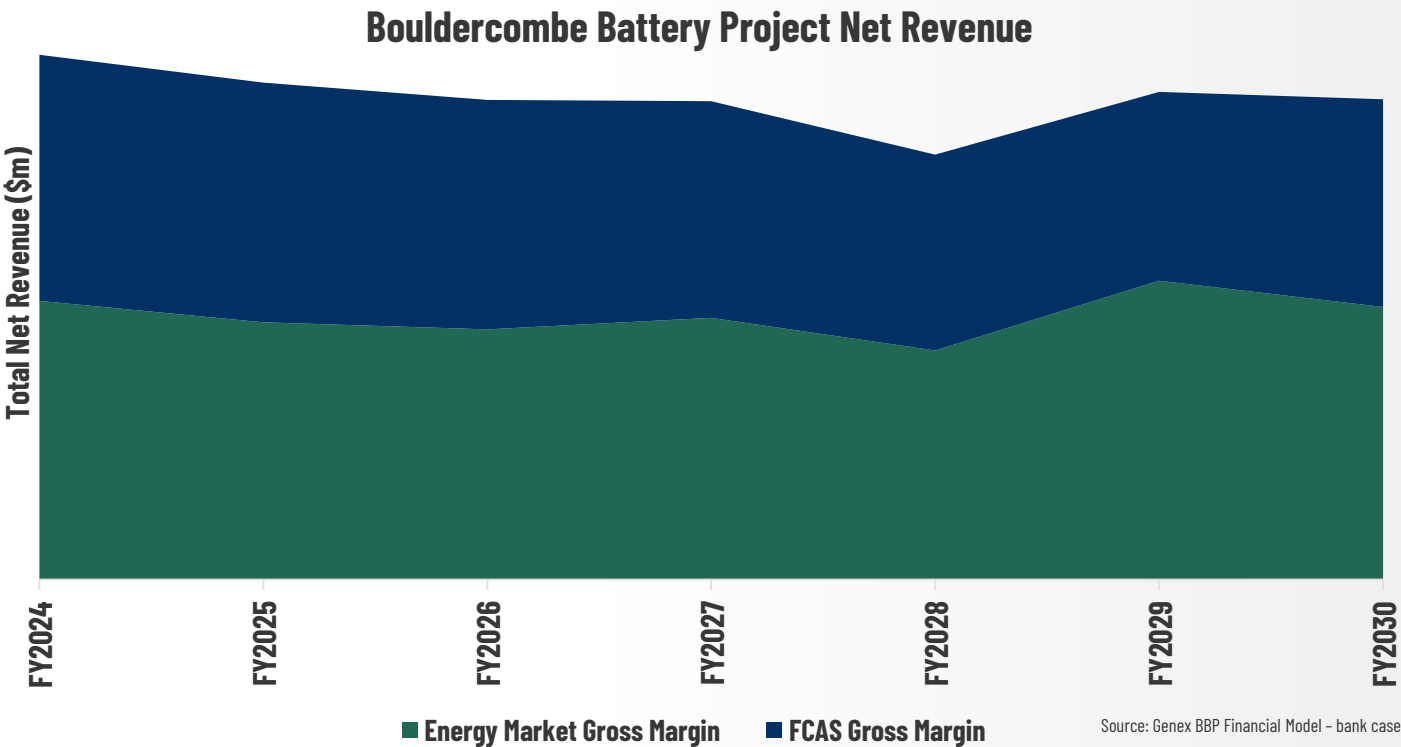


Above: inside the BBP Tesla Megapack 2.0



# Genex Power's battery financials

Genex's BESS will leverage energy market arbitrage and FCAS markets to deliver strong and predictable revenue streams



Attractive outlook for price arbitrage in certain states with the introduction of 5-minute settlement in October 2021

Initial Capex of **\$55-\$60m<sup>1</sup>** to develop the asset



Life of asset revenue to average over **\$10m** per annum



Operating life expected to be greater than the **20 year warranty**



Strong EBITDA margin of **>75%** expected from BBP



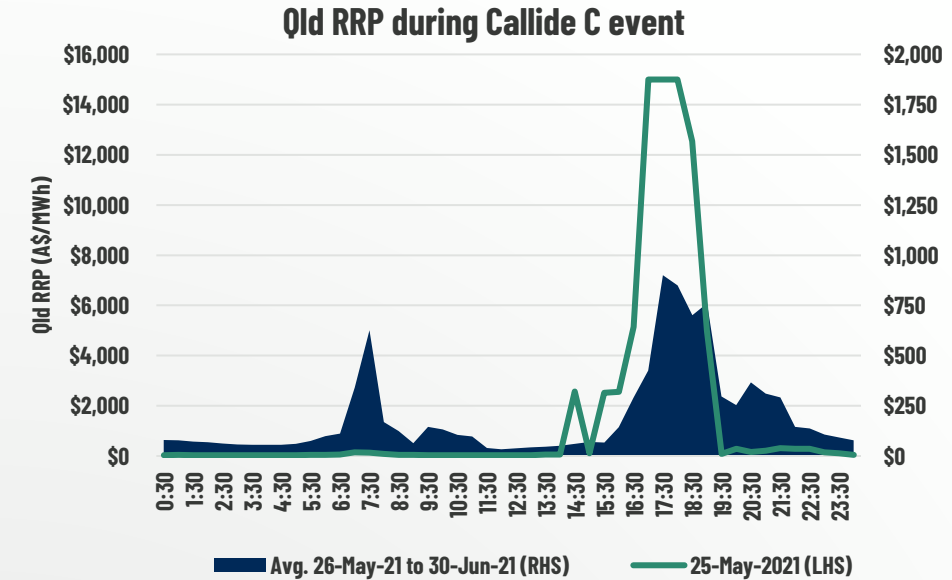
Minimal requirements for ongoing sustaining capital



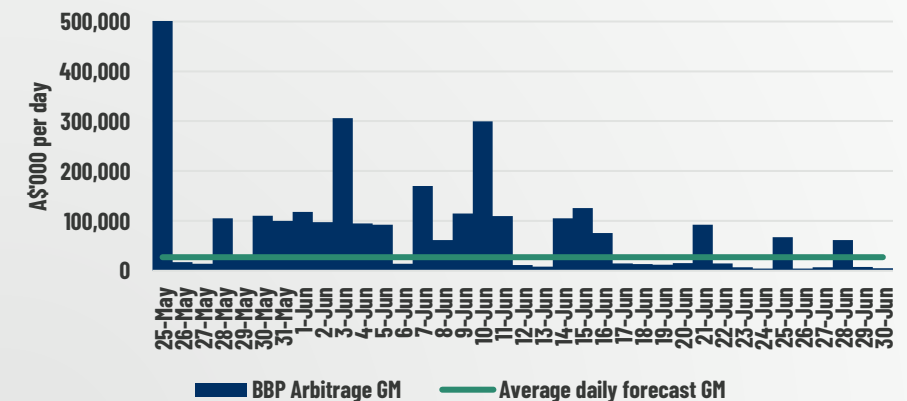
# Large-scale batteries & contingency events – Callide C case study

- On 25 May 2021, Unit 4 (405MW) at the Callide C coal-fired power station suffered a turbine fire:
  - The remaining two units at Callide also tripped (the fourth was offline)
  - The transmission lines connecting Callide to the grid opened
  - Capacity at nearby power stations including Gladstone, Stanwell, Yarwun and Mackay was affected
  - The Queensland-NSW interconnector was disrupted
- The outage at Callide resulted in a 3,000MW shortfall
  - Nearly 500,000 homes and businesses in Queensland lost access to power
- Average RRP prices in Queensland **escalated to \$15,000 for nearly 2 hours**
- If **BBP had been operational at the time, it would have made \$700k in gross margin** on 25 May 2021 solely from arbitrage activities
  - Over the period to 30 June, as prices remained volatile, the BBP would have netted a total of \$3.2m from arbitrage gross margin alone, averaging some 255% of forecast daily revenues**
- Extreme contingency events such as Callide C are unpredictable, but likely to increase in frequency as coal plant ages and retires
- Importantly similar events are not factored into Genex's revenue forecasts for the BBP and therefore represent substantial upside to equity

## Significant events can deliver substantial profitability for batteries



## BBP Illustrative Arbitrage GM during Callide C event



Source: AEMO, Genex calculations

# Energy storage roll out strategy

Genex will leverage its experience in storage gained from the development of the Kidston Pumped Storage Hydro Project to achieve its target of 2500MWh of storage by 2025

**2000MWh**

**K2-Hydro**

250MW/8 hour

## Expansion

**BBP**

50MW/2 hour  
BESS

## Leverage our Relationships and financing skill set

- ✓ Powerlink Queensland
- ✓ Tesla
- ✓ Queensland Government
- ✓ ARENA
- ✓ NAIF
- ✓ CEFC

**2500MWh**

## Progress Future Growth

- ✓ BBP 50MW/2 hour BESS
- ✓ 250MW/8 hour Kidston Pumped Storage Hydro Project
- ✓ Additional 1-2 BESS
- ✓ Geographic diversification
- ✓ Strategic partnerships

## Diversified revenue streams

- ✓ Energy offtake
- ✓ FCAS
- ✓ Energy
- ✓ Network services
- ✓ Firming



LOW RISK PROFILE



RAPID EXECUTION



STRONG CASH  
GENERATION



HIGH RETURNING  
PROJECTS

# Genex diversified renewable portfolio

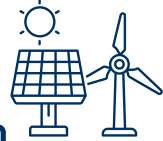




# Investment highlights

## 01

### Diverse renewable energy and storage portfolio



- ✓ 2 operating 50MW solar projects (KS1 & JSP)
- ✓ K2-Hydro funded and in construction
- ✓ Battery and wind projects in advanced stages

## 04

### Revenue stream certainty



- ✓ 85% revenue contracted for 30 years
- ✓ >79% EBITDA margin
- ✓ Minimal sustaining capex
- ✓ Average annual revenue \$82.5m until 2055
- ✓ Utility like nature of cashflow and revenue stream

## 02

### Proven track record of project execution



- ✓ Successfully developed >\$200m worth of projects
- ✓ Secured long term energy contracts providing secure cash flows
- ✓ Developed, financed and built KS1 and JSP on time and on budget

## 05

### 350MW of power generation and storage



- ✓ \$1 billion renewable energy & storage portfolio
- ✓ Average interest rate of 2.96% locked in via long term hedge

## 03

### Strong relationships



- ✓ Tier 1 stakeholders



## 06

### Near term development of pipeline opportunities



- ✓ 200MW of near term development opportunities
  - 50MW Bouldercombe Battery – construction 2022
  - 150MW Kidston Wind – construction 2023

## Contact



**Simon Kidston**

Executive Director

**Tel:** +612 9048 8852

**Email:** [sk@genexpower.com.au](mailto:sk@genexpower.com.au)



**James Harding**

Chief Executive Officer

**Tel:** +612 9048 8855

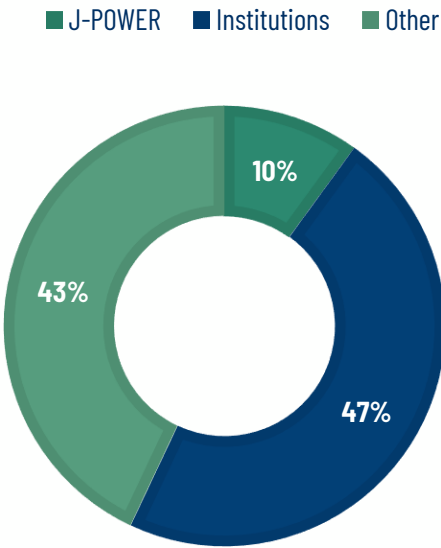
**Email:** [jh@genexpower.com.au](mailto:jh@genexpower.com.au)



# Corporate snapshot

ASX code:	<b>GNX</b>
Shares on issue:	<b>1,069,900K</b>
Market cap (30.09.2021):	<b>\$251M</b>
Cash (30.06.21):	<b>\$45M<sup>1</sup></b>

## SHAREHOLDERS



## Board and Management



**Dr. Ralph Craven**  
Non-Executive Chairman



**Michael Addison**  
Non-Executive Director



**Teresa Dyson**  
Non-Executive Director



**Yongqing Yu**  
Non-Executive Director



**Kenichi Seshimo**  
Non-Executive Director



**Ben Guo**  
Non-Executive Director



**Simon Kidston**  
Executive Director



**James Harding**  
Chief Executive Officer



**Craig Francis**  
Chief Financial Officer



**Arran McGhie**  
Chief Operations Officer



# Our people, communities and the environment



## People, Health and Safety

- Continuation of COVID-19 protocols to ensure our people and communities remain safe
- Commitment to managing risk and driving safety leadership through our organisation and ensuring our contractors implement best practice
- Strong focus on diversity and indigenous engagement within our workforce



## Environment

- Strict focus on minimising disturbance
- Commitment to conserving and protecting the environments we operate in
- K2-Hydro converting disturbed mine site to sustainable energy generation
- 2 million tonnes CO<sub>2</sub> abatement by 2025



## Community

- Focus on job creation in our local communities
- At Jemalong, 151 jobs were created, 68% were local, 22% were women and 11% were Indigenous
- Indigenous Engagement Strategy to promote Indigenous employment and procurement for K2-Hydro
- 800 jobs created at Kidston and along the transmission route



# Disclaimer

This document has been prepared by Genex Power Limited (“Genex” or “Company”) for the purpose of providing a company and technical overview to interested analysts/investors. None of Genex, nor any of its related bodies corporate, their respective directors, partners, employees or advisers or any other person (“Relevant Parties”) makes any representations or warranty to, or takes responsibility for, the accuracy, reliability or completeness of the information contained in this document to the recipient of this document (“Recipient”) and nothing contained in it is or may be relied upon as, a promise or representation, whether as to the past or future.

The information in this document does not purport to be complete nor does it contain all the information that would be required in a disclosure statement or prospectus prepared in accordance with the Corporations Act 2001 (Commonwealth). It should be read in conjunction with Genex’s other periodic releases.

This document is not a recommendation to acquire Genex shares and has been prepared without taking into account the objectives, financial situation or needs of individuals. Before making an investment decision prospective investors should consider the appropriateness of the information having regard to their own objectives, financial situation and needs and seek appropriate advice, including financial, legal and taxation advice appropriate to their jurisdiction. Except to the extent prohibited by law, the Relevant Parties disclaim all liability that may otherwise arise due to any of this information being inaccurate or incomplete. By obtaining this document, the Recipient releases the Relevant Parties from liability to the Recipient for any loss or damage that it may suffer or incur arising directly or indirectly out of or in connection with any use of or reliance on any of this information, whether such liability arises in contract, tort (including negligence) or otherwise.

This document contains certain “forward-looking statements”. The words “forecast”, “estimate”, “like”, “anticipate”, “project”, “opinion”, “should”, “could”, “may”, “target” and other similar expressions are intended to identify forward looking statements. Indications of, and guidance on, future earnings and financial position and performance are also forward-looking statements. You are cautioned not to place undue reliance on forward looking statements. Although due care and attention has been used in the preparation of forward looking statements, such statements, opinions and estimates are based on assumptions and contingencies that are subject to change without notice, as are statements about market and industry trends, which are based on interpretations of current market conditions. Forward looking statements including projections, guidance on future earnings and estimates are provided as a general guide only and should not be relied upon as an indication or guarantee of future performance.

Recipients of the document must make their own independent investigations, consideration and evaluation. By accepting this document, the Recipient agrees that if it proceeds further with its investigations, consideration or evaluation of investing in the Company it will make and rely solely upon its own investigations and inquiries and will not in any way rely upon this document.

This document is not and should not be considered to form any offer or an invitation to acquire Genex shares or any other financial products, and neither this document nor any of its contents will form the basis of any contract or commitment. In particular, this document does not constitute any part of any offer to sell, or the solicitation of an offer to buy, any securities in the United States or to, or for the account or benefit of any “US person” as defined in Regulation S under the US Securities Act of 1993 (“Securities Act”). Genex shares have not been, and will not be, registered under the Securities Act or the securities laws of any state or other jurisdiction of the United States, and may not be offered or sold in the United States or to any US person without being so registered.