FLUENCE
A Siemens and AES Company

EES EUROPE – OCTOBER 2021

Optimising Energy Storage Costs Through Standardization and Lifetime Services

OUR MISSION

Transform the way you power your world to create a more sustainable future.

Fluence is the global leader in grid connected energy storage

Joint Venture of Siemens & The AES Corporation provides proven storage products and services

OUR TRACK RECORD

13+
YEARS

150+
PROJECTS

29
COUNTRIES AND TERRITORIES

7,900+
TOTAL MW STORAGE AND OPTIMISED BIDDING ASSETS

7,600+
GW-HOURS OF DELIVERED SERVICE GLOBALLY

INDUSTRY RECOGNITION

#1
ON GUIDEHOUSE ENERGY STORAGE LEADERBOARD

Guidehouse INSIGHTS

#3
IN ENERGY FAST COMPANY MOST INNOVATIVE COMPANY

FAST COMPANY

OUR CUSTOMERS

SDGE A Sempra Energy utility
aps
AusNet services
BORREGO SOLAR
EDF
ESB
e·on
Gore Street Capital
Mitsubishi Corporation
NEXIF ENERGY
SAN MIGUEL CORPORATION
S·POWER An AES and AIMCo Company
LS POWER Innovation and Investment in Energy
SIEMENS Ingenuity for life
enel
sembcorp
Statkraft
TATA POWER-DDL

We are creating the energy storage market and accelerating grid transformation

2008

1st lithium-ion battery to connect to the electric grid
INDIANA, US

2009

1st commercial grid-scale battery
CHILE

2014

Contracted first 100 MW/400 MWh energy storage peaker
ALAMITOS, CA, US

2015

First grid-scale battery project in Finland
HELSINKI, FINLAND

2017

Build largest energy storage project in the world, for the 5th time
ESCONDIDO, CA, US

2018

Bringing market participants across grid value chain together to max asset value
VIC, AUSTRALIA

2019

Largest portfolio contracted in the region with 500+MW from 20+ projects
SOUTHEAST ASIA

2020

Delivered fastest response time of grid-scale battery
IRELAND

Deploying largest project in the world, capacity peak power, 1200 MWh
CALIFORNIA, US

Industry Firsts

From 2008-2020, the Fluence team designed and delivered the first battery-based energy storage systems in 18 markets

GW-scale success requires new thinking

Are you asking the right questions?

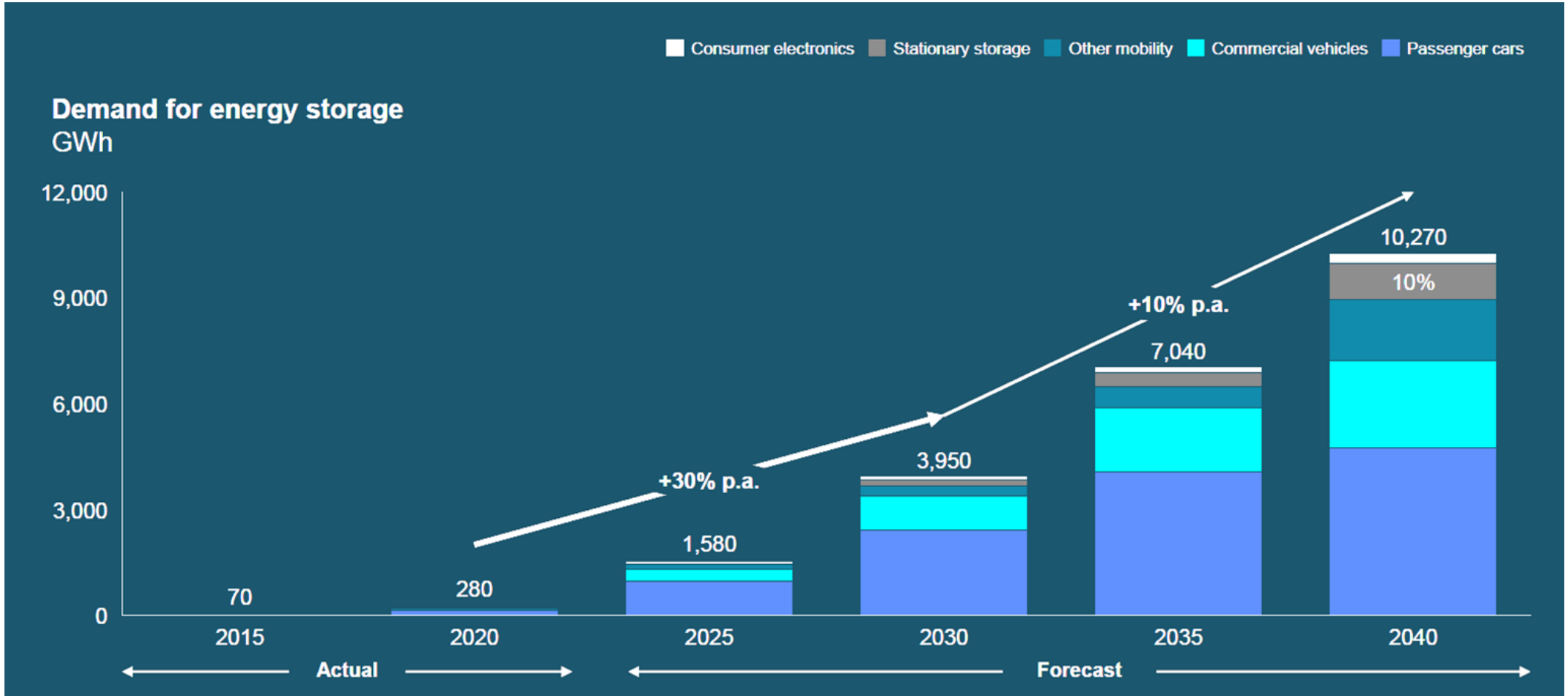
STABILITY
Am I confident my project's bankability?

CAPACITY
Will I be able to access battery supply?

PRODUCT
Is the technology future-proof?

MARKETS
How do I maximize asset revenue?

Mobility applications drive battery demand



Source: McKinsey & Company 2021

How will you access battery capacity in a market prioritizing EVs?

"**Unreliable battery cell supply** is a problem for the industry… **Securing cell supply is also crucial** for energy storage providers to meet their near-term project pipeline. Those who have **access to supply have a competitive advantage**."

"**Only a few large energy storage providers** can command the volume when purchasing batteries. Energy storage providers must have a **sophisticated supply chain strategy** by developing strong supply partnerships, producing a scalable product."

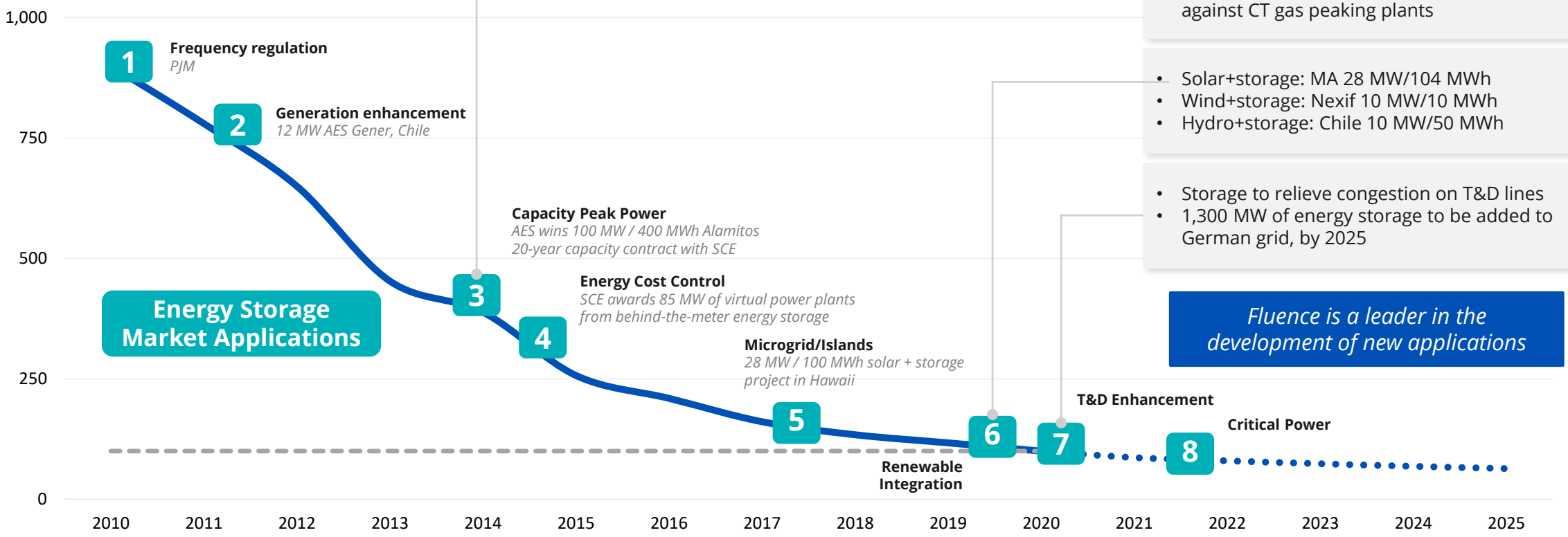
Source: BNEF Energy Storage System Providers 2021 Report

New Applications and Segments are Continuously Commercially Unlocked Due to Lower Pricing and Higher Flexibility Needs

Continued decline in battery prices increases energy storage applications; renewables and T&D are recently "in the money" and poised for massive investment in next five years

Battery Cell Price, 2010-2025 ($/kWh)

Average market view ($/kWh)



- Beginning of energy storage positioning against CT gas peaking plants

- Solar+storage: MA 28 MW/104 MWh
- Wind+storage: Nexif 10 MW/10 MWh
- Hydro+storage: Chile 10 MW/50 MWh

- Storage to relieve congestion on T&D lines
- 1,300 MW of energy storage to be added to German grid, by 2025

Fluence is a leader in the development of new applications

Source: BNEF 2020

One tech stack.

FLUENCE CUBE

Hardware

Configurable, factory-built, standardized form factor delivers safe, scalable, cost-effective systems with the latest storage components

FLUENCE OS

Controls

Fully integrated operations platform combines comprehensive controls and asset management

FLUENCE IQ

Intelligence

Extensible digital intelligence and machine learning to improve system performance

Mass customization.

CUBE

Single physical container

NODE

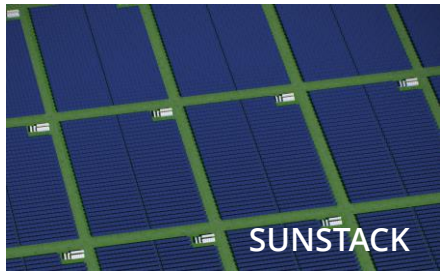
Cube or string of cubes connected to a DC bus

CORE

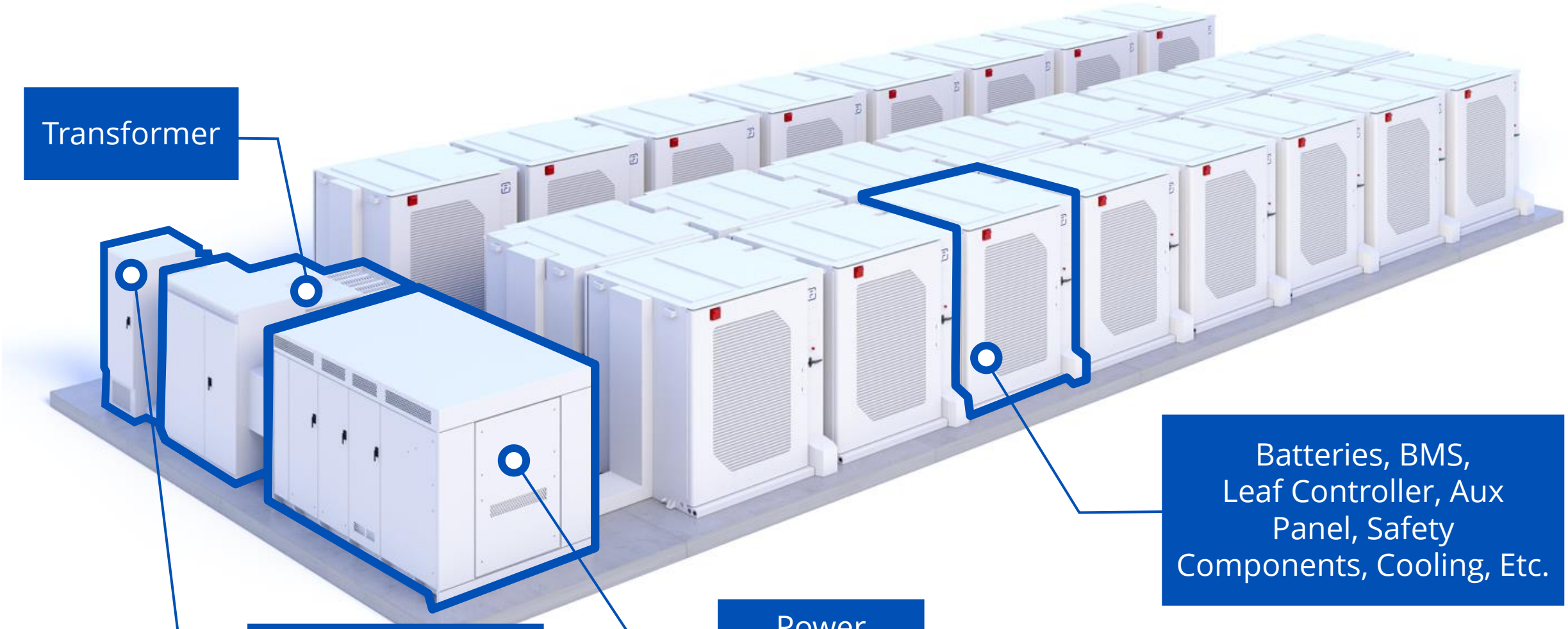
Collection of Nodes connected to a transformer

ARRAY

Collection of Cores connected to an interconnection



Productization and standardization are the foundation for flexibility, embedded safety, rapid delivery and augmentation

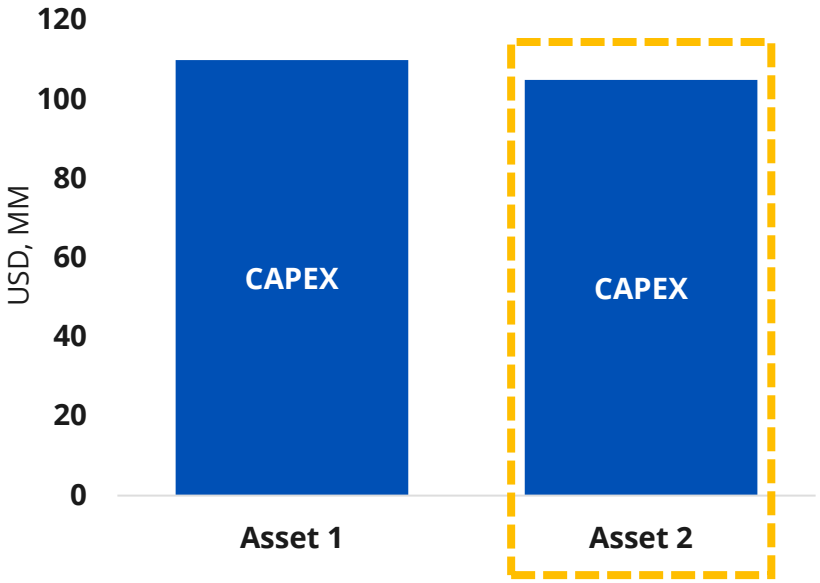


Importance of Total Cost of Ownership (TCO) in Procurement Decisions

Energy storage assets charge / discharge in real-time throughout their lifetime; operating expenses and system performance play a key role in long term cost of ownership

CAPEX Based Procurement

Asset 2 selected based on all-in CAPEX cost (BESS, BOP, land, labor)



Standards for Systems, commissioning, Testing and operation to enable lower TCO

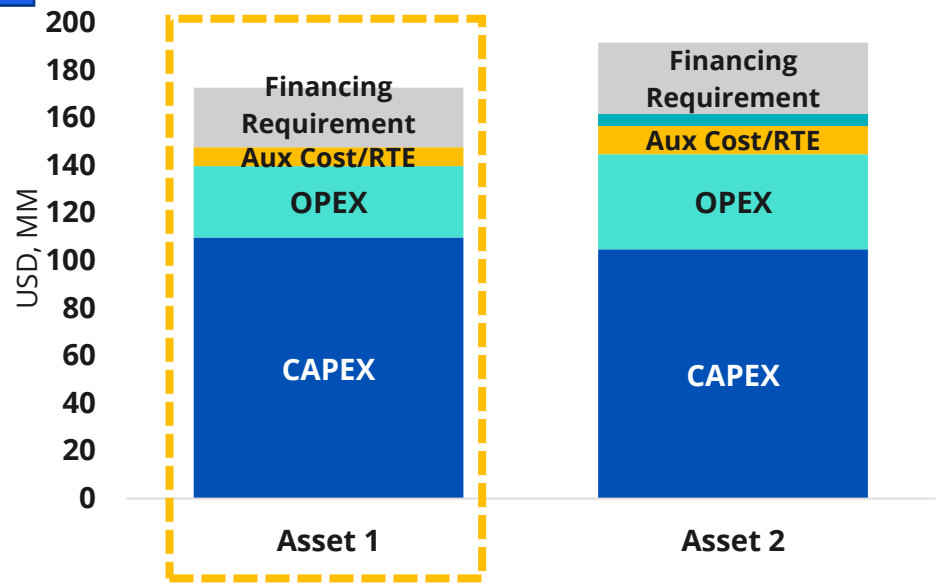
TCO estimated based on cost of capital over full asset life (e.g., 20 years)

Example TCO elements[1]:

- Maintenance
- Warranties
- Capacity Maintenance
- Contingency
- Aux Load cost
- Roundtrip efficiency (RTE)
- Cycling / degradation based on dispatch profile

TCO Based Procurement

Asset 1 selected based on lifetime costs of storage asset (TCO)



CAPEX-only evaluations risk higher lifetime costs;
Advanced energy storage markets are transacting based on TCO evaluations (e.g., U.S., Australia, U.K.)

[1]Examples are a non-exhaustive list of potential factors in TCO that are not captured by CAPEX evaluation

How do you keep 20-year assets updated in a market that changes every 12 months?

Those able to **adapt** will lead the storage industry.

MARKETS

APPLICATIONS

MAINTENANCE

SOFTWARE

Complete services are critical enabling operators to adapt to changing market and technology conditions

Guarantees

Safeguard asset revenue potential over project life with degradation, capacity, and availability guarantees

Warranties

Secure your system with back-to-back OEM equipment warranties and extensive Fluence claims support

Maintenance

Maintain equipment and optimal operating condition with preventative and reactive maintenance

Support

Access 24/7 support backed by the most comprehensive data and experienced team in the industry

Reporting

Understand asset state of health, performance, and risk with monthly system analysis and KPI reporting

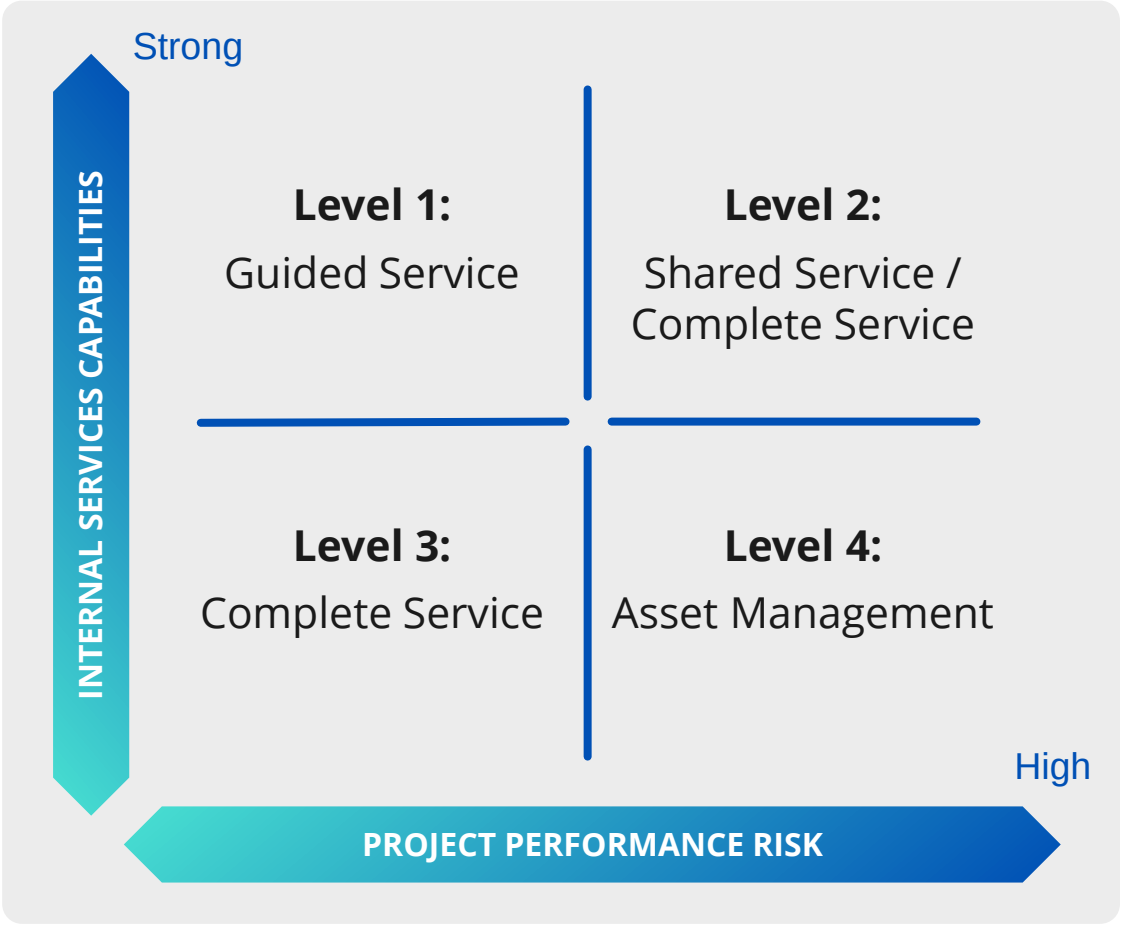
Training

Receive comprehensive training delivered by experienced service reps - included with all storage systems

Ideal service level depends on in-house capabilities and the project's performance risk

What to consider when selecting a services package:

- Do you want to maintain the asset?
- What are your commercial obligations?
- Have you maintained a storage asset?
- What size system are you purchasing?
- Do you need capacity guarantees?
- Do you need an availability guarantee?



Planning ahead through effective augmentation strategies is critical to ensure lifetime project performance

Batteries degrade and lose capacity. Degradation varies depending on technology, application, cycling profile, temperature etc.

Augmentation becomes necessary to maintain the performance characteristics over the project life.

Overbuild at the start of the project → Utility customers looking for guaranteed firm capacity

Adding capacity / modifying throughout the asset's life

- AC-Augmentation
- DC-Augmentation

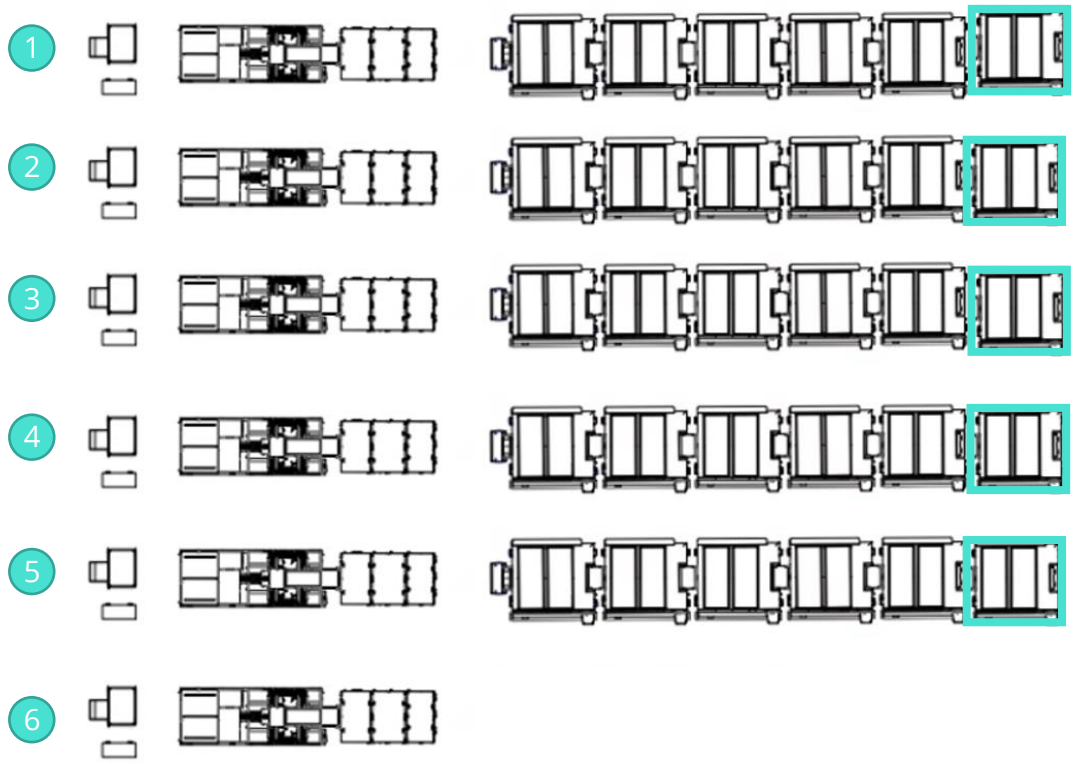
→ Investors / IPPs looking to maximize revenue

Using a practical example to highlight DC-augmentation

Illustrative example

Example 6 core Gridstack SD Cube arrangement of 30 cubes

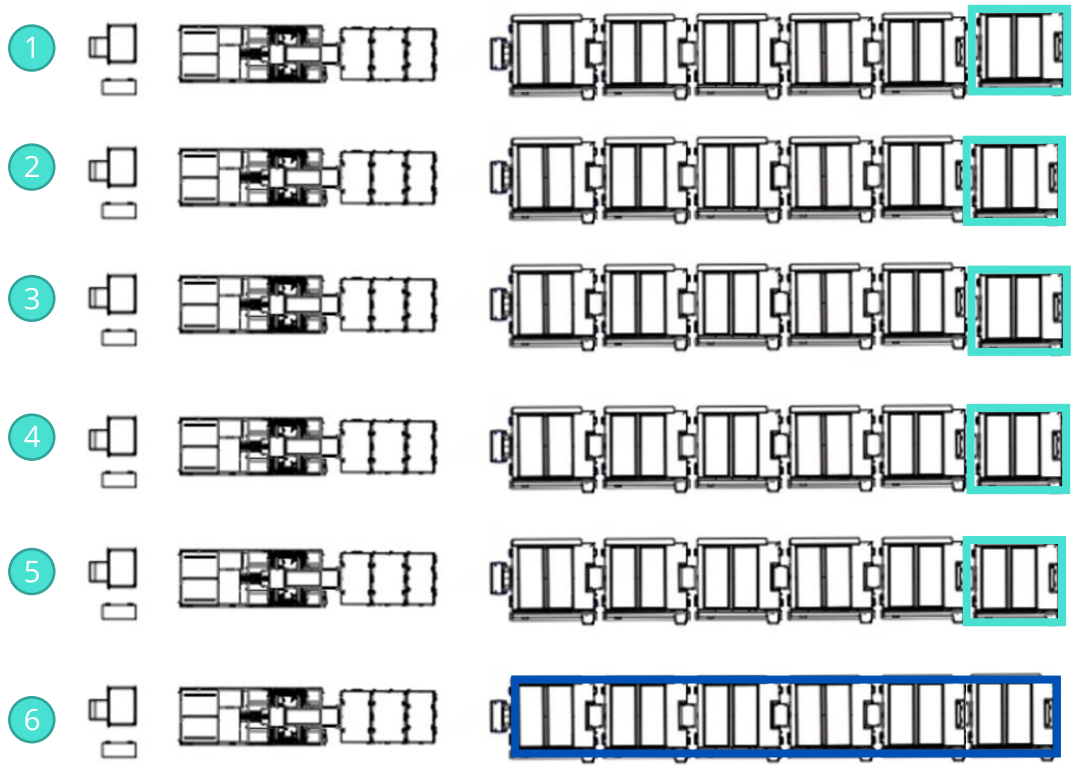
Using a practical example to highlight DC-augmentation



Illustrative example

Step 1: The cubes from core 6 reallocated to similar SOH cubes in core 1-5, freeing up an inverter bay

Using a practical example to highlight DC-augmentation



Illustrative example

Step 2: New cubes with new batteries delivered and installed behind Core 6. Due the agonistic design of the cube and F.OS controls, the new cubes may take advantage of a new or different chemistry.

Conclusions

- GW-scale success requires new thinking in the energy storage industry.
- Unreliable battery supply can be a challenge
- While battery cells cost reduction has drive market deployment the curve is flattening – standardized products create flexibility, embedded safety, rapid delivery and augmentation
- Procurement needs to be done on a lifetime cost basis as BESS realize their value over their lifetime
- Project owners need to assess the ideal service level based on in-house capabilities and the project's performance risk
- Augmentation needs to be carefully planned for – design, technical considerations, software and controls, long-term business case.

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Thank You

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