rluence

A Siemens and AES Company

Infrastructure Investor Hong Kong, November 12, 2019

Transforming the way you power your world.

"After a 100-year Hiatus, Batteries are Helping Again"

Thomas Edison's vision: Many central station power plants and distribution networks utilized battery systems in the 1890s.



... Broadway/42nd Street: 1898

Source: Engineering News, Vol. 30, p 358, Nov. 2, 1893. 2 © Fluence Energy LLC. All Rights Reserved.



Fig. 3 — Load Diagram of 53d St. Station, Edison IIluminating Co., of New York City, Sept. 30. 1893.



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Project Development + Technology



Technology + Sales/Delivery Channel Fluence was formed to be the leading battery energy storage **TECHNOLOGY** company globally

FLUENCE

A Siemens and AES Company



Economic case for Energy storage continues to gain momentum worldwide





2020 Energy Storage Installation (Utility, Commercial & Industrial, and Residential Storage)

12,000 10,578 10,000 7,657 8,000 MW 6,236 6,158 6,000 4,000 2,000 0 Weighted Avg. IHS H1 2019 WM 2019 BNEF 2019

THE WALL STREET JOURNAL. Giant Batteries Supercharge Wind and Solar Plans

Utilities are investing in large units that make it more affordable to store renewable energy and deploy it when needed.



First, energy storage is key to realizing the potential of clean energy

BloombergNEF

The global energy storage market will grow to a cumulative **1,095GW/2,850GWh** by 2040, attracting **\$662 billion** in investment over this period.

Source: BNEF 2019 Global Energy Storage Forecast; IHS H1 2019 Grid Connected Energy Storage Market Tracker; WoodMackenzie Sep 2019;





GW

Global Solar Additions (Additions & Forecast)



Market data continue trending upward, annual storage installations expected to grow 200% to 300% over 5 years

External Market Forecast – Annual Installations Grid, C&I & Residential



Sources: BNEF 2017, 2018 and 2019 Global Energy Storage Forecast; IHS H1 2017, 2018 and 2019 Grid Connected Energy Storage Market Tracker; WoodMackenzie Oct 2018 and Sep 2019;

What drives growth?



Battery production capacity is growing rapidly



What drives growth?

TRANSFORM YOUR NETWORK

TRANSFORM YOUR GENERATION

TRANSFORM YOUR ENERGY USE



Storage as a Peaker: The Beginning

AES Alamitos Long Beach, California, United States 100 MW / 400 MWh

SERVICES

- Capacity, local reliability
- Peak power/off peak mitigation
- Ancillary services

IMPACT

12

- Competitive bid vs thermal peaker, cost effective
- Replaces retired gas units
- Meets flexibility (duck curve)
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Transform your Generation

Energy Storage Value appreciation - Example US: Utilities actively including storage as a resource in integrated resource plans (IRP)

On the ground experience		
	IRP assumption on storage	Notes / Actual projects
aps	400 MW by 2032 (5.3 GW of gas)	400 MWs ES + >400 MWs existing gas in 2019 RFP + plans to replace gas with storage when contract expires in 7 years
DUKE ENERGY. CAROLINAS	200 MW by 2023 300 MW by 2026	
FPL	50 MW by 2020	Announced 407 MW BESS to be sited on solar farm
Ocolorado	275 MW by 2023	Received bids for storage (standalone and w/ renewables) far below expectations
	650 MW by 2021	
	No storage, 456 MWs of new peakers by 2023	RFP for 400+ MWs of storage issued in 2019

Peakers are rarely used: in the U.S. the majority have low capacity utilization, and average run times of less than 8 hours per start

Transform your Generation



Renewables accelerating the needs for peaking capacity globally

Transform your Generation



Rapid energy storage growth reflected in the scale of large, recently <u>announced</u> Solar+Storage and standalone projects

Transform your Generation



Transformative global T&D projects under consideration Transform your Network

Germany



France





Project Ringo "Virtual Power Line"

Raw materials + Battery manufacturing Technology (Solution + Digital) Development + Projects

Investment Opportunities



Thank You

Marek Wolek Vice President, Strategy & Partnerships, Fluence marek.wolek@fluenceenergy.com