rluence

A Siemens and AES Company

Applications and best practices of Energy Storage systems to advance energy transition and economic growth

24th National Energy Conference "Energy and Development 2019" Athens 21/11/19

Transforming the way you power your world.

Market trend #1: Decarbonization & RES



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Source. DNV ENERGY TRANSITION OUTLOOK 2018 A global and regional forecast to 2050

Market trend #2: Techno-Economical evolution

Transitions driven by technology



9 Energy and Mobility Transitions, San Francisco, February 4, 2019

BloombergNEF

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ELUENCE **A Siemens and AES Company**

> A 100% dedicated energy storage technology & services provider backed by two industry powerhouses



Fluence is the global leader in grid connected energy storage Joint Venture of Siemens & The AES Corporation delivers complete, proven storage systems



Microgrids & Islands

ENEL

Isle of Ventotene, Italy 0.5 MW / 0.6 MWh

- Complex control developments for stable operation with existing gensets.
- 15% fuel savings demonstration on islanded grids.
- ~55% reduction in genset operating hours.
- Enable further integration of renewables.





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Renewable Integration

EDPR

Romania, Wind Farm 1.4 MW / 1 MWh

Services:

 Output Stabilization & Peak Shaving

Impact:

- Reduction of forecast errors
- Reactive power compensation
- Grid code compliance



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Frequency Regulation and Generation Enhancement

AES Andres Santo Domingo, Dominican Republic 10 MW / 10 MWh

SERVICES

Frequency Regulation/Control

- Alternative to generators
- Supports grid resiliency during storm conditions



Frequency Regulation and Generation Enhancement

AES Los Mina DPP Santo Domingo, Dominican Republic 10 MW / 10 MWh



SERVICES

Frequency Regulation/Control

- Alternative to generators
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Andres Power and Frequency – Hurricane Irma

System charged and discharged at maximum capacity (10MW) during the storm





August 31, 2017 (One week prior to Hurricane Irma)

September 7, 2017 (during Hurricane Irma)

Transmission/Trading Enhancement

AusNet / Energy Australia Ballarat, VIC, Australia 30 MW / 30 MWh

SERVICES

- Local capacity
- Peak/off-peak management
- FCAS/Ancillary Services

- Competitive selection
- Maximizes transmission
- Strengthens network



Transmission & Distribution Enhancement

Arizona Public Service (APS) Punkin Center, Arizona, United States 2 MW / 8MWh

SERVICES

- Transmission upgrade deferral
- Peak management

IMPACT

• Power reliability at half the cost of a transmission line



Transmission & Distribution Enhancement

Transmission vs Storage - Lumpiness of Investment

20-year cost of solution (NPV\$, MM)



Transmission project development costs start occurring 3-5 years before project is put into service. These costs are not highlighted separately here, but rather considered part of total capex.

Flexible Peaking Power

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

SERVICES

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

- Competitive bid vs thermal peaker, cost effective
- Replaces environmental retired units
- Meets flexibility (duck curve)



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FLUENCE A Siemens and AES Company

Thank you

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