



Advancion[®]
Energy Storage

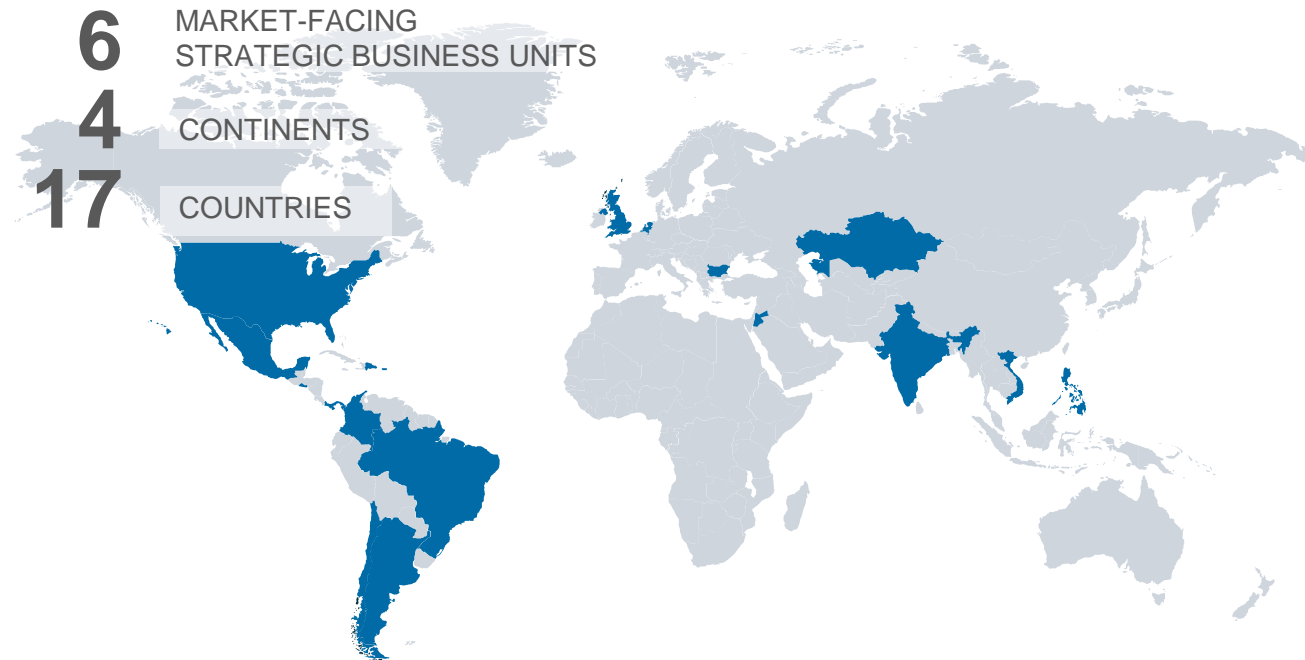
AES Energy Storage

DOE EAC Panel: Storage Market Environment
June 2, 2016



About the AES Corporation

Mission: Improving lives by providing safe, reliable and sustainable energy solutions in every market we serve



AES Serves
10M
CUSTOMERS



8
UTILITY
COMPANIES



21,000
GLOBAL
WORKFORCE

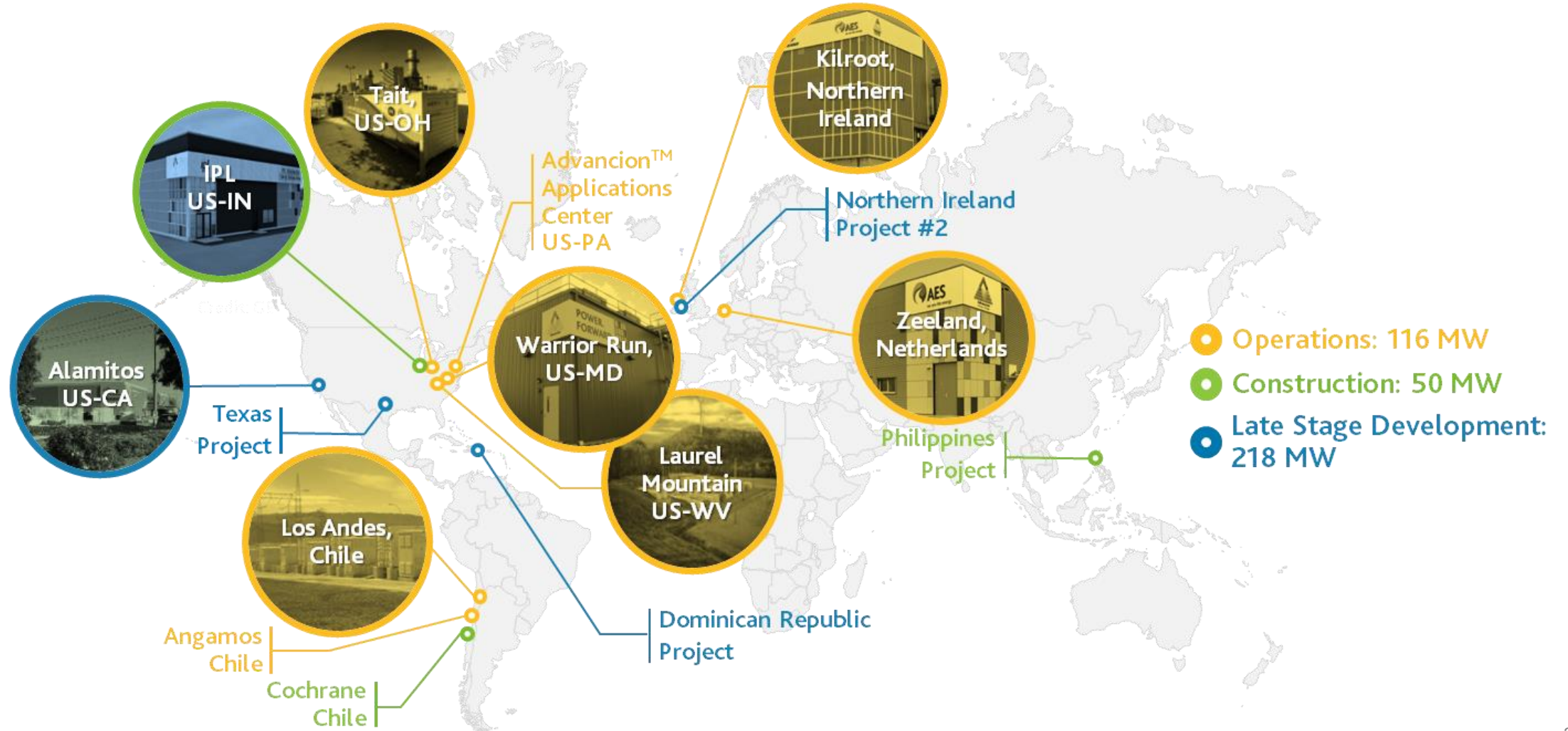
\$37B
TOTAL ASSETS
OWNED & MANAGED

\$15B
TOTAL 2015
REVENUES

36,000 MW
GENERATION CAPACITY

AES operates the world's largest fleet of battery-based energy storage arrays.

More than 8 years of commercial operating experience



Energy storage is a viable alternative to peaking power plants.

Storage competitively contracted for local capacity in California; cost effective

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

Impact

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

100 MW Alamitos Energy Center
Long Beach, California



Energy storage is a proven solution for multiple applications.

Enhancing grid efficiency and reliability



- ① Capacity Release
- ② Frequency regulation/Ancillary Services
- ③ Flexible Peaking



- Credit: GE
- ⑤ Capacity release
 - ⑥ Investment deferral, replacement



- ⑦ Demand-charge management & Reliability



DOE is positioned to provide analysis of energy storage benefits to grid planners and regulators faced with big challenges.

Challenges

- Replacing generation retiring from age, once-through cooling, air emissions.
- Meeting peak demand with capacity that is flexible enough to manage variability.
 - ▶ Utilities in the SW U.S. alone have ~10,000 MW of gas peakers planned for the next decade.
- Transmission expansion to bring large-scale renewable generation to load.
- Grid modernization initiatives.
- Gas infrastructure challenges.

Energy storage benefits:

- Reduced capacity and infrastructure costs
- Reduced fuel and O&M costs
- Reduced air emissions
- Improved reliability
- Improved asset utilization

DOE/labs are capable of good ES analysis.

- Apply it to real and relevant challenges.
- Publish more and more frequently (vs demos).

DOE analysis of energy storage benefits: Seek real and relevant challenges; publish more frequently.

