

# Grid-Tied Disruptive Technologies

## Mobile and Stationary Sources

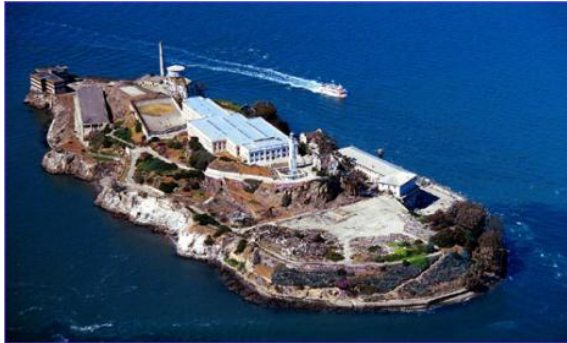
CSG State Legislator Workshop, May 11<sup>th</sup>, 2018

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# Why Now?



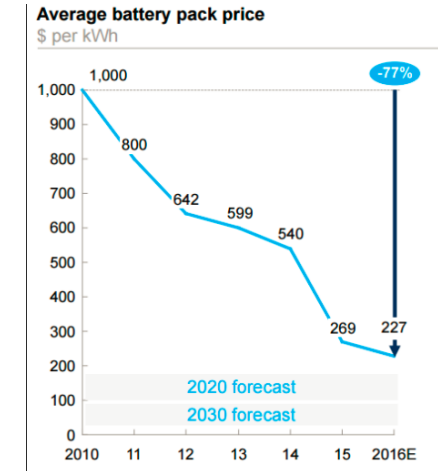
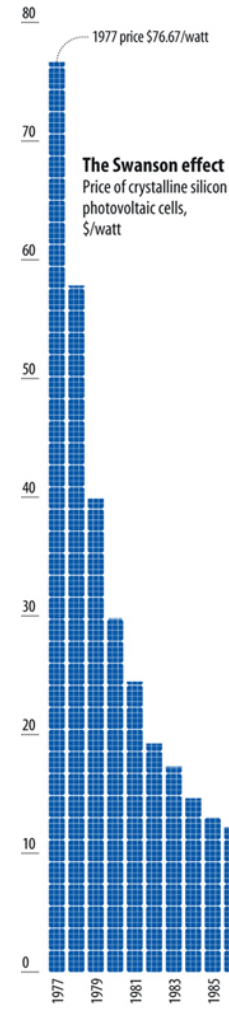
**Alcatraz Island, San Francisco Bay**  
 Electricity Cost (2010): \$0.76/kWh  
 Electricity Cost (2011): ~\$0.71/kWh

**60 – 80% emissions reductions**



**Cuttyhunk Island (Massachusetts)**  
 Electricity Cost: **\$0.25/kWh**  
 2017

Photo courtesy Princeton Power Systems, Inc.



**Alcatraz \$4/W**

**Cuttyhunk \$0.50/W**

Source: Bloomberg, New Energy Finance

# Challenges & Opportunities

- Increased grid reliability, resiliency, local backup
- Efficiency improvements
- Renewables Integration
- Demand Management
  
- Lower utility energy revenue
- Direct benefits accrue to the wealthy
- Increased burden on fewer and lower-income customers to support the Grid



Electric Vehicles?

# “Second Uses” for Car Batteries



~2-days Home backup in NJ

- Vehicle-to-grid Services – “V2G”
- Used Car Batteries in Stationary Applications – “2<sup>nd</sup>-life”



## First 3-months of 2018 EV Sales

- 55,267 vehicles (31% higher than 2017)
- 4 to 16 Million cars by 2028?
  - 128 to 834 GWh's of storage

## Start planning for:

- Widespread home car charging
- Inexpensive grid-tied batteries

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Mobile and Stationary Sources

## Q & A?

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