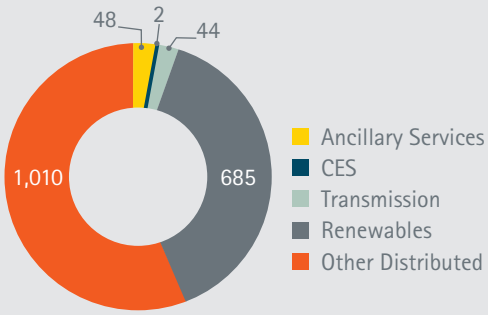
Copper's Role in Grid Energy Storage Applications

Copper Development Association Inc.
Copper Alliance

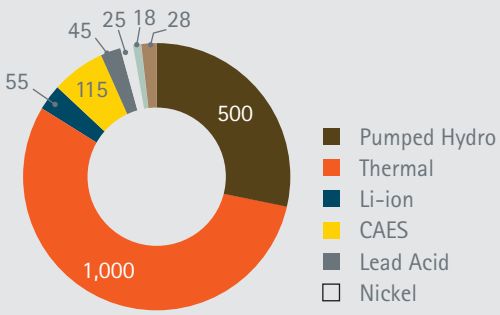
The market for energy storage in the U.S. is robust and rapidly changing, with strong governmental and venture capital investments, successful demonstration projects and recent technological advancements all contributing to future growth.

Currently, the majority of the energy storage market is in:

Mature Technologies



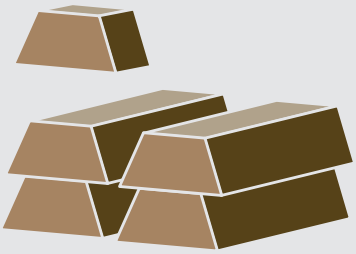
Newer Technologies



Estimated Current Installed Capacity (MW)

- Thermal energy storage
- Pumped hydro power
- Compressed air energy storage (CAES)
- Distributed applications
- Integration of renewables – wind and solar PVs

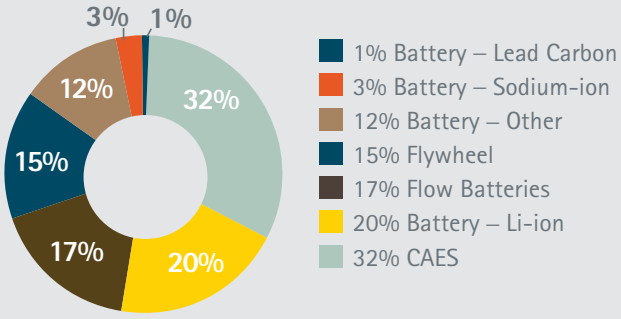
0.3 to 4 tons per MW



The range of copper content found in storage installations.

= 1 ton of copper

DOE Smart Grid Demonstration Grant

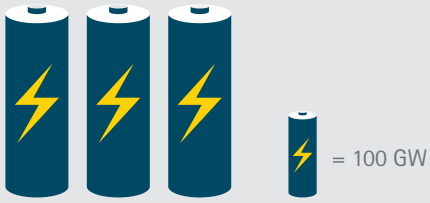


$772 million

Amount invested by the federal government through the grant program with an associated MW of 537.3.

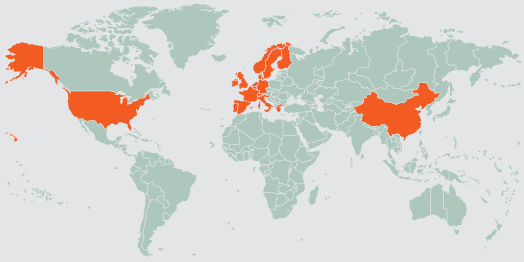
The amount forecasted by industry analysts that will be invested in grid storage applications in the U.S. through 2020.

300 gigawatts (GW)



The estimated global opportunity for energy storage over the next 10 to 20 years, valued between **$200 and $600 billion**.

United States, Western Europe and China represent the largest markets for energy storage.



Copper. Essential to Sustainable Energy.

Copper's durability, efficiency, reliability, superior conductivity and safety play key roles in the batteries, wiring, and motors used by these devices. Lithium-ion, flow and sodium batteries as well as flywheels, CAES, and pumped hydropower are strong users of copper at the unit level, and certain pieces of electrical equipment and supporting infrastructure—such as transformers, generators, inverters, cooling systems, other motors and wiring—also rely on the metal.

Sources: Market Evaluation for Energy Storage in the United States, KEMA, Inc., January 2012.