Li ion Storage for Decarbonization of the Industrial Sector

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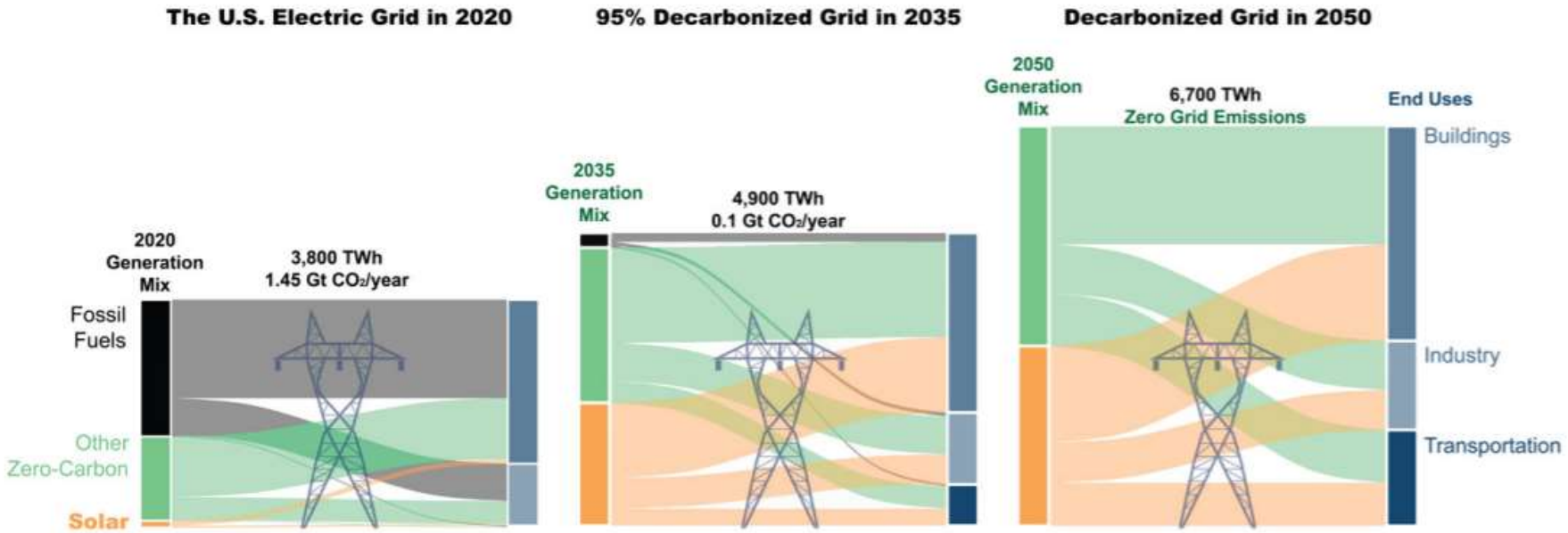
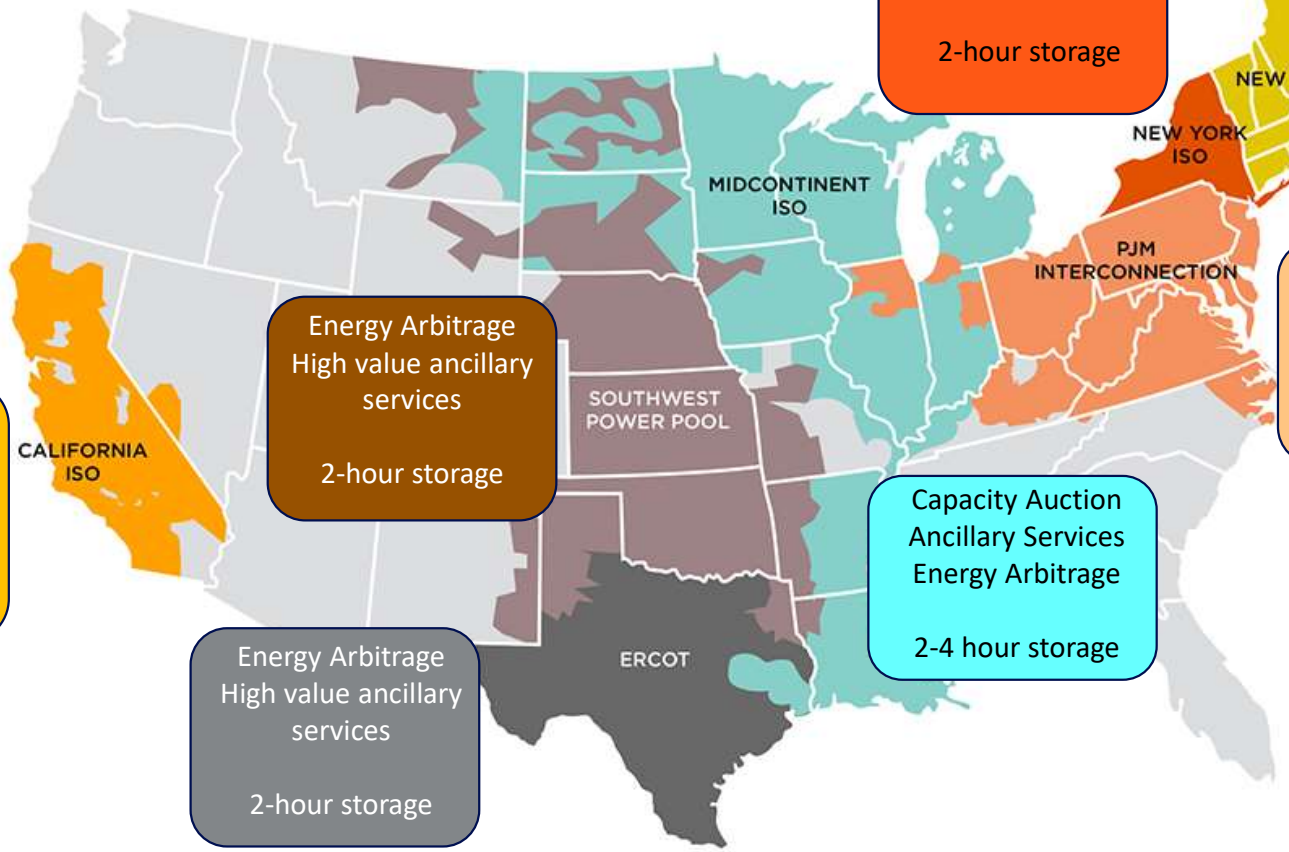
Storage contributes to Industrial Decarbonization by Facilitating Higher Levels of Renewables Penetration on the Grid



Grid mixes and energy flows in 2020, 2035, and 2050, as envisioned in the Solar Futures Study. Newly electrified loads from buildings, transportation, and industrial sectors mean that the electric grid will deliver more energy in 2035 and 2050. This energy will come almost entirely from solar and other zero-carbon sources.

Source: DOE Solar Future Studies Fact Sheet

Existing Market Mechanisms for Storage



Capacity Auction
Ancillary Services
Energy Arbitrage

2-hour storage

Capacity Auction
Ancillary Services
Energy Arbitrage

2-4 hour storage

Capacity Auction
Energy Arbitrage
Ancillary Services

4-hour storage

Bilateral capacity market
Energy Arbitrage
Ancillary Services

4 hour storage

Energy Arbitrage
High value ancillary services

2-hour storage

Capacity Auction
Ancillary Services
Energy Arbitrage

2-4 hour storage

Energy Arbitrage
High value ancillary services

2-hour storage

EDF renewables

Policy and regulatory drivers boost value of storage

Proposed federal storage ITC (pending)

NYSERDA 3GW Target

Capacity Auction
Ancillary Services
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2-hour storage

Capacity Auction
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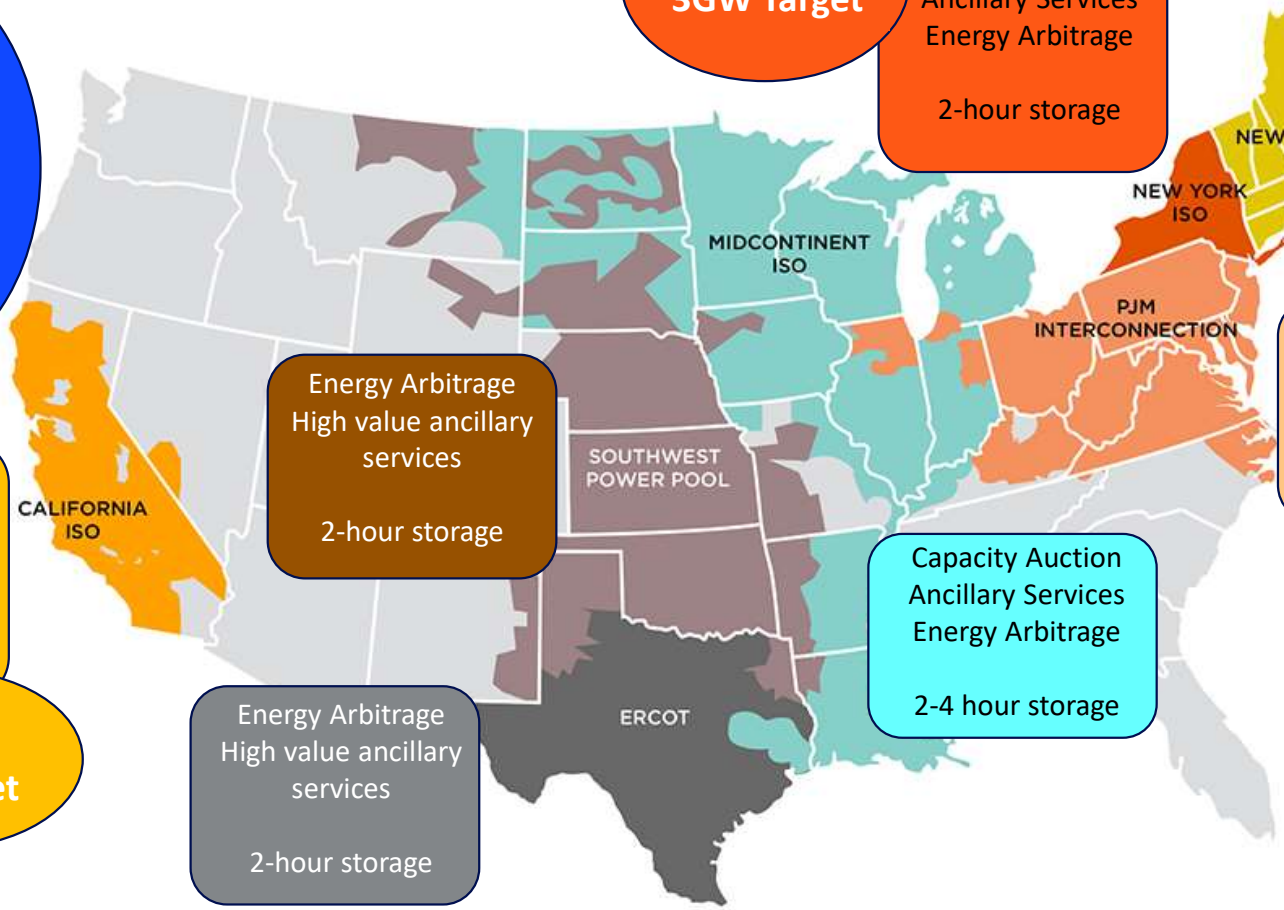
Energy Arbitrage

2-4 hour storage



Capacity Auction
Energy Arbitrage
Ancillary Services

4-hour storage

Energy Arbitrage
High value ancillary services

2-hour storage

Bilateral capacity market
Energy Arbitrage
Ancillary Services

4 hour storage

Capacity Auction
Ancillary Services
Energy Arbitrage

2-4 hour storage

SB100, LDS Target

Energy Arbitrage
High value ancillary services

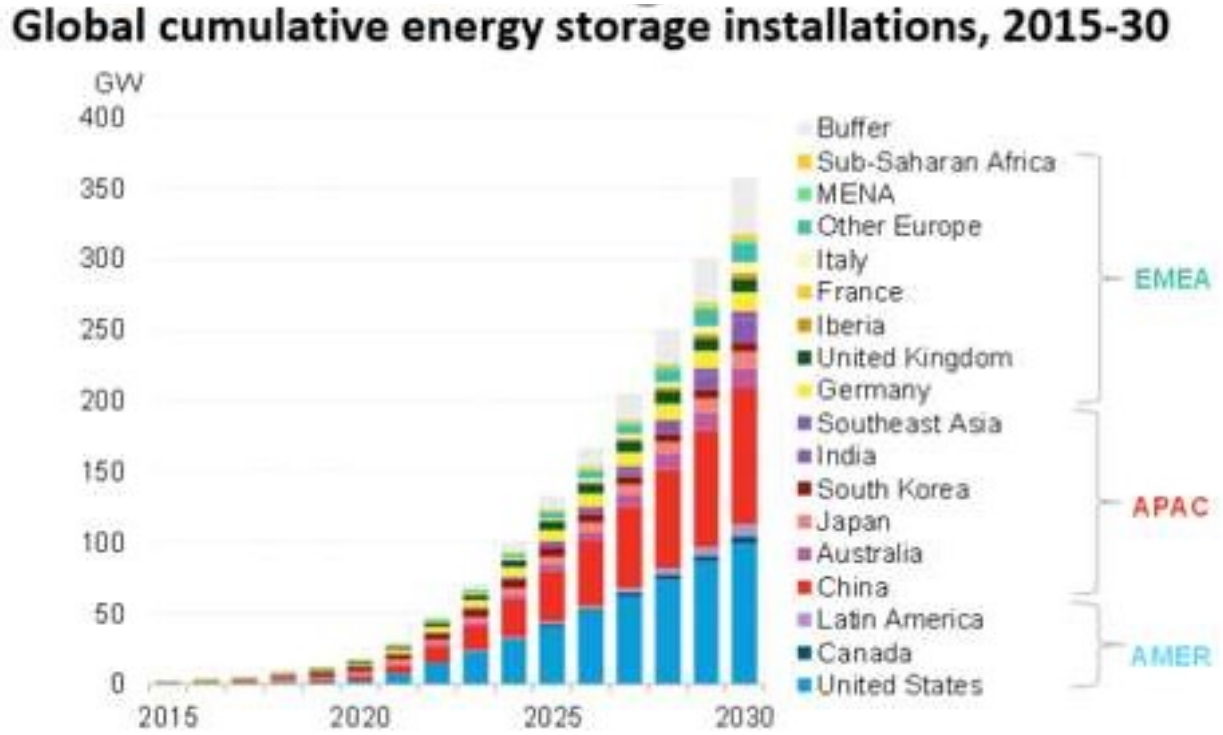
2-hour storage

EDF renewables

Recent Li Ion Battery cost increases

Lithium Carbonate	Lithium prices increased ~4-5x in 2021 and continue to rise in 2022. Cost increases affect battery cathode and electrolyte
Lithium Supply	New Li mines take years to come online and will lag demand
Commodities	Other commodities (Al, Cu, etc) also increasing in 2021
Transportation	Transportation costs are up ~5x
Exchange Rate	US Dollar is weak compared to RMB

Demand for Li continues to grow



Source: Bloomberg NEF

US and China dominate growth through 2030

However, projections indicate stationary storage will remain about **10% of total Li battery market share**

Li cost increases may **disproportionately affect the stationary market…**potentially **accelerating adoption** of alternate storage technologies