

Batteries: Difficult but Essential for Clean Tech

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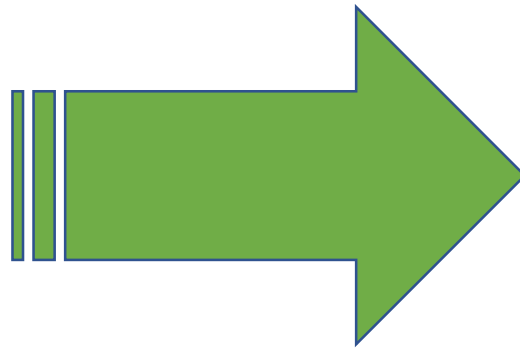
EVs – 2000 and Today



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It's not all cars

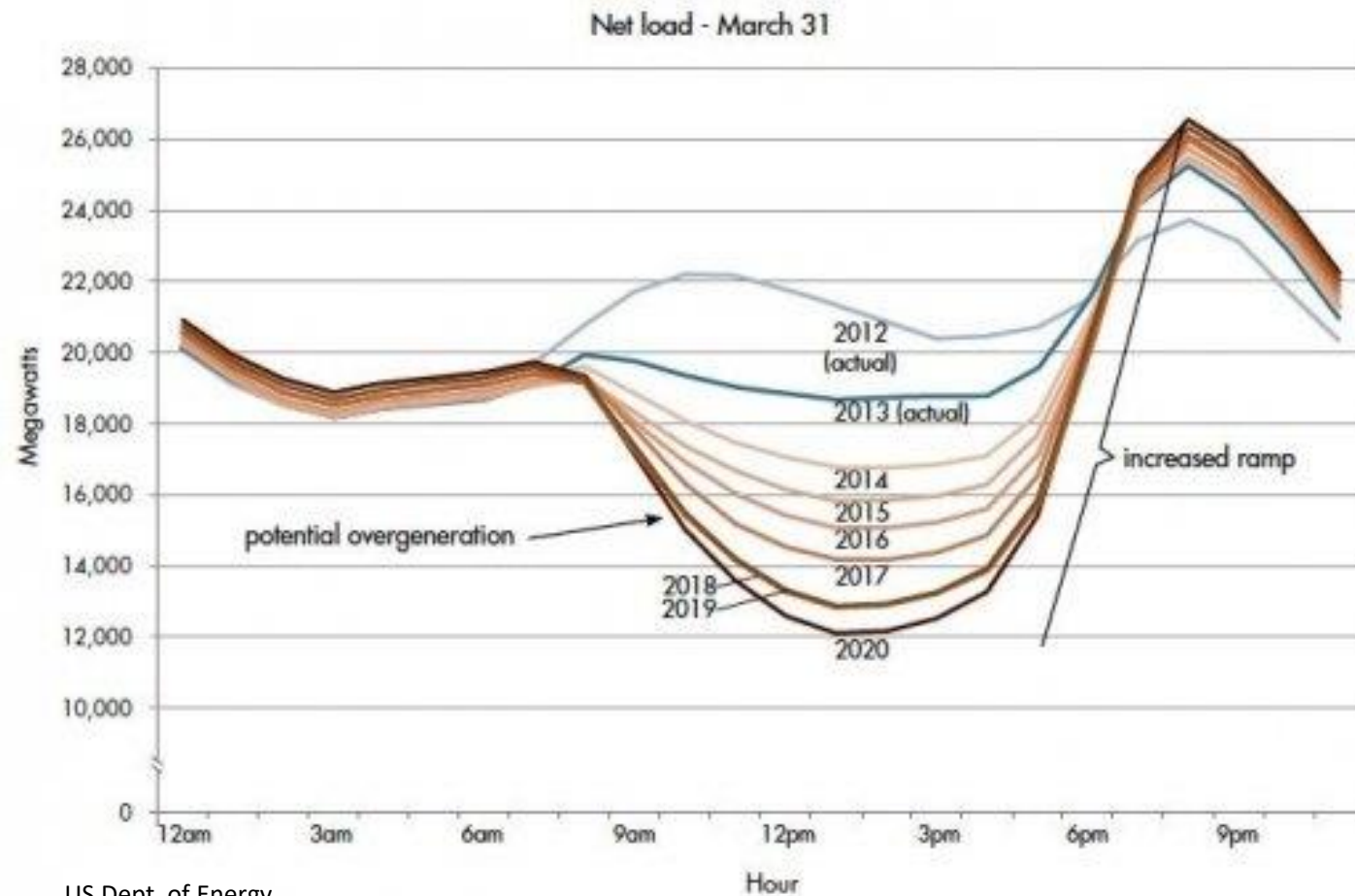


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An issue with renewable energy in California



Ever new promises of new tech

How a blue dye found in wastewater could power batteries

Methylene blue is dye, poison, medication

The Verge September 6, 2018

Fireproof Lithium-Ion Batteries That Harden When Hit

Liquid electrolyte that solidifies on impact could keep batteries from shorting and catching fire

IEEE Spectrum August 22, 2018

VCs Continue Investing in Batteries: Sila Nano Gets \$70M for Silicon Anode Tech

Sila claims it can increase lithium-ion battery capacity by up to 40 percent.

Greentech Media August 20, 2018

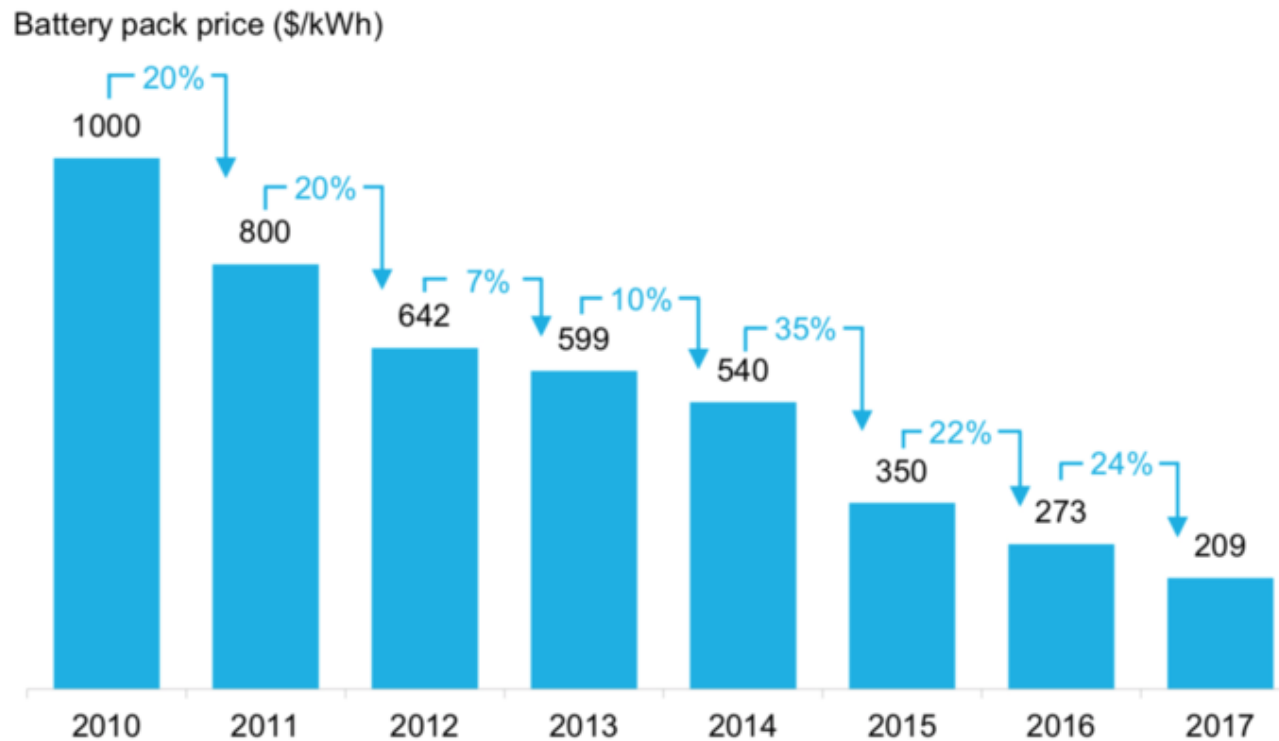
Stanford researchers have developed a water-based battery to store solar and wind energy

Stanford scientists have developed a manganese-hydrogen battery that could fill a missing piece in the nation's energy puzzle by storing wind and solar energy for when it is needed, lessening the need to burn carbon-emitting fossil fuels.

Stanford News April 30, 2018

What is driving the market now

Figure 11: BNEF lithium-ion battery price survey results – volume-weighted average



Source: Bloomberg New Energy Finance. Note: Prices are a weighted average for BEV and PHEV and energy storage and include both cells and packs. As of 2017, cell prices were around \$147/kWh.