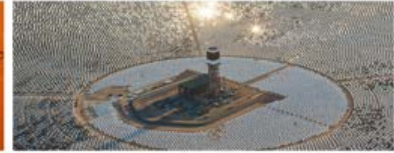


DOCKETED	
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Description:	*** THIS DOCUMENT SUPERSEDES TN 229538-13 *** - Presentation by Brian Gerke, Lawrence Berkeley National Laboratory
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Key points from the CA DR Potential Study Phase 3: The Potential for Shift Demand Response

Brian Gerke, Lawrence Berkeley National Laboratory

**2019 IEPR Joint Agency Workshop on Buildings Policy:
Energy Efficiency, Decarbonization and Load Flexibility**

August 27, 2019

The future is now for the duck curve

The case for Shift demand response in California

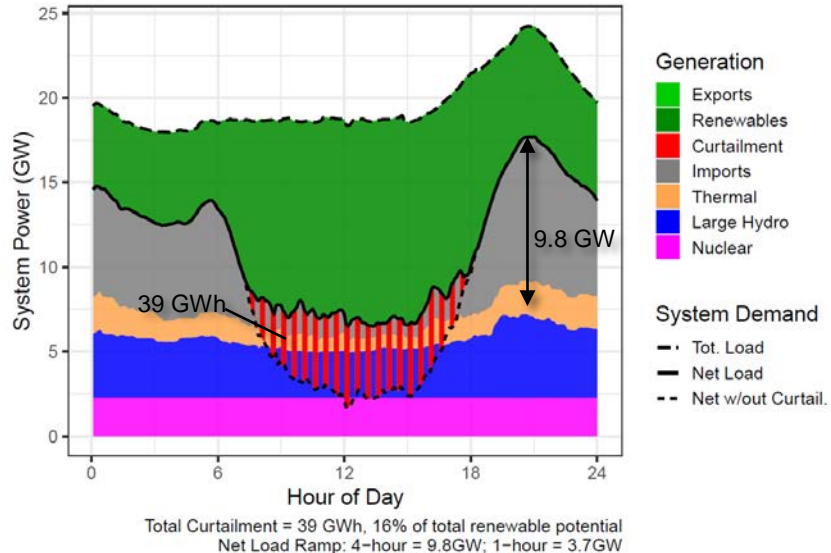
WHY do we need **Shift**?

- To alleviate curtailment of renewables.
 - Curtailment in May 2019 alone represents ~\$11M in value.*
- To ease ramping rates and flatten demand peaks.
 - Day-ahead prices spiked to near \$1000/MWh at times in 2018.**

WHEN do we need **Shift**?

- **Shift** can potentially ease ramping rates every day.
- Typical need is to shift **away** from evening or morning peaks & **toward** mid-day or overnight.
 - Typically two opportunities to shift each day—sunrise and sunset.

CAISO Generation and Demand
May 27 2019

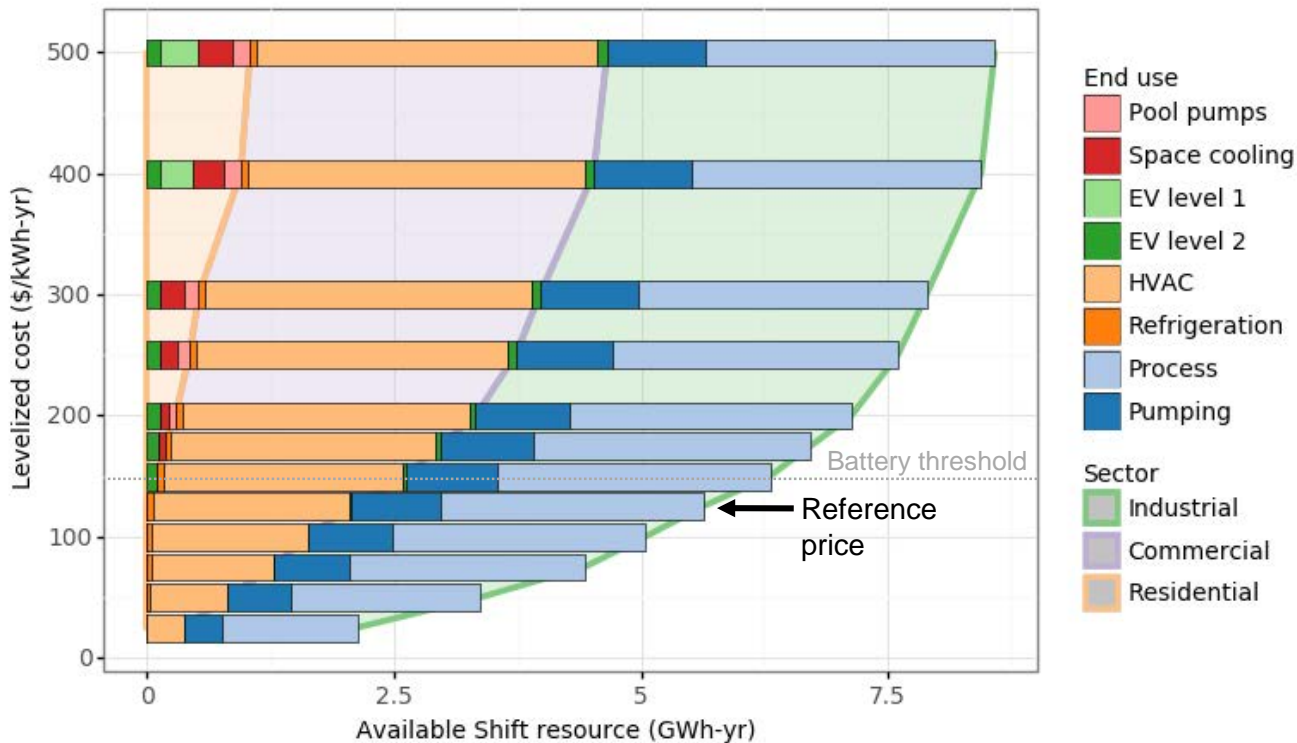


*Based on approx \$40/MWh LCOE for new solar build in 2023 https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf
**Compare to typical peak prices around \$70/MWh (<http://www.caiso.com/Documents/2017AnnualReportonMarketIssuesandPerformance.pdf>)

Source: CAISO

Modeling a supply curve for Shift DR in 2030

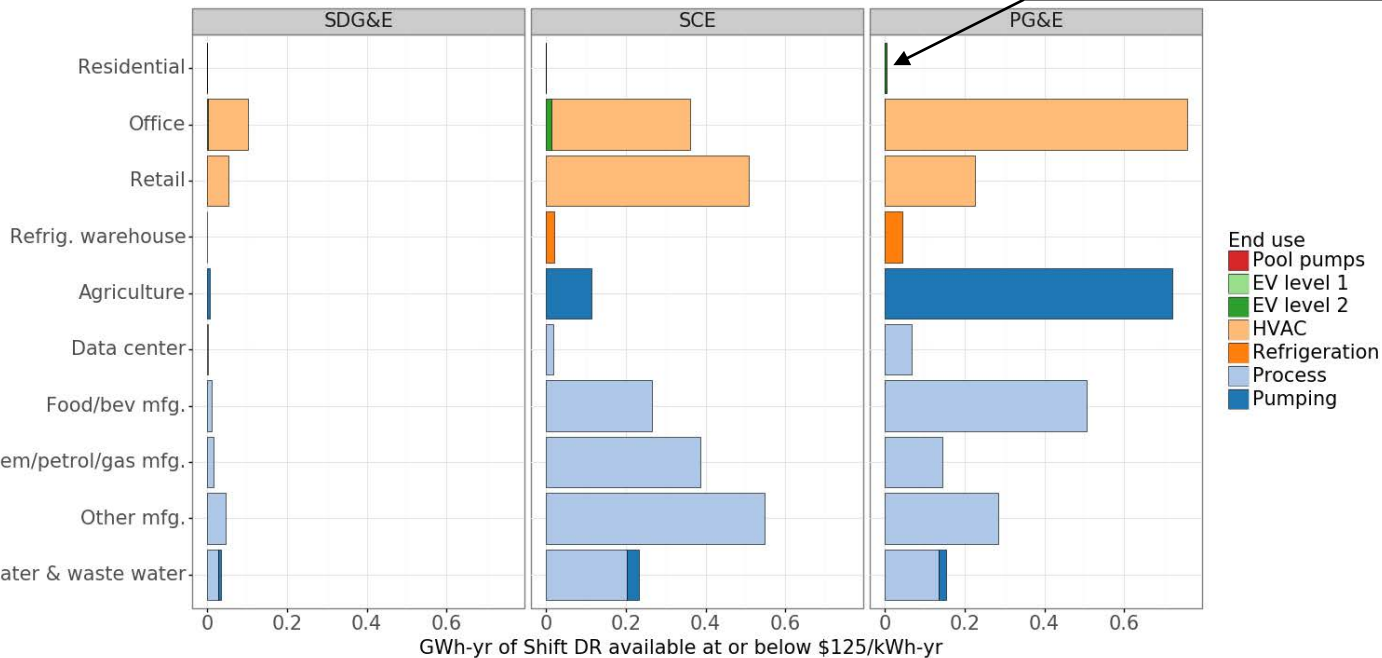
Shift resource by sector and end use



Shift resource by utility, building type, and end use

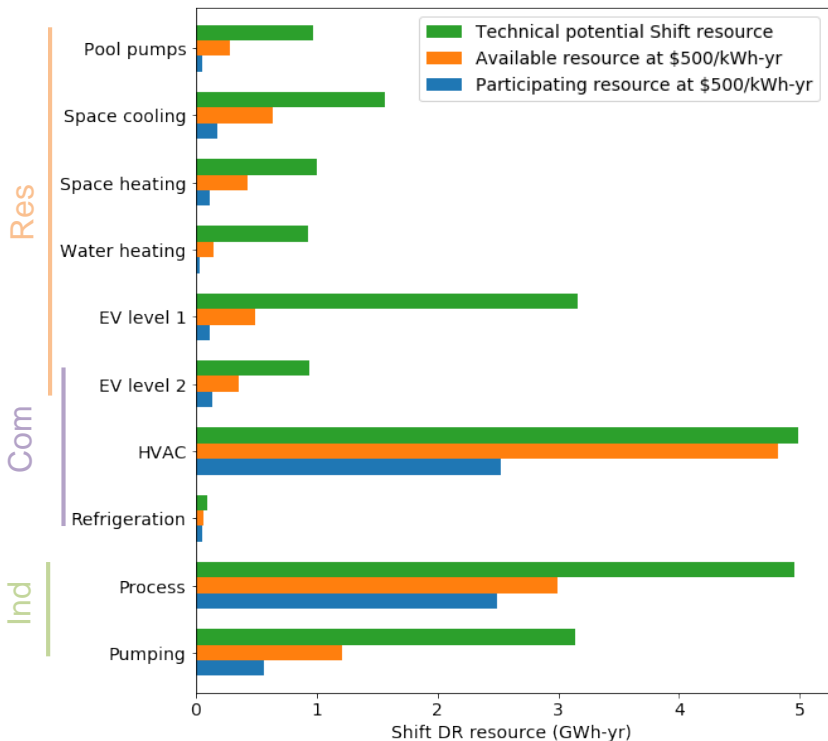
For technologies that are less expensive than batteries

Limited res. potential in baseline scenario



Participating, available and total Shift potential

The importance of costs and customer participation rates



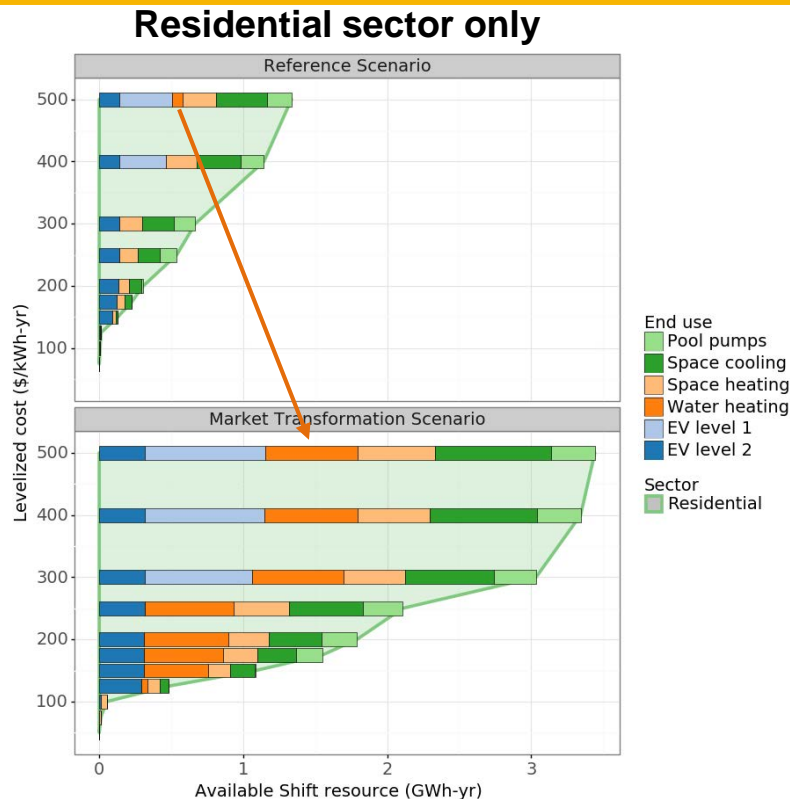
Technology costs and performance levels constrain how much of the technical potential can be made accessible. Bringing down costs can increase the available resource.

Analysis includes a customer participation model based on historical participation rates, which sharply limits residential participation. New customer engagement models may help.

Imagining a transformed market for Shift

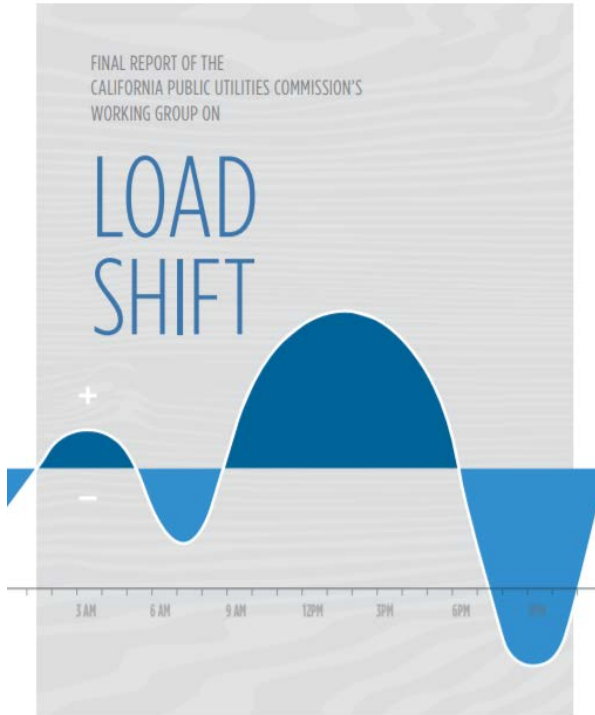
Electrification, lower costs, and higher participation

- Electrification scenario: Heat pump space and water heating reach ~30% penetration by 2030, on the way to meeting California's carbon neutrality mandate.
- We also modeled a market-transformation scenario with large (3x-10x) reductions in cost and increases in customer participation.
- Dramatic increases in the available Shift resource are possible, especially for new electrification loads



Pathways to Shift as a resource

Diverse pilot options to try soon



- **CPUC's Load Shift Working Group Identified 6 new pilot concepts** with diverse levels of market integration, granularity, organizational roles & customer class targets.
- Data from pilots would provide essential new data to chart a course for Shift through modeling and program development

Read more at: <https://gridworks.org/initiatives/initiatives-archive/load-shift-working-group/>