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Flexible Demand: A Critical Element of Future Electricity Systems

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Opinions expressed are my own and do not reflect official views of CAISO or UC Berkeley

Last Time I Was "Here"

- January 2020 workshop on implementing dynamic pricing
- I made a pitch for getting prices "right", so that they reflect the true level and variation in society's cost of providing incremental energy
- But getting prices right only helps if customers can respond to the signal they send

Why the Price Signal is Becoming More Important Every Year

- Great news is that renewable energy has dropped in cost massively and competes with fossil fuel on levelized cost basis.
- Bad news is that levelized cost is only part of the equation. Doesn't get electricity to the hours it is wanted.
- We must either move supply to when it is demanded or move demand to when it is supplied.
  - Or Both!!!

We can do this without flexible demand, but why would we?

- Storage probably won't be free, or super cheap, anytime soon
- Trading electricity with other areas will help, but will remain limited
- Low-carbon dispatchable electricity is not likely to be a cost-effective solution in the near future
- Some demand can flex at little or no cost

Old-fashioned Demand Flexibility

- Interruptible load
- Interruptible appliance use – A/C cycling

- The unfortunate history of thinking of demand interruption as Value of Lost Load
  - There are lots of loads with massively different values
- The key is to reduce the lowest value demand when the cost of incremental electricity rises
  - That requires good signals of cost
  - And technologies/structures that allow consumers to efficiently respond to those signals

Flexible Demand Technologies

- Key to a central role of demand in smoothly and efficiently balancing a high-renewables system
  - Improve grid resiliency
  - Reduce cost of a low-GHG supply
  - Reduce reliance on expensive storage and transmission infrastructure
- And allow smart implementation of demand participation
  - Replace the need for disruptive large demand adjustments from a small number of customers with massively distributed small adjustments

The Chicken-and-Egg Problem in Demand-side Participation

- Chicken-and-Egg

  => Pricing-and-Response Technology

- How do we get from here to there? Quickly?

- Very much looking forward to finding out today

Thanks!

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