Dispatching 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

Demand flexibility has growing value with increased intermittent generation, but how should it participate in the market?

- Voluntary reductions when asked?
- Dynamic pricing?
- "Dispatchable" demand resources?
- Forward quantity contracts with charges or rewards for deviation?

- And in which markets should demand participate? Retail? Wholesale? Both?

Is demand just negative supply?

- Demand starts from a "requirements contract", right to buy all desired at predetermined price
  - Price differs from marginal cost of supply
    - In California, price on average is more than double marginal supply cost for residential customers not on low-income program
    - In nearly all markets, at super-peak times marginal price to customer is well below marginal cost
- Resulting need to set a baseline quantity for measuring demand reduction raises both *moral hazard* and *adverse selection* issues
- Highly unusual arrangement in markets, with exception of forward contracts and adjustments for deviations

Why isn't dynamic retail pricing the full answer to demand participation?

- Demand responding to dynamic pricing isn't "dispatchable"
  - Can't be treated as a "resource"
  - Electricity is different, need to balance supply and demand every minute
- But by organizing demand participation as payment for reduction from a baseline formed under a requirements contract, how much are we exacerbating the problem we are trying to solve?
  - How much less dispatchability would we need if we started with flatter load profiles from dynamic pricing?

If dispatchable demand is critical, who should implement such programs?

- Is this more appropriately a retail market function or a wholesale market function?
  - asking the economic/operational question not the legal one addressed by FERC Order 745
- If dispatchability is a real-time resource for grid reliability, shouldn't it be run by grid operator?
- But if aggregated demand quantities are what matter, couldn't load serving entities do the aggregation and offer net demand to grid operator?
  - Would that more effectively let a thousand demand response paradigms bloom?

How do dynamic pricing and demand response programs co-exist?

- Dynamic pricing is the day ahead market mechanism and demand response is the "emergency" real-time adjustment?
- But then shouldn't real-time adjustments be priced up and down symmetrically?
- If so, are we back to "demand response" is the name for pricing deviations from a forward contract?

Thanks!

- Very much looking forward to answers from the other panelists and the other esteemed conference participants

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