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# Policy Research Using Confidential Customer-Level Utility Data

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# The Role of Research in Electricity and Natural Gas Markets

- Electricity and Natural Gas Markets are large and central to the well-being of Californians
- State government plays a much larger role in these markets than in most others
  - Design, Pricing, Resource Planning, Energy Efficiency
- Critical that state policy be evidence driven
- Critical that evidence come from credible, independent sources, not just stakeholders
- Critical to study causality, not just correlation

# Example: Research on Customer Response to Retail Prices

- How do customers respond to increasing-block pricing? Do they understand it?
  - How does that impact conservation goals?
- How much do customers respond to price changes?
- How effective are conservation rebate programs such as 20/20 program?
- How large is the “bill confusion” problem when customers receive a joint bill for gas and electricity? (in progress)
- Do “flex your power” days reduce or shift usage? (in progress)

# Example: Research on Distributional Impacts of Rate Structures

- Does increasing-block pricing benefit the low-income customers? By how much?
- Does increasing-block pricing harm customers in the central valley?
- Would time-varying pricing hurt or help low-income customers? Different region?
  - Impacts of optional time-varying pricing?
- What impact would a monthly fixed charge (offset by lower volumetric charges) have on low-income? on central valley?

# Example: Impact of Residential Solar PV Policies (work in progress)

- How much does increasing-block pricing change the incentive to install solar PV?
  - What impact would lowering high-tier prices have?
  - What impact would fixed charges have?
- What share of PV systems are installed by low-income, middle-income, upper-income?
  - How has that changed over time?
  - Using census block group and usage level to develop accurate estimates

# Future Research Possibilities Using Smart Meter Data

- How much do customers shift usage in response to time-varying prices?
  - How does it vary across income-levels or location?
- How does peak-time pricing compare to peak-time rebates for conservation?
- How do information devices (in-home displays, smart phone notification, etc) change responses?

# Most or all of these studies could not be done without customer-level data

- They rely on distinctions at the customer level that would be lost with aggregation
- They rely on details of customer level usage, such as how close they are to the steps between tiers
- They rely on matching with other data
  - from the census, at the census block group level
  - from the California Solar Initiative
  - from surveys, such the Residential Energy Consumption Survey

# Supporting materials

- Borenstein, "[The Redistributive Impact of Non-Linear Electricity Pricing](#)", Energy Institute at Haas Working Paper #WP-204R, revised April 2011, published in *American Economic Journal: Economic Policy*, 2012.
- Borenstein, "[Regional and Income Distribution Effects of Alternative Retail Electricity Tariffs](#)", Energy Institute at Haas Working Paper #225, U.C. Berkeley, October 2011.
- Borenstein, "[Effective and Equitable Adoption of Opt-In Residential Dynamic Electricity Pricing](#)", Energy Institute at Haas Working Paper #229R, U.C. Berkeley, April 2012, published in *Review of Industrial Organization*, 2012.
- Ito, "[Do Consumers Respond to Marginal or Average Price? Evidence from Nonlinear Electricity Pricing](#)" Energy Institute at Haas Working Paper #210R, U.C. Berkeley, revised October 2012, forthcoming in *American Economic Review*.
- Ito, "[Asymmetric Incentives in Subsidies: Evidence from a Large-Scale Electricity Rebate Program](#)" Energy Institute at Haas Working Paper #244, U.C. Berkeley, September 2013.