Distribution Forecasting Working Group

Load Modifying Demand Response Uncertainty and Proposals to Improve DER Methods

Meeting 3: May 16th 2018

Overview of DR Programs

IOU's current programs fall under two categories

(1) Load Modifying Demand Response (LMDR) programs: Included In the DPP

Not integrated into the CAISO markets.

- Permanent Load Shifting (PLS)
- Real Time Pricing (RTP) [PG&E does not have such program]
- Time-of-Use (TOU)
- Critical Peak Pricing (CPP)
- Peak Time Rebate (PTR) [PG&E does not have such program]

(2) Supply Side Demand Response (SSDR): Not-Included In the DPP

Integrated into the CAISO markets for direct dispatch to meet system and local needs*.

- Treated as supply-side resources and counted towards meeting Resource Adequacy (RA) requirements. Therefore, we do not account for these resources on the demand side to avoid potentially double counting DR between the load forecast and RA credits.

*Note: If in the future, SSDR is deemed acceptable for use by for direct dispatch to meet distribution needs, then those SSDR should be included in the forecast

Load Modifying Demand Response

2017 IEPR LMDR Forecast for SCE
88 MW (2030)

Suppliers

United States Census Bureau

acxiom

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Inputs

NAICS*

Demographic & Socio-economic Data

System Topology & Customer Data

Process

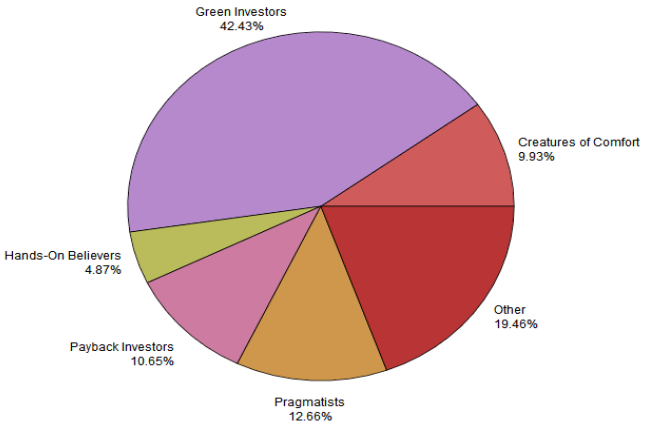
1. Allocate Ex Ante LMDR to existing Participants
   - Use annual impact report to apply individual and/or average load impacts
2. Identify key indicators of adoption
   - Perform regression analysis to assess the correlation between the propensity indicators and LMDR adoption
     - Home SQFT ↑ (2,000-3,000) and Year Built ↓ (before 1970)
     - ACXIOM Segment ↑ (Green Investors)
       - Upper income, middle-age families dominated by high-earners and growing new wealth. High technology propensity.
3. Score each service account eligible to participate in a LMDR program
   - Utilize regression results to rank service accounts based on highest probability score
4. Allocate residual Ex Ante LMDR based on ranked order to reconcile with IEPR LMDR forecast

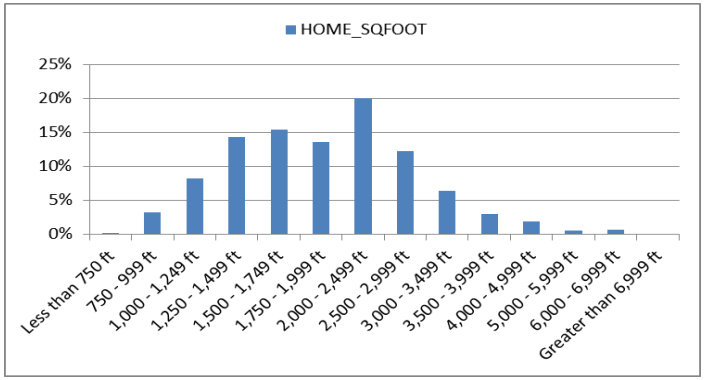
*North American Industry Classification System

LMDR

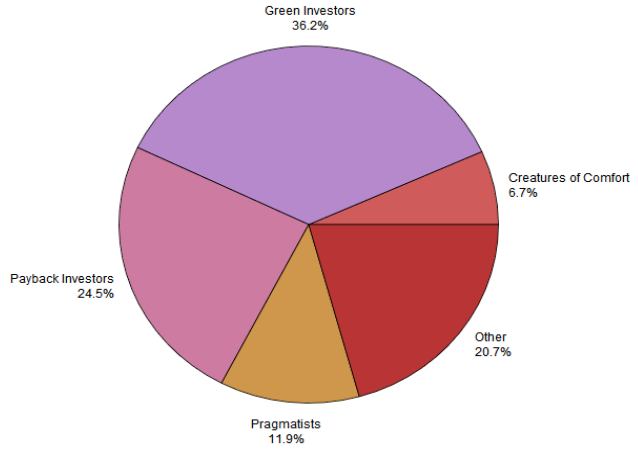
Load Modifying Demand Response

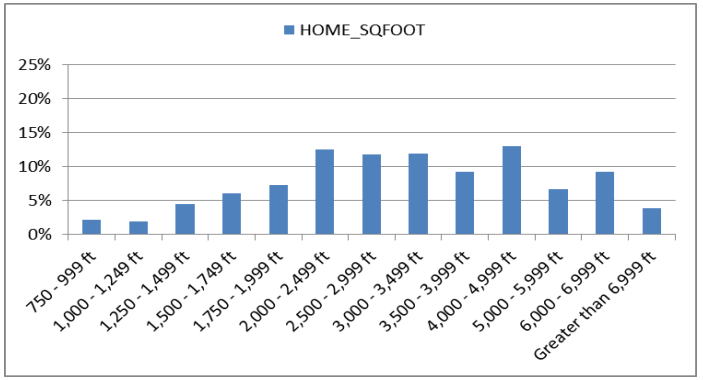
Existing Residential Participants





Top 1,000 Scored Residential Non-Participants





Load Modifying Demand Response

Key Uncertainties

1. Data availability and quality
2. Customer Behavior

Lessons Learned

- Continued need to evaluate indicators that affect customer's choice to enroll and/or opt out
- Test methods to address timing of adoptions

Proposed Improvements

1. Data availability and quality
   - Leverage existing survey research to identify other possible indicators of adoption
   - Add transactional data to better estimate the timing of enrollment and opt outs
2. Collaboration with CEC
   - Share lessons learned and improve system level allocation
   - Request supplemental non-residential characteristics and trends
   - Understand departing load assumptions to avoid double counting DR impacts with CCAs.

Load Modifying Demand Response (DR that is not integrated into the CAISO Market)

Key Uncertainties

Forecast Uncertainties:

- Evolution of TOU rate structures over the forecast horizon.
- Rate of customer opt out from residential TOU.
- Load impacts from residential TOU.
- Potential CCA LMDR programs.

Allocation Uncertainties

- Lack of data on local variations in opt out rates for residential TOU
- Lack of data on local variations in load impacts from residential TOU
- Lumpiness issues related to procurements of LMDR under DIDF/IDER
- Potential CCA LMDR programs

Proposed Enhancements to Allocation Method

- Review and analyze data collected in TOU pilots and Phase I of TOU default transition.
- Consider special study for DRMEC or EPIC to better understand potential adoption and impacts of TOU rate structures at system and local levels.
- Collect data on local TOU opt out rates and load impacts.
- Collect data on any CCA LMDR programs.
- Coordinate with DER procurement team to include any LMDR contracts under DIDF/IDER

Load Modifying Demand Response

Key Uncertainties

- Residential TOU Rate adoption/opt out
- Weather conditions and normal usage fluctuations increase error in estimates
- No direct measurements available in behavioral changes

Proposed Improvements

- Leverage results of LTPP studies for disaggregation of load impact to WECC busbar
  - Use ex-post load impacts on a control group of customers
  - Calibrate results to add up to system wide load impact estimates
  - Apply regression model to estimate future impacts
- Further disaggregate to circuits based on program class and proportion of customer segment on each circuit
- Scale to IEPR system wide forecast