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RECURVE

SHAPE THE FUTURE OF ENERGY

CEC - IEPR Building Decarbonization Workshop

Carmen Best

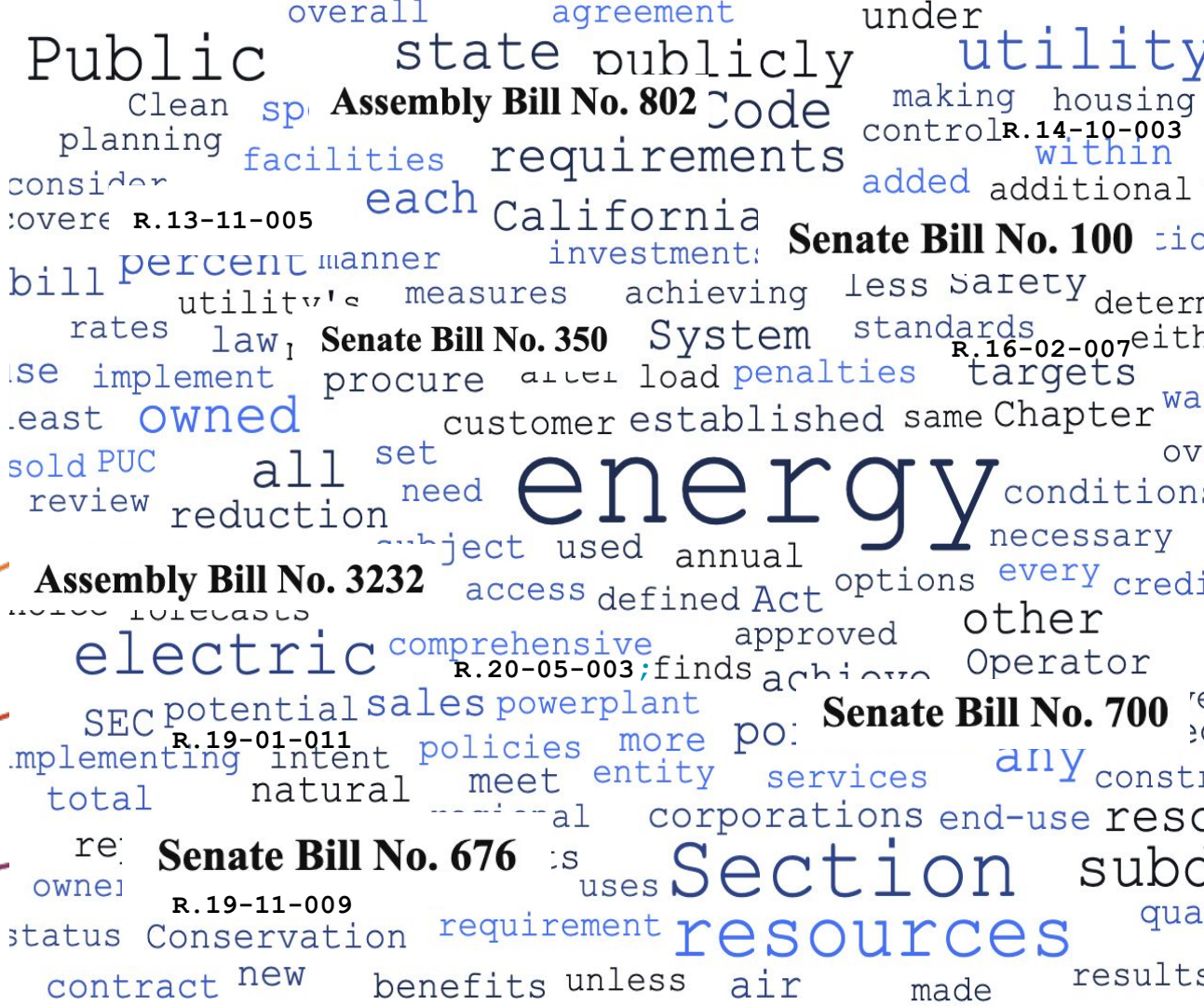
VP of Policy & Emerging Markets

Panel 1 - Grid Integrated Efficient Buildings

October 5, 2021

California's policies:

Are not aligned to scale.



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Unified Field Theory

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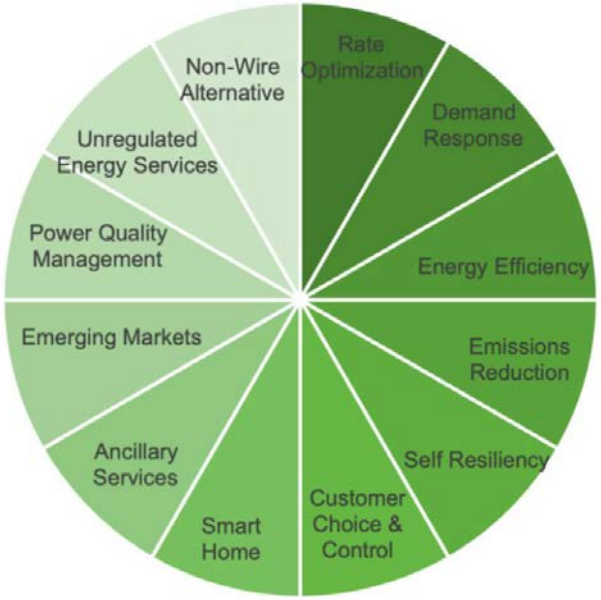
Common Resource Valuation Methodology



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Source: Figure 1. Value Stacking
Smart Electric Power Alliance, 2017

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Open-Source Normalized Metered Energy Consumption

CALTRACK

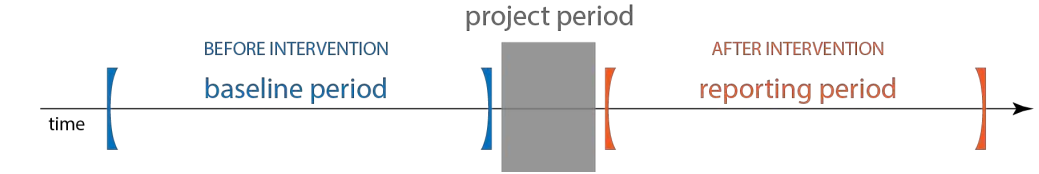
Technology Agnostic
Change In Consumption

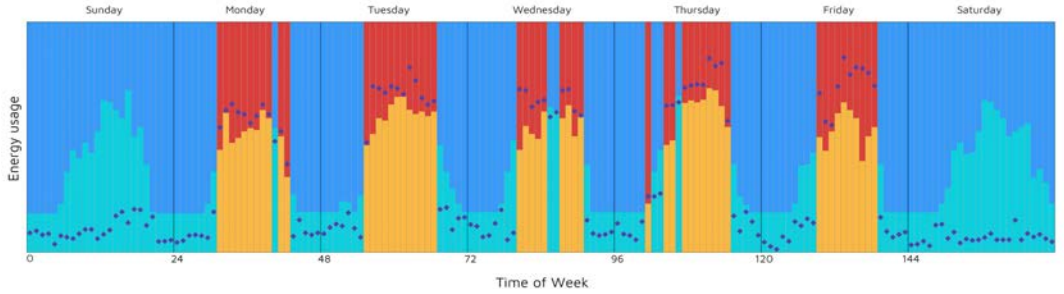
LFENERGY
OPENEEMETER

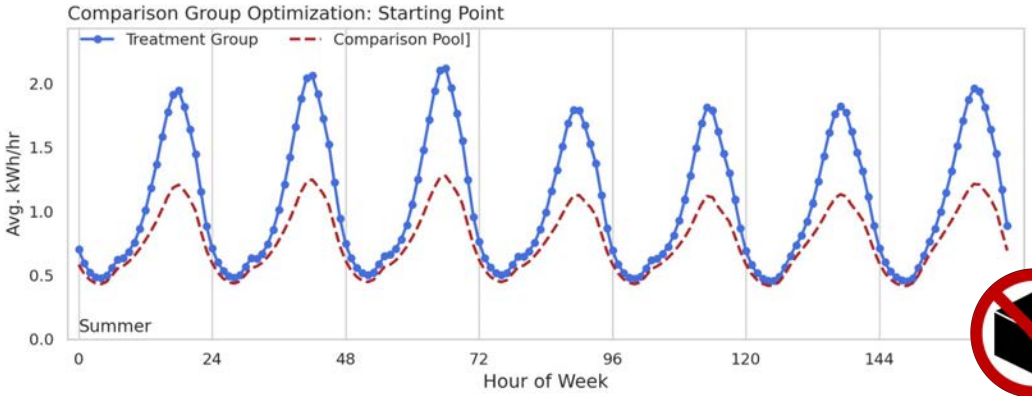
Hourly Time of Week &
Temperature Model

OPEN
GRIDMETER

Matched comparison groups
net impact to the grid



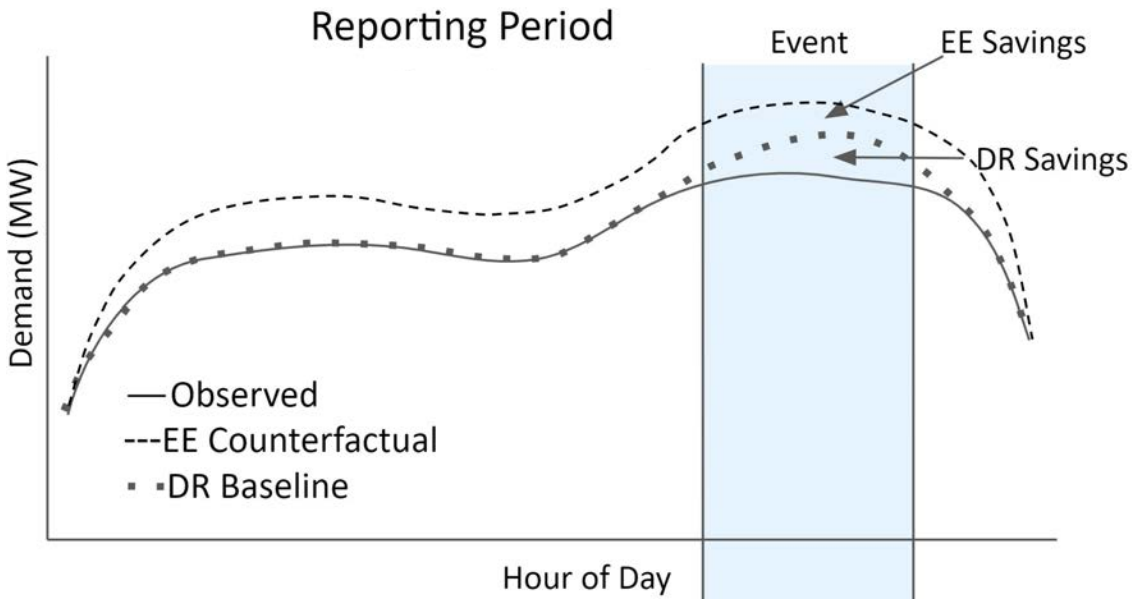




Open-Source Meter-Based Telemetry

Unified Field Theory of Demand Flexibility:

- ➔ Measure all BTM DERs based on grid impacts at the meter
- ➔ FLEXwatt = hourly NMEC site-baseline Δ population stratified comparison group
- ➔ Attribute impacts to appropriate contract (EE/DR)
- ➔ Revenue-grade open-source and verifiable from raw data to results =



EE / NMEC / Load Shifting
365 day CalTRACK model

Demand Response
60 day CalTRACK model

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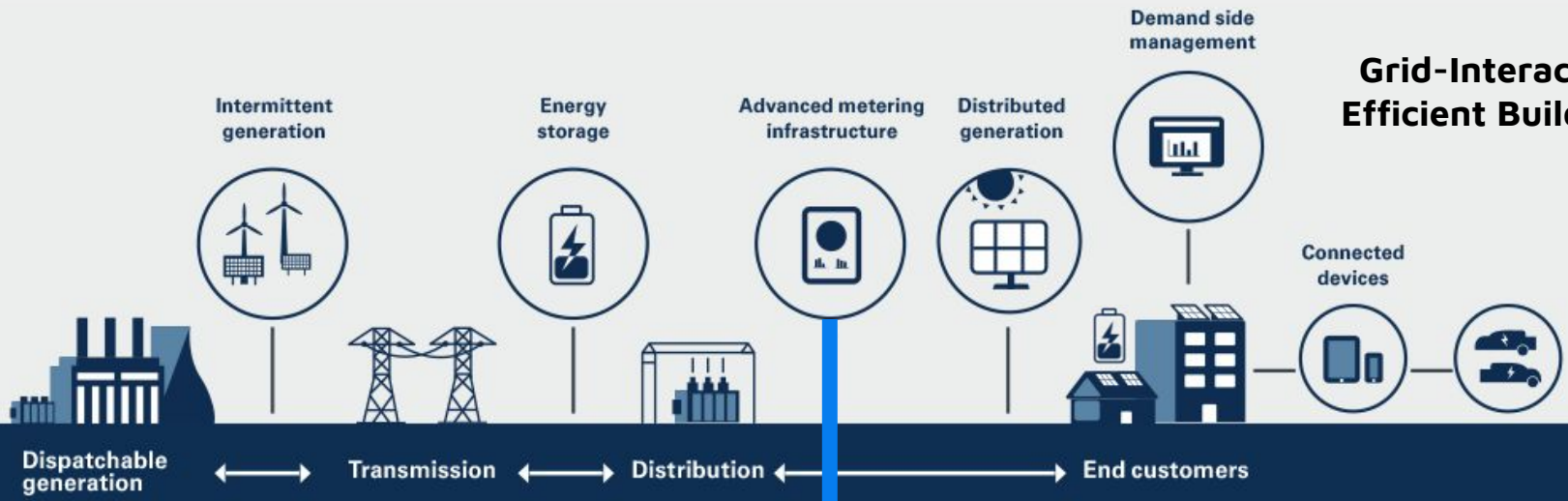
The Grid is a Balance of Supply and Demand

Supply = Demand



Supply: Energy Resources

Demand: Load Modifying Resources

Utilities Benefits From Demand-Side Resources

Load Modifying Resources (LMR)

- 15% price advantage over supply-side*
- Hedges market peak energy events
- Modifies forecast to reduce RA
- Provides benefits to local customers
- Incorporate the full value stack

FLEXVALUE

Supply-Side

Market Resources

- Energy
- Capacity
- Ancillary
- Transmission
- Distribution
- Cap and Trade
- Ghg Adder Rebalancing
- Methane Leakage
- Losses
- **Non-Grid Priorities**
  - ❑ Equity
  - ❑ Resiliency

Demand-Side

Load Modifying Resources Enable the Full Value Stack

DEMAND FLEXMARKET

* IEA US Supply-Side Reserve Margins: https://www.eia.gov/todayinenergy/detail.php?id=39892

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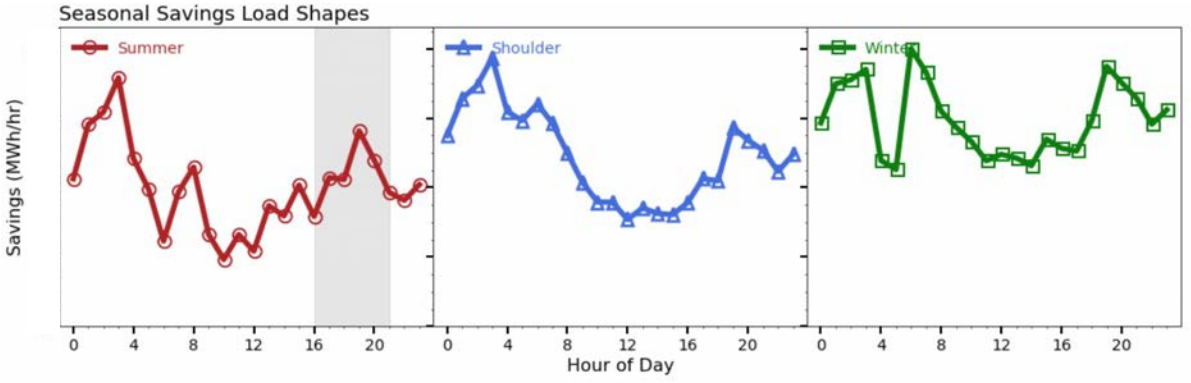
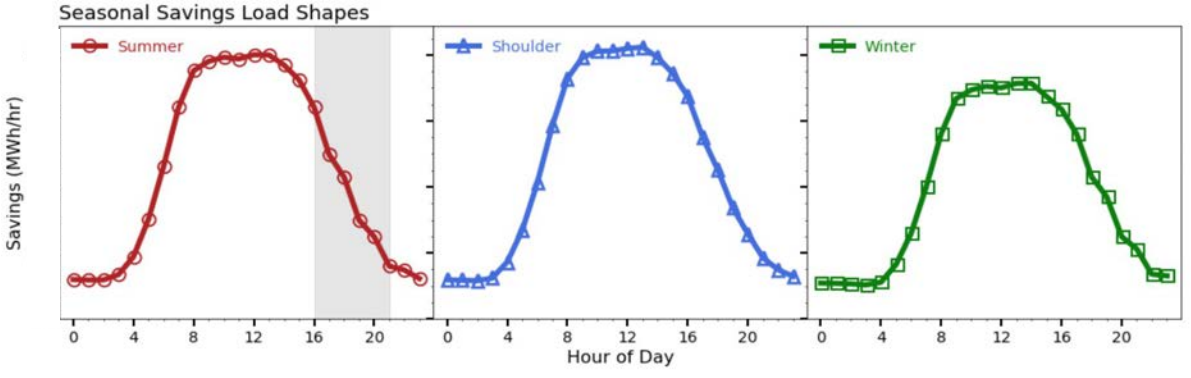
What Does Stuff Do In The Real World?

FLEXVALUE

Measured Impacts:



Deemed Impacts:

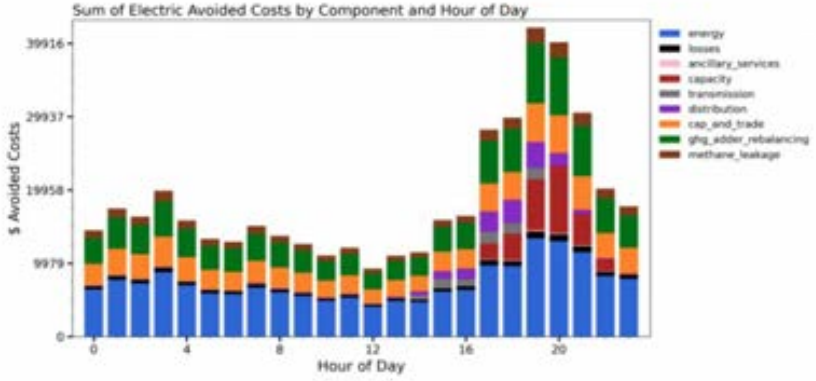


Averages Cloud Real Value & Performance

FLEXVALUE

Measured Value:

From CalTRACK Hourly Measurements:

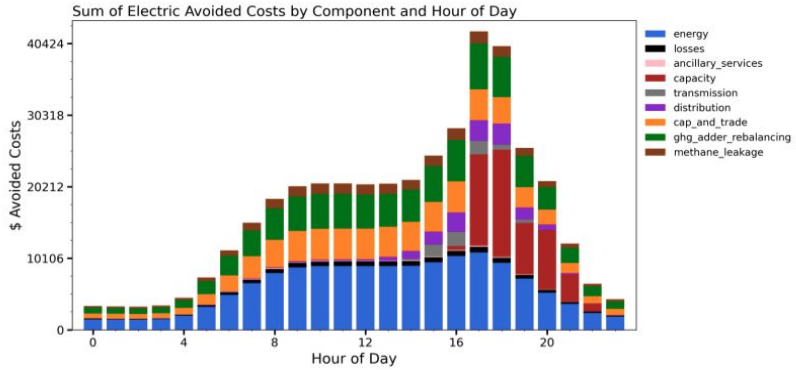


$447k Grid Value

Δ $48,000

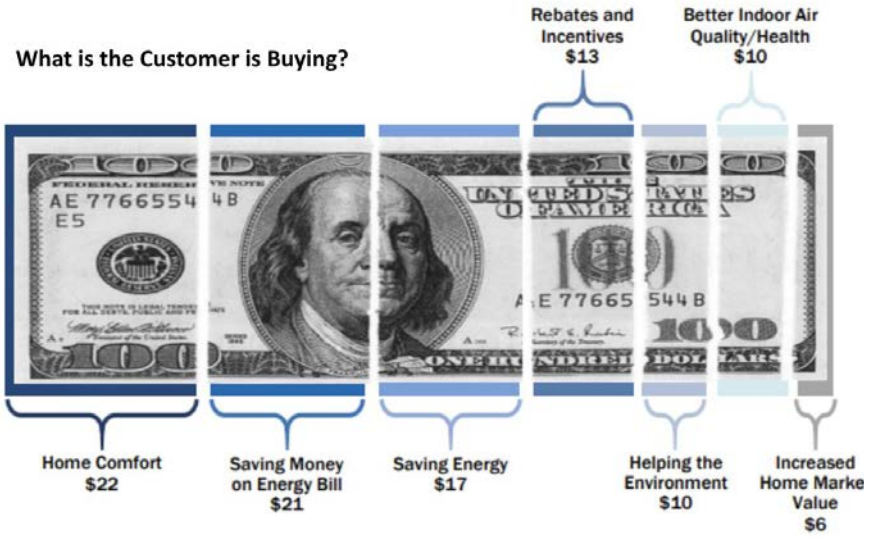
Deemed Value:

Using DEER Load Shape:

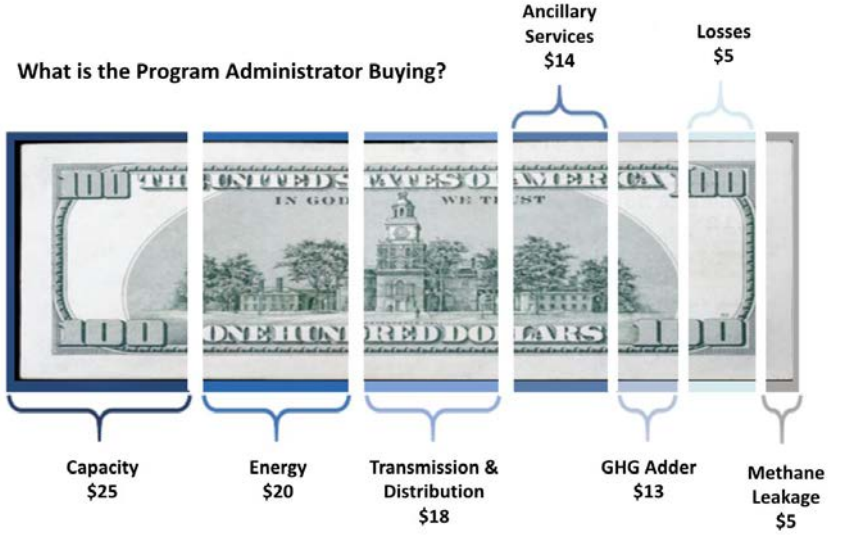


$399k Grid Value

Customers Benefit From Demand-Side Resources

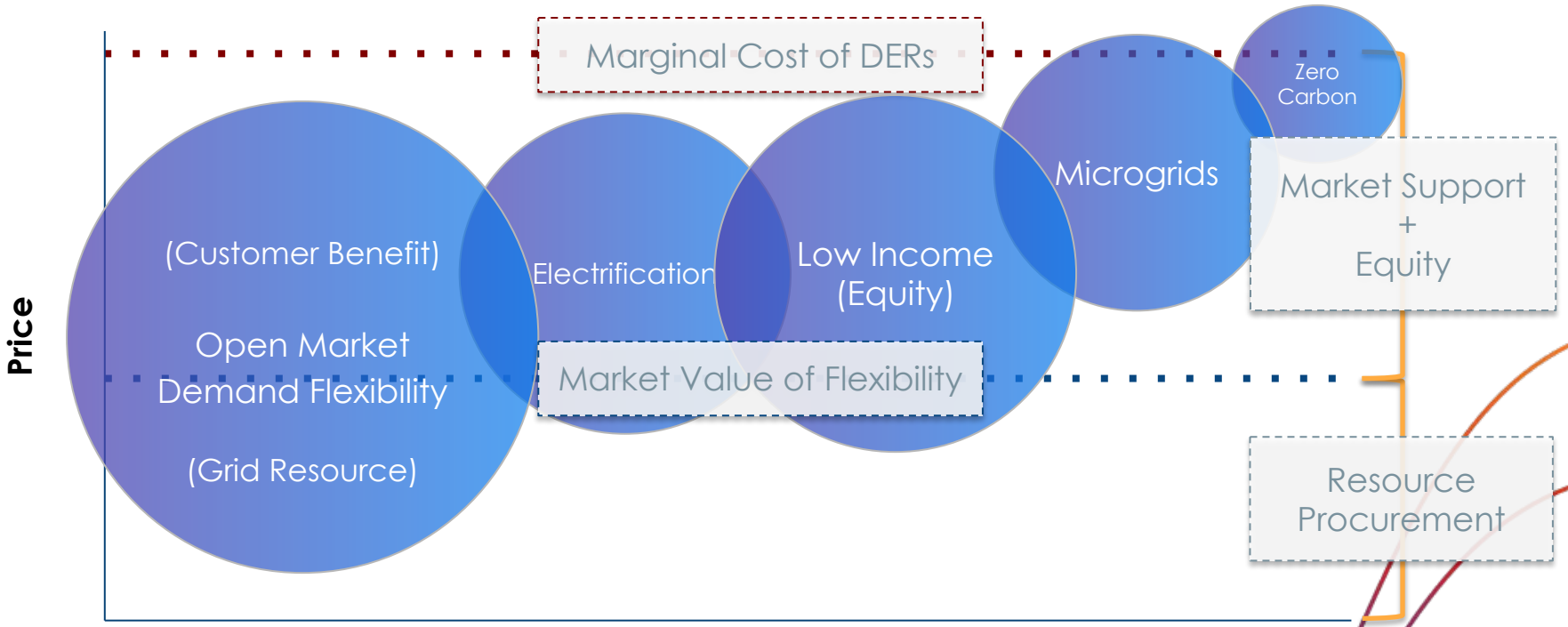


"Considering the cost of your recent retrofit and these main benefits that you experienced, if you were to express the value of each of these benefits by distributing 100 dollars across your list – how much out of 100 dollars would you pay for...?"



[Recurve Comments on Energy Efficiency Summer Reliability and Appropriate Cost Tests: August 31, 2021]

Multiple Goals & Objectives of Investment



Aligns with Total System Benefits Metric + Segmentation Strategies Proposed by NRDC in "A Roadmap to Better Energy Efficiency Policy"

Building a Value Bridge

VALUE

Flexibility

Equity

GHG Impacts

CUSTOMER

Sustainability

GRID

(system)

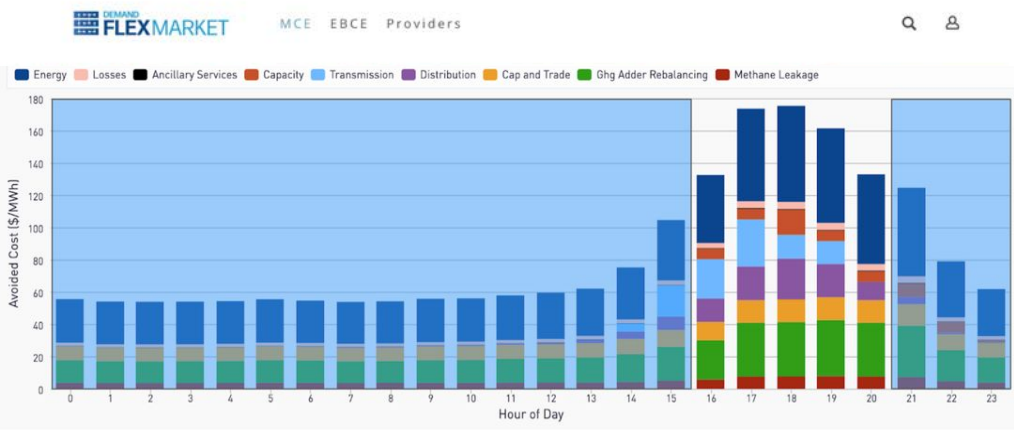
Bill Impacts

Resiliency

Rates

PERFORMANCE

DEMAND FLEXMARKET



~$150/MWh during peak: June 1 - September 30, Weekdays

Peak FLEXmarket

Utility Procurement

Additional Flex as a Energy Market Hedge, and Load Modifying Resource (**LMR**)

- Seasonal Summer Peak Savings at $150 a MWh
- Day ahead signal based on CAISO price

Commercial Efficiency Market

CPUC Program

Market for Cost Effective Long-Term Savings **(Population NMEC + P4P)**

- Paid for at the rate that makes every project cost effective (TRC=1)
- Extra value for savings at the peak periods

MCE Implementation Plan

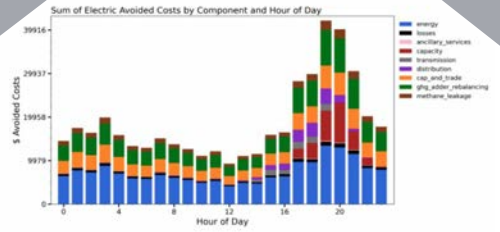
Making Markets for Demand Flexibility

Grid-Interactive Efficient Buildings

Customers

- ➔ Energy savings
- ➔ Peak Reduction
- ➔ Carbon Reduction

Grid Benefits



DEMAND FLEXMARKET

Energy Solutions

- ➔ Business Models
- ➔ Technology
- ➔ Consumer Finance

Utility

Recurve Platform: Cash Flow for Grid Value

Aggregators

- ➔ Metered Performance
- ➔ Payment for Grid Value Stack
- ➔ Project Finance

CA - Summer Reliability Proposal

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Questions?

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