
Each and Every Load....

CalPlug Workshop

May 13, 2014

Paul Delaney

New Product Development and Launch

Evolving Energy Efficiency Trends

Early Years

Energy Savings Tips

Energy Audits

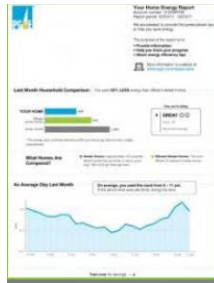


Standard Rebates



Today

Robust Data Tools and Home Energy Reports



Partnerships



Market Interventions: Retail, Distribution, Wholesale



Deeper Savings



Continuing Trends

Zero Net Energy



Whole Building



Big Data



Water-Energy Nexus



Locational Targeting



Energy Feedback

IS DISAGGREGATION THE HOLY GRAIL OF ENERGY EFFICIENCY?
THE CASE OF ELECTRICITY

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GIREESH SHRIMALI³, and ADRIAN ALBERT⁴

¹ Precourt Energy Efficiency Center, Stanford University

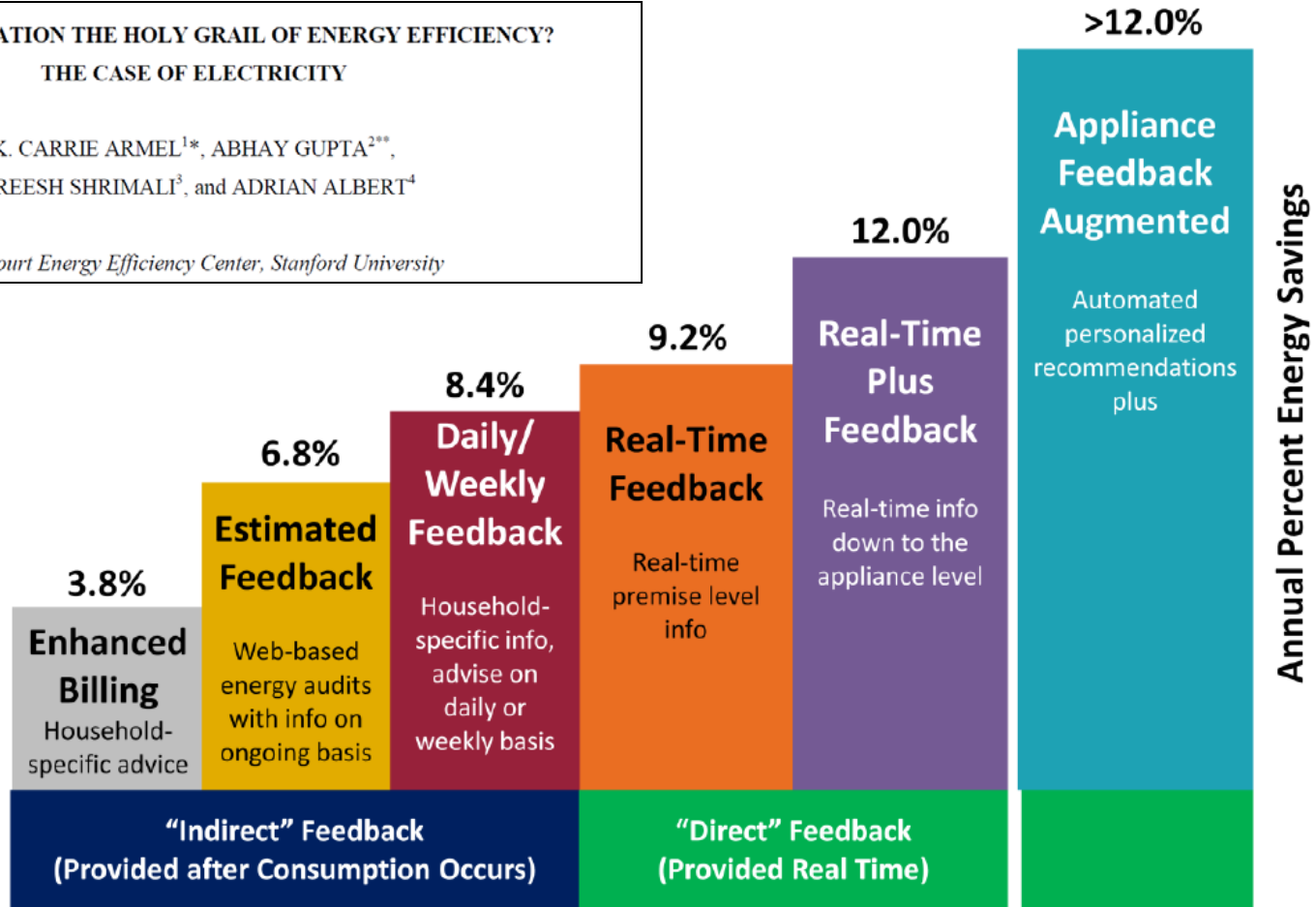
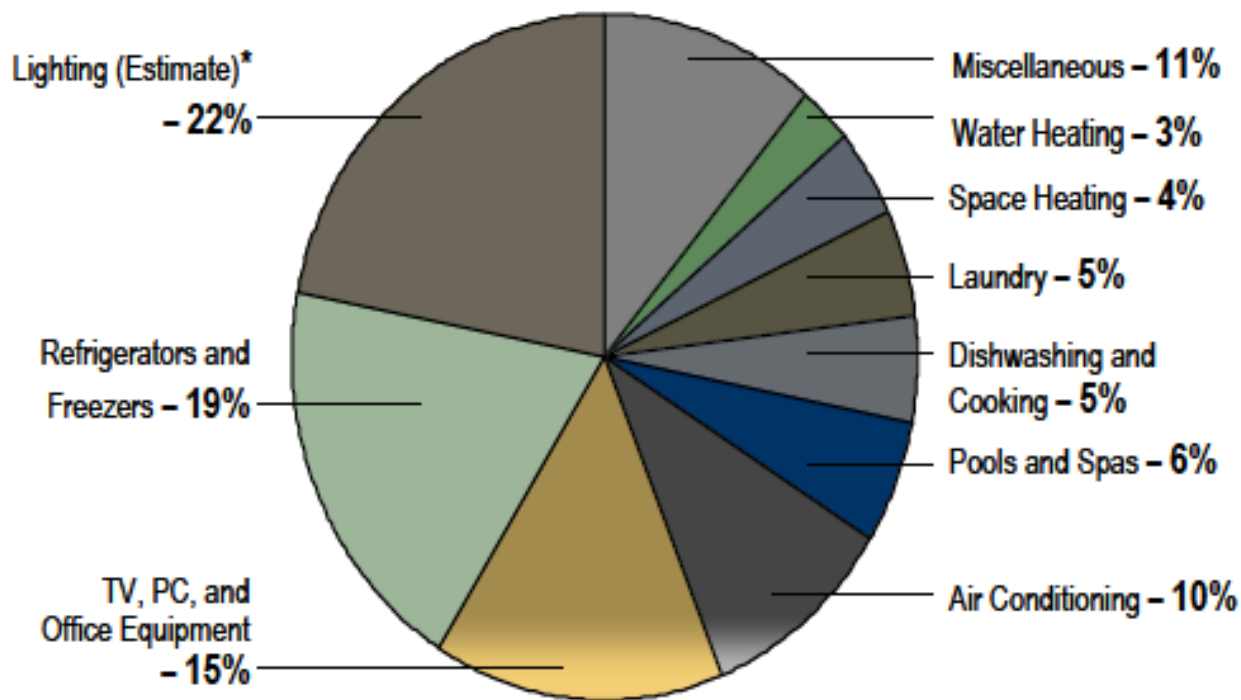


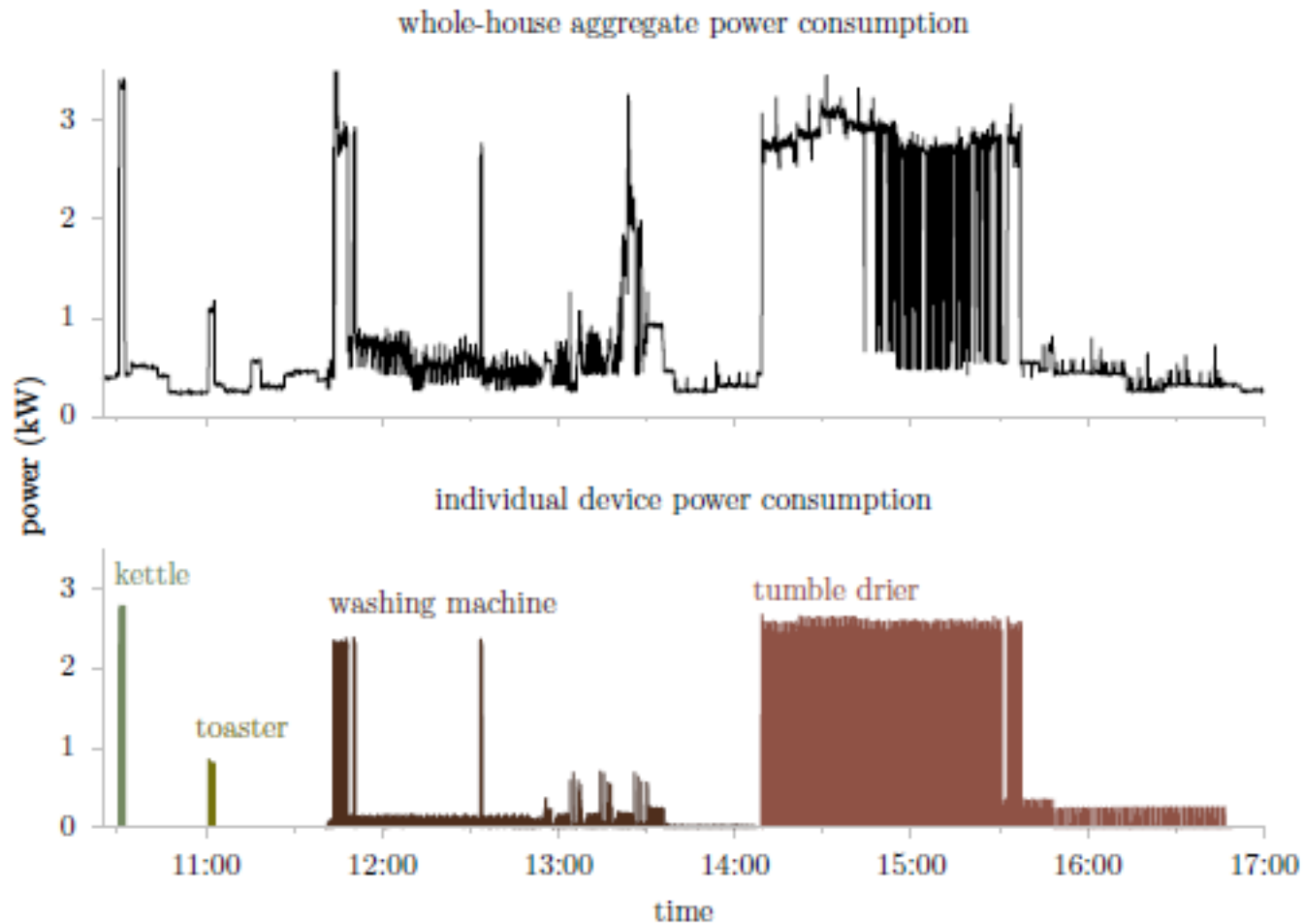
Figure 1. Residential savings due to energy consumption feedback. The five left-most bars are derived from 36 residential electricity studies between 1995-2010 (taken from Ehrhardt-Martinez, Donnelly, & Laitner, 2010). Many studies were comprised of small samples; the authors estimate

Statewide Average Electricity Use Per Household

(5,914 kWh per Household)



Disaggregation – example 1



Disaggregation – example 2

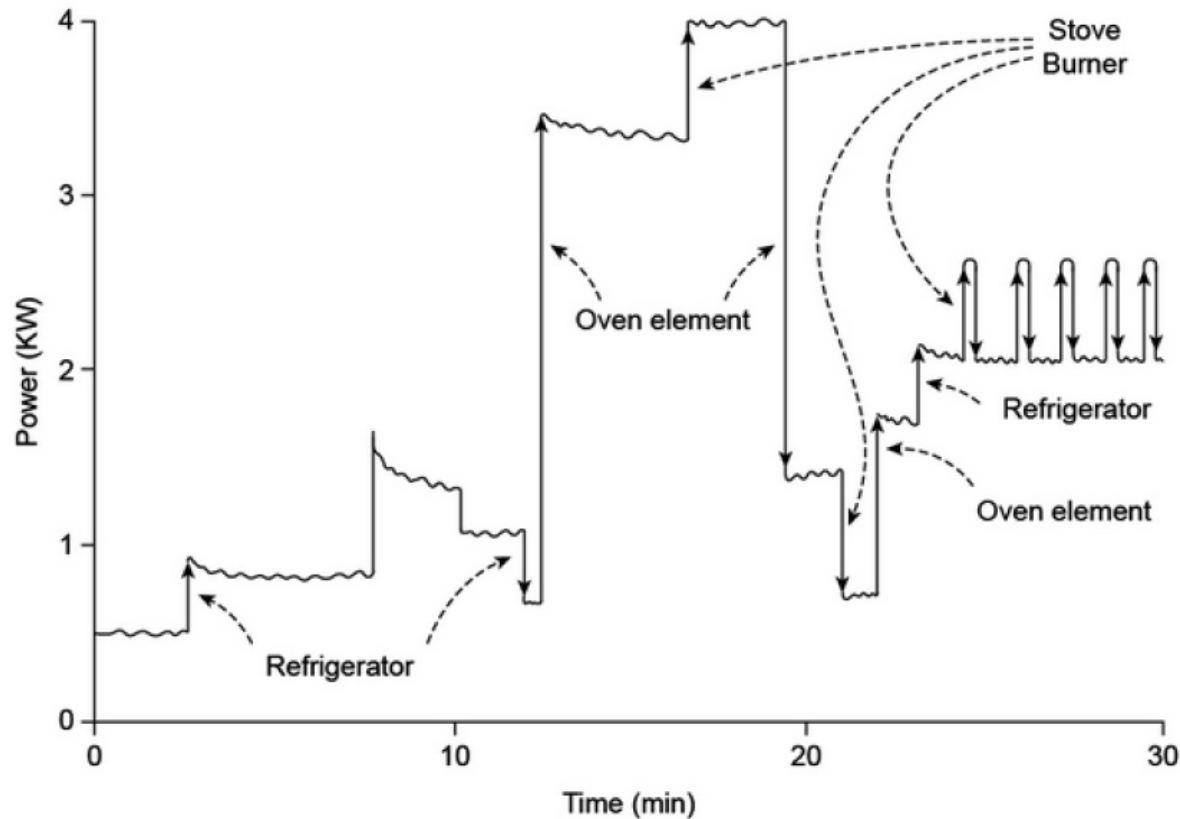


Figure 3. Disaggregation refers to the extraction of appliance level energy use data from an aggregate, or whole-building, energy signal. A set of statistical approaches that extract patterns characteristic of a given appliance are applied to accomplish this. (Figure from Hart, 1992)

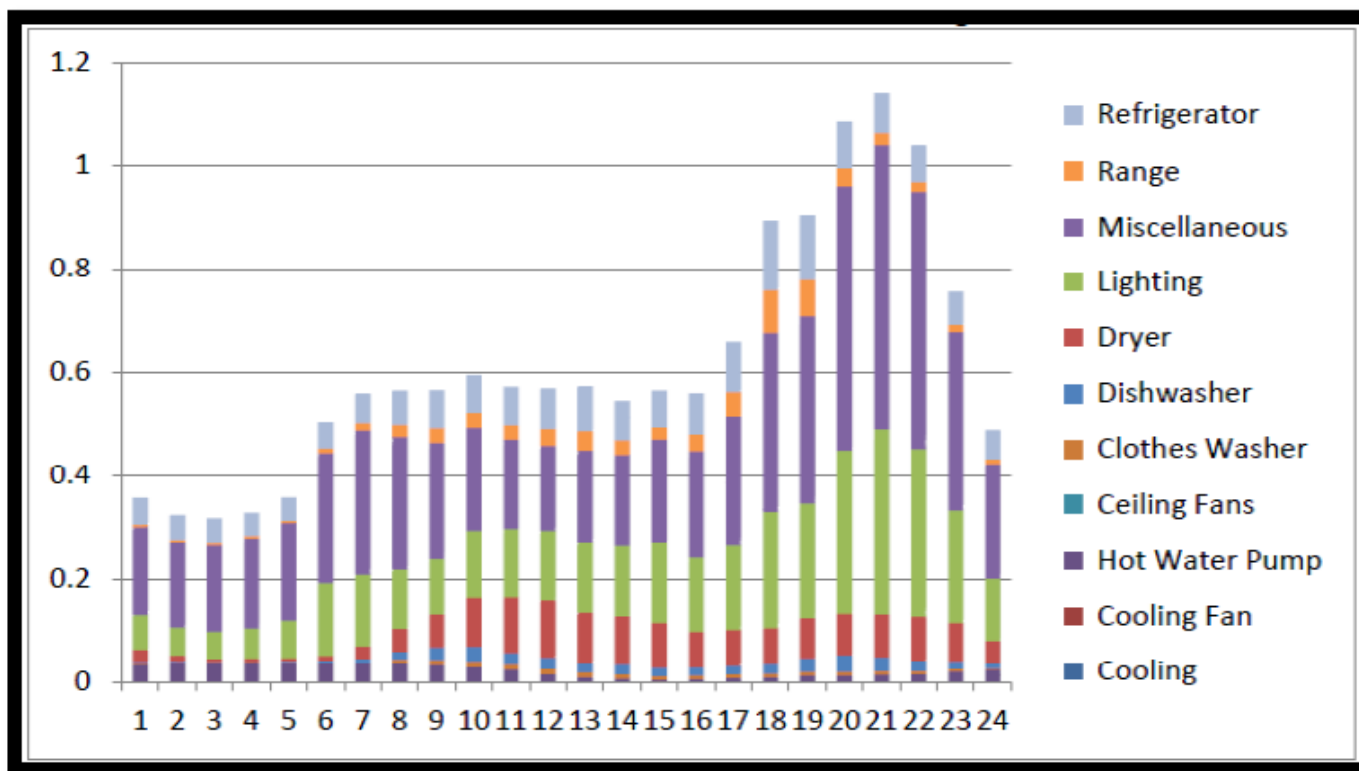
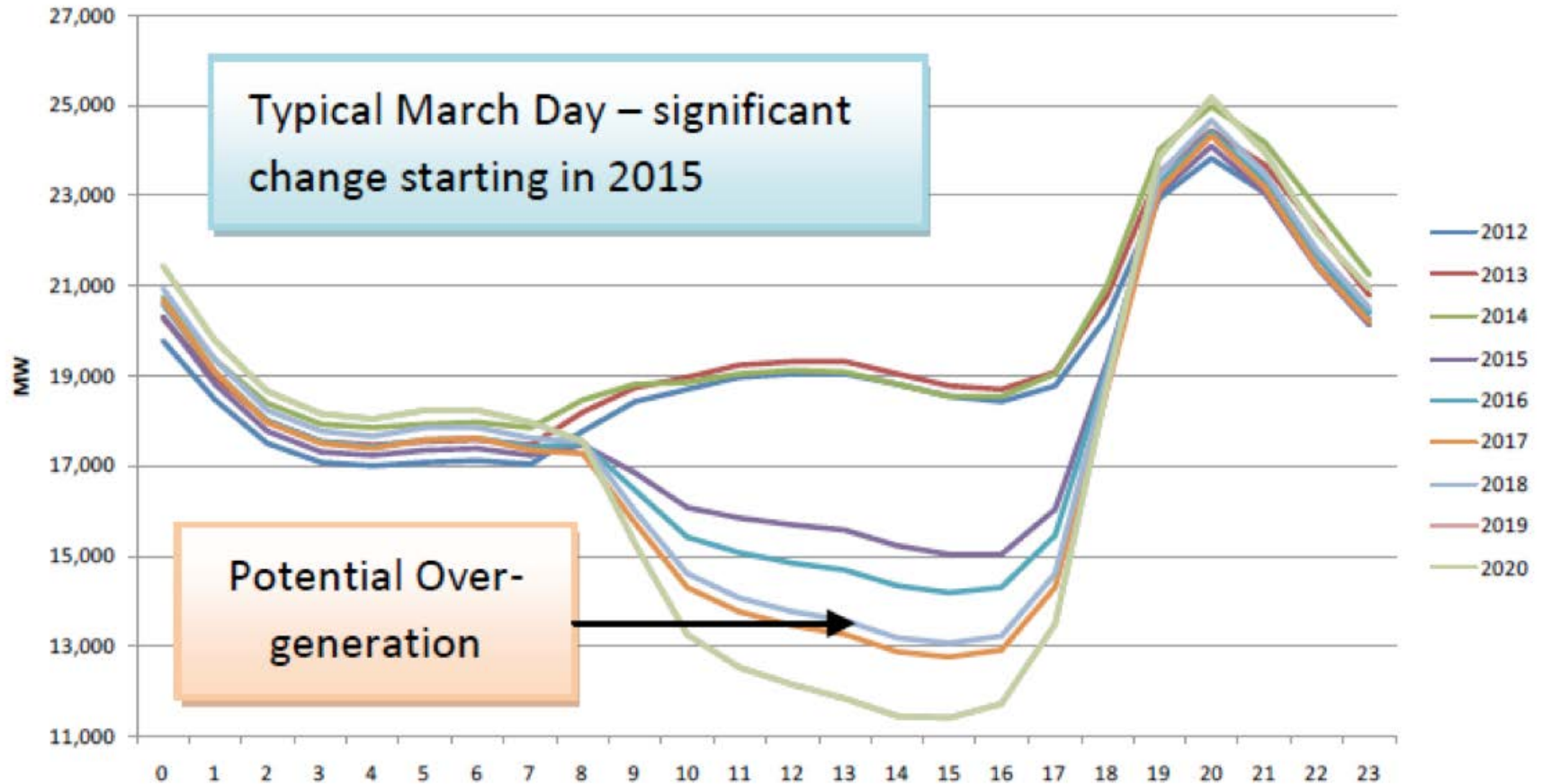


Figure 14: Simulated House Load on December 21st (kWh versus Hour)

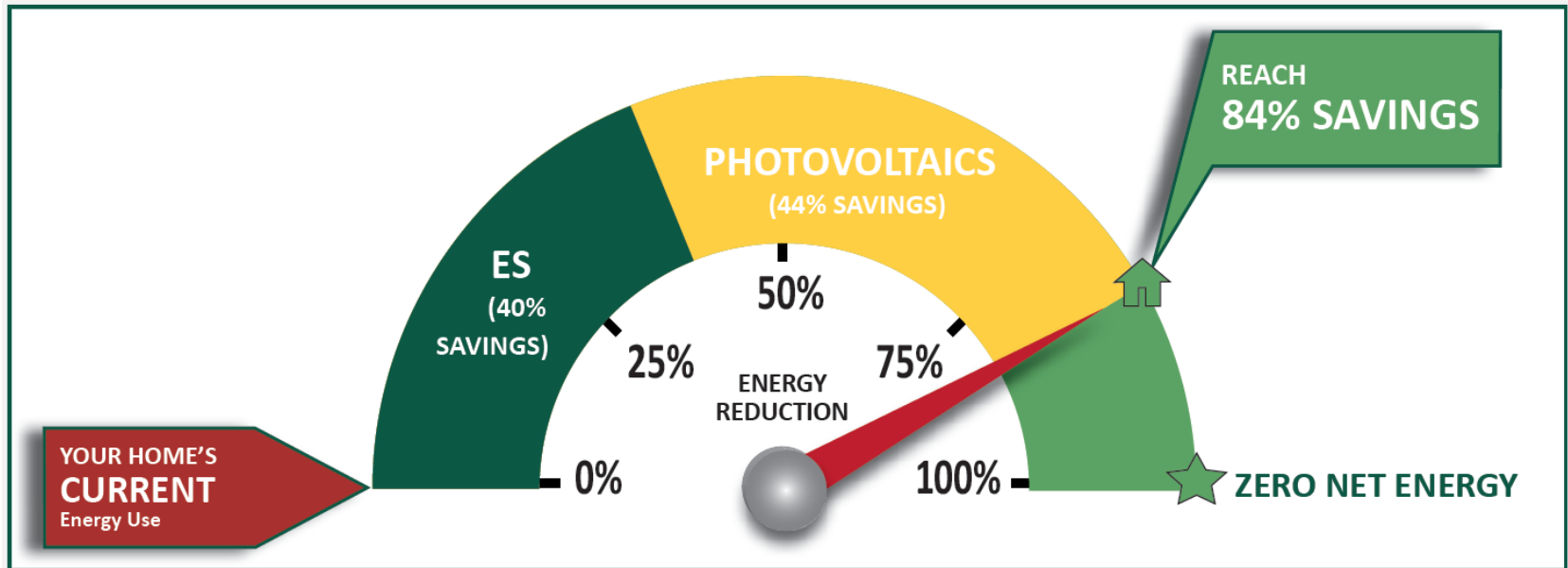
The Duck Curve

CAISO Net Load --- 2012 through 2020



“Our goal is to foster and enable new technologies to modernize and green the electric grid. The entire ISO is committed to advancing the organization toward a sustainable energy future.”...Steve Berberich, CEO, CAISO

Existing Single Family Neighborhoods – Irvine, California



Residential ZNE – Irvine, California



Residential Energy Storage Unit (Battery)



Smart Appliances



LED Lighting



Electric Vehicle Charging Station



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