

CHALLENGES & SOLUTIONS IN A TRANSFORMING INDUSTRY

MAY 2015

OWEN SMITH

PRINCIPAL, ROCKY MOUNTAIN INSTITUTE

RMI. Creating a clean, prosperous,
and secure energy future.™



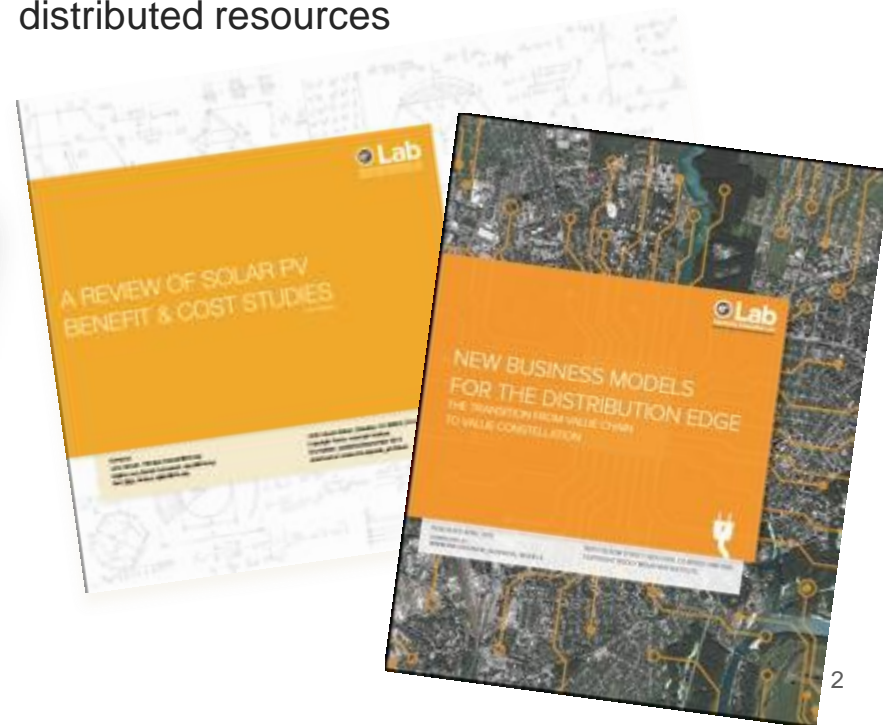
ABOUT RMI AND E-LAB



Rocky Mountain Institute works across industries on challenging energy issues to drive the efficient and restorative use of resources with market-based approaches



e-Lab brings together leading electricity sector actors to solve regulatory, business, and economic barriers to the deployment of distributed resources



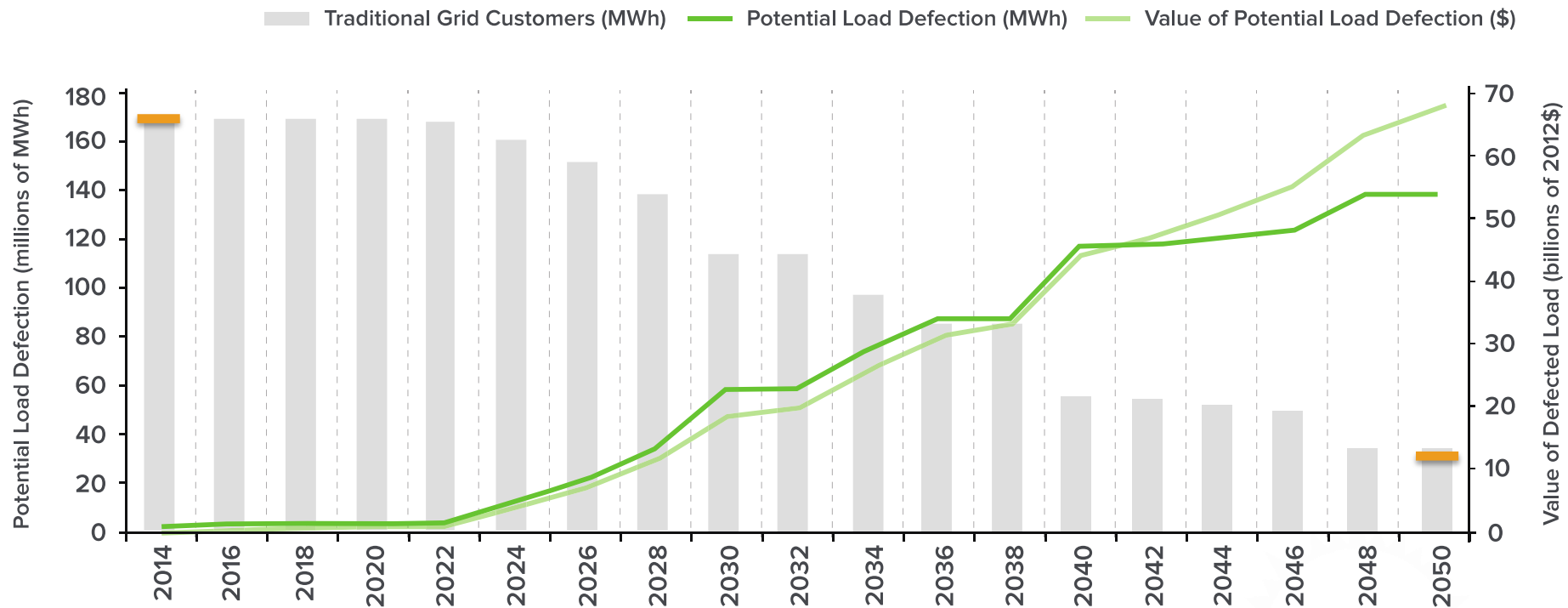
ECONOMICS OF SOLAR + BATTERY STORAGE

Economically Optimal Generation Mix Westchester, NY



POTENTIAL MAGNITUDE OF LOAD DEFECTION

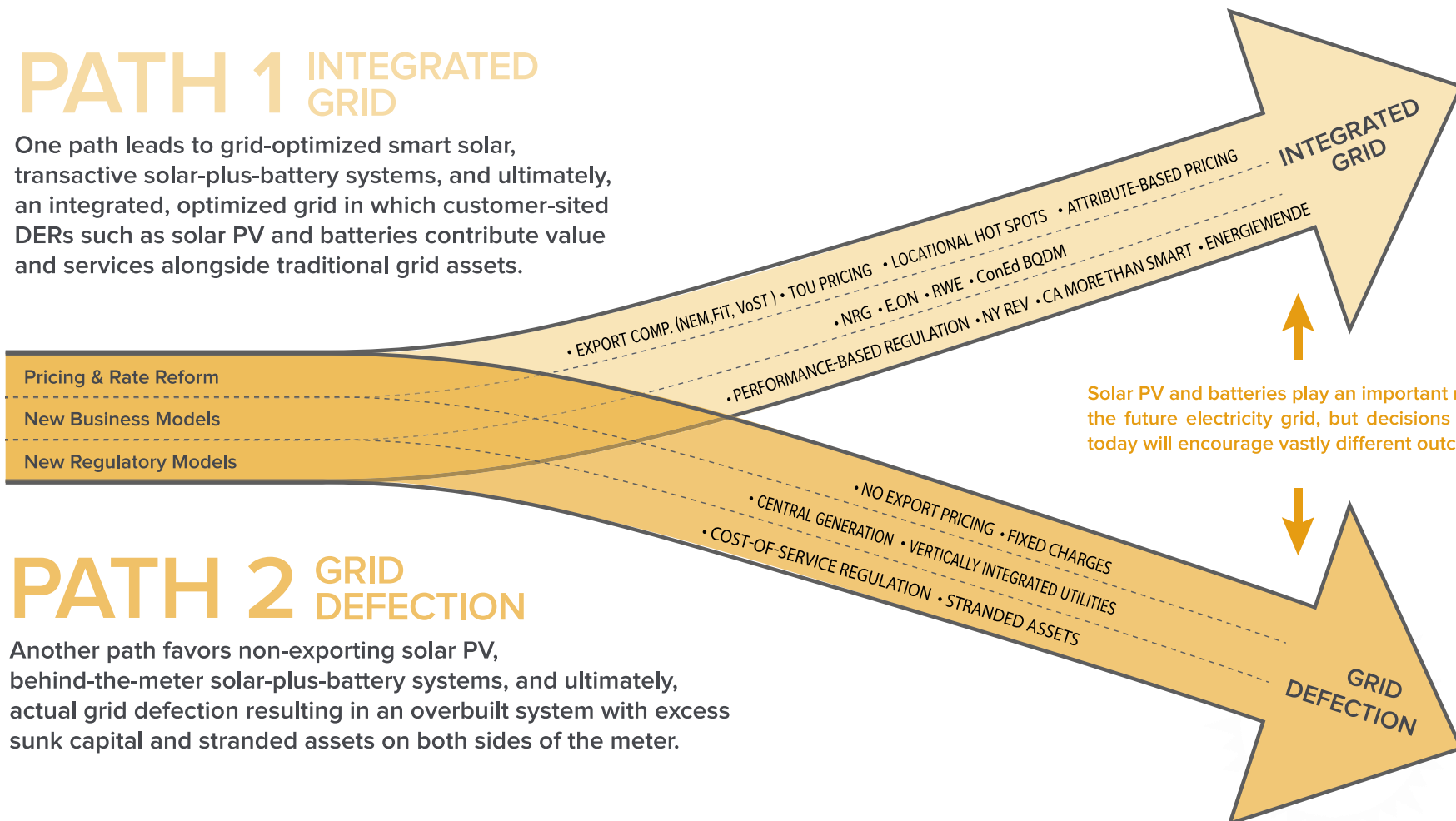
NORTHEAST RESIDENTIAL POTENTIAL LOAD DEFECTION



A FORK IN THE ROAD

PATH 1 INTEGRATED GRID

One path leads to grid-optimized smart solar, transactive solar-plus-battery systems, and ultimately, an integrated, optimized grid in which customer-sited DERs such as solar PV and batteries contribute value and services alongside traditional grid assets.



PATH 2 GRID DEFECTION

Another path favors non-exporting solar PV, behind-the-meter solar-plus-battery systems, and ultimately, actual grid defection resulting in an overbuilt system with excess sunk capital and stranded assets on both sides of the meter.

THREE LEVERS TO CREATE AN INTEGRATED GRID

Pricing Realignment

Design pricing models that align customer incentives with the costs and benefits of distributed resources

Bridge Business Models

Adapt business models that can increase and capture value within the existing regulatory paradigm

Regulatory and Business Model Reform

Redesign regulatory and business models to provide a platform for the economic and operational integration of distributed resources



RATE DESIGN FOR THE DISTRIBUTION EDGE: ELECTRICITY PRICING FOR A DISTRIBUTED RESOURCE FUTURE

August 2014 e-Lab publication

Available at http://www.rmi.org/elab_rate_design

Framing the Need:

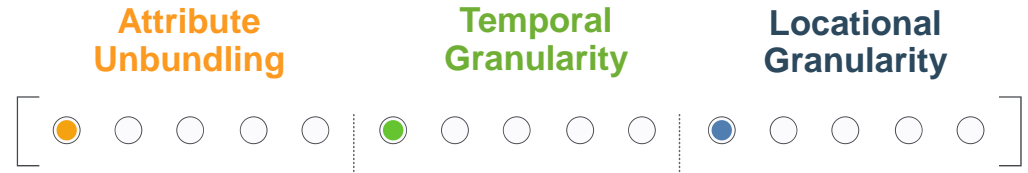
- Capabilities and costs of distributed energy resources (DERs) are rapidly improving, and customer adoption is growing significantly
- Existing rate structures (especially for most residential and small commercial customers) do a poor job of directing these investments to optimize value
- As adoption of DERs grows, misalignments between customers, DER providers, and grid operators will become more problematic, unless rate structures evolve
- A transition to more sophisticated rates can address these misalignments and unleash new waves of innovation in DER products and services



“There is a growing disconnect between the rapidly evolving new world of distributed energy technologies and the existing world of electricity pricing”

THREE SPECTRUMS FOR PRICING EVOLUTION

Today's block pricing is fully bundled, with no time- or location-based differentiation



Time-of-Use Pricing represents a viable near-term solution that represents greater temporal granularity...



...while **Hourly Pricing** represents a subsequent option with even greater temporal granularity



Energy + Capacity Pricing (Demand Charges) represents a viable near-term solution for attribute unbundling...

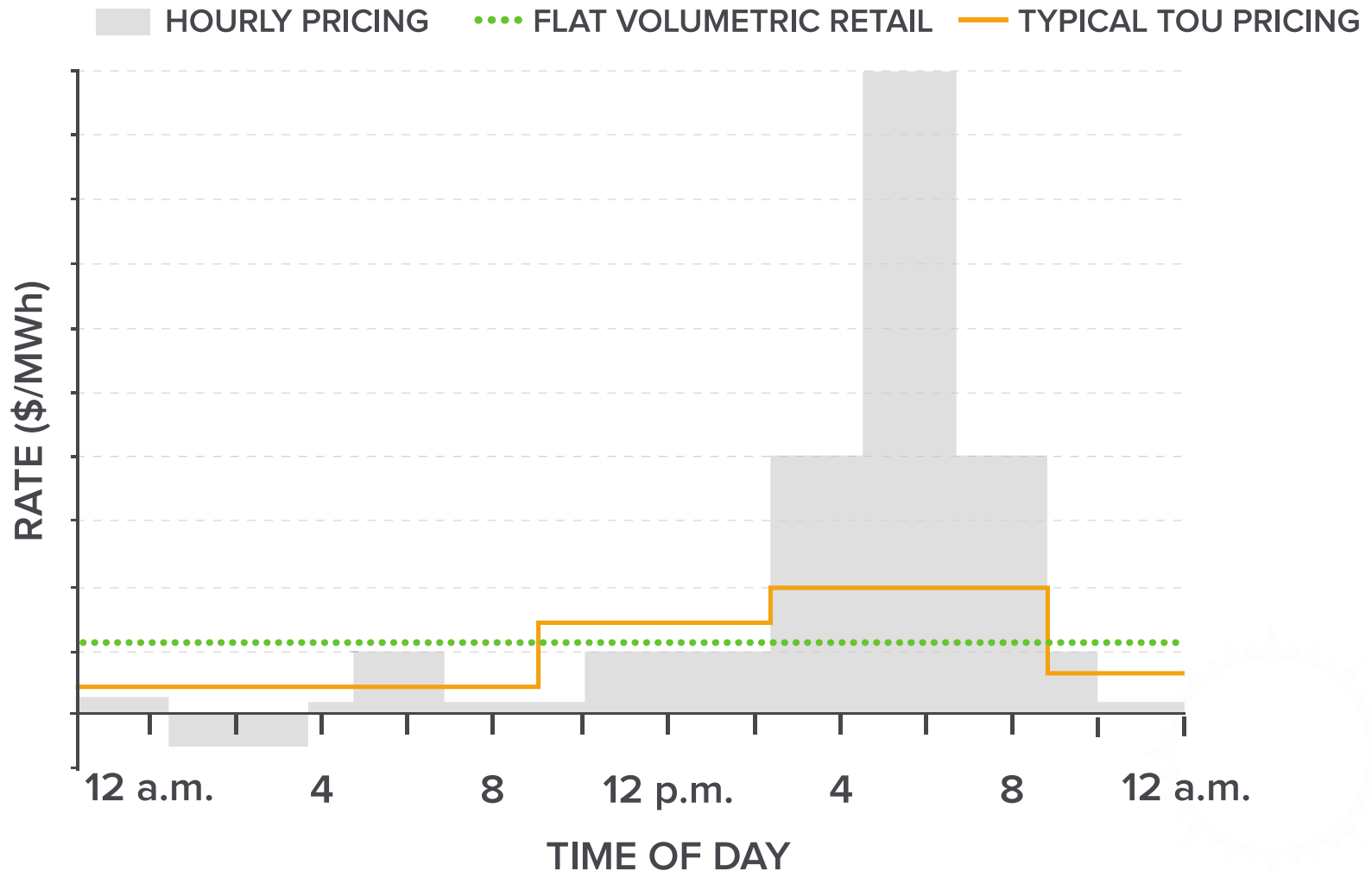


... and **Distribution Hot Spot Credits** represent a viable near-term solution for locational granularity

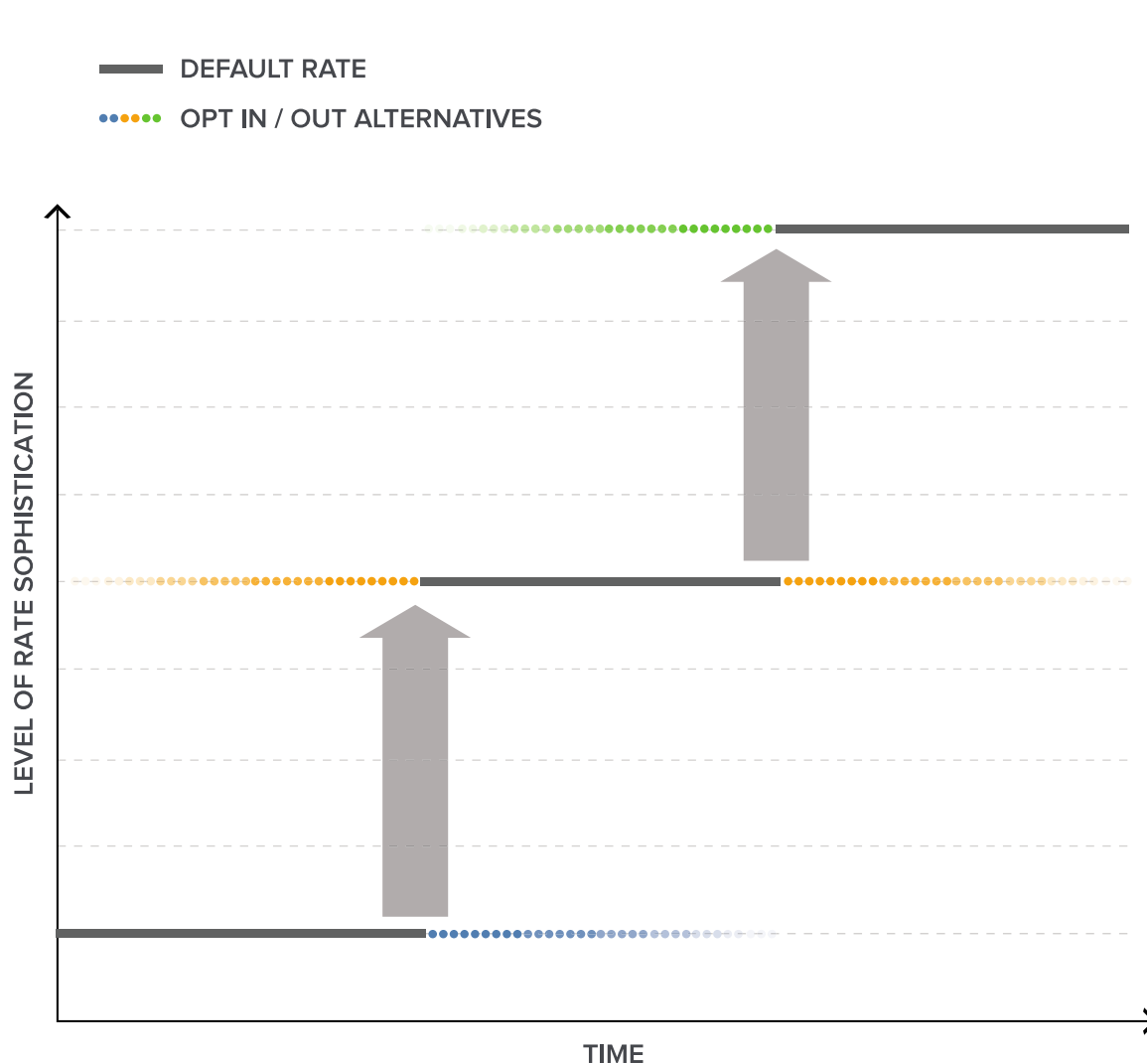


There are multiple viable near-term solutions, as well as more sophisticated longer-term options

ILLUSTRATING THE TEMPORAL CONTINUUM



DEFAULTS AND ALTERNATIVES: AN APPROACH TO INTRODUCING MORE SOPHISTICATED RATES



HIGH SOPHISTICATION RATE

Alternative rate options available to customers that are more sophisticated than the moderate sophistication default rate.

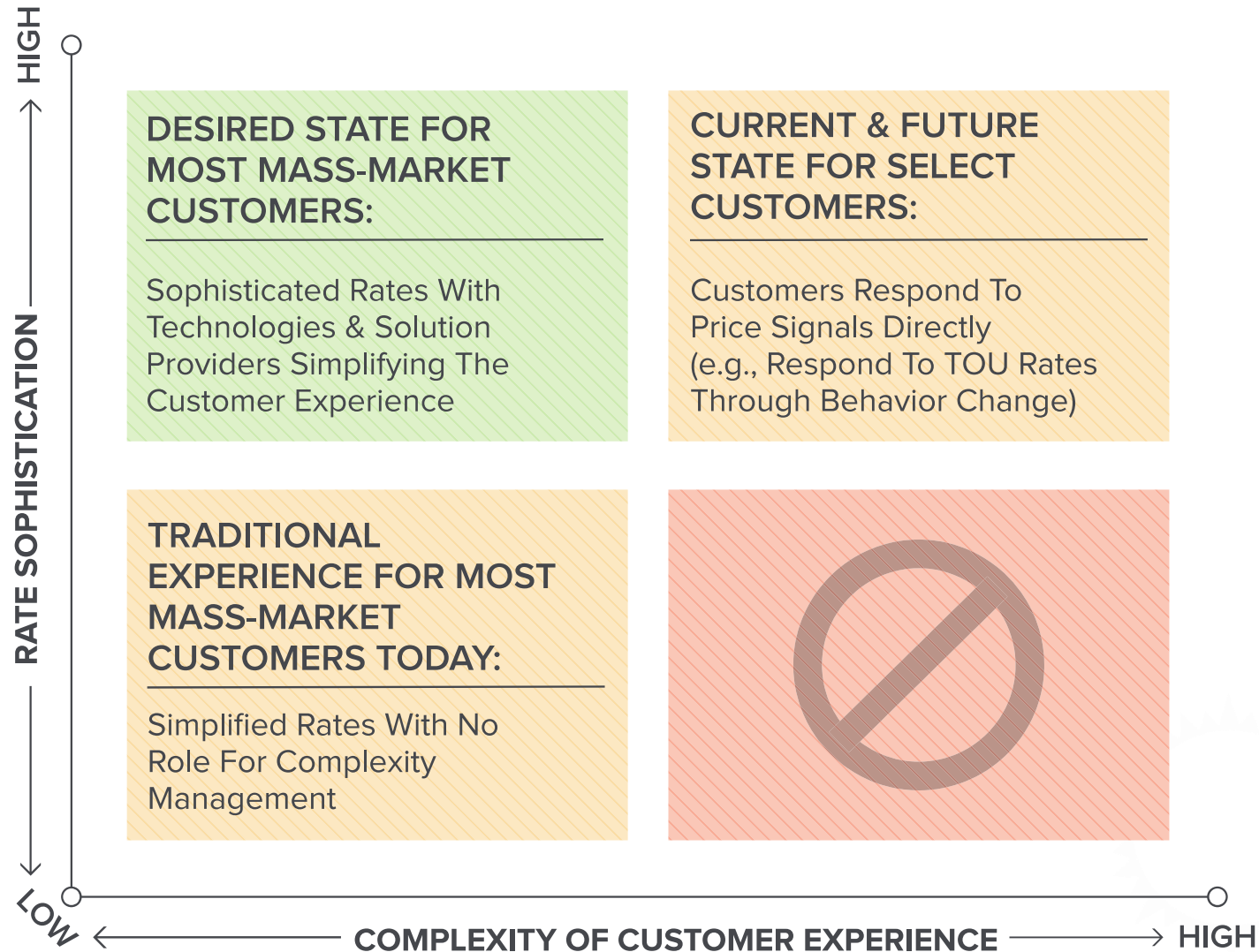
MODERATE SOPHISTICATION RATE

Alternative rate options available to customers that are more sophisticated than the traditional default rate, and alternatively less sophisticated than the high sophistication default rate

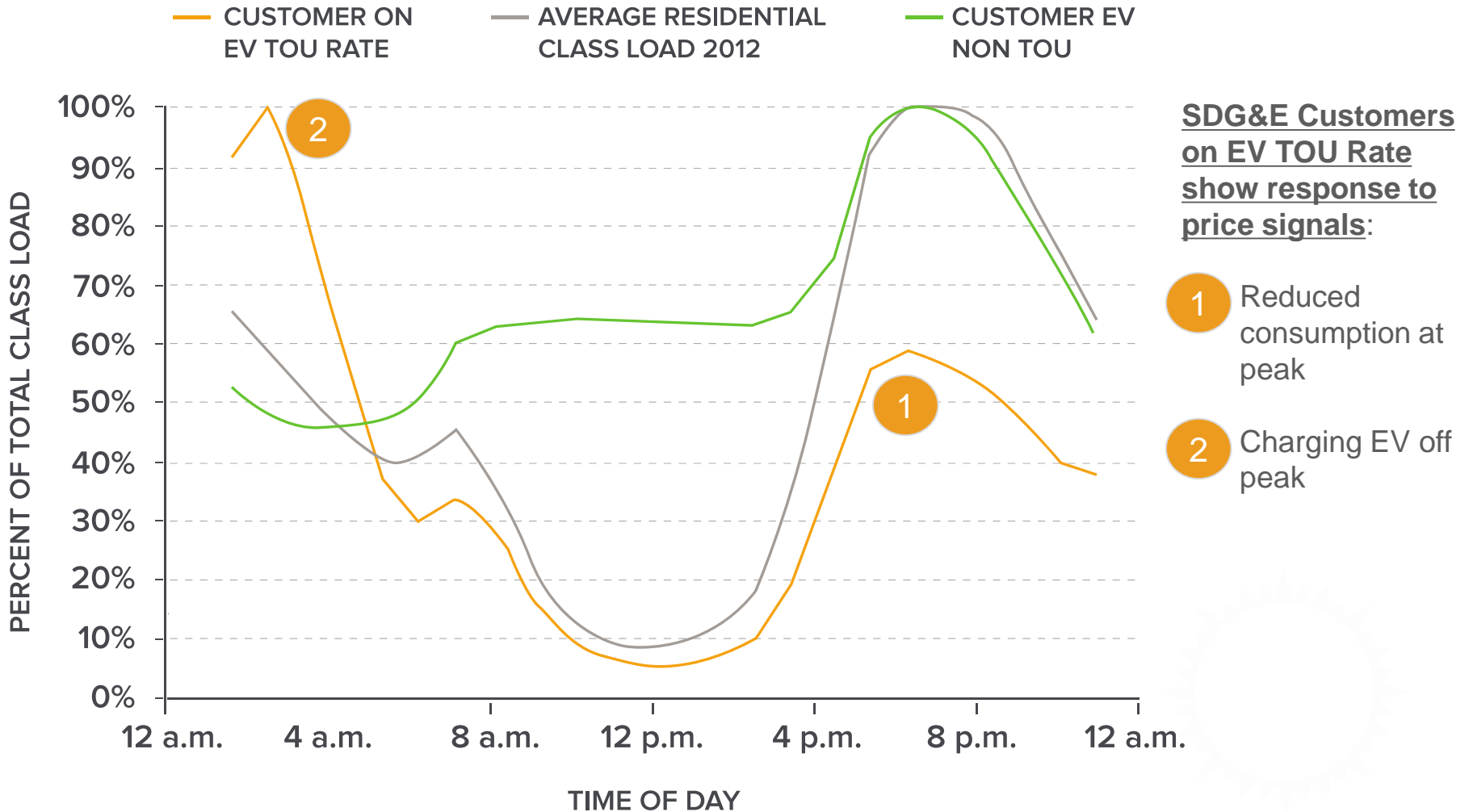
TRADITIONAL RATES

Alternative rate options available to customers that are less sophisticated than the moderate sophistication default rate

SOLUTION PROVIDERS CAN MAINTAIN A SIMPLE CUSTOMER EXPERIENCE AS RATES BECOME MORE SOPHISTICATED

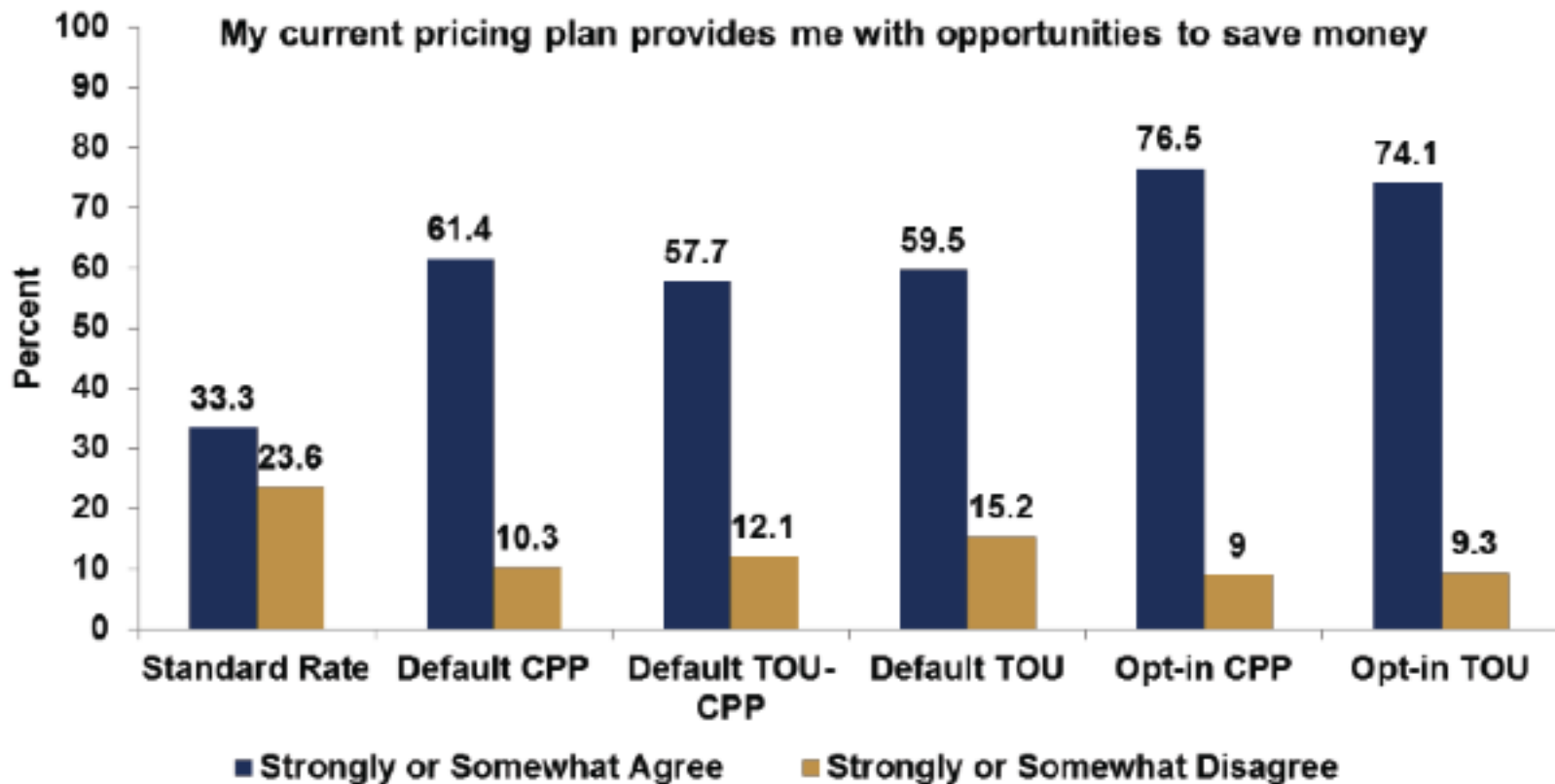


EXAMPLES EMERGING OF SOPHISTICATED RATES IN PRACTICE: SDG&E EXAMPLE



ADVANCED RATES EMBRACED BY CUSTOMERS: SMUD EXAMPLE

More advanced rates (both default and opt-in) provide customers with money-saving opportunities as compared to standard rate option.



Source: SPO Final Evaluation



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