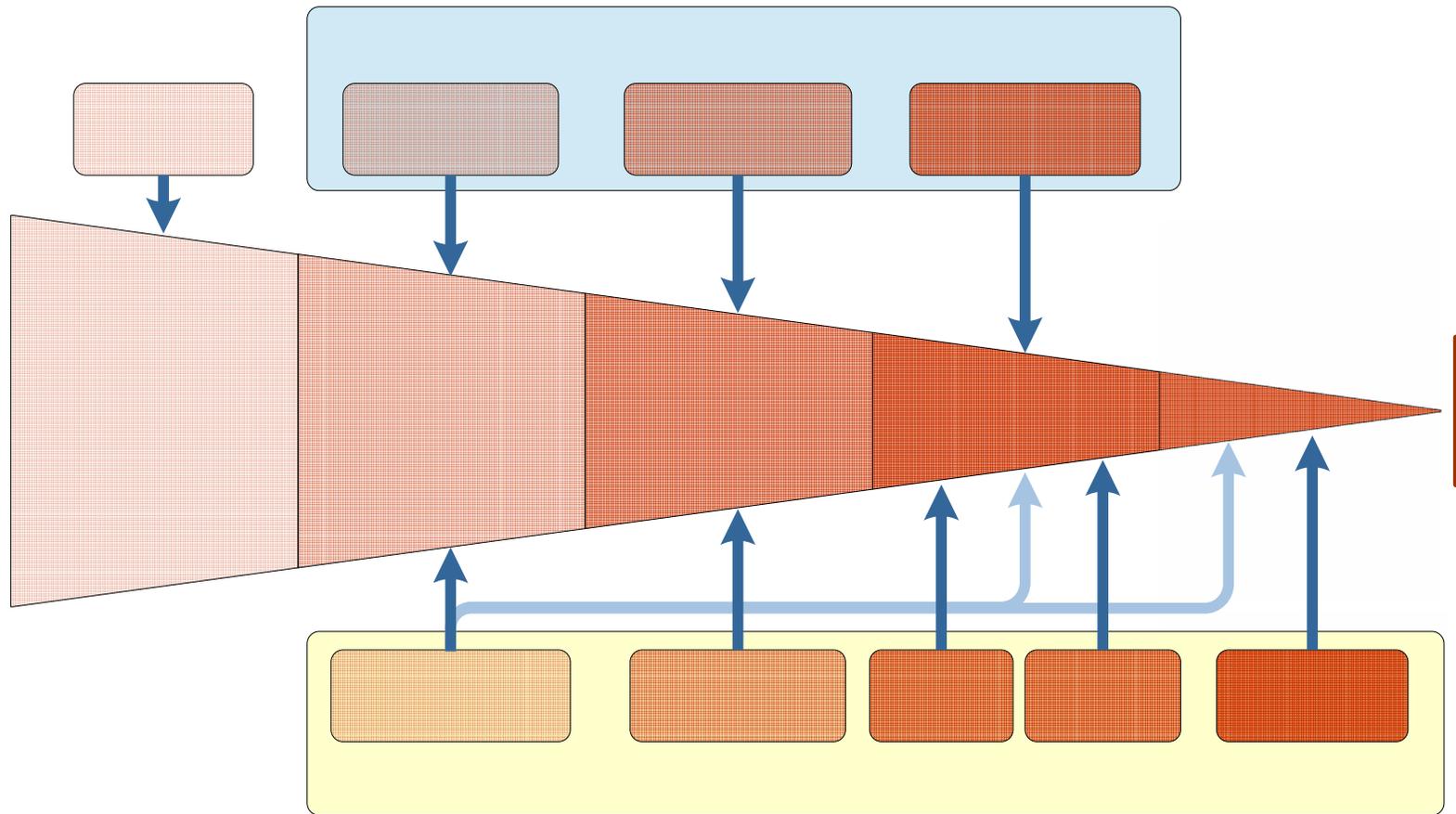


# Measurement and Evaluation of Demand Resources

Jeff Schlegel  
Independent Consultant  
FERC Technical Conference  
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# The Diversity of Demand Resources...



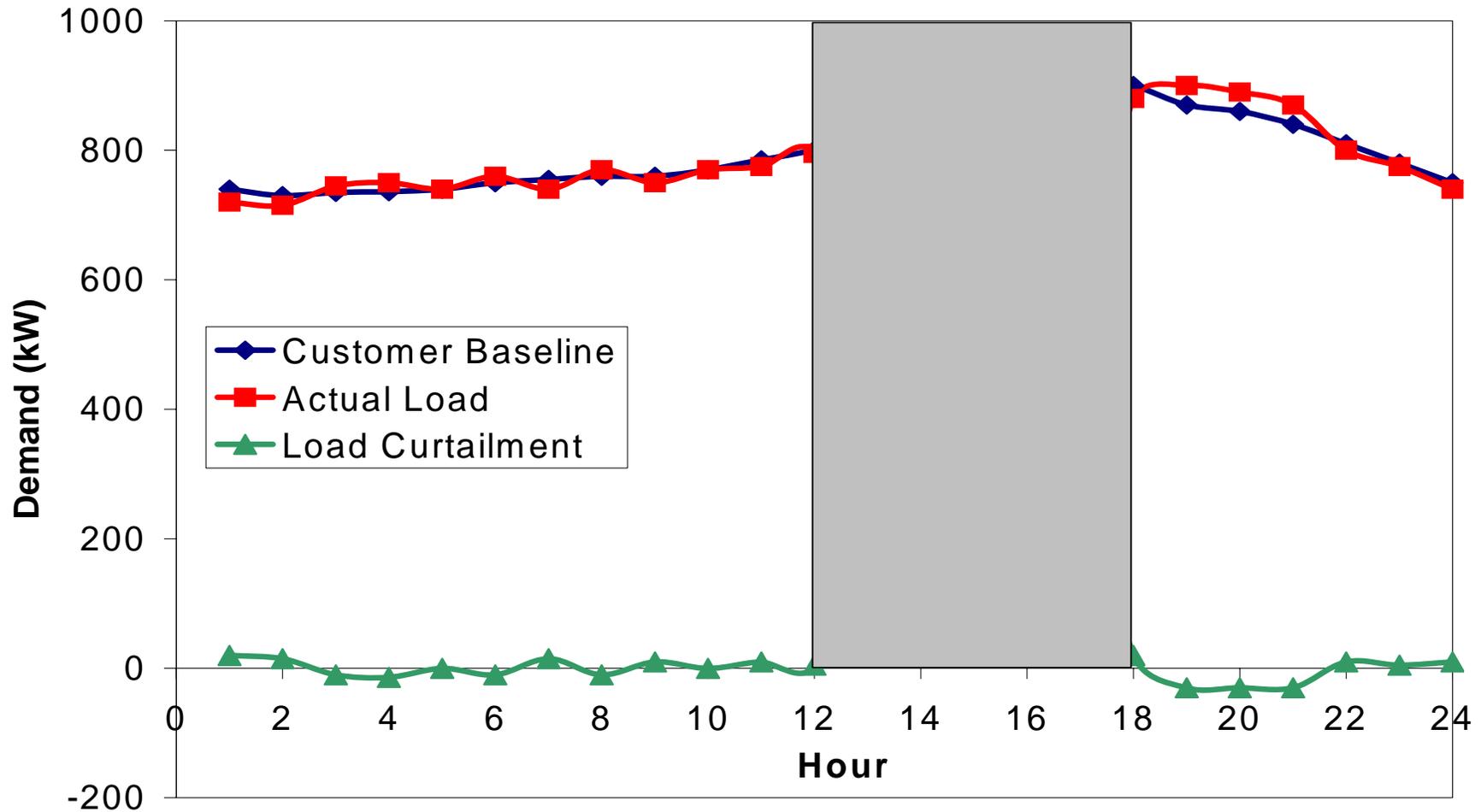
## ...Leads to a Variety of M&V and Planning Approaches Based on:

- Objectives of the DR program
- Characteristics of the resource
- Timing of the impacts
- Uses of M&V results (e.g., cost allocation, capacity markets, resource/transmission planning)
- Perspectives of stakeholders and market participants

## Common Components of Demand Resource M&V

- Measured performance of the Demand Resource measure in the installed condition
- Compared to the baseline condition (without the measure)
- At a defined time (e.g., system peak, DR event, on-peak energy hours, defined performance hours)

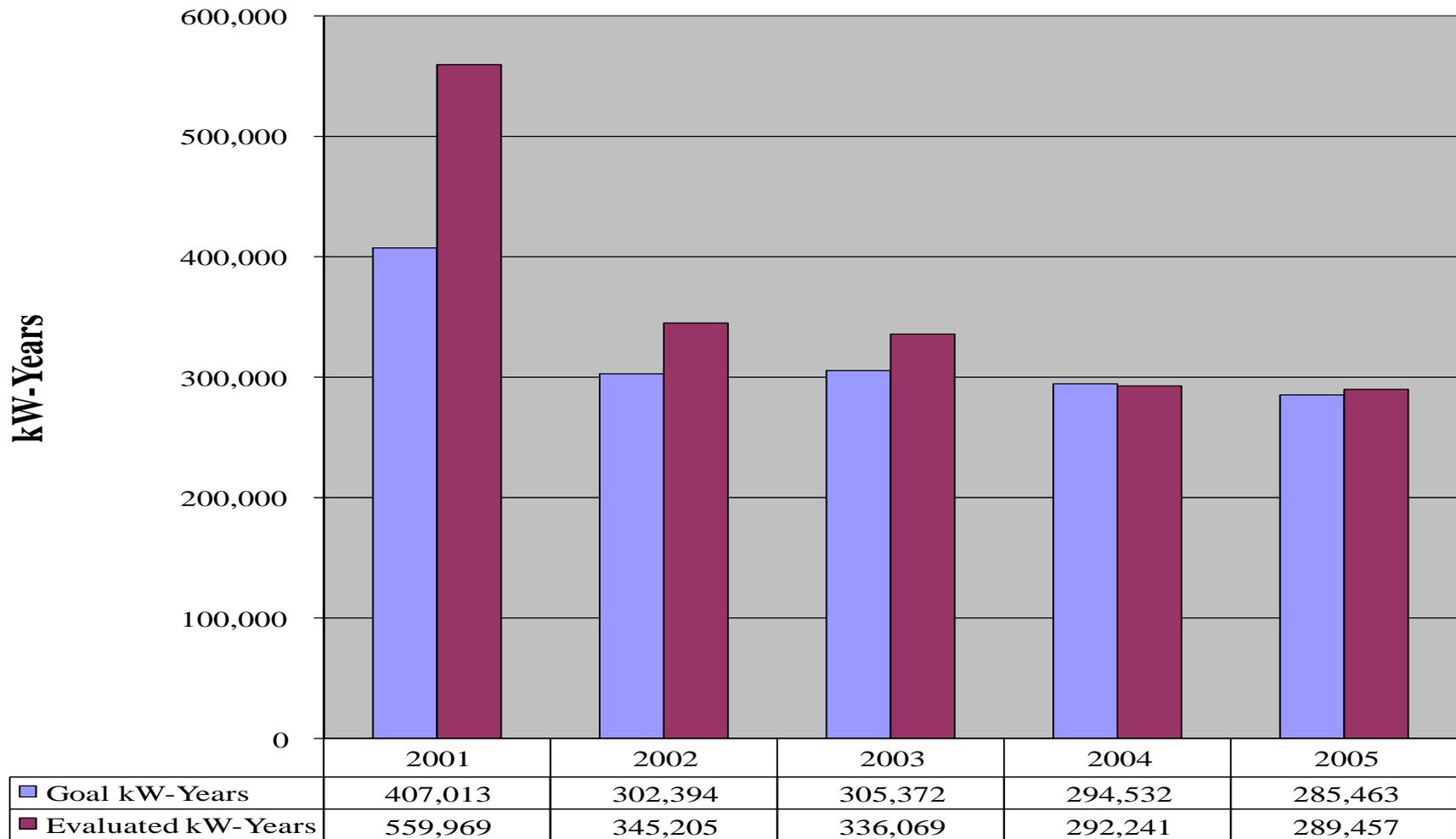
# DR M&V: Establishing Customer Baseline is Key



# Evaluation of Energy Efficiency and Retail Programs

- Evaluation: based on analysis of metered and billing data, site measurements; energy & capacity
- Technical reference manual of key impact factors and values
- Systematically updated and refined using evaluation data
- Refined values used in planning

# Performance of a Diversified State/Retail Energy Efficiency Portfolio



# Energy Efficiency M&V is Applicable to Wholesale Markets

- Energy efficiency M&V is applicable: reliable, systematic measurement of EE measure impact and customer baseline
- Appropriate for the EE resources
- BUT addressing *timing*, i.e., the retail vs. wholesale performance periods, can be a challenge

# Value of the Resource vs. Valuation in Market Rules (ISO/RTO)

## Mismatch in Resource Valuation and the Time Periods for Valuation

Retail Programs (Avoided Costs)	ISO/RTO Programs
	Demand Response Events (timing unknown in advance)
Capacity Benefits: Summer and winter system peaks, in MW	Forward Capacity Market: Specified Performance Hours (on-peak, critical peak, in MWh)
Energy Benefits: On- and off-peak, for summer and winter periods, in MWh	High Prices or Pricing Events (timing unknown in advance)
T&D Capacity Benefits	Transmission Planning (TBD)
Cumulative and Lifetime Impacts	Shorter-Term Periods

# Strict M&V Requirements Can be a Barrier to Entry for Demand Resources

- M&V is a cost, often significant
- Some M&V requirements may not be relevant for demand resources
- ISO/RTOs not always familiar with Demand Resource M&V practices
- Not necessary to meter the output of each demand resource as one would for a 200 MW power plant

## Increased Consistency in M&V Would Help...

- Consistency across ISO/RTOs
- Retail program requirements and wholesale market rules
- Time periods for valuation
- Terminology
- Common platform for M&V standards and protocols

...But M&V Standards  
Should be *Comparable*,  
NOT Uniform

- Characteristics of Demand Resources different than supply, and vary across Demand Resources
- Need clear, appropriate, and flexible M&V standards that result in reasonably *comparable* reliability
- National and regional efforts should consider multiple purposes for DR (retail, wholesale, environmental)