DSM Program Evaluation and its Benefits

Developing Optimal Deployment Strategies

Steve Fenrick

Power System Engineering, Inc.
Web Site: www.powersystem.org
fenricks@powersystem.org

July 20, 2011

Presentation Agenda

- Types of Analysis

- Why Looking at Consumer Characteristics is Important When Evaluating DSM Programs

- Value Proposition in Customizing Deployment Strategy for Consumer Characteristics

- Key Elements and Steps for Optimal Deployments

Evaluation versus Settlement

Evaluation	Settlement
Able to use all information available at end of year or season	Must be operable on a short time horizon (people want their money)
Methods can be more complex and focused on accuracy and providing information to utility decision-makers	Need for understandability and transparency since financial payment or penalties based on calculations
Interested in program performance and key drivers rather than "truth" for each participant	Applies to each individual consumer

Ex Ante versus Ex Post

- Ex Ante Estimates

  – What energy/demand response do we estimate will happen?

  – Engineering-based estimates (deemed savings)

- Ex Post Estimates

  – What energy/demand response do we estimate did happen?

  – Data-based estimates using interval data, monthly use data, survey responses, climate data

Evaluation Types for DR

Guidance and Recommendations for Ex Post Impact Evaluation of Event-Based DR

Day Matching Methods

Regression Methods

- Easily implemented
- Tend to be biased and less accurate
- Cannot easily incorporate key drivers of impacts
- No statistical testing of results
- More susceptible to gaming
- Constrained by program features such as "pre cooling"

- More complex
- **<u>Able to incorporate key drivers of impacts</u>**
- Not biased and more accurate
- Statistical testing of results
- Able to incorporate all available information

Day Matching Methods

- Can exclude high or low days within a "Look back window"

- "Morning" adjustments or climate adjustments possible

Day Matching Similar Event Day Usage

Avg similar day use

kW Use

Similar Days · Event
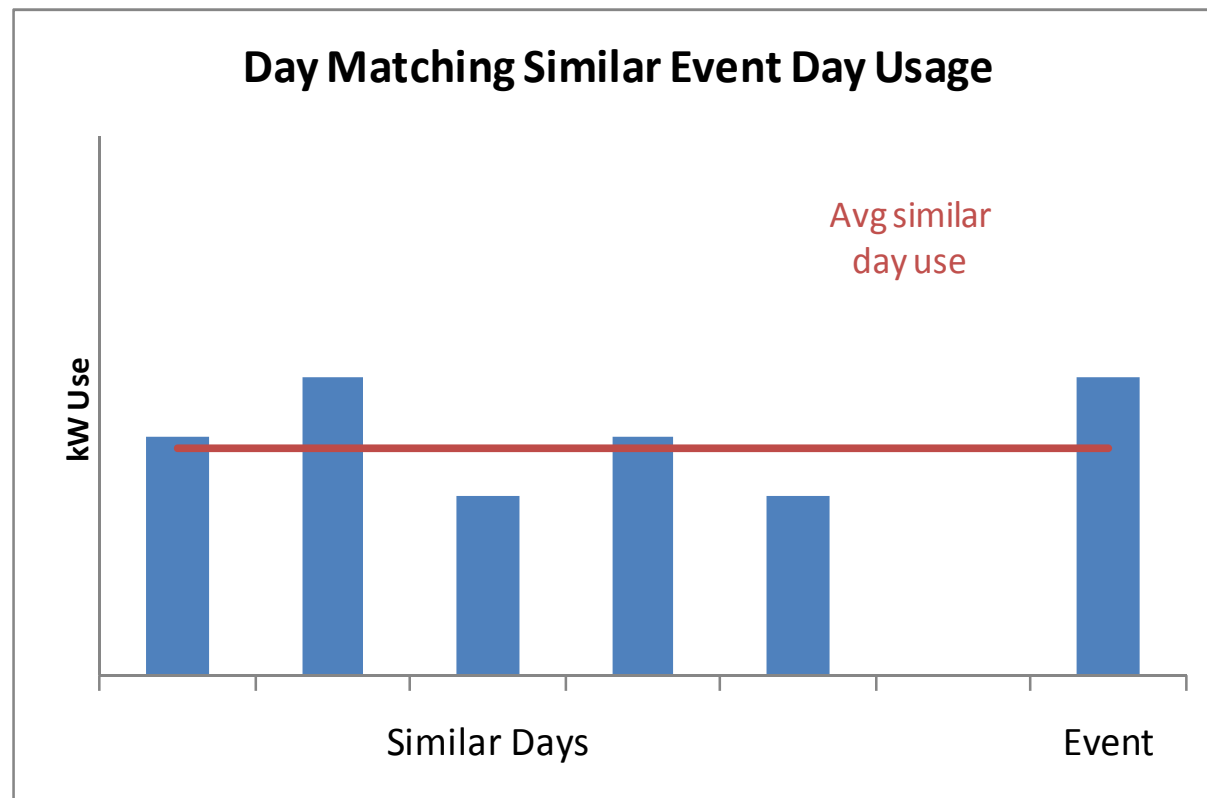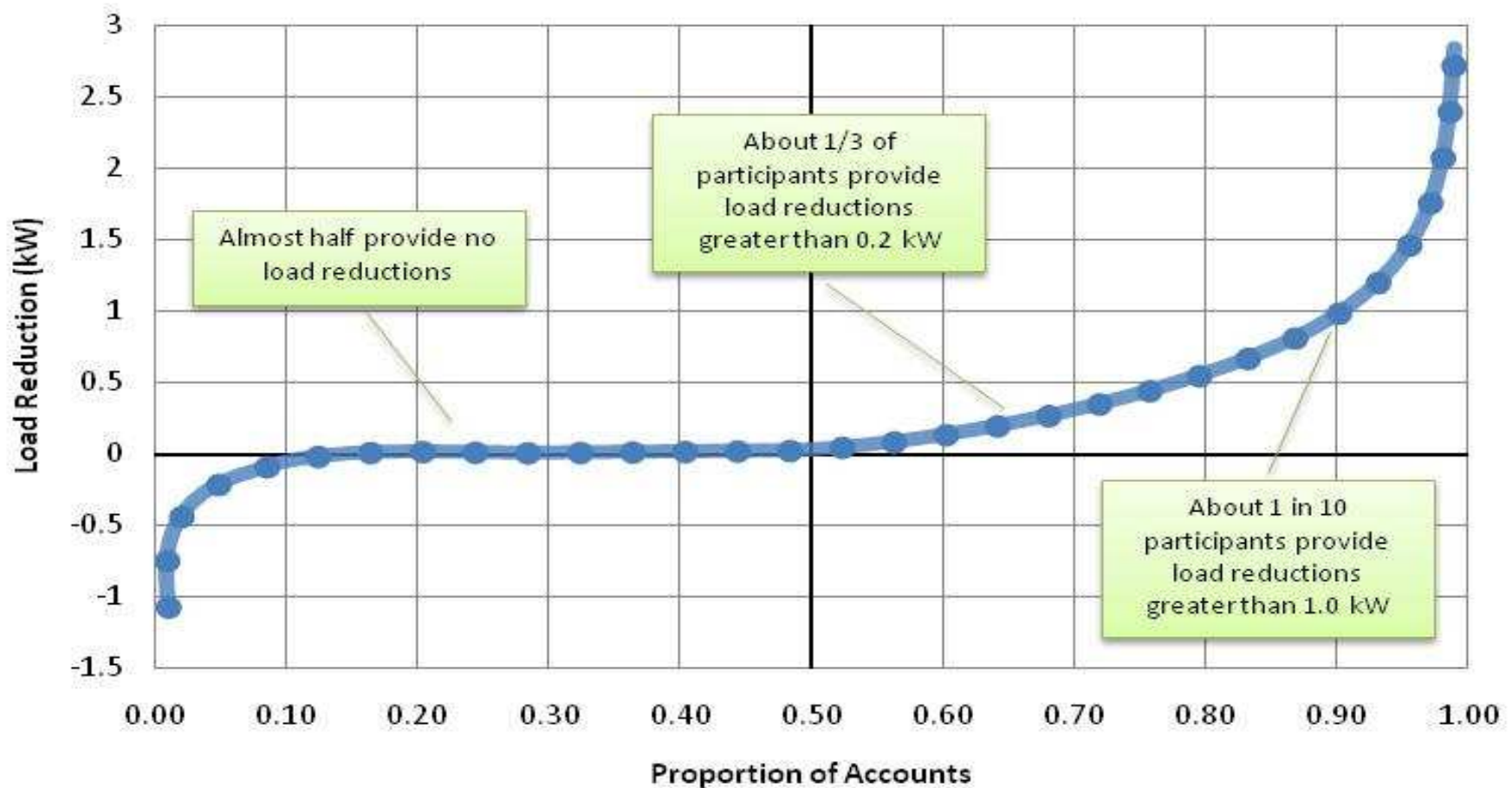
Regression Methods

- Compare hourly expected demand to actual demand

- Expected demand is a function of climate changes, event, **participant characteristics**, etc…

Regression Method

Estimated demand reduction

Usage

Peak Period

Time of Day

Baseline Realized
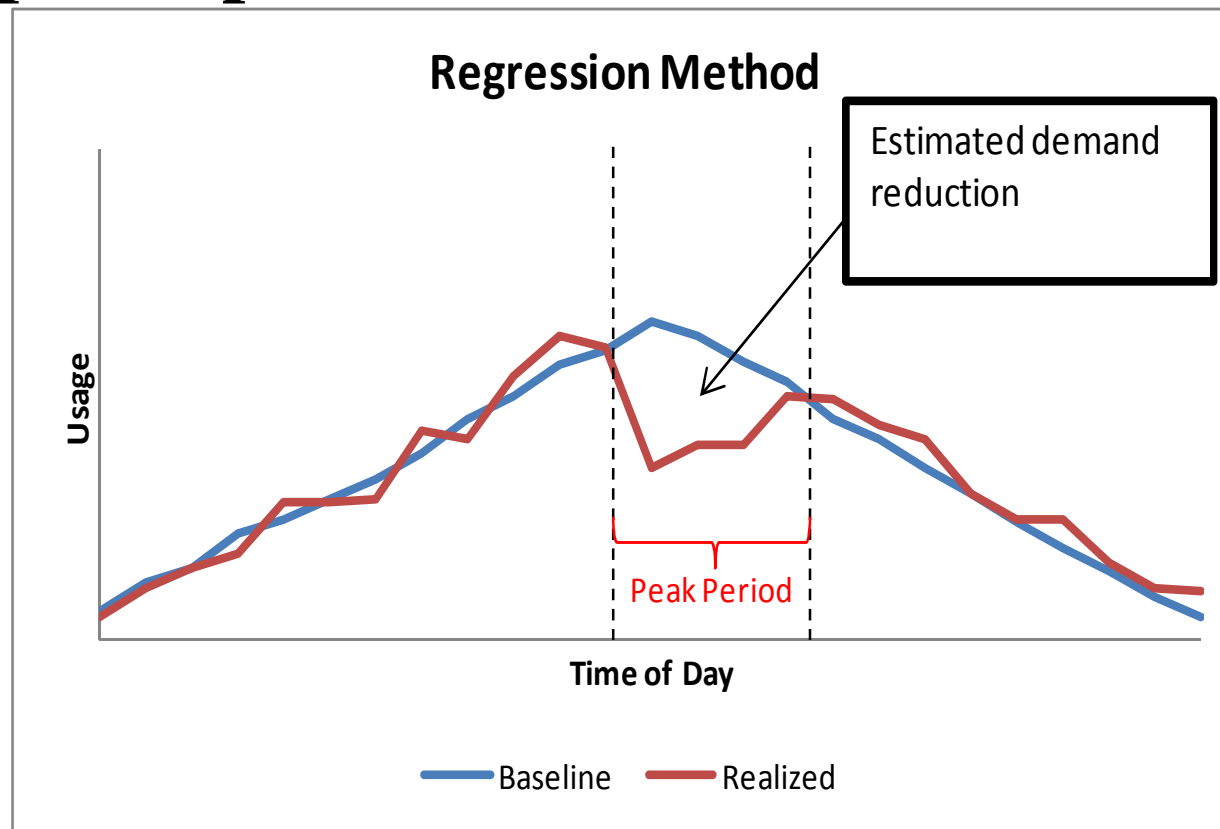
Why Are Key Drivers Important?

Cumulative Distribution of Average Event Load Reduction
(by Customer)

Almost half provide no load reductions

About 1/3 of participants provide load reductions greater than 0.2 kW

About 1 in 10 participants provide load reductions greater than 1.0 kW

Load Reduction (kW)

Proportion of Accounts

Assume a System of Three Consumers

- Jane has the motivation to change behavior, Joe has the ability to change behavior, Jill has neither
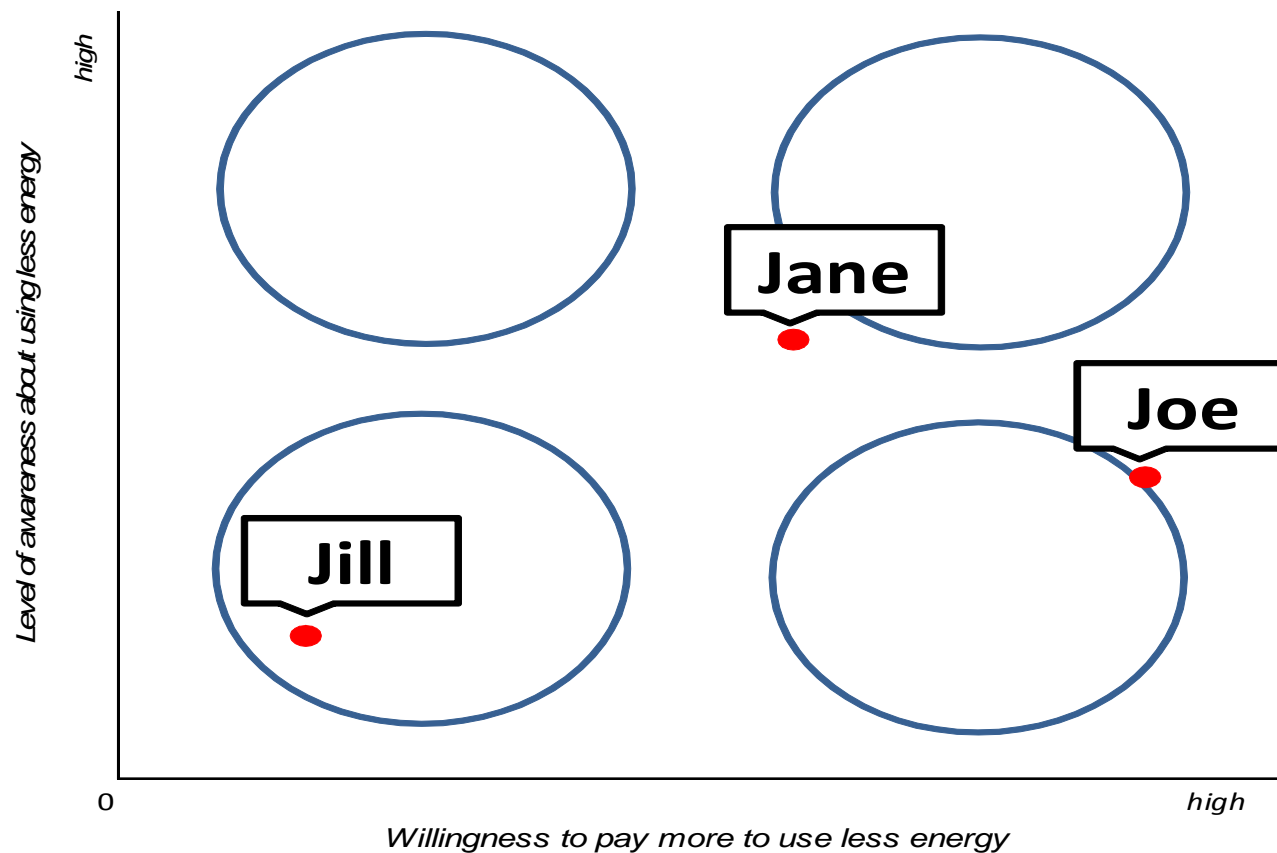
Translate Evaluation Results to Strategic Deployment Plan

- Evaluation results can help predict consumer behavior changes

Cumulative Distribution of Average Event Load Reduction
(by Customer)
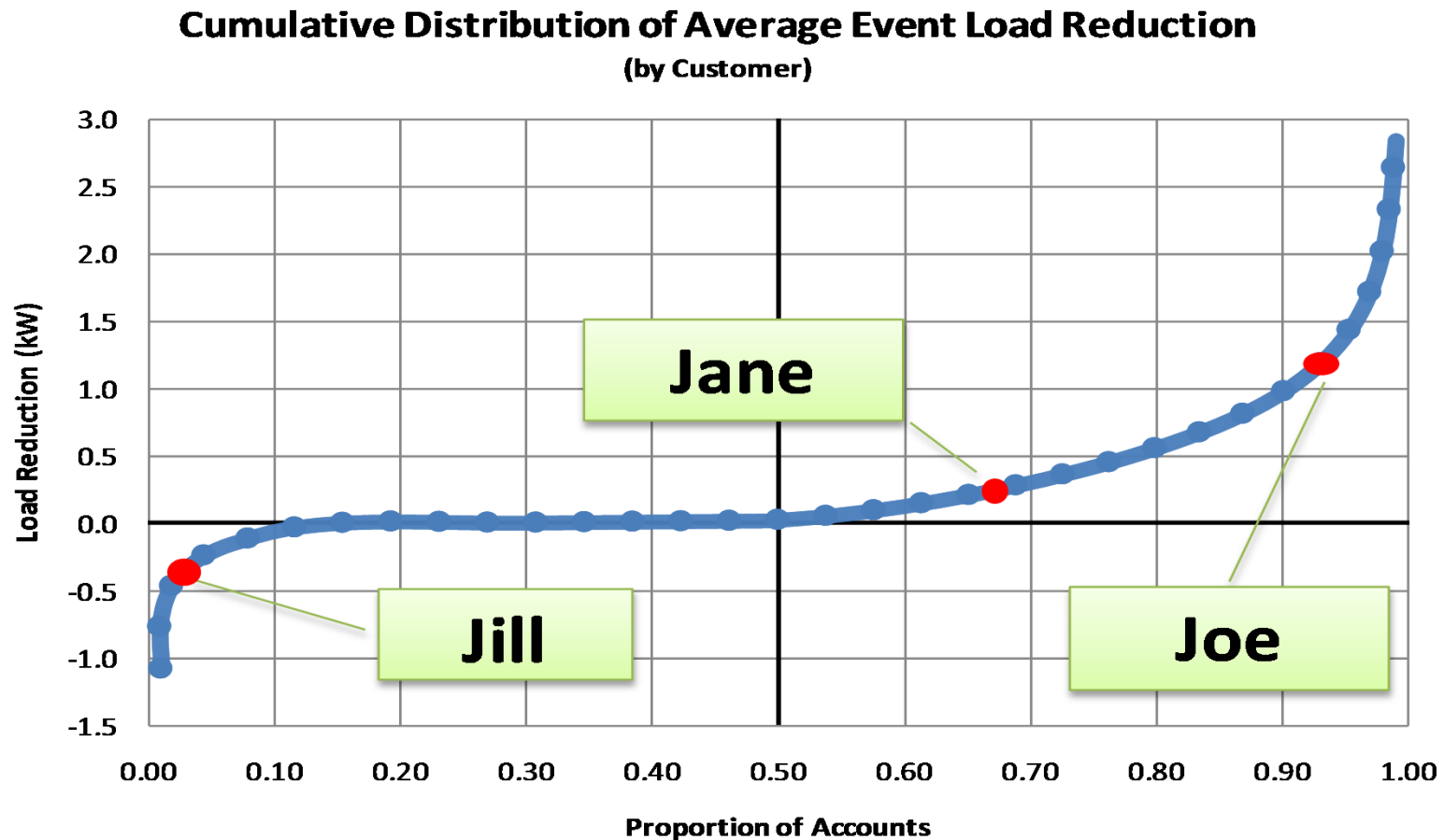
Potential Value Proposition

Reallocate marketing resources from Jill to Joe
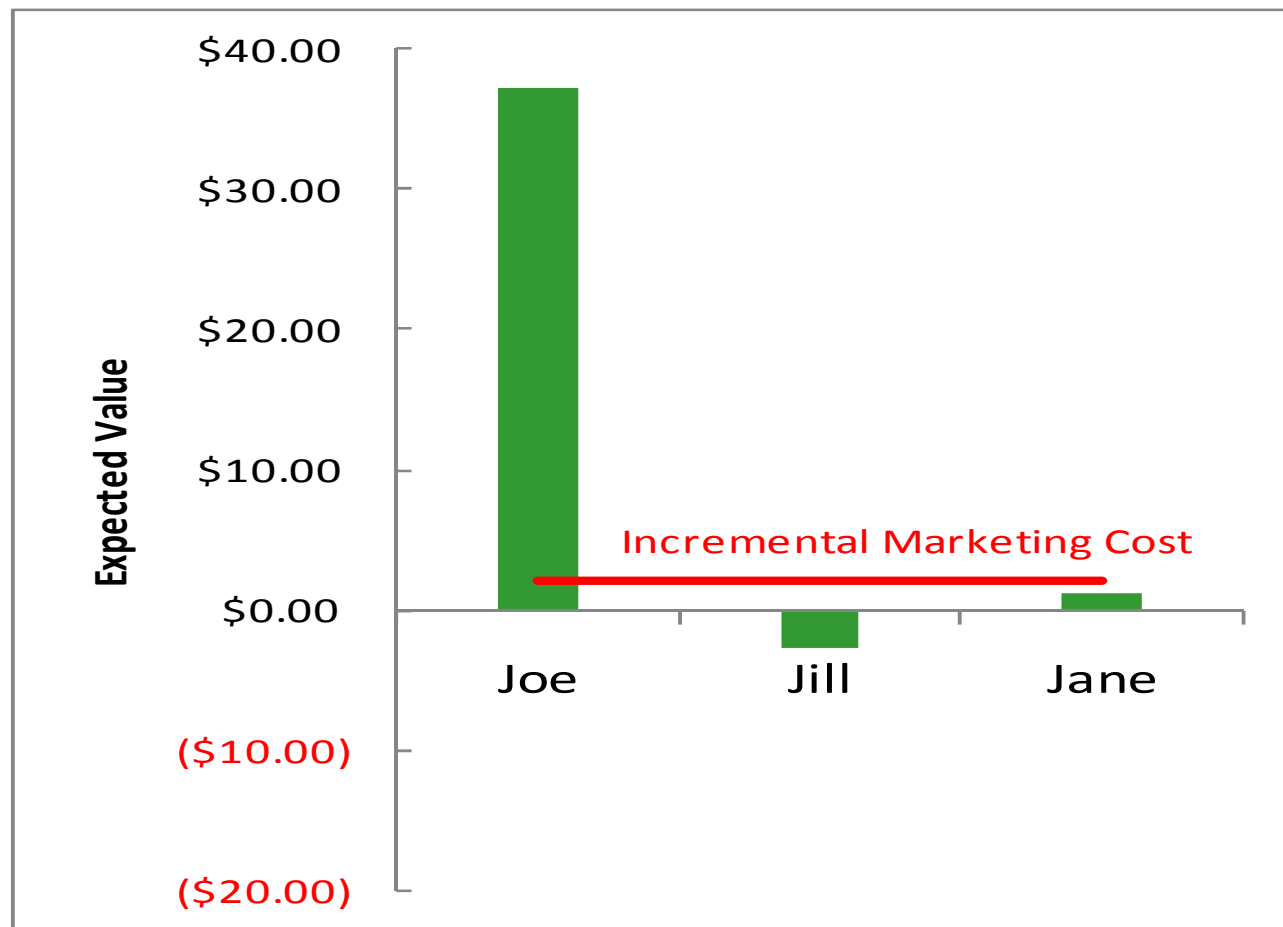
Value of DSM Program

Customized strategy increases chances of Joe participating and decreases chances of Jane leading to less waste and higher benefits

Assume a 10,000 member system comprised of:
- 1/3 "Joe's"
- 1/3 "Jill's"
- 1/3 "Jane's"

Consumer Type	Expected Value (no customized strategy)	Expected Value (customized strategy)
"Joe" Consumers	$124,321	$372,963
"Jill" Consumers	$(8,999)	$(1,800)
"Jane" Consumers	$3,833	$3,833
Total Value	**$119,155**	**$374,996**

Key Elements
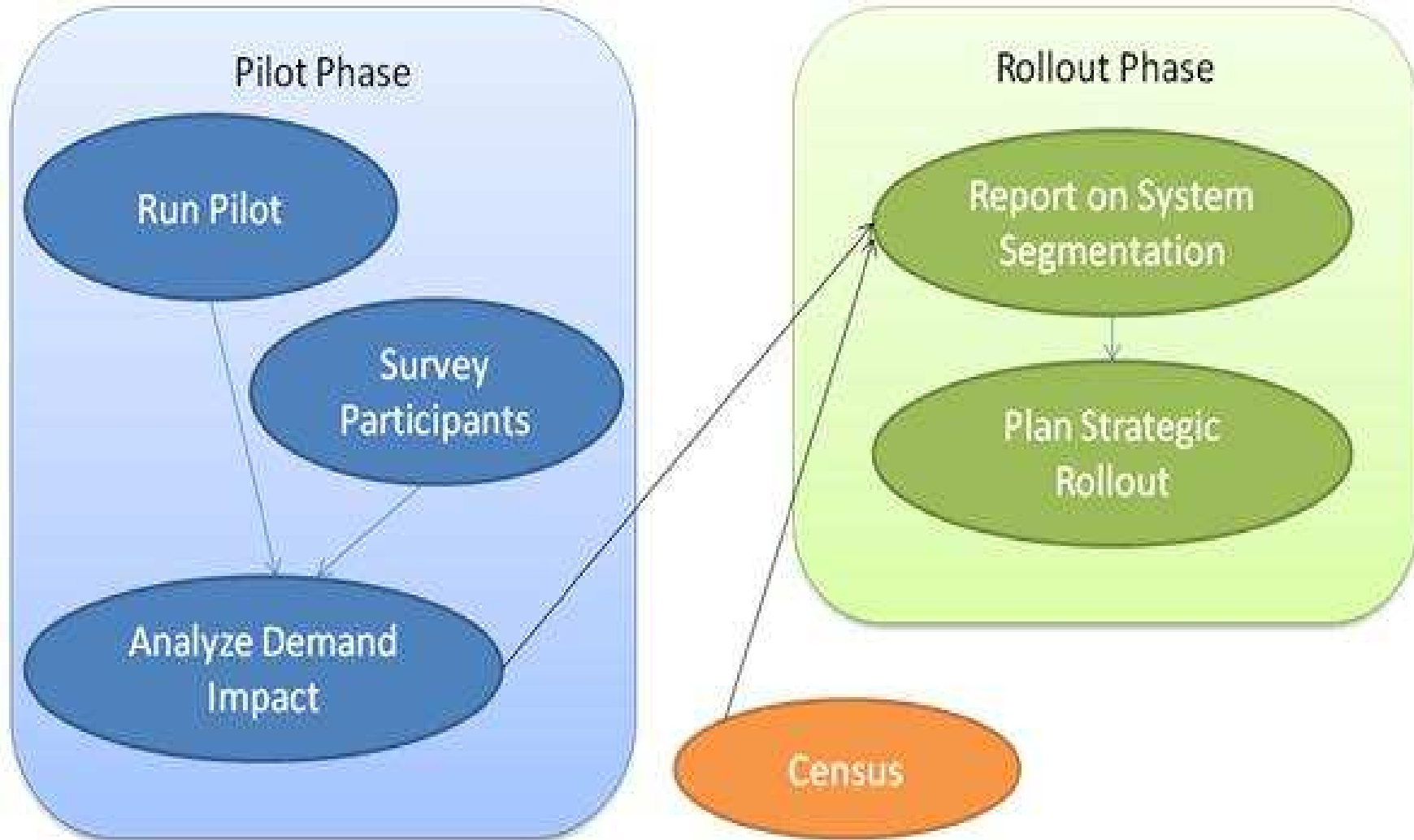
Suggested Steps for DSM

1. Pilot program with multiple marketing strategies

2. Survey participants

3. Demand/energy impact analysis of pilot

   ❑ Or… use impact analysis of neighbors and industry (e.g. CRN Smart Grid Grant results when available)

4. Census or other data gathering of system

5. Segmentation and optimized roll-out strategy

   – Target low-hanging fruit and maximize program ROI

   – Manage customer perceptions, expectations, and word-of-mouth

Questions?

Thank You!

Steve Fenrick

Direct: 608-268-3549

Email: fenricks@powersystem.org

Website: www. powersystem.org