Energy Efficiency Programs and Evaluation

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Who We Are

- Created in 1991 by administrators of ratepayer funded EE programs and nonprofits
- As their organization to:
  - Leverage efficiency resources (U.S. and Canada) to address structural market barrier and capture greater total savings
  - Share “best” practices
  - Identify common needs to enhance savings impacts

Who We Are

- Nonprofit
- Governed and funded by members and sponsors
- 150 members from states and provinces with ratepayer funded efficiency programs
- Staff of 30
- $4 million organizational budget supporting a member base with collective annual program budgets in the $Billions

Membership is limited for credibility

- **Efficiency Program Administrators**—utilities and non-utilities with ratepayer funded programs
- **Public Stakeholders**—such as DOE national labs, state and provincial energy offices, government energy research agencies, regional and national efficiency organizations

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- **NO** Organizations with private interests, e.g., manufacturers, consultants, program contractors

Mission

CEE works on voluntary national and bi-national efforts to accelerate markets for energy efficient products and services.

What We Do

- Through committees of members we facilitate national initiatives designed to overcome market limitations and uncover market opportunities.
- We work to achieve consensus on performance levels and other aspects of import. Members voluntarily adopt initiatives locally.
  - Result—greater consistency and market focus
  - Greater market recognition of value and how to locate associated products and services

Origin of EE Programs (1)

- Mid-70s:
  - Energy crisis and OPEC oil embargo
  - Conservation
- Early 80s to early 90s: Supply planning, Integrated Resource Planning and Efficiency
- Mid-1990s:
  - Deregulation/restructuring
  - Many states abandon IRP
  - Establishment of public benefits/system benefits charges

Origin of EE Programs (2)

- 2000s:
  - Restructuring
  - Enron
  - Reliability issues
  - Increased focus on systems benefits
  - Renewed emphasis on IRP
  - Resource procurement
- Most recently:
  - Renewable integration
  - Climate change tool
  - “Smart” capabilities

EE Industry Today

- EE Savings potential
- Program administration
- Program funding and impacts
- Program design
- EM&V
- State and federal policy environment

EE Technical Savings Potential

- EPRI estimates that EE programs have the realistic potential to reduce electricity consumption growth rate by 22% (to 0.83% per year) from 2008 through 2030, or 36% under “ideal” conditions (EPRI 2009).
- ACEEE examination of 11 EE potential studies showed median economic potentials of 20% for electric and 21.5% for gas, and median technical potentials of 33% for electricity and 40% for gas.

EE Savings Potential from Behavior Change

- Behavioral insights from the social sciences can be harnessed to improve results from more traditional program approaches in C&I and Residential sectors.
- Examples:
  - Frame program options (opt out versus opt in)
  - Design programs and equipment with human factors in mind
  - Increase the use of feedback whenever possible
  - Harness the power of recent technological and social developments (e.g. online social networking) to facilitate active energy management and enhance program participation

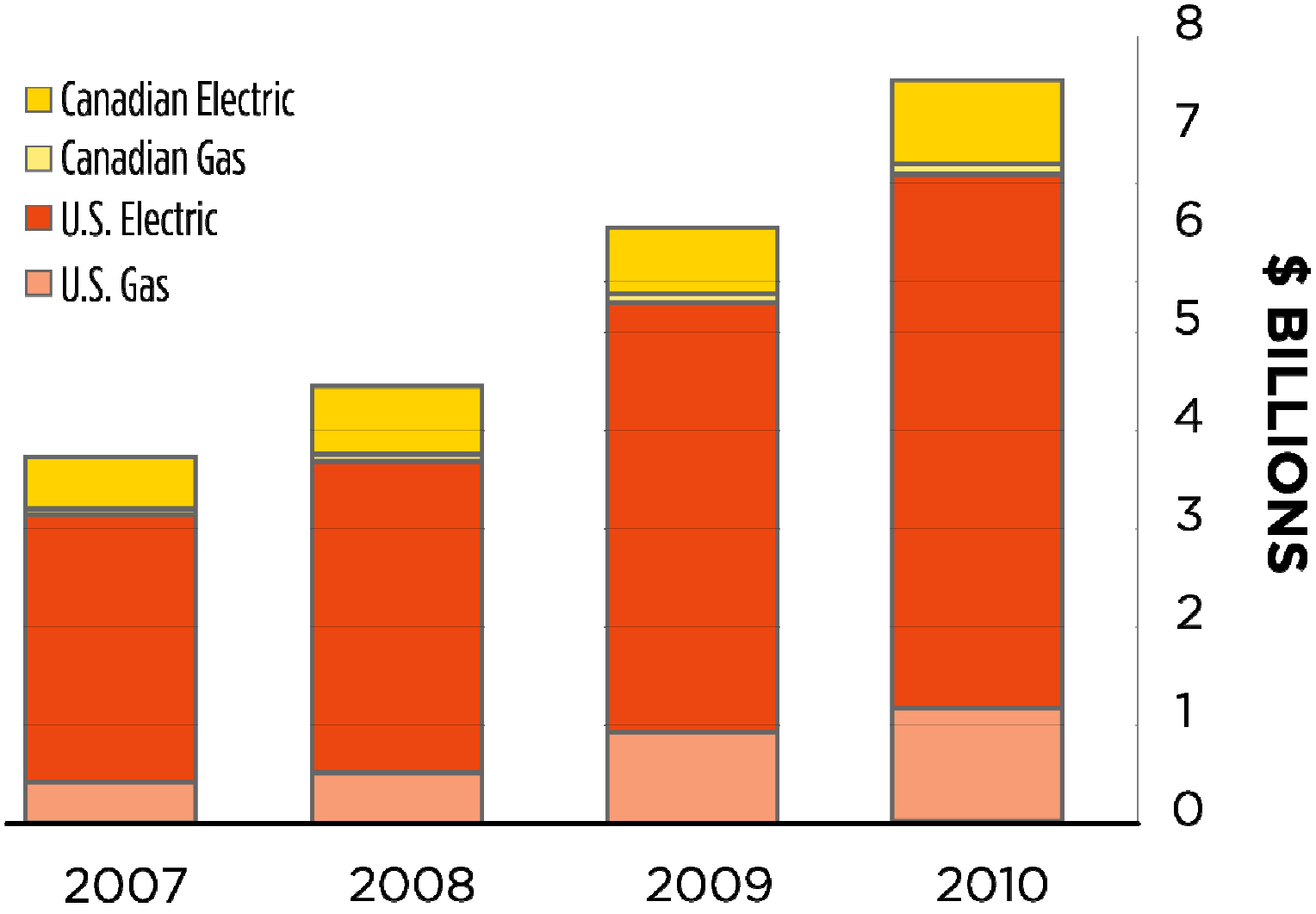
EE Savings Potential from Smart Grid Technology

- EPRI (2008): Potential savings in 2030 of five applications enabled by a Smart Grid
  - Between 56 and 203 billion kWh and between 31 and 114 million metric tons CO_2
- Hledik (2009): Annual power sector CO_2 emissions reductions by 2030 from a national smart grid strategy
  - Conservative scenario (currently available technologies only): 5 %
  - Expanded scenario (includes future smart grid technologies): almost 16 %

Program Administration

- Two basic types of program administrators:
  - Utility
    - IOUs and energy distribution companies, including co-ops
    - Municipally owned power providers
  - Non-Utility
    - State government
    - non-government statewide or regional organizations
- Utility program administrators
  - Are the most numerous type of program administrator
  - Administer ~ 80% of ratepayer funded energy efficiency budgets in the U.S. (as of 2008)

2010 DSM Budgets Grow to $7.5 Billion

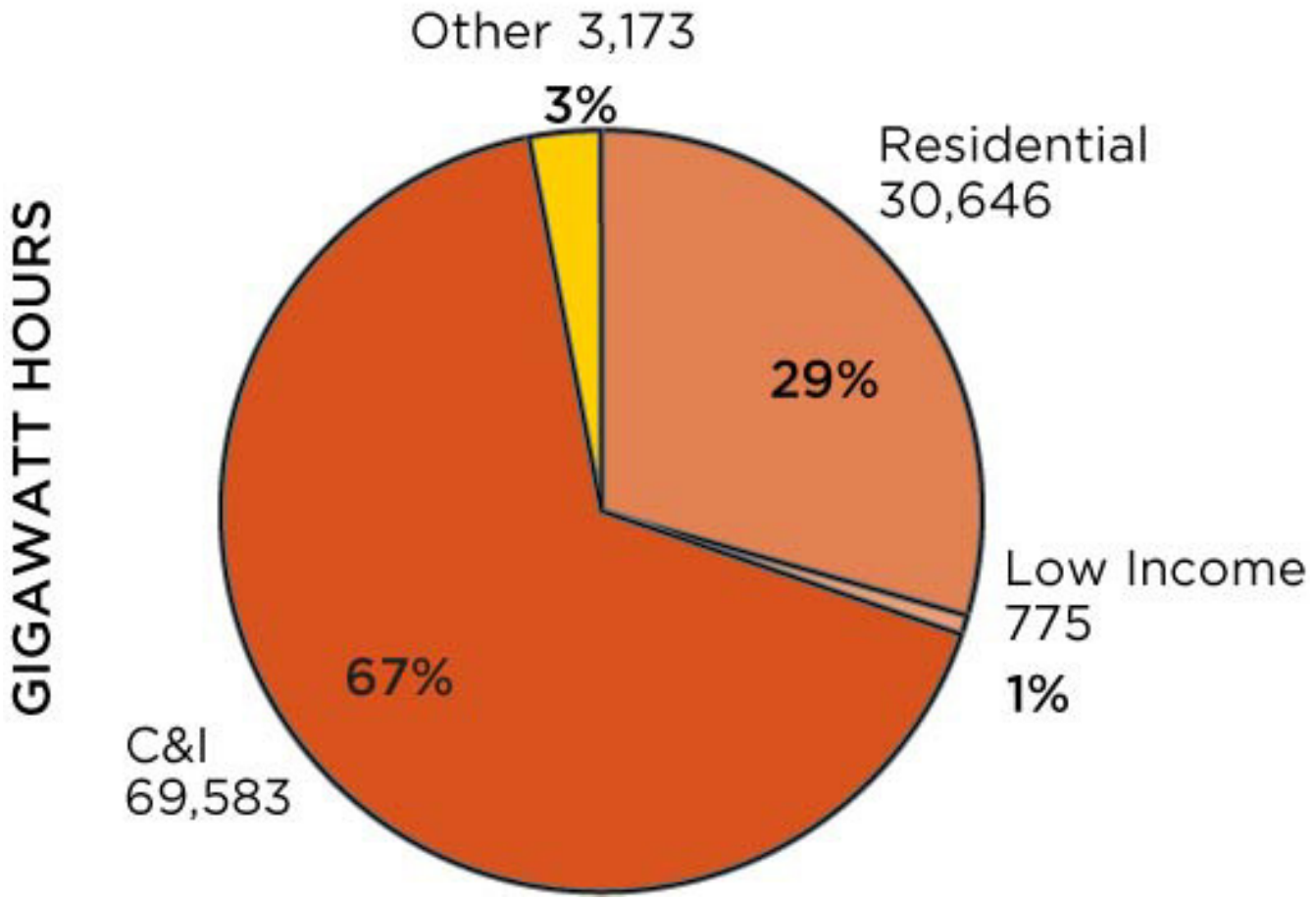


Total U.S. and Canadian DSM Budgets

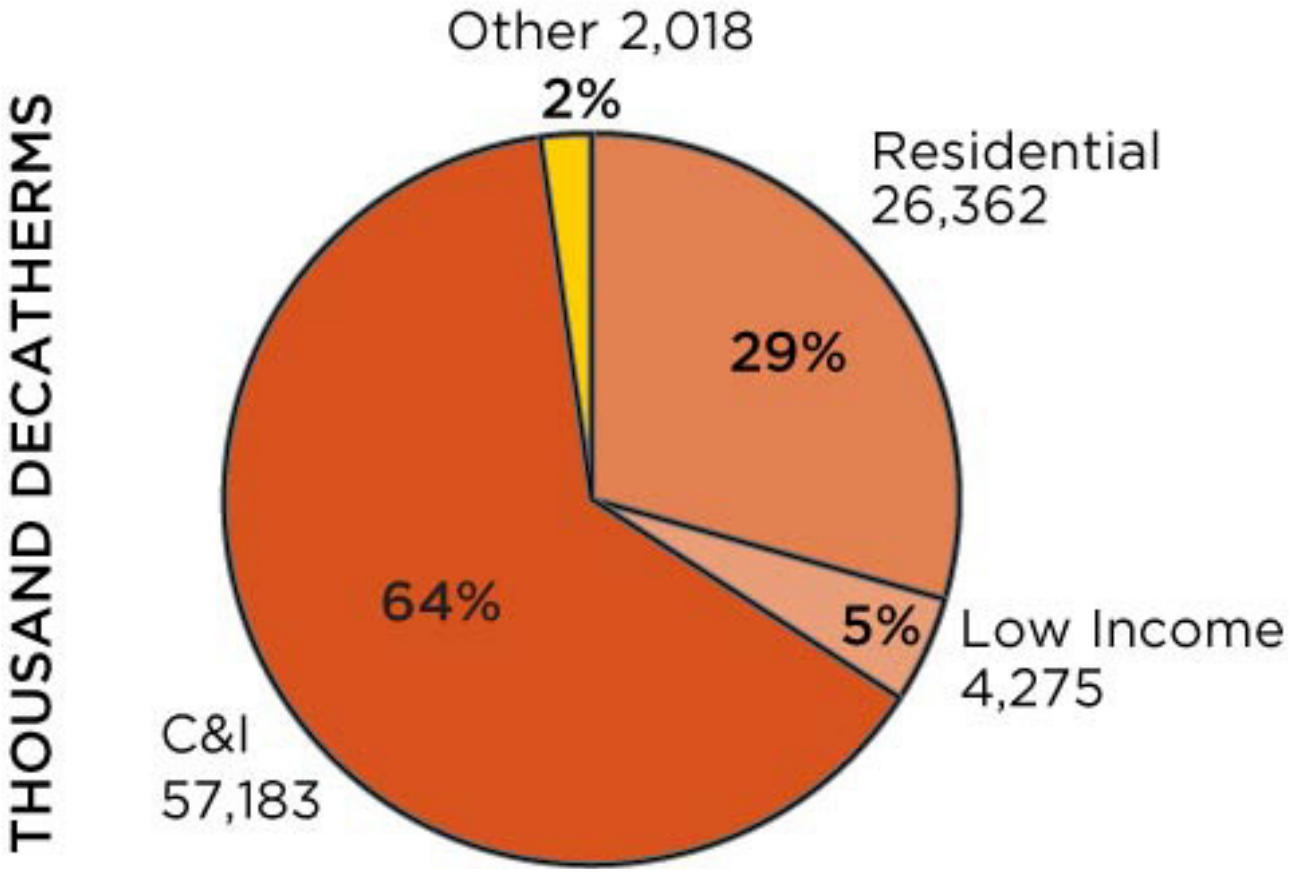
Where does $5.4 B US Electric DSM come from?

- California ($1.5B) and New York ($0.6B) account for $2B (39%)
- Next $1.2B comes from FL, MA, NJ, OH, PA ($300M–$150M) (22%)
- Another $1.2B from WA, CT, TX, IA, IL, MD, MN, BPA-NEEA, WI, AZ, OR (22%)
- Remaining $1B from 26 states (<$1M–$85M) (18%)

Electric Program Savings
2009 Value of $9.7 Billion



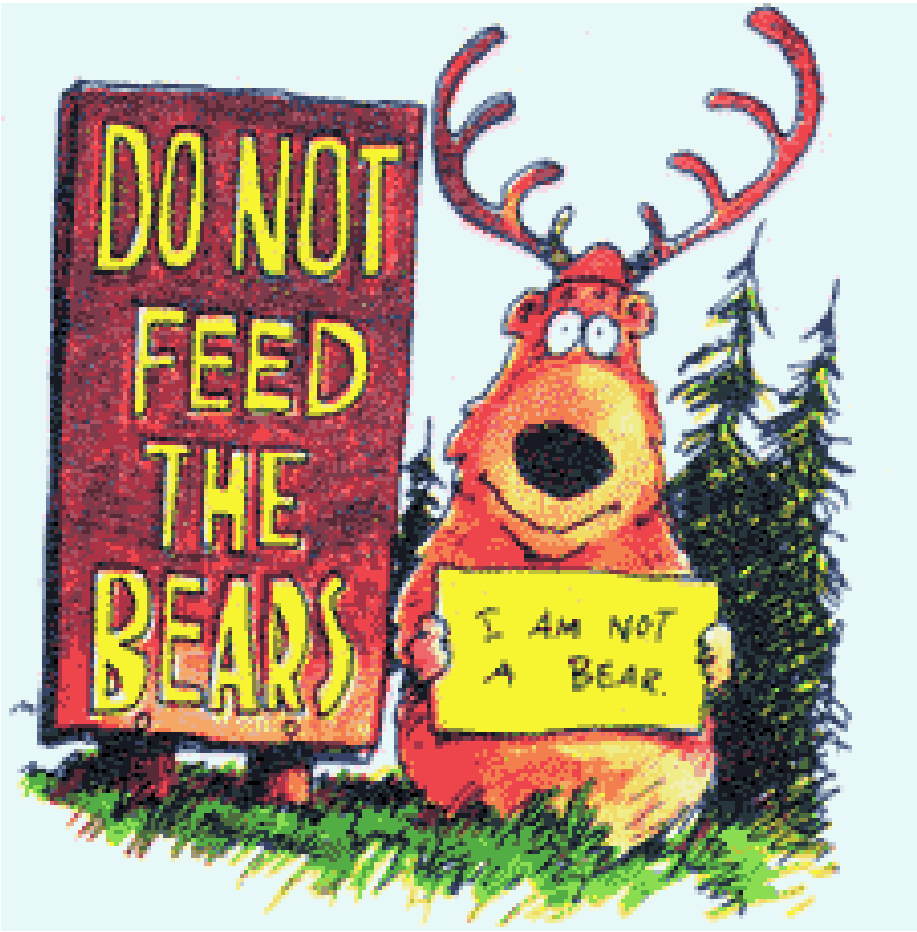
Natural Gas Program Savings
2009 Value of $781 Million



Designing Effective Programs to Meet States' Regulatory Objectives


SLOW DOWN!
Yer gonna get us KILLED!
ICANHASCHEEZBURGER.COM

Defining the objectives



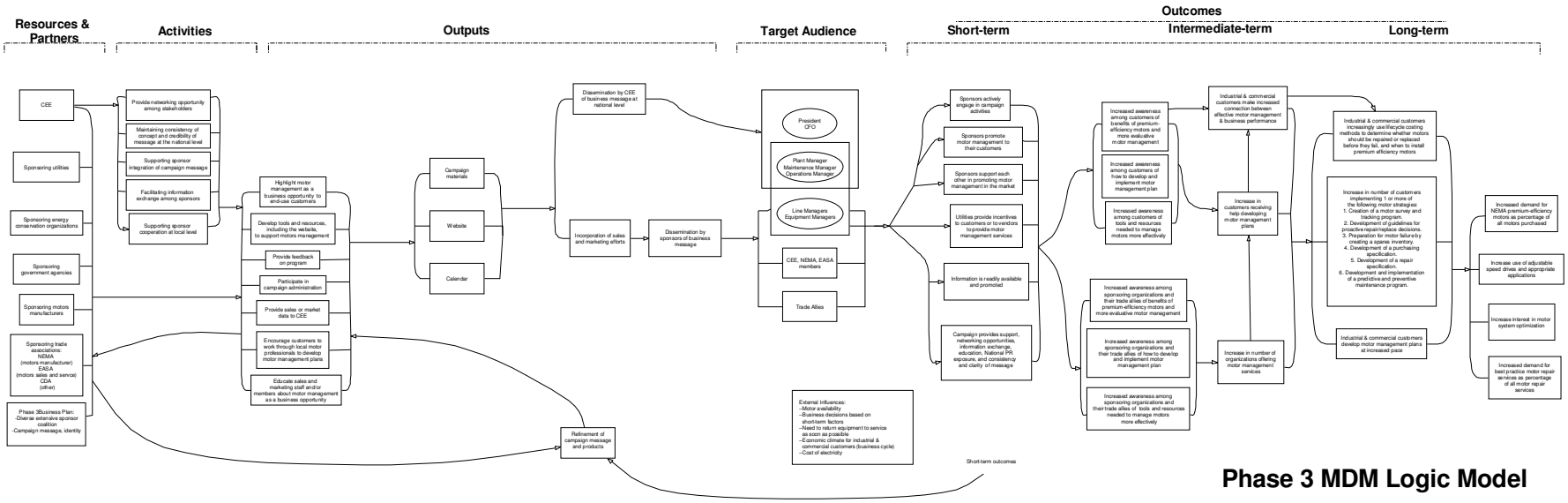
Source for all materials: Aha! Jokes http://www.Aha.Jokes.com/

Desired Impacts, Timing and Unintended Consequence

The Role of Program Logic

- A blueprint or map for programs identifies program goals and anticipated progress.
- Provides description of:
  - Activities the program will use to accomplish goals
  - Reveals expectations, relationships between program activities and anticipated effects
  - Identifies market barriers and opportunities, and how program activities are expected to address these

Logic Model



Phase 3 MDM Logic Model

Important “Principles of Evaluation”

- As much as possible, ensure that program administrator goals are measurable.
- Effective progress indicators align with goals. Remember that “what you measure is what you get”: the variables that are measured tend to drive outcomes.

Evaluation Planning

- As much as possible, plan for evaluation in conjunction with program planning and implementation, and look to evaluation to serve both program and broader organizational goals.
- Agree on baseline considerations for measuring savings, including measurement methodology, at the beginning of program and evaluation planning.
- Consider the rate of change of programs, the markets they serve, or regulations, and take this into account in planning for evaluation.
- Programs do not operate in a vacuum. In planning for evaluation, consider and disclose causal factors other than the program activities that could contribute to observed outcomes, and the possible impacts of these factors on the outcomes.

Evaluation Context

- Measurement of energy savings and cost-effectiveness is context-sensitive.
- Take into account how equipment and people interact when planning for and conducting evaluation.
- Programs aimed at altering behavior, manufacturing and stocking practices, and other lasting structural change tend to require a different evaluation approach from traditional rebate programs.

Evaluation Precision

- In determining precision requirements, consider how the results are to be used and what is practical and affordable relative to the undertaking or goal.
- Disclose the level of precision associated with reported measurements.
- Recognize potential sources of bias in evaluation data that could produce inaccurate results, no matter what the level of precision.

Evaluation Quality Assurance

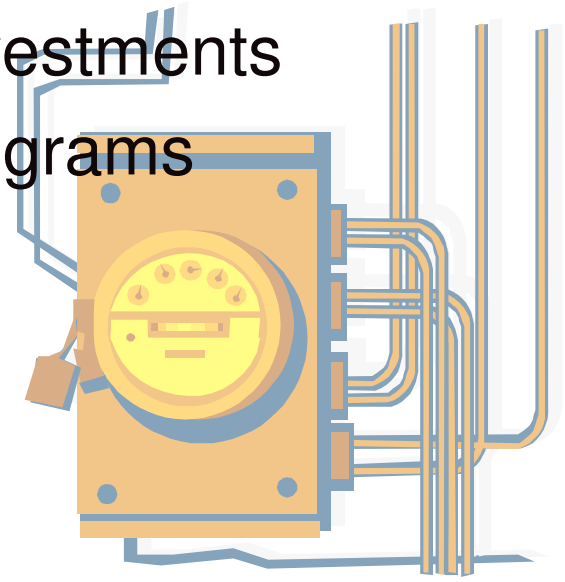
- Consider evaluation as a routine part of a continuous program improvement process.
- Where program administrators have excellent data tracking systems and reporting capability, have internal capability for data cleaning, and have collected necessary evaluation data along the way, evaluation is more affordable, rapid and accurate.
- The timing of data collection is important to good evaluation.
- Allow adequate time to pass before calculating cost-effectiveness.
- After taking into account the other principles identified here, consider allowing alternative methods when establishing requirements for evaluation.
- As programs and markets evolve, the evaluation methods may need to change.
- Evaluation reports should include an executive summary that presents the results in a manner that will enable those with limited background in the subject matter to understand the key findings and conclusions.

Evaluation Budgeting

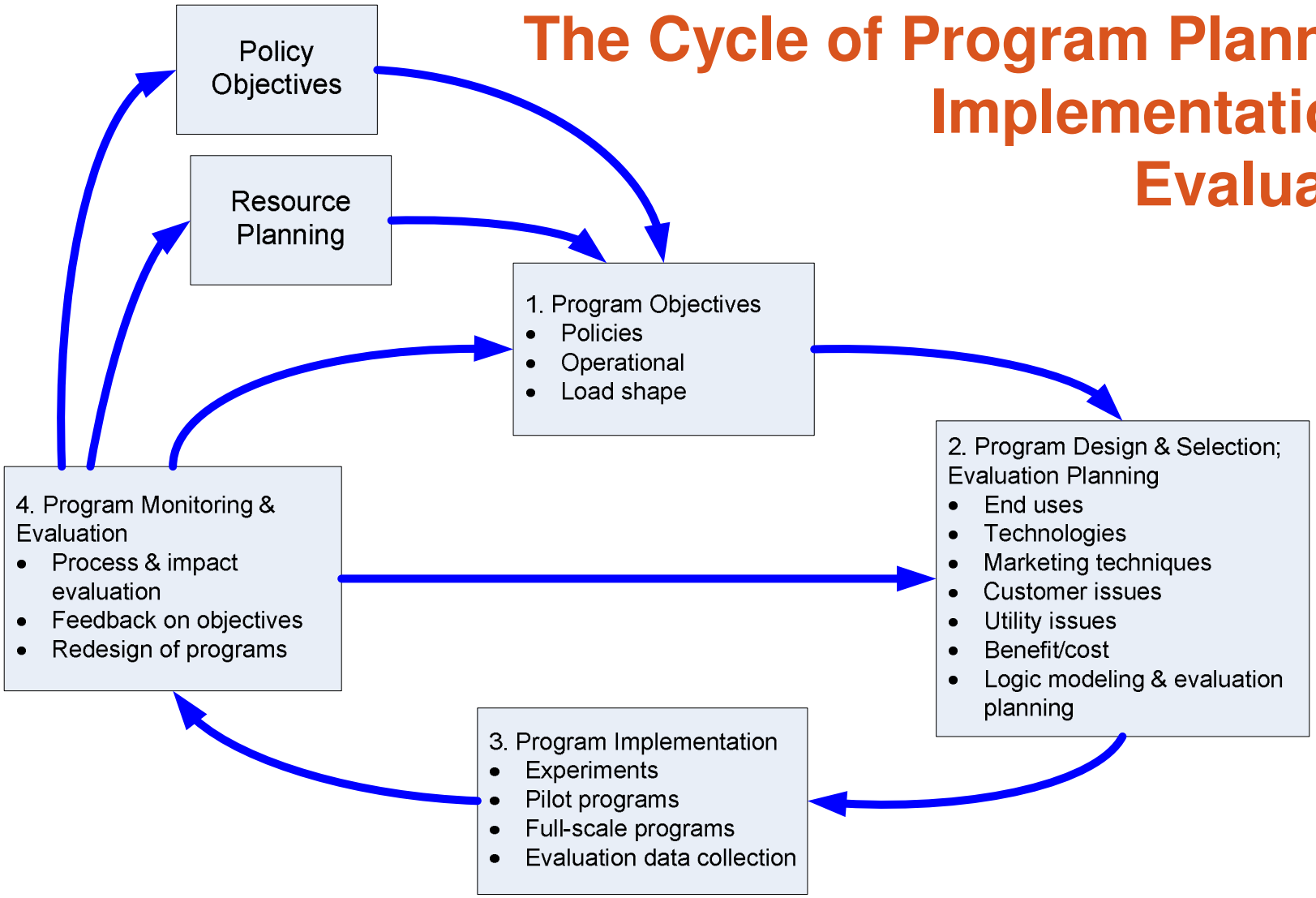
- **Allocate evaluation resources in relation to the expected program savings, level of uncertainty of savings estimates, cost or difficulty of measurement, and the importance of the undertaking or goal.**

Evaluation Purposes

- System reliability
- Generation cost savings
- Consistency with program design
- Utility recovery of costs/investments
- Enhancement of future programs



The Cycle of Program Planning, Implementation & Evaluation



Adapted by CEE from Pierre Landry, SCE, and *Demand-Side Management, Vol. 4: Commercial Markets and Programs,* EPRI, 1987.

Supported Program Areas

- Residential
  - Lighting
  - Appliances
  - HVAC
  - Whole House
  - Consumer Electronics
- Industrial
  - Motors and Motor Systems
  - Water-Wastewater
  - Energy Management
- Commercial
  - Lighting
  - HVAC
  - Kitchens
  - Whole Building Performance
  - Servers and Data Centers
- Gas appliances & HVAC

Examples of Platforms to Leverage

- ENERGY STAR
- Lighting for Tomorrow
- Motor Decisions Matter
- CEE Initiatives and Qualifying Products Lists

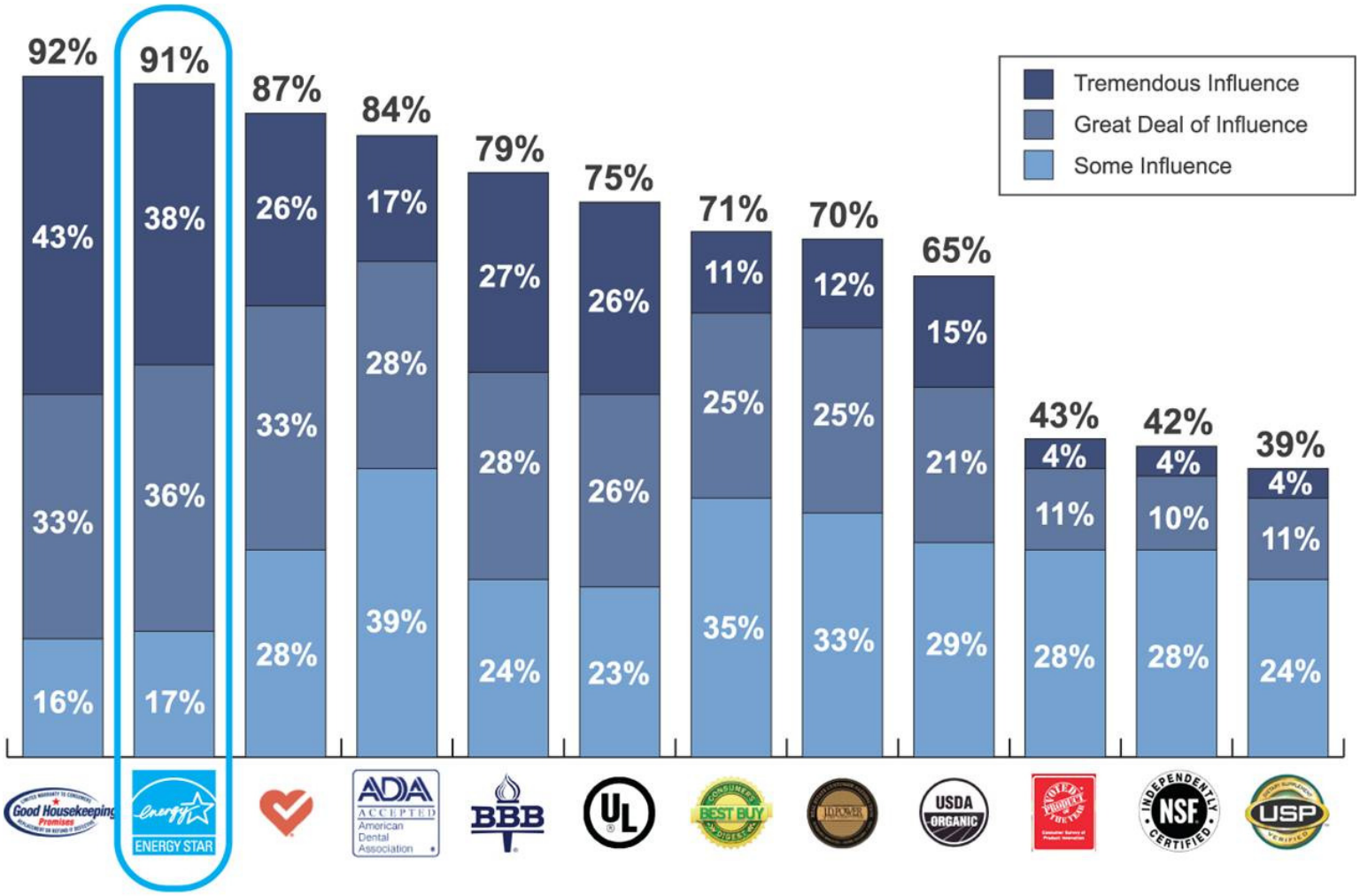
Energy Efficiency Needs a Brand!

- Brands:
  - Differentiate
  - Message to the heart & mind
  - Project credibility
  - Strike emotional chord
  - Create loyalty

ENERGY STAR Brand Promise/Tenets

- ENERGY STAR motivates businesses, public organizations, and individuals to take action to help protect the global environment, while saving on energy bills and maintaining their quality of life
  - Real energy savings
  - No compromise in performance/reliability
  - Short, attractive payback periods
  - Credible—govt' backed source of information

ENERGY STAR Influence



Source: Fairfield Research, July 2009

A Platform for Rate-payer Funded Energy Efficiency Programs

- Binary Label—simplifies consumer purchase
- Powerful Brand—high awareness & influence
- Credible Energy Savings—3rd-party Verified
- Widgets and Whole Buildings
- Consultative & Transparent
  - EPA and DOE partner closely with EE sponsors directly and at CEE

State Policy Considerations

- Administrator type
- IRP
- Cost recovery
- Incentives or removing disincentives:
  - "De-coupling" of profits from sales to stabilize revenues and reduce risks for utilities and customers
  - Performance based regulation

State Policy Considerations

- Longer planning and evaluation time horizons
- Evaluation
  - Broad array of benefits/market effects allowed in cost effectiveness measurement
  - Cost effectiveness testing at portfolio level
- Valuing Environmental Bens (New England Forward Capacity Market, RGGI, etc.)

State Policy Considerations

- Behavior and Marketing based program strategies
  - Great potential
  - Attribution and persistence difficult
  - More latitude on EM&V

Federal and State Actions

- Continues to impact opportunities for EE and the EE landscape
  - Energy Policy Act of 1992, and 2005 & 2007 federal energy legislation
  - ARRA/stimulus funding (see the CEE Summary of Recovery Act Resources for help)
- Can have dramatic implications for program planning

Available Resources

- DOE and EPA Effort – SEE Action Network
- CEE summaries of EE programs, initiatives and Qualifying Products Lists
- CEE/IPU Evaluation Webinar "Metering the Unmetered Resource: Evaluation Methods for Achieving Diverse Energy Efficiency Policy Objectives"
  - Introduction to energy efficiency program evaluation for regulators assessing the role of efficiency in modern utility energy portfolios and for new EE program administrators

Available Resources

- The CEE Energy Efficiency Program Evaluation: A Guide to the Guides
  - Includes key evaluation guides, sources of papers and reports, and links to wide variety of resources such as deemed savings databases
- The CEE MAPE Clearinghouse
  - Searchable database of CEE members' Market Assessments, Program Evaluations (MAPE) and related public documents

Thank You!

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CEE Home Page www.CEE1.org

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