M&V for Residential DR in Energy and Capacity Markets

April 9, 2014

MIC

Evolution of Residential Demand Response

- Past
  - Direct load control (DLC)
  - Legacy DLC using radio controlled switches, one way communication, no AMI
  - All programs run by EDC
- Future
  - DLC (adaptive algorithm), thermostat controlled, behavioral programs
  - AMI
  - LSE and third party CSP participation
  - Dynamic management of customers that should be cycled

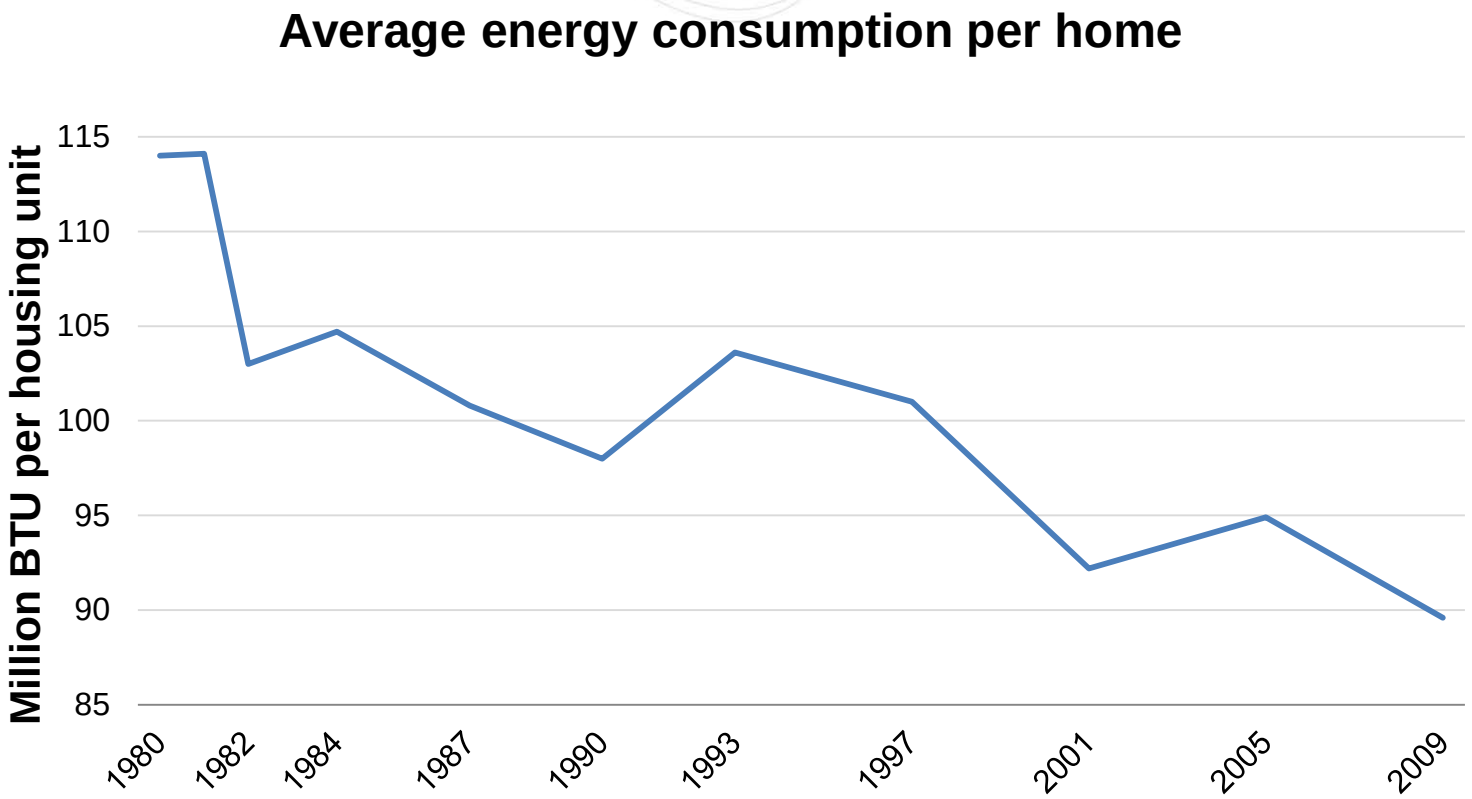
Measurement and Verification (M&V) for residential DR today

- Interval metered
  - M&V based on actual meter data
  - Must pass CBL test (like non-residential DR)
- Non-interval metered
  - M&V based on load research study using historic data
    - Deemed savings report – available for all PJM members
    - Load research study submitted by CSP
  - Switch operability study
- Sub-sampled
  - M&V based on actual meter data from a sample of customers

Deemed Savings Report

- Outdated
  - completed in March 2007 with data from 2001 – 2005
  - AC's are substantially more efficient, usage patterns change
- Geographically limited
  - Data from BGE, PSEG, JCPL
  - Footprint has substantially increased
  - Potentially settling DR in Chicago and Kentucky with data from NJ & MD
- Assumptions may no longer be appropriate (new capacity products)
  - Only used during design conditions
  - Focused on one specific hour
  - Impact of multi-day events

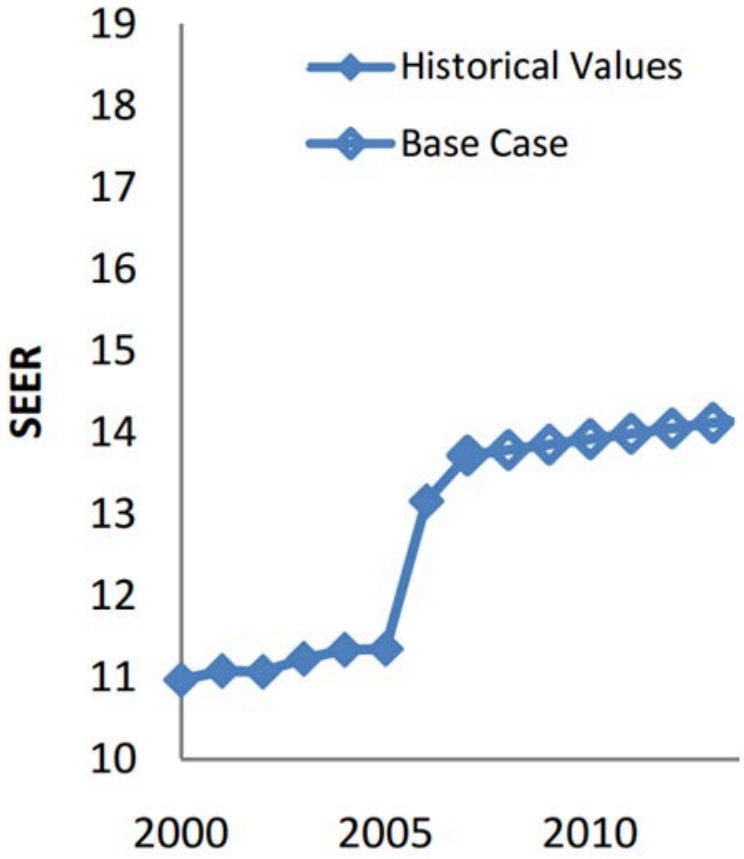
Residential energy usage decreasing



Source: EIA Residential Energy Consumption Survey 2009 — Release date: June 6, 2012

Air conditioner efficiency dramatically increased since 2005

SEER – measure of AC efficiency. Higher is more efficient.



Source: Robert De Kleine, “Life Cycle Optimization of Residential Air Conditioner Replacement” University of Michigan, Report No. CSS09-12, December 2009

Load Research & Switch Operability Studies

- Cumbersome process to evaluate and administer
- Inconsistent methodology and detail across studies
- Quality and accuracy is not always transparent
- Valid for too long of a time period (5 years)
- Questions regarding optionality of results
  - If I do and don't like results can I just use my older results.