Whole Market Transformation –
Residential New Construction (RNC) in California

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April, 2011
Uses of RNC Study Data

- Multiple studies shared the survey data
  - Baseline Study - characteristics of non-participant houses
  - RNC Program Impacts
  - Codes & Standards Program Impacts
  - RNC Market Effects Study
- Inter-related findings for whole market segment
Residential Baseline Study

- Based on on-site surveys and energy modeling
- Describe characteristics of new homes - compare to trends
- Estimate energy use vs. code for non-participant houses
- Never published as stand-alone - used for other three studies
Baseline Information

- **Glazing**
  - Glazing % dropped from 17% to 14% since 1995
  - Dual pane vinyl, low-e now in 95% of homes

- **Space heating**
  - Avg furnace efficiency from 80% to 83%
  - 90%+ AFUE furnaces from 2% to 19% of homes

- **Space cooling**
  - Avg SEER from 10.5 to 13.3 since 1995
  - SEER >13 increased from 0% to 34%

- **Etc.** (DHW, ceiling insul, radiant barriers, duct leakage)
RNC Program by Utilities

- Statewide Advanced Homes Program
  - Each utility runs its version
  - Consistent approaches and rebates
- Evaluated 2006-2008 Program Cycle
  - Evaluation work 2007-2009
  - Final report February 2010
- Estimated direct program impacts
  - Savings in energy, demand, gas
RNC Impact Findings

- RNC market activity WAY down
- Actual savings differed from claimed
  - Models seriously underestimated cooling energy, overestimated heating energy
  - Electricity savings higher than expected; gas savings lower
- Baseline (code compliance) varied
  - Most areas homes were better than code
Codes & Standards Program

- Multiple res code enhancements, e.g.:
  - Hardwired lighting
  - Duct sealing
  - Whole home performance enhancements
- Determined savings vs. prior code
- Estimated compliance rates for typical houses (non-participants)
- Used whole house modeling method
C&S Impact Findings (Res)

- Hardwired lighting standards
  - Biggest savers in entire code cycle
  - Compliance rate 113% (savings > code)
- Whole house energy savings
  - Electricity compliance rate 120%
  - Gas compliance rate 235%
- Compared as-built new homes to code homes, vs. prior code
RNC Market Effects

- Pilot study
  - Determine feasibility of measuring market effects

- Major questions
  - Can spillover be measured reliably?
  - What is magnitude of spillover effect?
  - How do RNC interventions affect market?
RNC Market Effects Findings

- There is spillover from RNC program
  - Improved code compliance
  - Greater above-code construction
- Overall RNC compliance margins
  - 58% of homes better than code
  - 13% of homes below code
  - Avg RNC 7.4% less energy than code - RNC baseline is better than code
RNC Market Effects Findings

- **Total Savings**
  - Above code homes saved 39,225 MWh
  - Below code homes wasted 5,471 MWh

- **Net Savings (Delphi process)**
  - Nearly 50% credited to utility programs
  - Training of builders, code consultants, building officials
  - Split between 2006-08 and prior cycles
RNC Market Effects Findings

- If utility programs ended
  - More non-compliance, worse margins
  - Similar effect if non-utility progs ended
  - Savings effects would not persist

- Good/bad news for RNC program:
  - Spillover is significant due to program
  - Higher baseline diminishes prog savings
  - Spillover captured by C&S program eval
  - …but portfolio got the credit anyway
Discussion

- **Spillover - it’s clearly not zero**
  - It can be measured (but complex)
  - Is it wise to neglect it?

- **Given multiple influences on market…**
  - Can we parse out different, overlapping market intervention effects?
  - Does it make more sense to measure at market level?

- **How to define “program” and “intervention” for evaluation purposes?**
Studies Cited

- **Residential New Construction (RNC) Programs Impact Evaluation**

- **Codes & Standards (C&S) Programs Impact Evaluation**

- **RNC Market Effects Study (Phase II)**
Questions/Discussion

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