SESSION 4B

RESIDENTIAL NEW CONSTRUCTION: BLUEPRINTS FOR ESTIMATING NET ENERGY SAVINGS

Moderator: Pam Rathbun, Tetra Tech

PAPERS:

What an Opportunity: Four New England States Conducting Residential New Construction Baseline Studies at the Same Time!

Dorothy Conant, Independent Consultant
William Blake, National Grid
Kim Oswald, Viridian
Lisa Glover, Unitil
Robert Wirtshafter, Wirtshafter Associates, Inc.
Marjorie Izzo, Columbia Gas

Residential New Construction Energy Efficiency: Getting the Biggest Bang for the Buck

Robert Kasman, Pacific Gas & Electric Company
Ken Nittler P.E., Enercomp, Inc.
Derek Jones, Pacific Gas & Electric Company

Finding and Counting Market Effects: A New Construction Program Example

Lynn Hoefgen, NMR Group, Inc.
Greg Clendenning, NMR Group, Inc.
Ayat Osman, California Public Utilities Commission
Ken Keating, CPUC Master Evaluation Contractor Team
Edward Vine, California Institute for Energy and Environment
Allen Lee, Cadmus Group
Jim Stewart, Cadmus Group
John Stoops, KEMA

Getting MIF'ed: Accounting for Market Effects in Residential New Construction Programs

Marshall Keneipp, Navigant Consulting
Julianne Meurice, Navigant Consulting
David Alspector, Navigant Consulting
Mary Sutter, Opinion Dynamics
Roger Krouse, Arizona Public Service
Tom Hines, Arizona Public Service

SESSION SUMMARY:

This session presents innovative methods for measuring residential new construction baselines, modeling energy savings, and estimating net market effects. Four papers, representing work in four New England states, California, and Arizona, are included in this session.

The first paper, **"What an Opportunity: Four New England States Conducting Residential New Construction Baseline Studies at the Same Time!,"** discusses the steps taken and challenges encountered in designing a residential new construction baseline study in four New England states at the same time. The paper discusses how the baseline team of program administrators and evaluation staff,

energy efficiency consultants/advisors, and implementation contractors was organized to address the different budgets and research priorities among the four states. Their main challenge was to create an evaluation plan that provides comparable information on core building characteristics while offering flexibility to meet individual state priorities and/or budget limitations. The paper addresses areas where reaching agreement was relatively easy and where long discussions were necessary. It also describes problems encountered getting information on newly built homes from building departments to verify that a home was permitted and built to meet code, especially at the beginning of a new code cycle.

The second paper, **"Residential New Construction Energy Efficiency: Getting the Biggest Bang for the Buck,"** explains how the authors created an updateable Excel-based tool to determine the least-cost combinations of energy efficiency measures in new single family California homes. The study used modeling software and systematic simulation methods to answer three key questions: how much more does it cost to build a new single family energy efficient home than a 'standard practice' home, what are the least-cost combinations of energy efficiency measures that provide the greatest energy savings, and how far along the path toward Zero Net Energy is currently achievable with readily available energy efficiency measures and at what cost? The authors demonstrate it is possible to exceed Title 24 by 39%-62% in California with commonly available energy efficiency measures. A portion of those savings are achievable at relatively low cost, but the best measure combinations vary significantly by climate and must be selected thoughtfully. The paper also discusses some considerations for achieving Zero Net Energy new homes in the context of California's residential building code (Title 24), which doesn't address energy consumption from appliances, plug loads, and some lighting.

In the third paper, "**Finding and Counting Market Effects: A New Construction Program Example,"** the authors describe their effort to assess and quantify the market effects of California's investor-owned utility (IOU) programs targeting the residential new construction sector. The research began with a scoping study to specify a program theory and recommend an approach for data collection and analysis. This was followed by a qualitative assessment of whether each outcome posited in the program theory had occurred, and if so, whether the outcome could be linked to program activities. As there were indicators of market effects, the next step in the study was to convene a Delphi panel of energy efficiency consultants and a panel of residential new construction experts to assign attribution scores to IOU programs and non-IOU factors, and identify which elements of the programs were most responsible for savings. The study found that energy savings associated with the observed market effects are large and quantifiable, and posed four types of recommendations for the future: recommendations for the IOUs' programs targeting the residential new construction sector, recommendations for future evaluations, recommendations for changes to California's Market Effects Evaluation Protocol, and recommendations for treatment of non-participant spillover.

The final paper, **"Getting MIF'ed: Accounting for Market Effects in Residential New Construction Programs,"** describes the authors' evaluation efforts to quantify the broader savings from Arizona Public Services' (APS) residential new construction program over its fourteen-year history. The lack of clear baselines and methods to assess progress toward market transformation made it difficult to effectively claim indirect market influence savings. While the evaluation methods the authors used were not new, they were used in an innovative way to enable a holistic look at the program over time. The steps included: 1) historical tracing of 14 years of regulatory documents to re-create timelines of the program presence and activities; 2) creation of an influence diagram of all market influences on building practices; 3) in-person Delphi studies with market experts to help them understand the myriad of influences on the market and how APS intervened over time; 4) incorporation of the Delphi outputs as inputs for an engineering simulation model to calculate energy savings per home; and 5) combining the engineering results with market information to reach a final output of the Market Influence Factor (MIF). The team overcame the challenges of limited baseline data and no valid no-program area and implemented a research methodology that yielded broadly consistent results.