

CRACKING THE CODE

Impact Evaluation Methods for ARRA-Funded Energy Code Initiatives

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Presented by Jeff Perkins

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BACKGROUND

- ❑ Under ARRA, the U.S. DOE allocated funding to State Energy Offices for activities to advance code adoption and/or enhance code compliance.
 - The funding was contingent upon the states adopting the most recent national model code (2009).
- ❑ The paper discusses the program impact evaluation overseen by the authors.
- ❑ The BIG picture is a Broad Programs And Categories (BPAC) review of energy savings, GHG reduction, job creation, and cost benefit.



EVALUATION CONSTRAINTS



❑ Limited budget

❑ No fieldwork



CODE ADVANCEMENT

- ❑ Resources to adopt a new code, included:
 - Technical advisors
 - Cost-benefit studies
 - Experts to customize state specific codes
 - Outreach to community-level code bodies



COMPLIANCE ENHANCEMENT

- ❑ Resources to improve compliance and enforcement, included:
 - “Best practice” studies
 - Code manuals & equipment rental programs
 - General building science training
 - Code training for enforcers and the public
 - Train-the-trainer programs
 - Online webinars for code requirements
 - Statewide code conferences



OUR PATCHWORK NATION

□ How to deal with scope and scale?



STATES, STARTING POINTS, ACTIVITIES

IECC code dates in force at start

Activities undertaken

Programs	Residential	Commercial	Advancement	Compliance
State 1	2000	2000	na	✓
State 2	2006	2006	✓	✓
State 3	2003	2003	✓	✓
State 4	2000	2006	na	✓
State 5	None	None	✓	✓
State 6	None	2000	✓	✓
State 7	2003	2006	✓	✓



POSSIBLE APPROACHES

- ❑ *Attributing Building Energy Code Savings;*
NEEP/IEE/IMT/Cadmus; Feb 2013
 - Direct Empirical
 - Modeling & billing analysis
 - Tons of field work & lots of money

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➤ Indirect Estimates

- Challenging
- Inexpensive, may be inaccurate

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❑ Other Literature...

THE WISDOM OF CROWDS



THE WISDOM OF CROWDS

Human Judgement Aggregation*

*** The Wisdom of Crowds: Methods of Human Judgement Aggregation
Aidan Lyon, Eric Pacuit; University of Maryland; July 2014**



THE WISDOM OF CROWDS

Human Judgement Aggregation*



- ❑ You need a crowd
 - The right experts
 - Recruitment
- ❑ You need opinions
 - Surveys
 - Elicitation
- ❑ You need answers
 - Evaluation
 - Aggregation

* The Wisdom of Crowds: Methods of Human Judgement Aggregation
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GETTING THE CROWD

❑ Target: Fifteen Experts Per State

- Building associations
- Industry/Trade groups
- Interest groups
- Code officials

❑ Recruitment

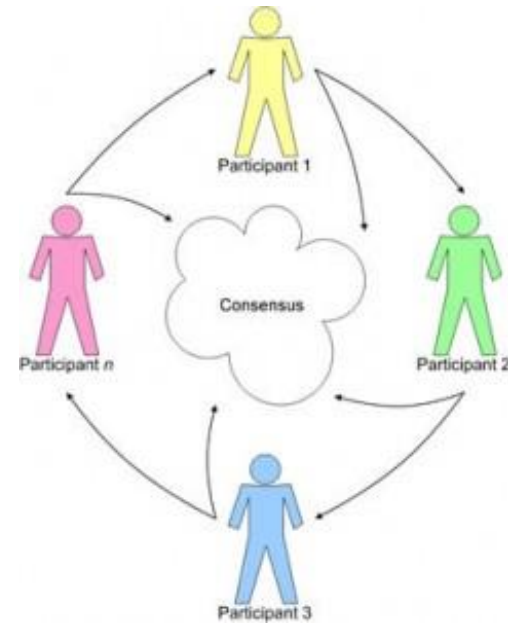
- Direct outreach
- Word of mouth
- Friends of friends

❑ Nothing in Return

GETTING THE OPINIONS

□ Delphi Method

- Direct questions
- Specific measures
- 2 rounds
 - Managing bias
 - Absolute vs Delta



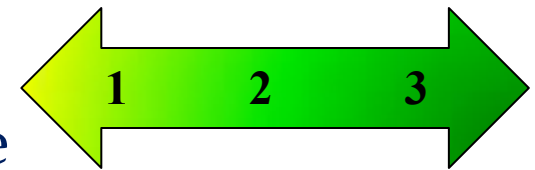
□ Credibility...

GETTING THE ANSWERS

❑ Evaluation & Aggregation

❑ Expert Opinion Credibility Score

- Consistency (internal/external)
- Credentials, experience, perspective



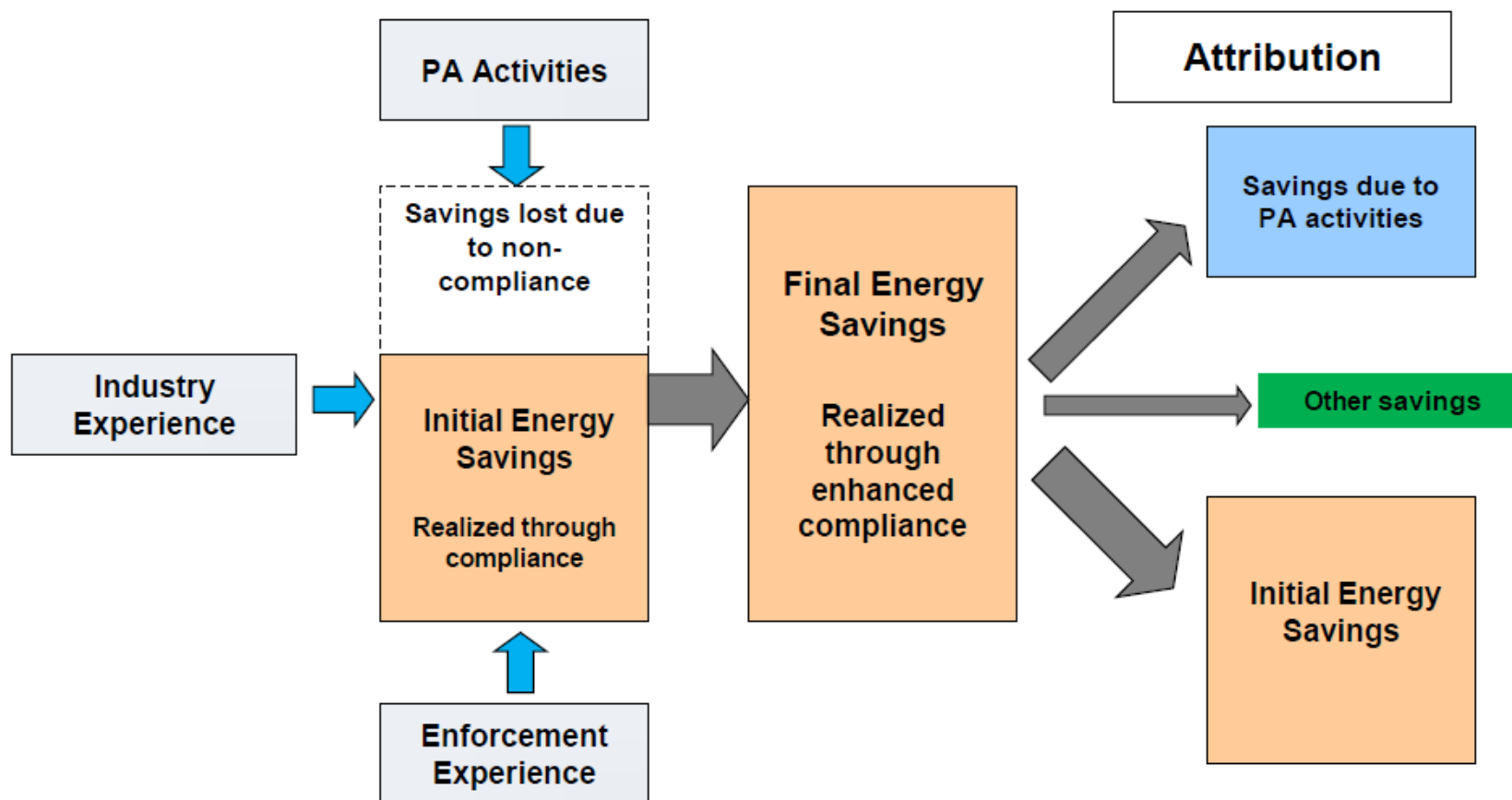
❑ Tweaking Score & Store

- Getting the WEC (weighted energy compliance)
- PNNL process and algorithms were critical
- Adjustments to the relative weights



Pacific Northwest
NATIONAL LABORATORY

CALCULATING IMPACTS



Attributing Building Energy Code Savings; NEEP/IEE/IMT/Cadmus; Feb 2013

WHAT IS THE FINAL ANSWER?

- ❑ Results still under embargo
- ❑ Due to be released in a matter of weeks
- ❑ Stay Tuned...



THANK YOU!

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