WHAT DRIVES PROGRAM UPTAKE? Looking Beyond Savings to Bundles of Features:

*Latest in NEBs and Indirect Impacts*

Session: New Territory for Targeted Programs

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NEB BACKGROUND / REVIEW / CONTEXT
Energy efficiency programs

- Programs planned based on energy savings – but range of omitted effects – HTM
- Energy benefits: Reduced energy use, reduced spending on energy
- **Non-energy benefits (NEBs): aspects of program participation not directly related to reduced energy use**

Omitted program effects, positive & negative

- What’s in a name...!?!, NEB, NEI, NEE, NetNEBs, Omitted Effects, Multiple Effects...
- 20 years of work in 90 programs (NEBs)
Motivation

- Bias/Wrong advice: Implicit assumption of “0” is wrong, B/C bias, Granger, evaluation to guide decision-making
- Measurement: Ranges and better may guide decisions
- Mis-understanding: Theory / “bundled features”, positive and negative effects other than energy savings

Consequences of omission

- Bias in EE investment, incomplete understanding of participation, ineffective marketing / targeting campaigns

20 years of Non-energy benefits (NEBs)

- Random + arrearage ➔ Low income ➔ HTM
- Low income policy ➔ broader

3 Beneficiaries, drivers (1994-5)

- Utility, Society, Participants
20 YEARS OF NEBS PROGRESS...*

Random, theorized lists ➔ Drivers, 3 main beneficiaries / perspectives

Arrearages & minimal others ➔ Tested methods & BPs including HTM

Low income results ➔ Ranges / focus ➔ Models & broad 3-perspective results for varied programs, measures, portfolios, sectors

Applications in Low inc. policy & mktg ➔ Broad applications incl. C/E

Skepticism ➔ Improving acceptance; chicken & egg

1994, 90+ programs/portfolios in US, int’l, 4 BMP reviews, 50 papers
### NEB DRIVERS, 3 BENEFICIARIES

<table>
<thead>
<tr>
<th>Utility / Ratepayer</th>
<th>Societal</th>
<th>Participant (all)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payments / financial</td>
<td>Economic development / job / multipliers</td>
<td>Payments &amp; coll’n</td>
</tr>
<tr>
<td>Debt collection efforts / calls</td>
<td>Tax impacts</td>
<td>Education</td>
</tr>
<tr>
<td>Emergencies / insurance</td>
<td>Environmental</td>
<td>Building stock</td>
</tr>
<tr>
<td>T&amp;D, power quality, reliability</td>
<td>Emissions</td>
<td>Health</td>
</tr>
<tr>
<td>Subsidy (LI)</td>
<td>Health</td>
<td>Equipment service incl. productivity, comfort, maint, etc.</td>
</tr>
<tr>
<td>Other</td>
<td>Water &amp; other resources / utilities</td>
<td>Other utilities (water, etc.)</td>
</tr>
<tr>
<td></td>
<td>National security</td>
<td>Other (transactions, enviro, psychic, etc.)</td>
</tr>
<tr>
<td></td>
<td>Wildlife / Other</td>
<td></td>
</tr>
</tbody>
</table>

More than 60 categories derive from these drivers. Include subsets as appropriate to application.

Source: (Skumatz/SERA, 2004)
# NEB Categories by Perspectives – From Drivers

<table>
<thead>
<tr>
<th>Utility</th>
<th>Society</th>
<th>Participant</th>
<th>(res &amp; com’l)</th>
</tr>
</thead>
</table>
| • Carrying cost on arrearages  
• Bad debt written off  
• Shutoffs  
• Reconnects  
• Notices  
• Customer calls / bill or emergency-related  
• Other bill collection costs  
• Emergency gas service calls (for gas flex connector and other programs)  
• Insurance savings  
• Transmission and distribution savings (usually distribution)  
• Fewer substations, etc.  
• Power quality / reliability  
• Reduced subsidy payments (low income)  
• Other | • Economic development benefits – direct and indirect multipliers  
• Tax effects  
• Emissions / environmental (trading values and / or health / hazard benefits)  
• Health and safety equipment  
• Water and wastewater treatment or supply plants  
• Fish / wildlife mitigation  
• National security  
• Health care  
• Other | • Water / wastewater bill savings  
• Operating costs (non-energy)  
• Equipment maintenance  
• Equipment performance (push air better, etc.)  
• Equipment lifetime  
• Shutoffs / Reconnects  
• Property value benefits / selling  
• (Bill-related) calls to utility  
• Comfort  
• Aesthetics / appearance  
• Fires / insurance damage (gas)  
• Lighting / quality of light  
• Noise  
• Safety | • Control over bill  
• Understanding / knowledge  
• “Care” or “hardship” (low income)  
• Indoor air quality  
• Health / lost days at work or school  
• Fewer moves  
• Doing good for environment  
• Savings in other fuels or services (as relevant)  
• GHG and environmental effects  
• Negatives |

Source: (Skumatz/SERA,1996 on)
NEB ESTIMATION APPROACHES
# NEBs MEASUREMENT – 4 MAIN MEASUREMENT APPROACHES*

<table>
<thead>
<tr>
<th>Direct Measurement</th>
<th>Secondary + Lit/Meas</th>
<th>Modeling</th>
<th>Survey-Based</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Records, billing data, market info; regression</td>
<td>- Incremental incidence * valuation</td>
<td>- 3rd party or specialized models</td>
<td>- Multiple approaches</td>
</tr>
<tr>
<td>- Utility, arrears, debt, calls, notice, subsidies; broader individ.</td>
<td>- Water savings, insurance, O&amp;M, etc.</td>
<td>- Emissions, Economics</td>
<td>- Participant effects (HTM) -only option for some</td>
</tr>
<tr>
<td>- Sample size</td>
<td>- Many factors available</td>
<td>- Many straight-forward, but also slippery slope</td>
<td>Survey options</td>
</tr>
</tbody>
</table>

**Story of a ferry... then it’s academic (HTM,WTP→LMS)**

- **Strengths & weaknesses**
  - Balancing precision & practical; non-overlap
  - Avoid bias, achieve high obs, transferability
  - False comparisons!? (Vs. spreadsheets)
  - Accuracy, consistency, unbiased, large sample...

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*SERASA*
NEB RESULTS: EXAMPLES
WHICH SOURCES OF NEBS ARE HIGH VALUE?

- Results sample of ~100 programs we’ve done & lit review
- Which sources dominate?
- Utility 10%; Societal 40-60%, participant 30-50%
- Considerable variation by program, climate, measures

Source: (Skumatz/SERA) ACEEE2010 & others)
WHICH NEBS ARE HIGHEST VALUE?*

- Utility (10%)
  - Few, low value (arrearages, subsidies)

- Societal (40-60%)
  - Emissions
  - Economic development
  - Potentially health (not well measured yet)

- Participant (30-50%); *(often higher for low income)*

  **Residential**
  - Comfort
  - Avoid moving / homelessness; home value
  - Illness / health
  - Ability to pay other bills / savings
  - Green

  **Commercial**
  - Tenant satisfaction
  - Maintenance
  - Comfort
  - Ability to sell
  - Productivity
  - Green

- Gaps
  - Health & safety, peak, infrastructure, security, hardship

*Source: Skumatz Economic Research Associates research*
**ARE NEBS HIGH VALUE?**

- Energy savings are less than ¼ of benefits from low income weatherization programs – less than 1/10 for some programs

**NEB vs. Energy Savings Value**

Including all NEBs

Omitting can misrepresent decisionmaking & impacts… with implications

Source: (Skumatz/SERA 2010 & others)
SOCIETAL IMPACTS

- Strong economic development performance
- Emissions – vary by generation; much measurement
- Hardship reduction; health care, infrastructure
- Gaps

(Source: Skumatz /SERA ECEEE 2007, ACEEE 2006)
UTILITY NEBS
EXAMPLE: LOW INCOME WX

Utility NEBs for Template Program

- Rate subsidy (61%)
- T&D (16%)
- Payment-related (13%)
  - Debt WriteOff (util) 13%
  - Shutoffs (util) 1%
  - Arrears (util) 0%
  - Coll'n Costs (util) 0%
  - Gas Calls (util) 0%
  - Calls to CSRs (util) 2%
  - T&D (util) 16%
  - Reconnects (util) 0%
  - Notices (util) 7%
  - Health/Safety (util) 0%

MODELS
Source: Skumatz Economic Research Associates research
WHICH PARTICIPANT NEBS ARE HIGH VALUE?

Example Participant NEBs breakdown

Share of NEBs

24% Comfort & svcs
18% Home & value
29% Health-related
29% Educ/bills/other

Top NEBs similar Across many programs (some variation in #s) New Zealand programs showed “environmental” among most important also.

Source: (Skumatz/SERA) ACEEE1997 & others)

Persistence issues...
IMPLICATIONS: Maintenance as a barrier -- $ amount to get to “neutral”, not just score ($ and distribution)
Owners had higher NEB total, and would have taken higher investment in new technology (education vs. fear of losing bid)

C&I NEW CONSTRUCTION

Source: Skumatz Economic Research Associates research
(Pct of Total Partic NEBs)
TOP NEBS FOR WX PROGRAM
(Percent of total survey-based participant NEBs)

Regressions to decompose/attribute drivers:
Measures: Insulation, furnace, draft repair
Demographics: Children, elderly,

Source: Skumatz Economic Research Associates research
## RESULTS FROM C&I PROGRAMS

<table>
<thead>
<tr>
<th></th>
<th>Lighting</th>
<th>High performance</th>
<th>New Construction</th>
<th>Tech assistance</th>
<th>Boilers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEB$</strong></td>
<td>75-90%</td>
<td>About 100%</td>
<td>90-110%</td>
<td>75-90%</td>
<td>110%</td>
</tr>
<tr>
<td><strong>Top NEBs</strong></td>
<td>Enviro, other</td>
<td>Comfort, quality of</td>
<td>Enviro, Tenant</td>
<td>Enviro, other</td>
<td>Features/</td>
</tr>
<tr>
<td></td>
<td>op costs, perf,</td>
<td>light, tenant satisf,</td>
<td>satisf, tenant</td>
<td>op costs, perf,</td>
<td>controlfootpri</td>
</tr>
<tr>
<td></td>
<td>lighting, comfort, safety</td>
<td>eqpt perf, productivity, enviro, sell/lease</td>
<td>satisf, tenant satisf, tenant satisf,</td>
<td>lighting, comfort, comfort,</td>
<td>nt, performance,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>tenants, noise</td>
</tr>
<tr>
<td><strong>Neg</strong></td>
<td>Maint, labor, light (not net negative)</td>
<td>Cost, maintenance</td>
<td>Maintenance</td>
<td>Maint, labor, light (not net negative)</td>
<td>Lifetime</td>
</tr>
<tr>
<td><strong>Actor info</strong></td>
<td>A&amp;E higher value than owners</td>
<td>A&amp;E less positive than owners</td>
<td>A&amp;E &gt; owners, Part &gt; NP</td>
<td>A&amp;E higher value than owners</td>
<td>Vendors strong, Participants much higher</td>
</tr>
</tbody>
</table>

Source: Skumatz Economic Research Associates research
OTHER PROGRAMS*

- Motors – Footprint more valuable
- Military – Mission, save a job, environment
- Real time pricing – knowledge / control
- Commercial program negatives: maintenance
- Various appliances (revealed analysis)
  - Features, noise,
  - O&M
- Student & retail
  - Daylighting
- Low income
  - Hardship
- Etc, etc.

Source: SERA research
OTHER PROGRAMS *

- Analyzed commercial recycling program
  - Changed collection & containers
- Surveys, interviews, focus groups
- NEBs value: 6:1 to 13:1!
  - Highest value NEBs:
    - Clean
    - Safe (sex/pee/drugs; cops)
    - Alley usage / tourists
    - Business loading
    - Many others
- Virtually ALL indirect
- C/B neg to positive

Source: SERA research
WHEW – HOLD EVERYTHING...

WHY do we CARE!!?
ADJUSTED PAYBACKS – ADDING ONLY PARTICIPANT EFFECTS

- Gross payback: 5.6 yrs → 2.5
- Net payback excl. FR: 9.0 yrs → 4.0
- B/C incl all partic NEBs: 0.9 → 1.9
- B/C adj for FR: 0.55 → 1.2

- Affects: program targeting, measures, disconnects, outreach, investment, efficiencies...
- Can use to maximize bang for the buck and minimize investment per “uptake”.

Source: Skumatz Economics (SERA)
## NEBS USES / APPLICATIONS

<table>
<thead>
<tr>
<th></th>
<th>Utility</th>
<th>Participant</th>
<th>Societal</th>
<th>ACCURACY NEEDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio dev’p</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Program refinem’t</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Marketing</td>
<td></td>
<td>Yes</td>
<td>*</td>
<td></td>
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<tr>
<td>B/C internal cust</td>
<td></td>
<td>Yes</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>B/C Tests</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Utility Incentives /</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rewards, supply, etc.</td>
<td></td>
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</tbody>
</table>

(*) these reflected in participant indirectly
Multiple actor interviews provide robust inferences

Source: Skumatz 2010
## METHODS TO INCLUDE NEBs IN REGULATORY TESTS

<table>
<thead>
<tr>
<th>Adder</th>
<th>Maximize DSM opportunities &amp; feedback</th>
<th>Minimize Regulatory Risk</th>
<th>Minimize Evaluation Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readily Measurable</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hybrid</td>
<td></td>
<td></td>
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<tr>
<td>All NEBs</td>
<td></td>
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</tbody>
</table>

Source: SERA Research
WHY ELSE SHOULD WE CARE?

Effective Selling of EE (What I Learned from Tide™)
BUY ME? COMPELLING?
EFFICIENCY MIS-MARKETED NOW

Which do you notice in the marketplace?
HOW TIDE DOESN’T SELL

BUY TIDE BECAUSE IT HELPS US MAKE LOTS AND LOTS OF MONEY!

BUY TIDE BECAUSE IT HAS ONE OF OUR LARGEST PROFIT MARGINS

It does sell miracles
NEBS ARE THE MARKET RESEARCH & THE “BUNDLE”

- People buy bundles of features and services
- People buy perceptions & emotions
- People make tradeoffs in decision-making (ROI)
“SELLABLE” FEATURES OF EFFICIENCY - HOUSEHOLDS
“SELLABLE” FEATURES OF EFFICIENCY - BUSINESSES
“SELLABLE” FEATURES OF EFFICIENCY – SCHOOLS
TIDE™ SELLS WHAT CUSTOMERS THINK THEY WANT TO BUY

Learning from that...

Tide--for whiter whites

She hangs the cleanest wash in town

...she swears by TIDE!

Procter & Gamble's amazing new TIDE gives you a real MIRACLE WASH!

No soap—no other "suds"—no other washing product known—will get your family wash as CLEAN as Tide!

THE WORLD'S CLEANEST, BRIGHTEST, WHITEST WASH

TIDE GETS CLOTHES CLEANER THAN ANY OTHER

WASHING PRODUCT YOU CAN BUY!
AND IF THEY WANT TO BUY FOR THE “WRONG” REASON, SO WHAT!?... GET OVER IT.

- Don’t have to be purists... We just want them to buy it!

I’m so embarrassed, but at least I’m ENERGY EFFICIENT!!!
LEARNING THE BASICS

Sell what people want to buy...

Or what they think they want to buy...

Not what WE want to SELL...!

And don't Lecture or talk down. Make them happy.
TO IMPROVE UPTAKE -- SELL ON WHAT PEOPLE WANT

- To recognize ROI, bundle
- To reach the next group
- To cut through the media clutter
- To move the needle forward

… it’s not selling OUT, it’s selling…

Honey, I really want to buy it…!
Jeff Gordon endorses it!
NEBS ARE MARKET RESEARCH, B/C, & BEYOND

DEAL WITH IT
THANK YOU!!

Questions?

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