



Rethinking Cost-Effectiveness and Non-Energy Benefits

...Climate change requires a new balance

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A National Dilemma

Is Cost-Effectiveness So Limited?

- Now mostly narrow definitions of costs and benefits
- Radical efficiency goal increases coming (40%?)
- Conventional “widget” programs don’t go deep
- California calling for more comprehensive approaches



Comprehensive Programs Pay

Integrated Solutions ➡ *Non-Energy Benefits*

- Existing homes: Comfort, safety, cost, durability, image
- New homes: Appeal, price, sales, cost to own
- Commercial buildings: Higher tenancy and revenue
- Retail merchandising: Market image and positioning
- Industrial facilities: Productivity gains

But are they part of cost-effectiveness?





Cost-Effectiveness for Whom?

Several constituencies to satisfy

- Utility administrators: EE cost < power cost
- Society in general: Overall benefits > public costs
- Actual program customers: Private benefits > net cost

***Customers seek value of many kinds
...will pay for whatever they value***





The Total Resource Cost Test

TRC =

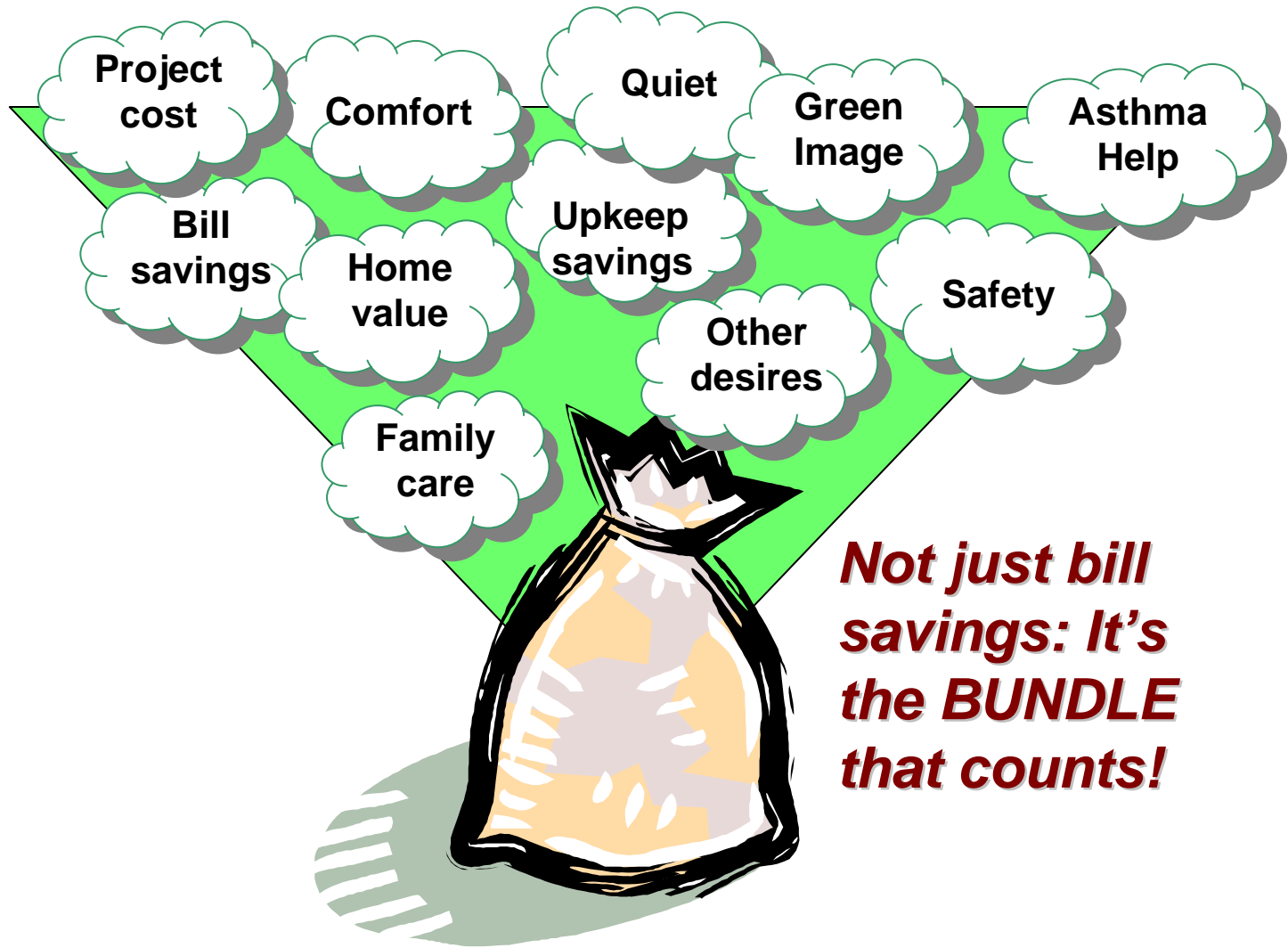
BENEFITS:
Utility Avoided Power Cost
(and sometimes some NEBs)

COSTS:
All program + participant costs
(total project costs)

But is the participant really buying only to reduce the energy cost?



How Do Customers Really Buy?



Not just bill savings: It's the BUNDLE that counts!





A Comprehensive Program Example: *Home Performance with Energy Star*

Emerging class of home energy efficiency programs

...addresses a huge underserved residential market

...can produce deepest home energy savings

...AND also creates valued non-energy benefits

...keeps expanding savings indefinitely after it ends

***but is often systematically undervalued
in public-goods cost-benefit tests***



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TRC Often Ignores Most Benefits

*Example: \$15,000 home retrofit
saving 2500kWh + 250 therms (~40%)*

- Assume \$2000 as share of program costs
- RESULT: TRC < 0.5 due to high participant cost
- BUT if NEBs are accounted for ...
- TRC could be > 2.0

AND society gains more than energy cost savings!





What Homeowners Actually Buy

- ✓ More comfort...in all rooms
- ✓ More reliable, durable HVAC
- ✓ Environmentalism
- ✓ **Reduced energy bills**
- ✓ Indoor air quality
- ✓ Home value increase or protection
- ✓ Home fire & gas safety
- ✓ Moisture/mold protection
- ✓ First on the block/pride
- ✓ Family health (general)
- ✓ Health specifics (asthma)
- ✓ Take advantage of incentives
- ✓ Improved home appearance
- ✓ Additional space
- ✓ Better/nicer windows
- ✓ Reduced home repair
- ✓ All credible improvements

...and these don't include the other benefits to society at large



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Treatment of These NEBs Varies

- Original TRC included ALL benefits and costs
- BUT...Only some states allow broad NEBs
- Others acknowledge NEBs but dismiss value
- No consideration of what the buyer values





The Lutzenhiser Survey Study

PG&E/CBPCA Home Performance Program

- Surveyed customer satisfaction and motivation
- Tantalizing first survey in 2003, refined in 2005
- Included ratings and rankings of buyer motivations
- Result: **Non-energy** benefits are dominant “deciders”

Dense data warning....





Motivational Factor	Rated Very Important	Priority Among "Very Important"			Total in Top 3	3-2-1 Weight
		1st	2nd	3rd		
Improve home's comfort	50	15	8	8	31	69
Replace older equipment	47	14	1	3	18	47
Save energy & resources	47	5	15	5	25	50
REDUCE ENERGY BILLS	45	8	14	12	34	64
Improve indoor air quality	36	4	1	4	9	18
Increase / preserve home value	31	4	5	4	13	26
Contractor Affiliated with E-Star	26	0	0	1	1	1
Address Health issues	25	1	5	1	7	14
Rebate Available	24	0	1	2	3	4
Retrofits indicated by contractor	15	0	0	0	0	0
Improve home's appearance	13	1	0	2	3	5
Work recommended by HP test	11	0	0	1	1	1
Add additional space	2	0	0	0	0	0
Interest buy down program	1	1	1	0	2	5
Customer choice (at Home Depot)	1	0	0	1	1	1
Reliable windows	1	0	0	0	0	0
Contractor's knowledge and reputation	1	0	1	0	1	2

Source: Lutzenhiser, 2006 for CPUC





Profound Implications for Policy

Climate change...changes the game

*Deep energy savings will be essential
...and comprehensive programs necessary*

NEBs are real and must be counted...

Conventional: Try to monetize all NEBs

- ...contentious, slow
- ...may violate some enabling legislation
- ...success unlikely

OR

Alternative: Reduce participant cost in TRC

- ...Could radically shift program portfolios
- ...Justifies more EE funding, incentives, new programs



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A Total Resource Cost Test Fix

TRC =

BENEFITS:
Utility Avoided Power Cost
(and no participant NEBs)

COSTS:
Program + 25% participant costs
(total RELEVANT project costs)

Reduce the participant cost to better balance the limited energy benefits





It's Time for a Change!

- Non-energy benefits really matter
- Cost-effectiveness is often too narrowly defined
- Climate policy implications warrant a new view
- Reasonable case for cost-test changes now
- Slow process, needs debate and formal review

...The stakes are too high to wait





Thanks...Questions?

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