INTERNATIONAL ENERGY PROGRAM EVALUATION CONFERENCE

Non-Energy Benefits (NEBs):
The Latest in Results, Applications, and Best Practices for State Cost-Effectiveness Tests

Lisa A. Skumatz, Ph.D.,
Skumatz Economic Research Associates

2015 IEPEC Conference — Long Beach, California

SERA

NON-ENERGY BENEFITS (NEBS)

Latest in Results, Applications, & Best Practices for State C/E Tests

IEPEC, Long Beach, August 2015

Lisa A. Skumatz, Ph.D.,
Skumatz Economic Research Associates, Inc. (SERA)
303/494-1178; skumatz@serainc.comz

SERA

NON-ENERGY BENEFITS

- Program **value** beyond direct goal (savings)
- **20 years** of progress/ where we are
- **Motivation**
  - 0 is the wrong number
  - "Bundled features" / rational / tunnel
- **B/C incomplete** – Biased investments / decisions because all costs, not all benefits
- High value from quantitative studies
  - Evaluation's purpose – to inform decision-making

Source: Skumatz / SERA research

SERA

20 YEARS OF NEBS PROGRESS…

1: Perspectives, Basic Measurement *1994-1998*

2. Estimation & B/C & LIPPT *1996-2001+*

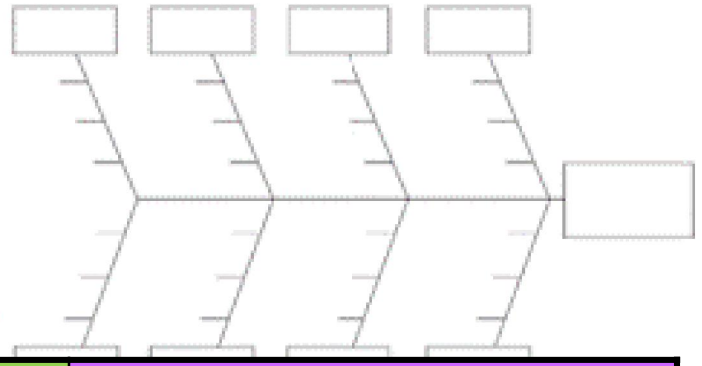
3: Measurement, Use, & Expansion *2001-present*

4: Refocus B/C Applics *2008-present*

But there still isn't agreement on name! - NEB, OPI, NNEB, MB, co-benefits…

SERA

NEB DRIVERS, 3 BENEFICIARIES



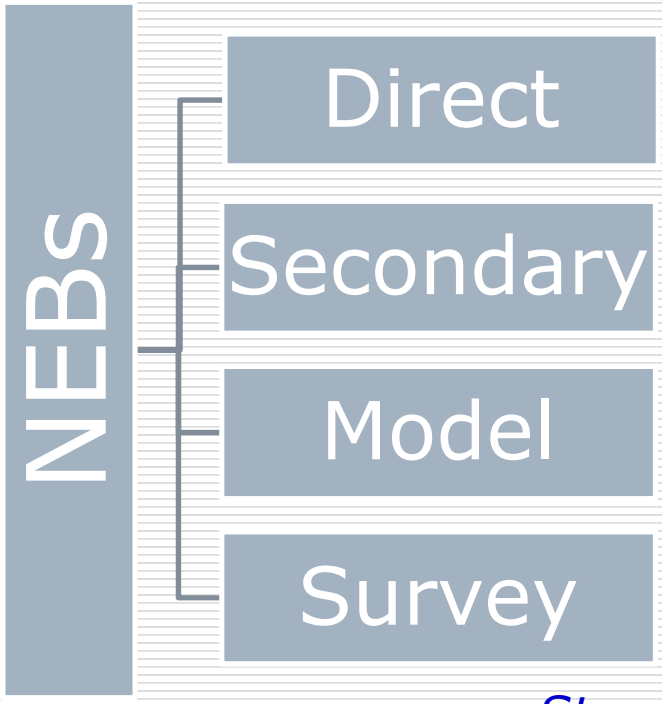
Utility/Ratepayer	Societal	Participant
oPayments/financial	oEconomic development / job / multipliers	oPayments & coll'n
oDebt collection efforts / calls	oTax impacts	oEducation
oEmergencies / insurance	oEnvironmental	oBuilding stock
oT&D, power quality, reliability	oEmissions	oHealth
oSubsidy (LI)	oHealth	oEquipment service incl. productivity, comfort, maint, etc.
oOther	oWater & other resources / utilities	oOther utilities (water, etc.)
	oNational security	oOther (transactions, enviro, psychic, etc.)
	oWildlife/Other	

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

Source: (Skumatz/SERA, 2004)

SERA

NEBs MEASUREMENT – 4 MAIN MEASUREMENT APPROACHES



➔Monetized NEBs

Story of a ferry… then it's academic

Strengths & weaknesses; bracket
Surveys most appropriate for some
Balancing precision & practical
Avoid bias, achieve many responses
Multiple survey approaches
How accurate is needed?

Source: Skumatz / SERA research

SERA

MEASUREMENT ISSUES & BEST PRACTICES

- Best measurement practices
  - "Net" positive & negative, meaningful, outcomes
  - Large sample, discount rates, host of other best practices / research
- Measurement accuracy (coming)
- Transferability considerations
  - Can't transfer directly (measures, climate, target, *lists*)
  - Some relatively constant or easily measured

Source: Skumatz / SERA research

SERA

NEGATIVE NEBS VALUE / PERCEIVED COST OF BARRIERS

Residential Example

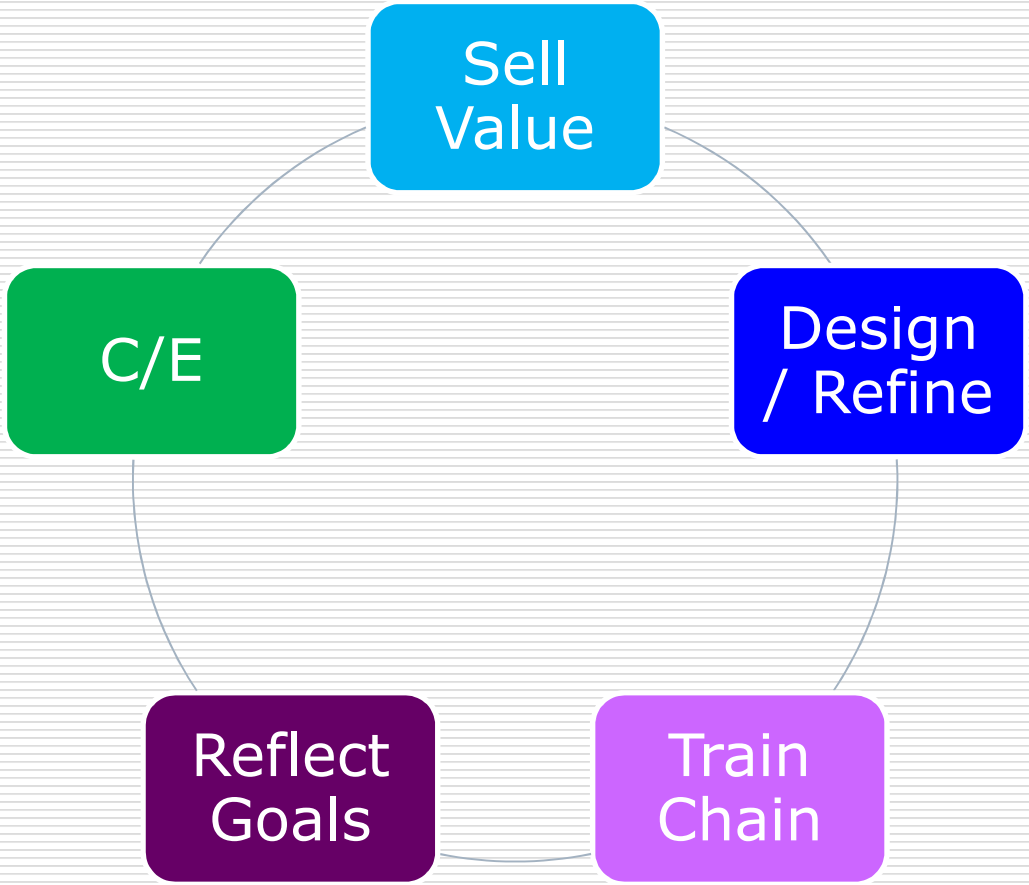
Negative NEBs	Solar W/H
Appearance	-$14 NZ
Maintenance	-$9 NZ

Commercial Example

Source: Skumatz Economic Research Associates research

SERA

KEY APPLICATIONS OF NEBS



SERA

NEBS IN COST-EFFECTIVENESS APPLICATIONS

NEBS IN C/E – COMPARE & OPTIMIZE INVESTMENT

- TRC / Societal, Participant, UCT, RIM… NEBs
  - *Bias from 0 value for part of net benefits. For true representation of B & C, NEBs elements estimate the missing factors.*
  - *Addresses bias, better guide measure, pgm, and portfolio investment*
  - **Address by**:

    1) include monetized NEBs appropriate to test (e.g. TRC, SCT), or

    2) exclude all costs associated with achieving NEBs or

    3) use UCT
  - B/C early, then "conservative" awaiting evidence

Source: Skumatz / SERA research

SERA

NEBS IN C/E – COMPARE & OPTIMIZE INVESTMENT

- ***Chicken & Egg*** – *important uses* ← → *trusted uses*; money if "serious" application
  - won't incorporate effects until well-measured; no money at measurement unless "serious" appl…
  - Much investment, data, expertise, increments in 20 years… Dominoes…

Source: Skumatz / SERA research

SERA

NEBS IN B/C – THE ACCURACY QUESTION(?!)

Risk?
Under the rug…!

- Simplified B/C Inputs- Lets compare the risks/ranges

[PV[NTG*(Sav+NET NEB)*Lifetime]/PV(Incr Cost)…]

NTG – accuracy, measurement, incomplete
RISK/RANGE: Medium,
$ high

Savings: Impact, repeatedly & expensively measured, little variation, $100K+
RISK/RANGE: LOW (+/- very small),
$ HIGH

EUL: Lists 20+ years old, Origins (!), technologies, dated, varies / local, values 2x
Risk/Range: HIGH (?-2+,varies; wrong),
$ medium-low

Incr cost: Limited, age, not local
RISK/RANGE: medium (not a factor of 2…)
$ VERY HIGH

Discount rate: Not highly complicated, purpose / use; <WACC, risk link, regulatory environment;
RISK/RANGE: medium, $ Very Low

NEBs: Lit exists, comparability, transferability, local, inexpensive to add to existing studies, gaps
RISK/RANGE: low-med (+/-…)
$ Very low

Source: Skumatz / SERA research

SERA

NEBS IN B/C – THE ACCURACY QUESTION(?!)

Risk?
Under the rug…!

- Simplified B/C Inputs- Lets compare the risks/ranges

[PV[NTG*(Sav+NET NEB)*Lifetime]/PV(Incr Cost)…]

NTG – accuracy, measurement, incomplete
RISK/RANGE: Medium,
$ high

Savings: Impact, repeatedly & expensively measured, little variation, $100K+
RISK/RANGE: LOW (+/- very small),
$ HIGH

EUL: Lists 20+ years old, Origins (!), technologies, dated, varies / local, values 2x
Risk/Range: HIGH (?-2+,varies; wrong),
$ medium-low

Incr cost: Limited, age, not local
RISK/RANGE: medium (not a factor of 2…)
$ VERY HIGH

Discount rate: Not highly complicated, purpose / use; <WACC, risk link, regulatory environment;
RISK/RANGE: medium, $ Very Low

NEBs: Lit exists, comparability, transferability, local, inexpensive to add to existing studies, gaps
RISK/RANGE: low-med (+/-…)
$ Very low

Where to invest – risk / reward??
- Make some periodic, etc…
- EUL for sure – lasting
- NEB no brainer
- NTG periodic sector-wide

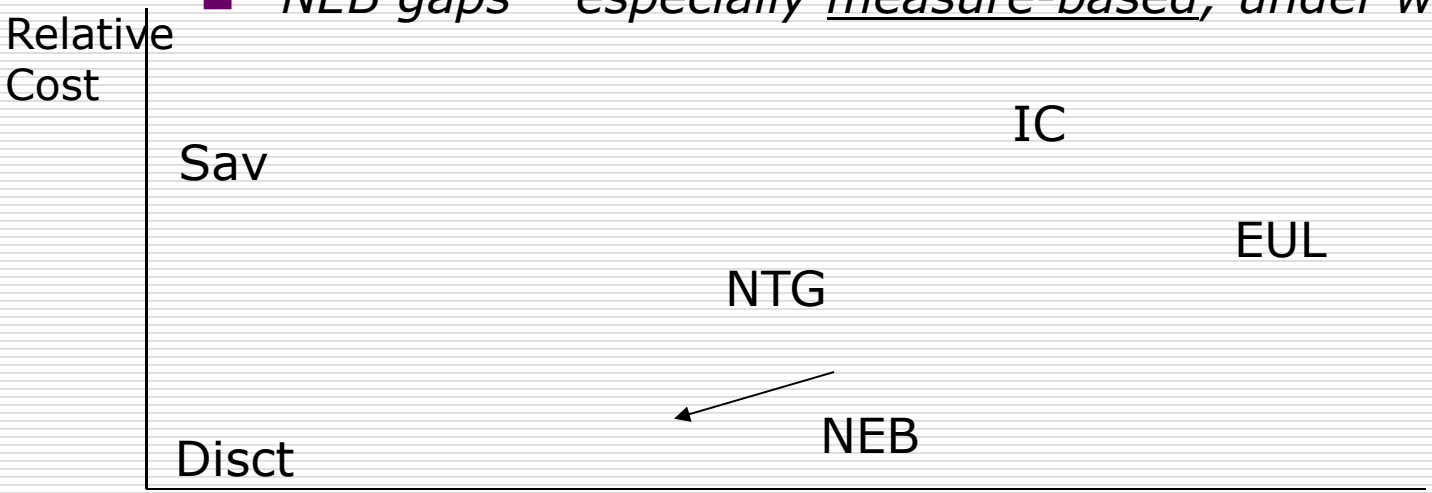
Under the rug…! And what we're being compared to isn't that magically accurate either. Just because it is in a spreadsheet doesn't make it TRUE!!

Source: Skumatz / SERA research

SERA

NEBS IN C/E – WHERE TO INVEST?

- ***Risk / Reward***–
  - *RANGES compared to COSTS*
    - *Make some periodic (savings, NTG, cost)*
    - *EUL problem, NEB no brainer (cheap, high value)*
      - *NEB gaps – especially measure-based; under way…*



Risk, value, range, return

Source: Skumatz / SERA research

SERA

KEY QUESTIONS FOR IMPROVING TESTS - BALANCE

- **Tradeoffs** – How much to improve tests? Depends on costs & benefits of accuracy improvements (in NEB categories)
  1. Which NEBs **most valuable**?
  2. What **value range** arises from reasonable cost measurement (eval budget)
  3. Does inclusion of this RANGE (low vs. high value) ***change the B/C conclusion***?

If **NO**,
You're done
And bias addressed sufficiently

IF **YES**,
Refine measurement up to value or cost of "wrong" decision

'NEB-It" Model

SERA

EXAMPLES OF STATE TREATMENT OF NEBS

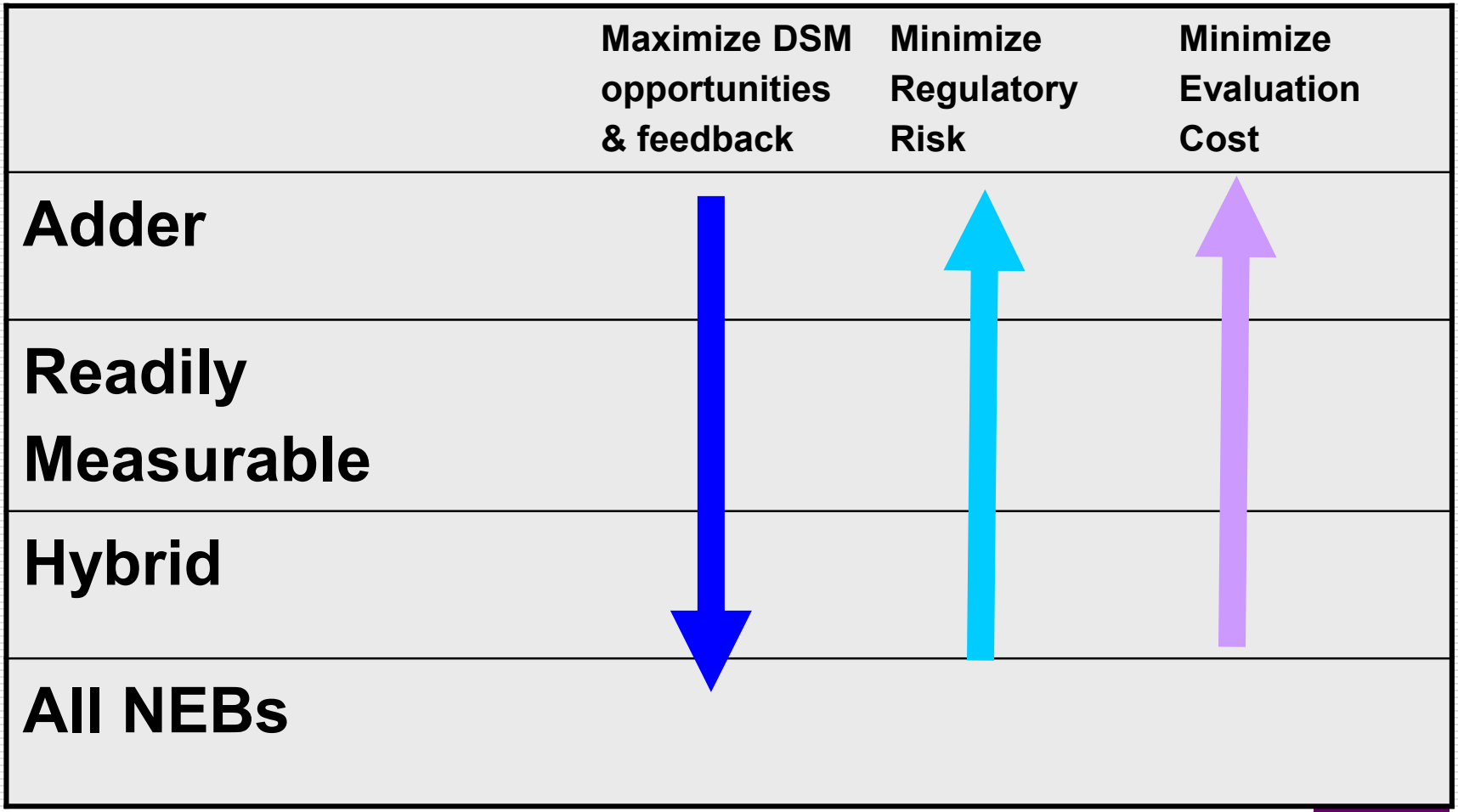
- Adders
  - (well-suited to program / measure independent)
- Readily Measurable
- Hybrid ←
- All NEBs←

- Program / measure-independent
- Domino effect

Source: Skumatz / SERA research

SERA

STATE REGULATORY TREATMENTS OF NEBS – EXAMPLES & SPECIFICS



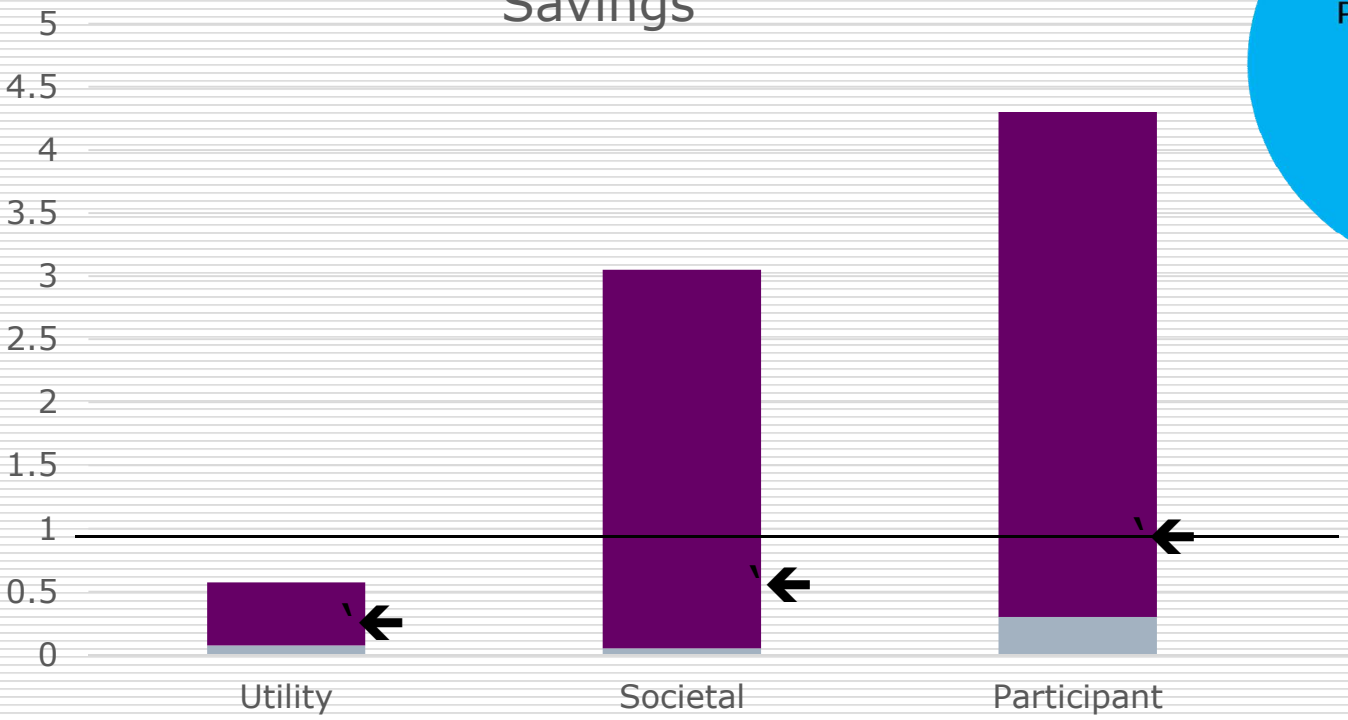
Source: SERA Research

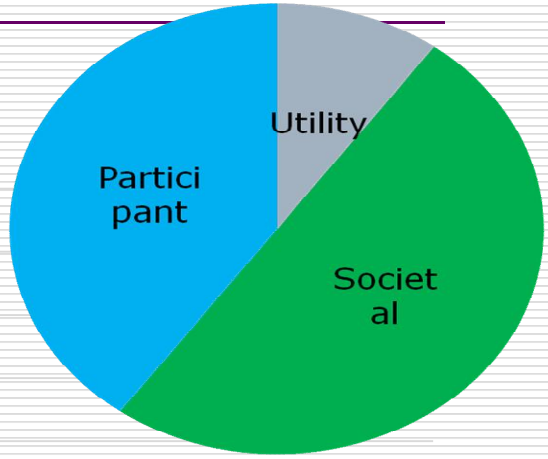
SERA

NEB RESULTS: WHAT IS BEING OMITTED?

What's being left on the table??

HOW VALUABLE ARE NEBS? WHAT IS BEING OMITTED?





Source:
Skumatz / SERA research

SERA

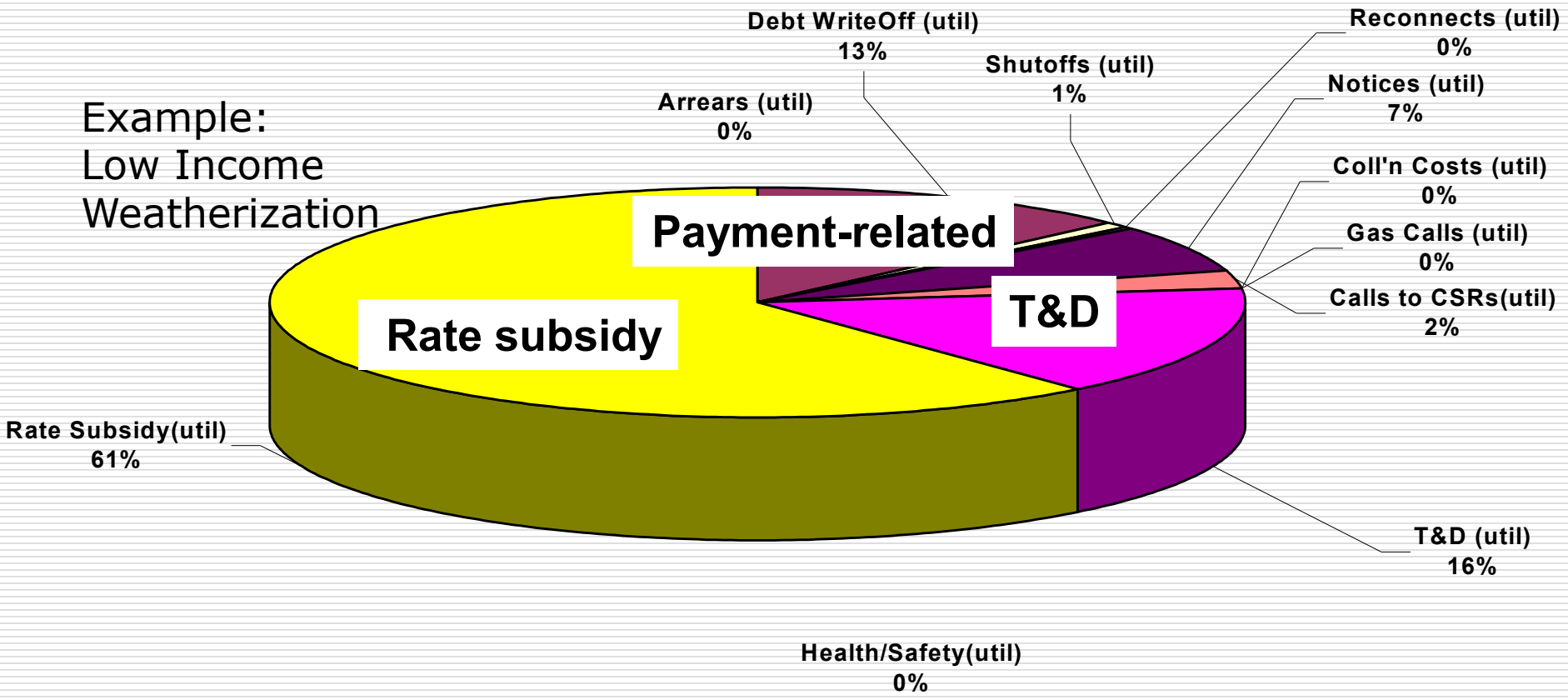
ARE NEBS HIGH VALUE?

Some program examples	NEB Value / Savings
Weatherization (Wx)	
Energy STAR Products	
A/C program	
Res EMS	
Low Income MF	
Low Income Wx	
Commissioning	
Com'l Lighting	
Portfolio / Total	
Com'l new construction	
Boiler	
Com'l Tech Assistance	
Audit / Incentives	

Source: Skumatz / SERA Research

UTILITY NEBS

Example:
Low Income
Weatherization

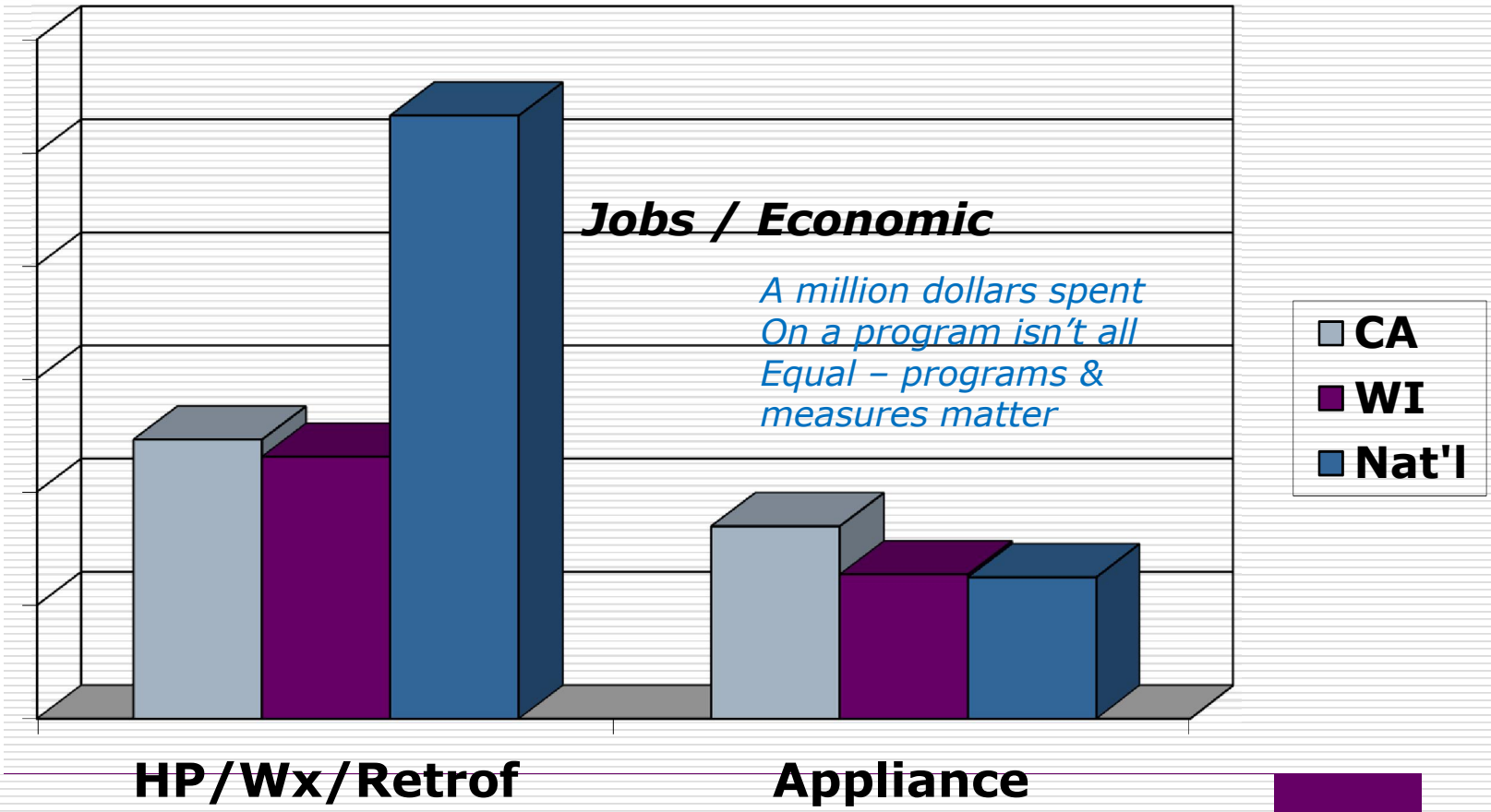


Source: Skumatz Economic Research Associates research

SERA

SOCIETAL IMPACTS – ALL PROGRAMS AREN'T ALIKE…

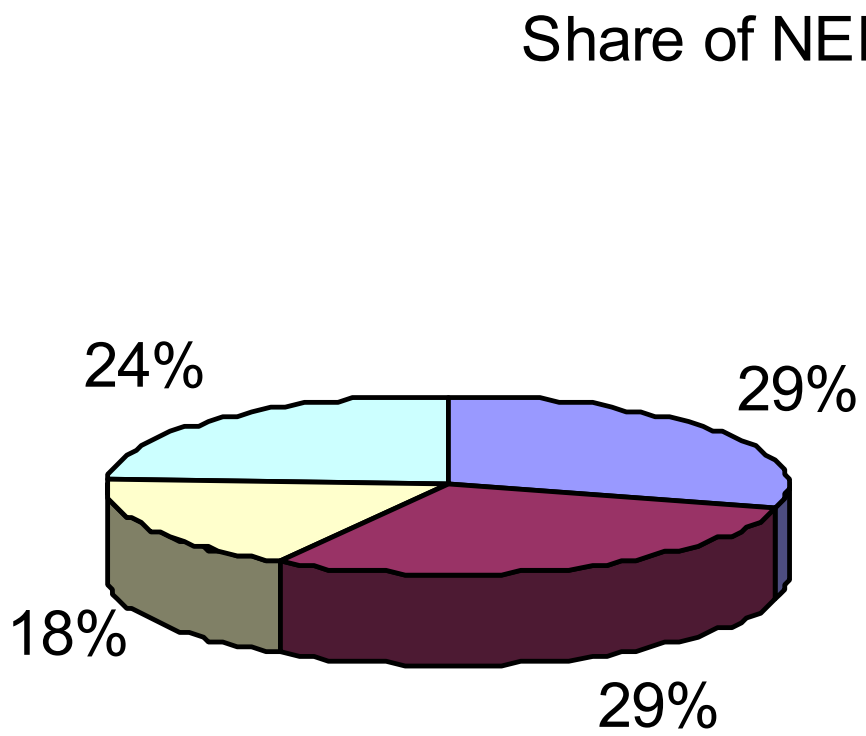
- Economics, Emissions, Hardship



(Source: Skumatz /SERA ECEEE 2007, ACEEE 2006)

SERA

WHICH PARTICIPANT NEBS ARE HIGH VALUE?



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

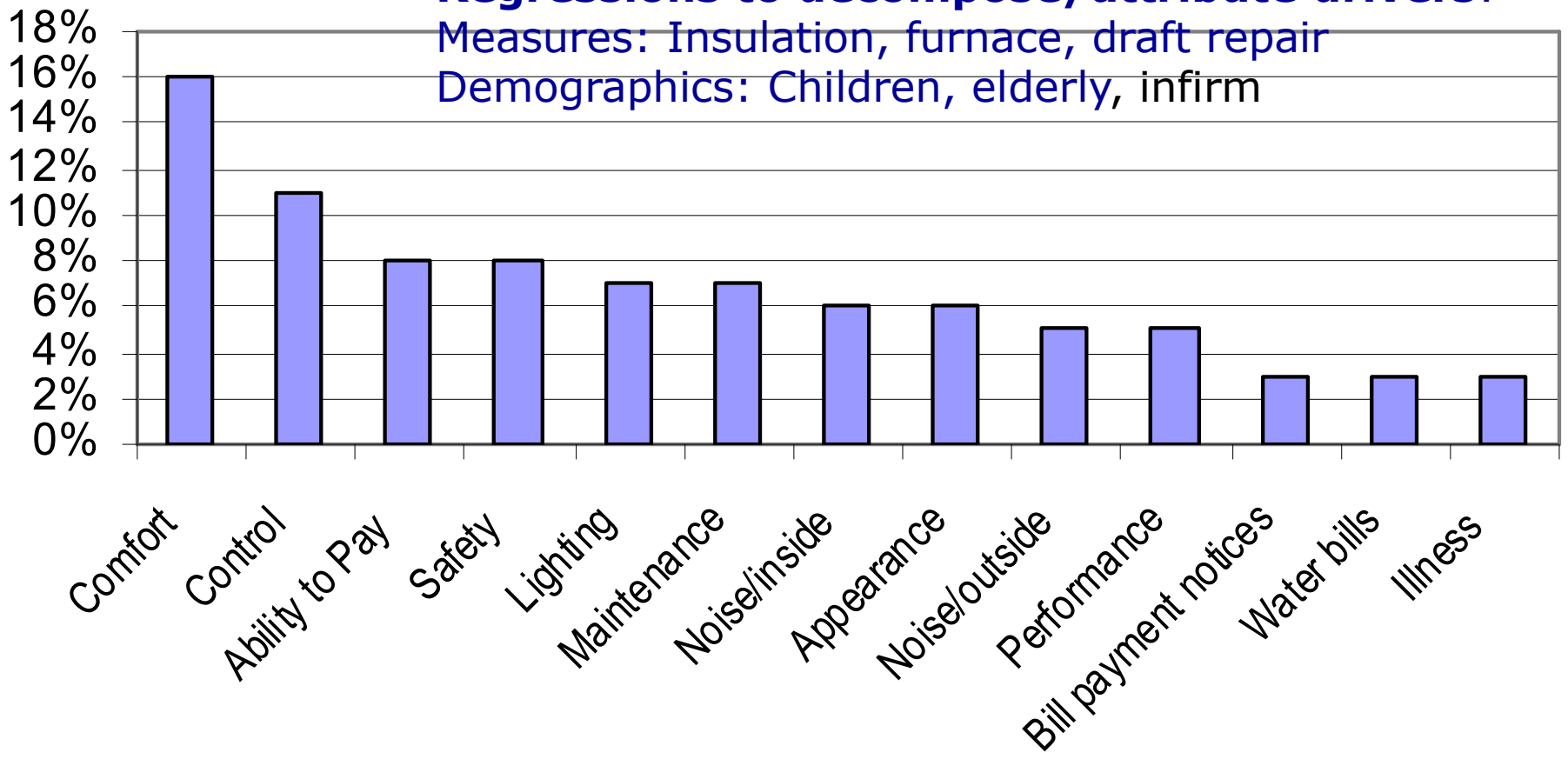
Source: (Skumatz/SERA research)

Persistence issues…

TOP NEBS FOR WX

(Percent of total survey-based participant NEBs)

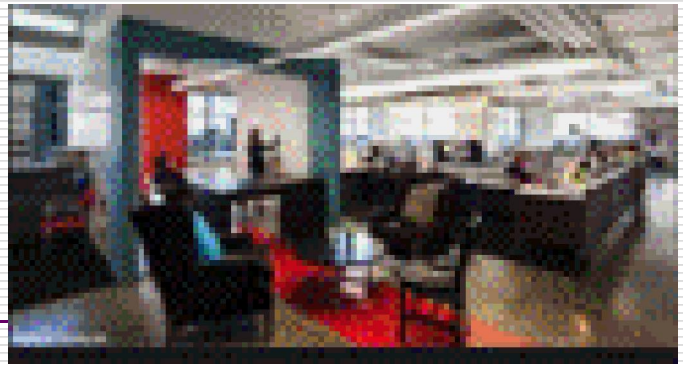
Regressions to decompose/attribute drivers:
Measures: Insulation, furnace, draft repair
Demographics: Children, elderly, infirm



Source: Skumatz Economic Research Associates research

SERA

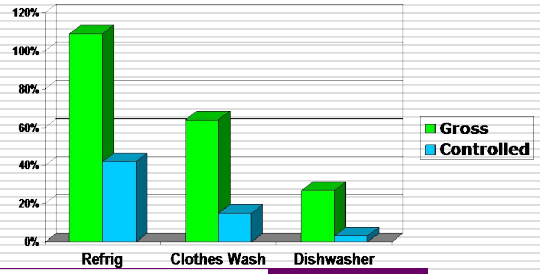
NEBS – WIDELY RESEARCHED



- 20 years, >100 programs, many states
  - All program types, sectors
  - Programs, measures, portfolios
  - Assembled into model / used for this analysis

'NEB-It" Model

- SERA input in deliberations in multiple states
  - Primary / secondary research
  - Recommended values / options,
  - Collaboration / intervention
  - Webinars / workshops / training
  - Other states / status
  - Corrections to existing tests
  - LIPPT / revised and new tests



Source:
Skumatz / SERA research

SERA

IMPLICATIONS FOR JUSTIFIABLE NEBs VALUES

	Utility	Soc	Part	Conserv. Rec'm	Rationale
Base Percent	X%	X%		X%	Program-invariant
Low Income	X%	X%	X%	X%	Multiple sources
Weatherization		X%	X%	X%	Substantial Participant impacts
Measure / Program-specific			%		Varies by measure, sector
Other Recom's					Local Research

Developing values / multiple states & utilities

Source:
Skumatz / SERA

SERA

THANK YOU!!

Questions?

Lisa A. Skumatz, Ph.D.

Skumatz Economic Research Associates (SERA),

Phone: 303/494-1178

skumatz@serainc.com