

# ***NON-ENERGY BENEFITS (NEBS)***

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## ***Consideration of Values for Illinois***

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# NON-ENERGY BENEFITS



- Program **value** beyond 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

# 20 YEARS OF NEBS PROGRESS...

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**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

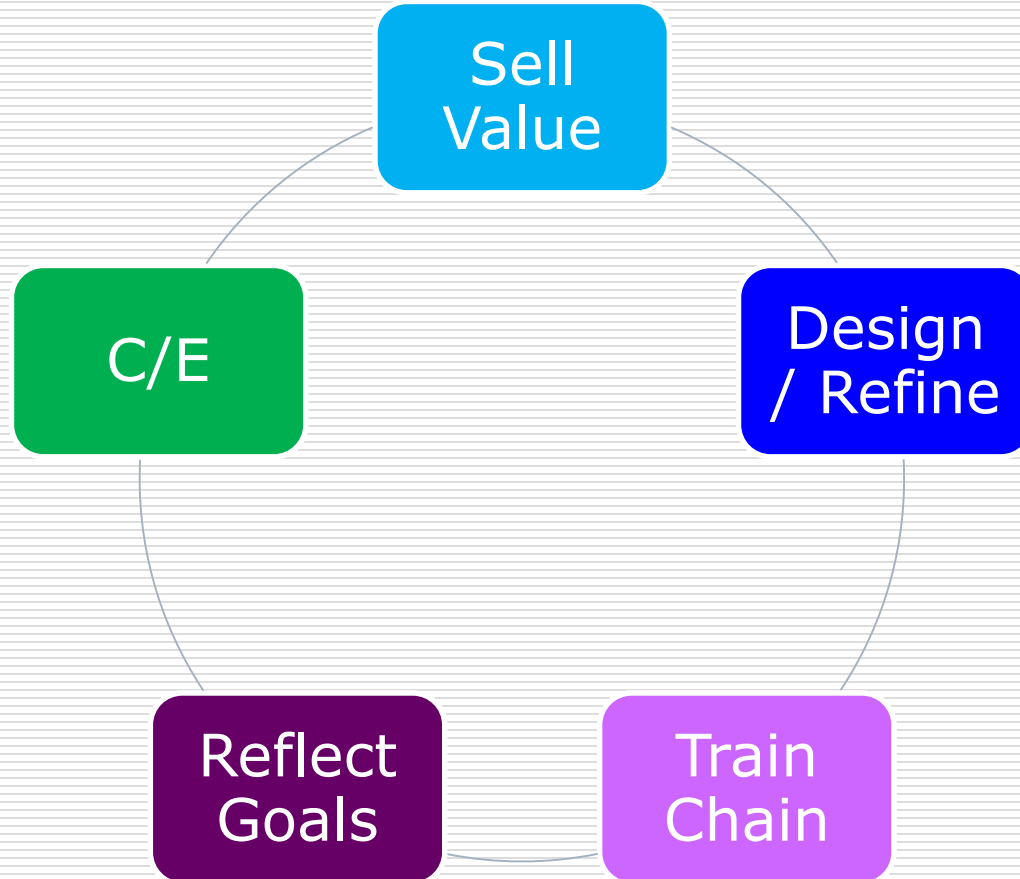
***But there still isn't agreement on name! - NEB, OPI, NNEB, MB, co-benefits...***

Source: SERA, all rights reserved

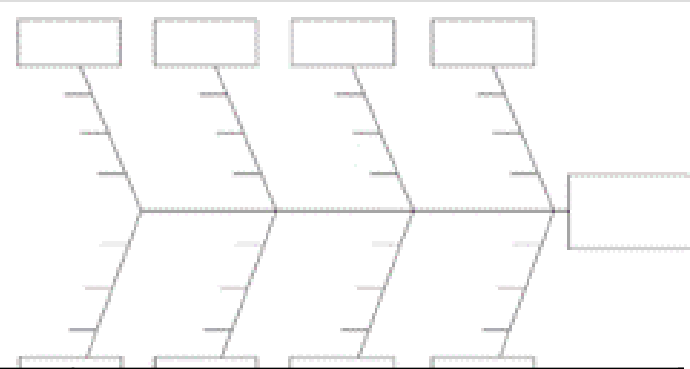
**SERA**

# KEY APPLICATIONS OF NEBS

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# NEB DRIVERS, 3 BENEFICIARIES



Utility/Ratepayer	Societal	Participant
<ul style="list-style-type: none"> <li>○ Payments/financial</li> <li>○ Debt collection efforts / calls</li> <li>○ Emergencies / insurance</li> <li>○ T&amp;D, power quality, reliability</li> <li>○ Subsidy (LI)</li> <li>○ Other</li> </ul>	<ul style="list-style-type: none"> <li>○ Economic development / job / multipliers</li> <li>○ Tax impacts</li> <li>○ Environmental</li> <li>○ Emissions</li> <li>○ Health</li> <li>○ Water &amp; other resources / utilities</li> <li>○ National security</li> <li>○ Wildlife/Other</li> </ul>	<ul style="list-style-type: none"> <li>○ Payments &amp; coll'n</li> <li>○ Education</li> <li>○ Building stock</li> <li>○ Health</li> <li>○ Equipment service incl. productivity, comfort, maint, etc.</li> <li>○ Other utilities (water, etc.)</li> <li>○ Other (transactions, enviro, psychic, etc.)</li> </ul>

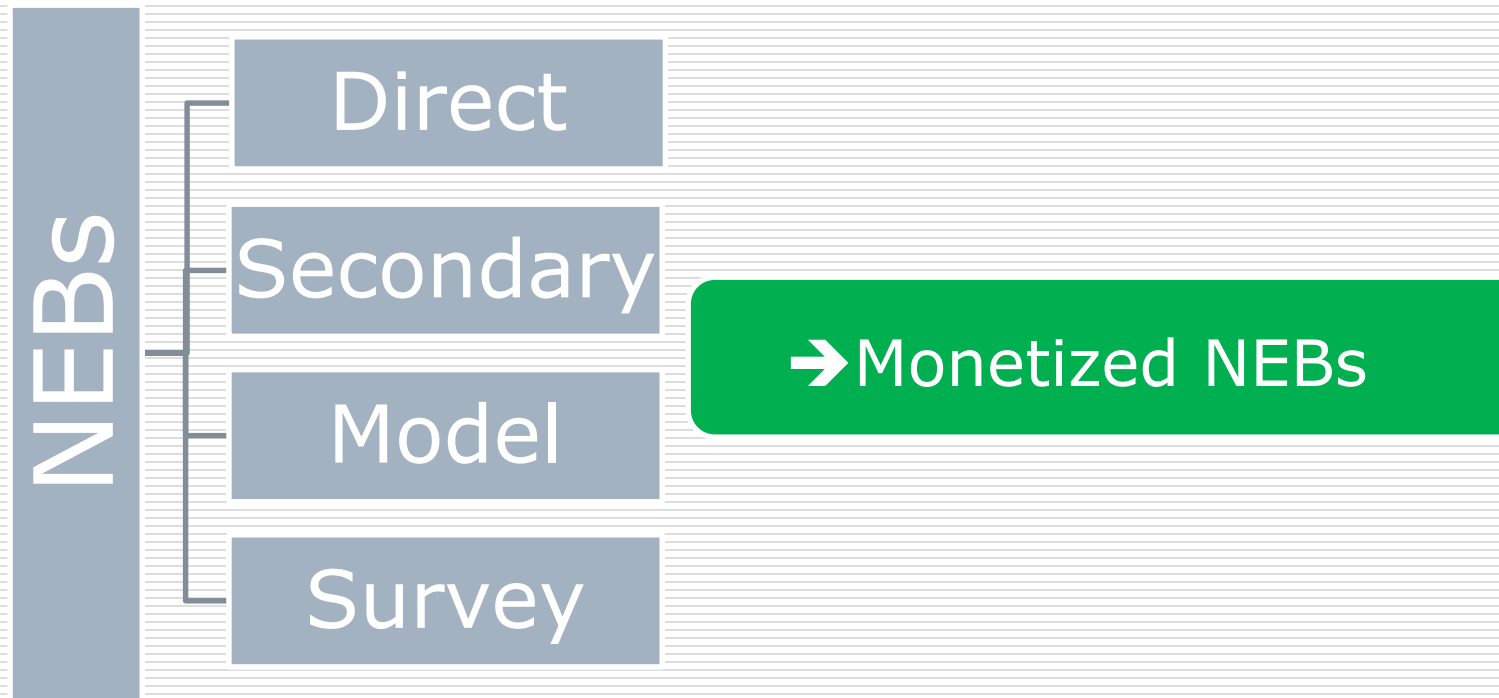
More than 60 categories derive from these drivers

Include subsets as appropriate to application.

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***NEB RESULTS:  
MEASUREMENT &  
EXAMPLES FROM 20  
YEARS***

# NEBs MEASUREMENT – 4 MAIN MEASUREMENT APPROACHES



*Story of a ferry... then it's academic*

*Strengths & weaknesses  
Balancing precision & practical  
Avoid bias, achieve many responses  
False comparisons?*

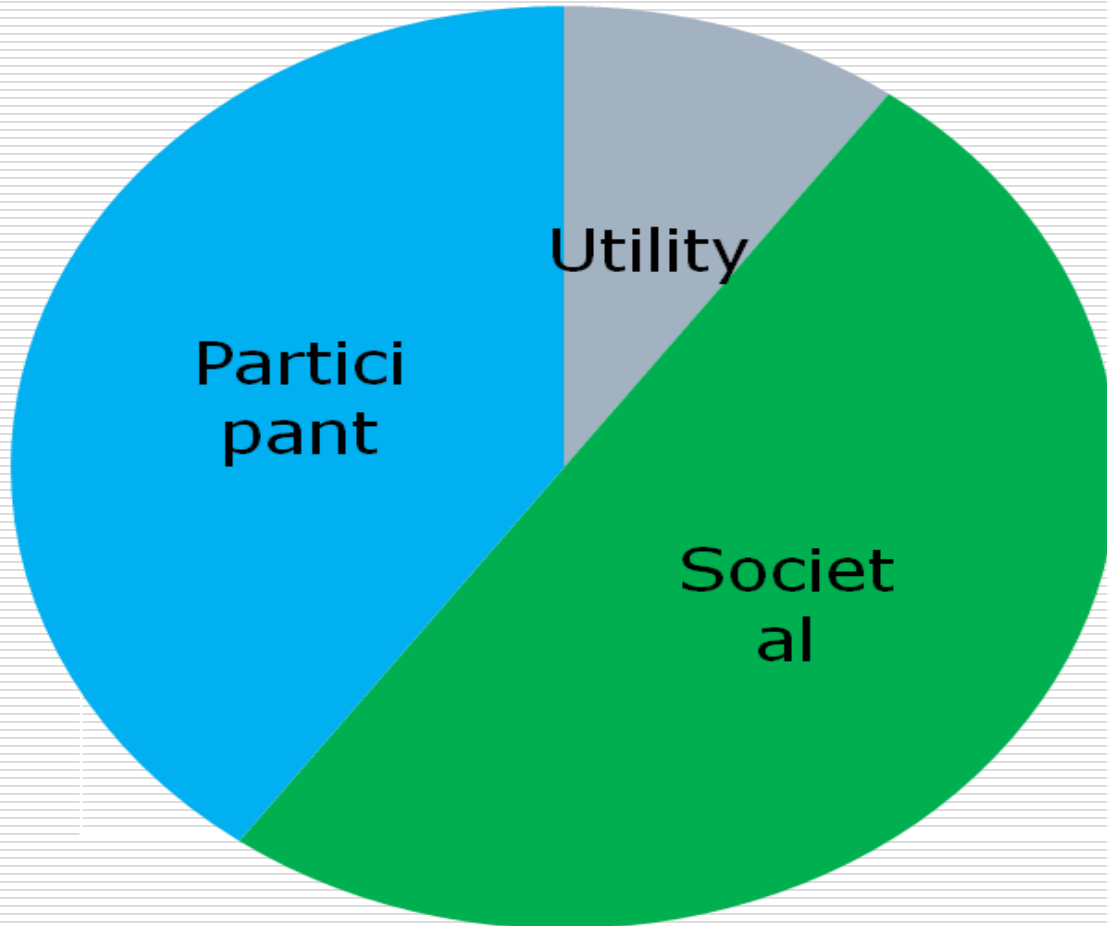
# ***MEASUREMENT ISSUES & BEST PRACTICES***

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- Best measurement practices
  - “Net” positive & negative, meaningful, outcomes
  - Large sample, discount rates, host of other best practices / research
- Measurement accuracy
  - Relative to other B/C elements
- Transferability



# WHICH NEBS ARE HIGHEST VALUE?



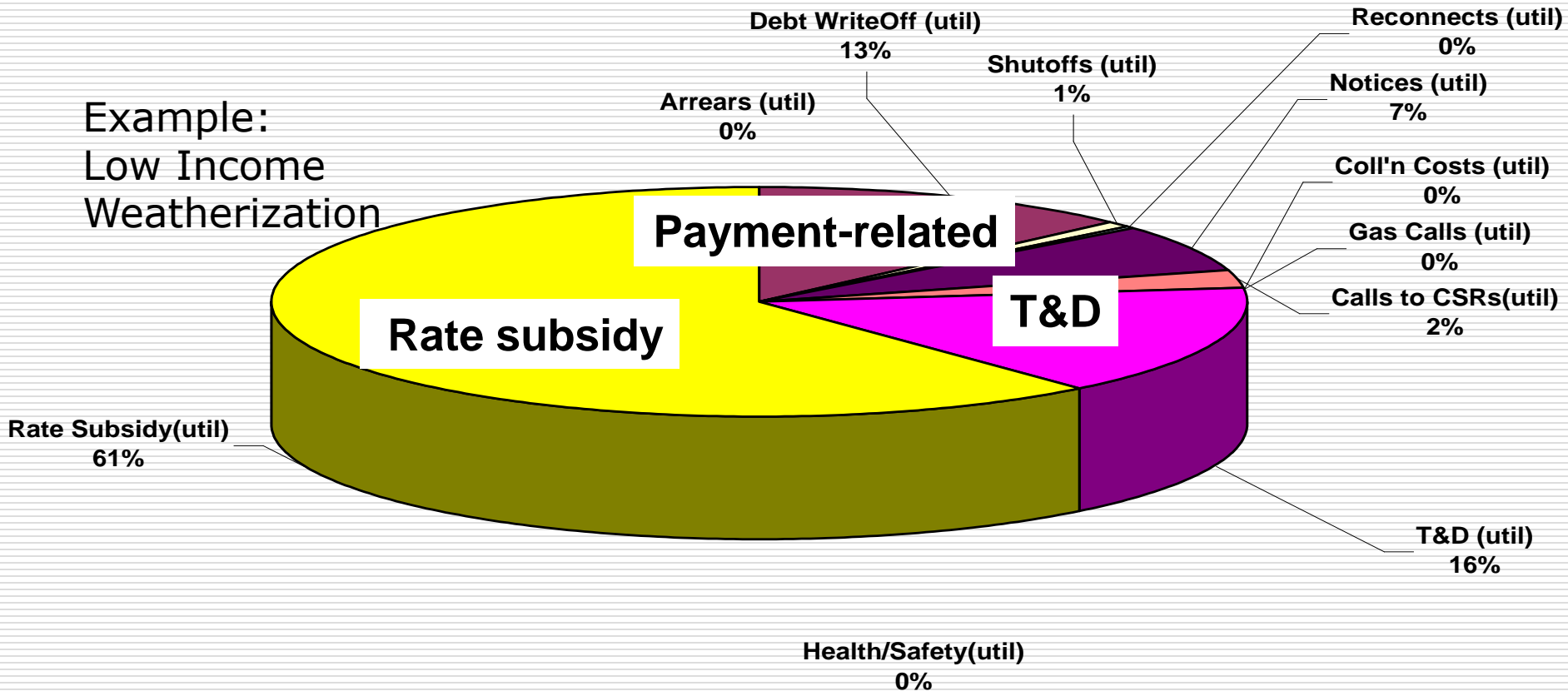
# ***ARE NEBS HIGH VALUE?***

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- Values vary by climate, measures included, sector. Participant only elements:
  - Single-appliance / equipment: 30%-90%+
  - Whole building: ~100%+
  - Low income: >100%
  - Many others
  - Portfolios

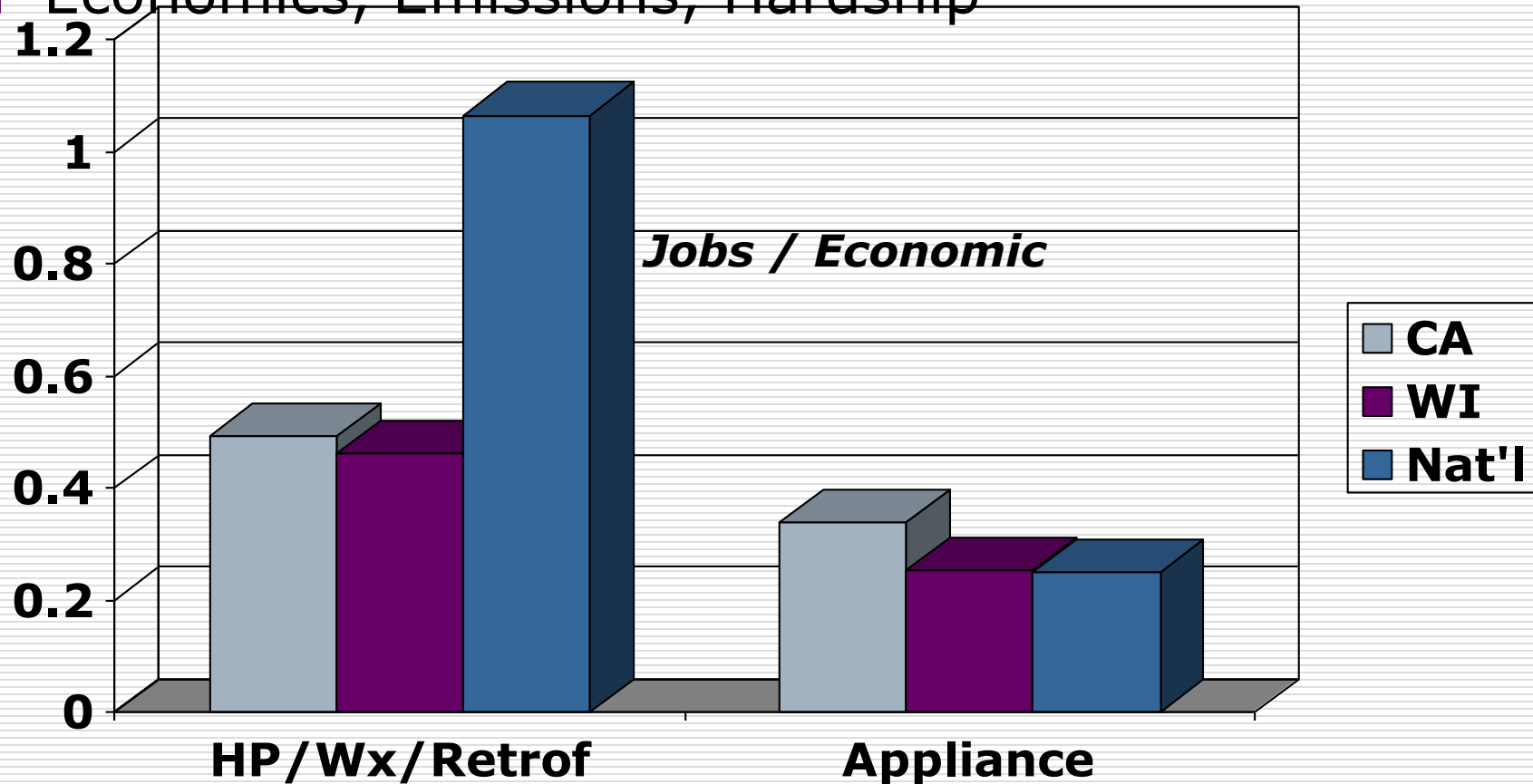
# UTILITY NEBS

Example:  
Low Income  
Weatherization



# ***SOCIETAL IMPACTS – ALL PROGRAMS AREN'T ALIKE...***

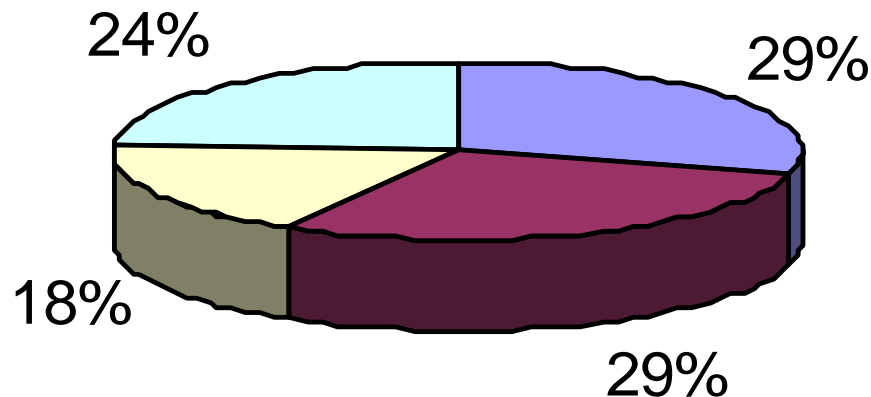
□ Economics, Emissions, Hardship



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

# WHICH PARTICIPANT NEBS ARE HIGH VALUE?

## Share of NEBs



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

- Comfort & svcs
- Home & value
- Health-related
- Educ/bills/other

Source: (Skumatz/SERA research)

Source: SERA, all rights reserved

Persistence issues...

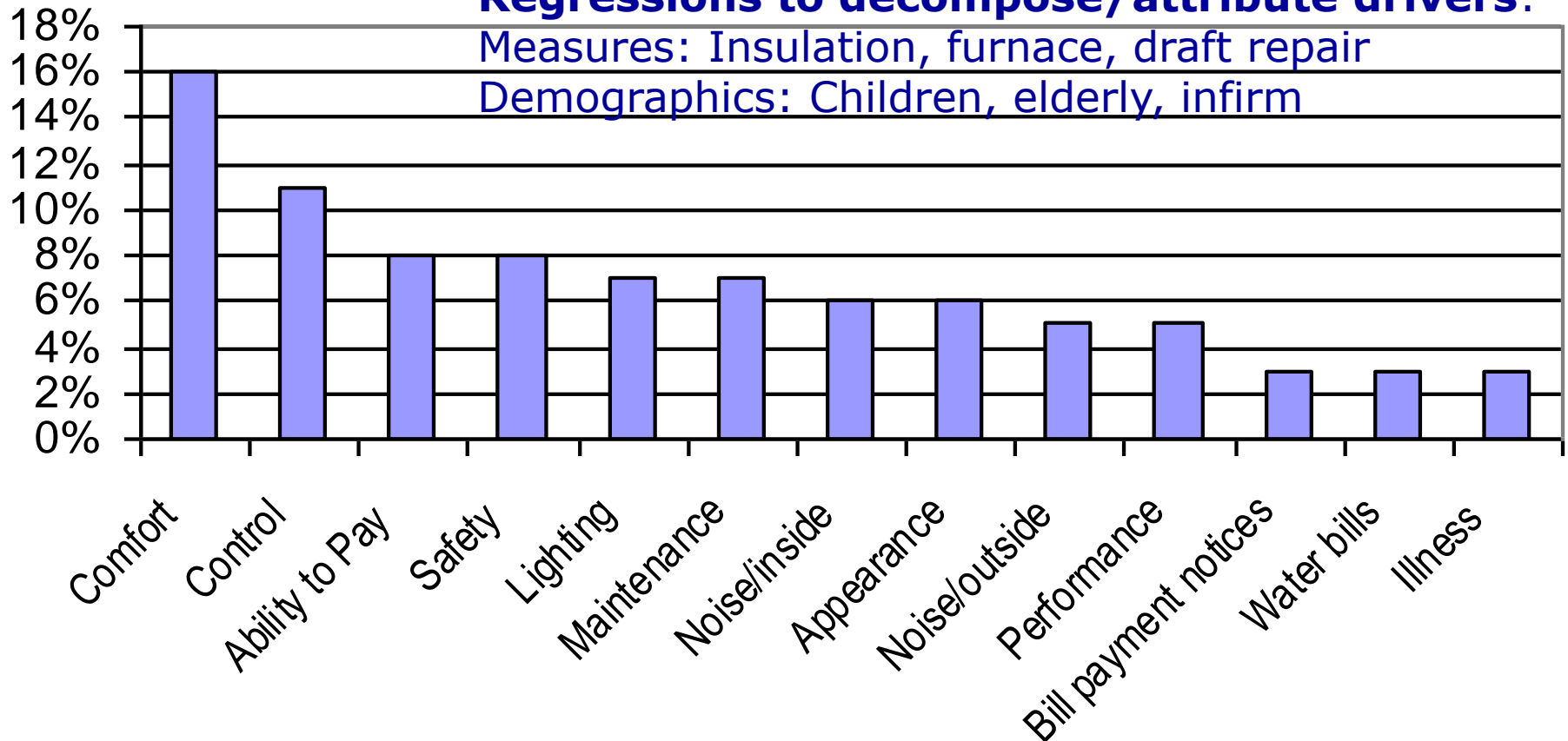
# TOP NEWS FOR WX

(Percent of total survey-based participant NEBs)

## Regressions to decompose/attribute drivers:

Measures: Insulation, furnace, draft repair

Demographics: Children, elderly, infirm

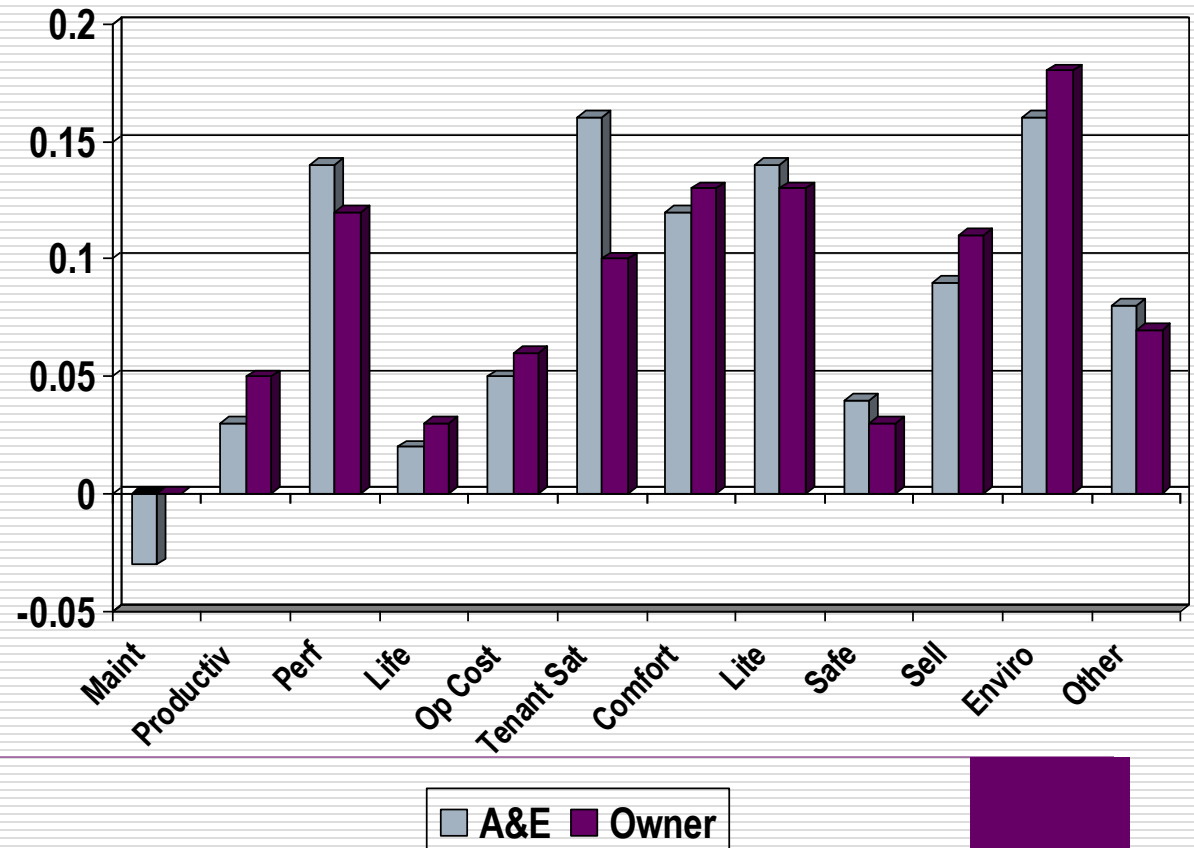


# NEGATIVE NEBS VALUE / PERCEIVED COST OF BARRIERS

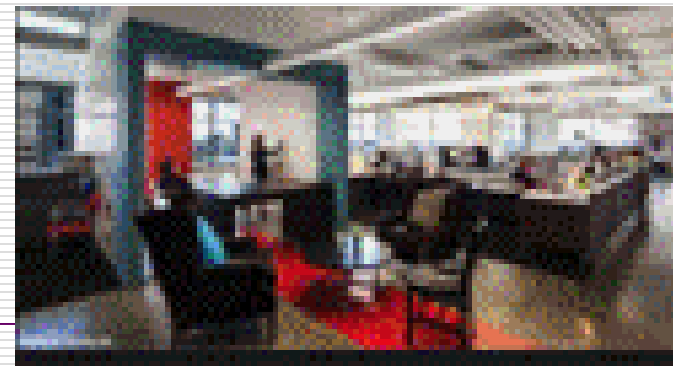
## Residential Example

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

## Commercial Example

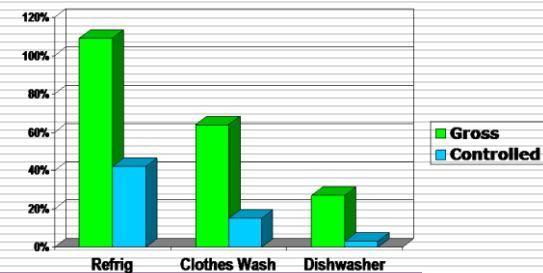


# NEBS – WIDELY RESEARCHED



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

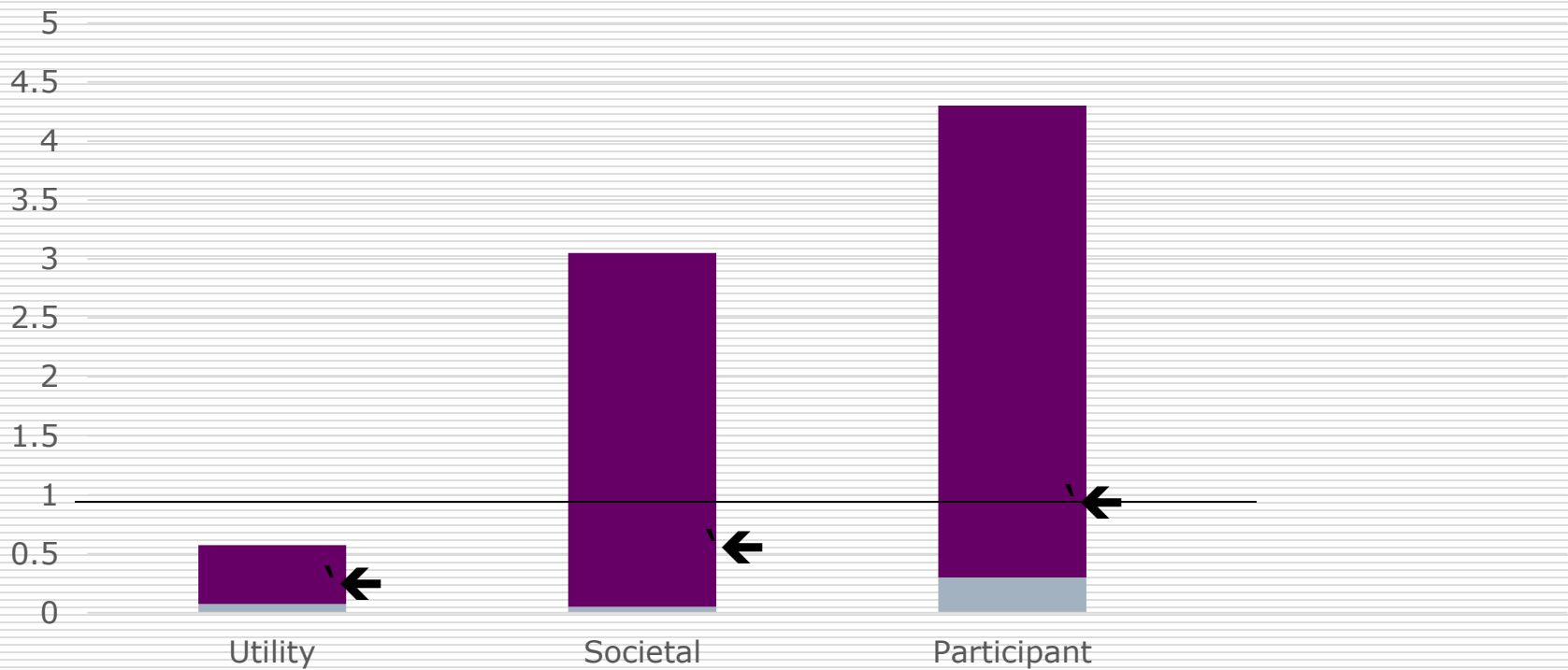
**'NEB-  
It"  
Model**





# RESULTS FROM THE NEBS RESEARCH

NEB Value Ranges – Multiplier times Energy Savings



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# ***NEBS IN COST- EFFECTIVENESS APPLICATIONS***

# NEBS IN C/E – COMPARE & OPTIMIZE INVESTMENT

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- TRC / Societal, Participant, UCT, RIM... NEBs
  - *For true representation of B & C, elements of NEBs rep. missing factors & address bias, better guide measure, pgm, and portfolio investment*
  - **Address by:**
    - 1) incl monetized NEBs or
    - 2) exclude all costs associated with achieving NEBs or
    - 3) use UCT
  - B/C early, then “conservative” awaiting evidence

# NEBS IN C/E – COMPARE & OPTIMIZE INVESTMENT

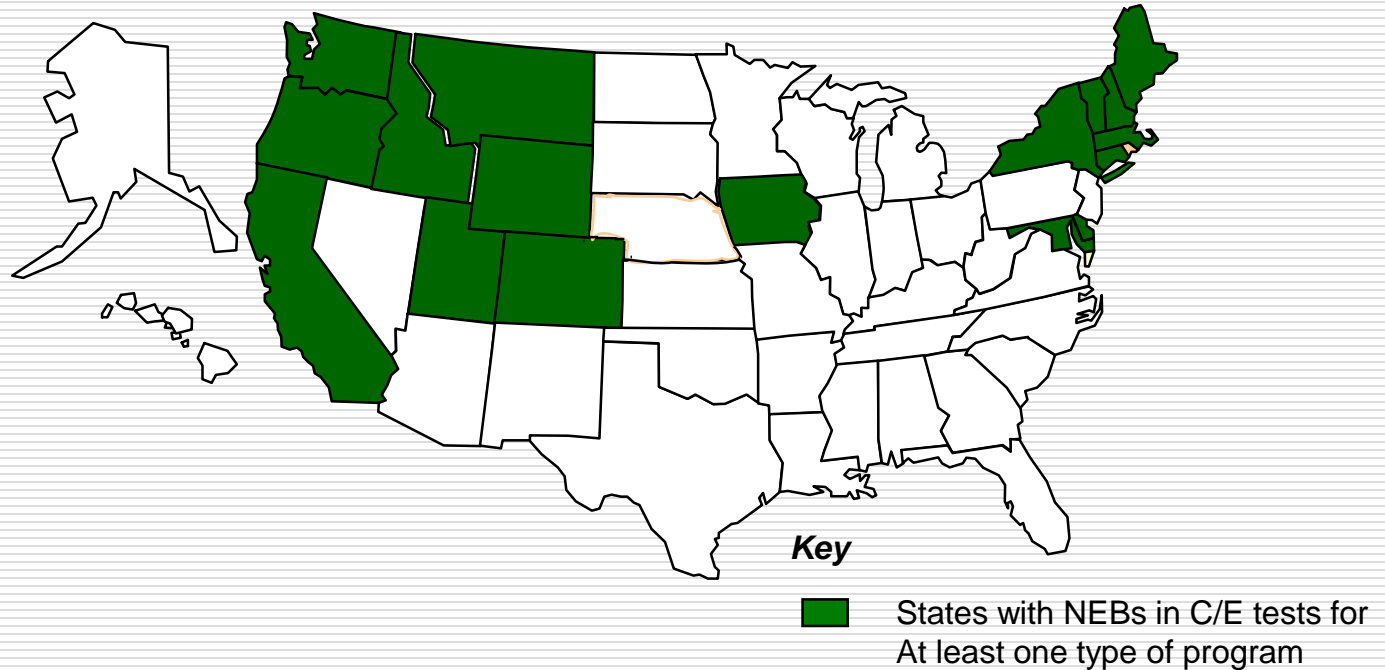
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- **Chicken & Egg** – *important uses* ← → *trusted uses*; money if “serious” application
  - won’t incorporate effects until well-measured; no money at measurement unless “serious” appl...
  - Much investment, data, expertise, increments in 20 years...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



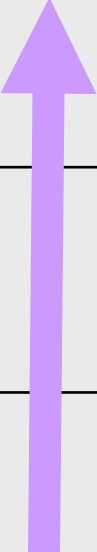


# ***STATES WITH NEBS IN C/E TESTS - STATE TREATMENT OF NEBS***

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# STATE REGULATORY TREATMENTS OF NEBS – EXAMPLES & SPECIFICS

	Maximize DSM opportunities & feedback	Minimize Regulatory Risk	Minimize Evaluation Cost
Adder			
Readily Measurable			
Hybrid			
All NEBs			

# ***EXAMPLES OF STATE TREATMENT OF NEBS***

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- Adders
  - Readily Measurable
  - Hybrid
  - All NEBs
- 
- Program / measure-independent
  - Domino effect

# IMPLICATIONS FOR JUSTIFIABLE NEBS VALUES

	Utility	Soc	Part	Conserv. Rec'm	Rationale
Base Percent	8%	8-200+%		15%	Program-invariant
Low Income	16%	30%+	100%+	30%	Multiple sources
Weatherization		30%+	55-80%+	50%	Substantial Participant impacts
Measure / Program-specific			30-100%+		Varies by measure, sector
Other Recom's					Local Research

Omitted items; Discussion of comparable values from other states.

Source: Skumatz / SERA  
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permission of author

*Excludes carbon / emissions values (already included),  
water savings, some O&M*



***THANK YOU!!***

***Questions?***

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# 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

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