Energy efficient retrofits: rational or rationalized?

Why it matters when you ask people why they did what they did.

BECC, Nov-2010

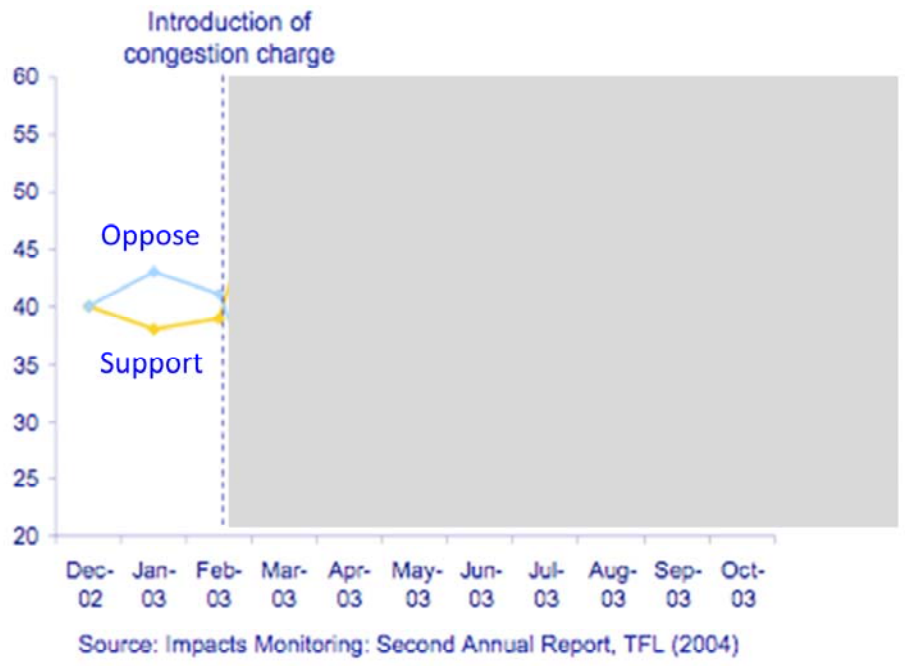
Charlie Wilson

Tyndall Centre for Climate Change Research

University of East Anglia, UK

It matters when you ask people what they think

"Do you support or oppose the congestion charging scheme?"



Source: Impacts Monitoring: Second Annual Report, TFL (2004)

1

Conclusions

- Energy efficient retrofit decisions:
  - *rationalised* after the fact ≠ *rational* before the fact
  - downplayed *normative influence* even on large $ outlays
  - financial investment? *property value* >> energy savings
  - *biases*: rationalisation, attribution (+ information recall)
- Policy implications:
  - …

2

WHY IS THIS IMPORTANT?

building energy use as major contributor to GHG emissions + cheapest opportunities to reduce emissions

continuing emphasis on energy efficient home weatherisation / renovation (Stimulus package monies)

apart from social housing, this has to be mediated by homeowners' decisions

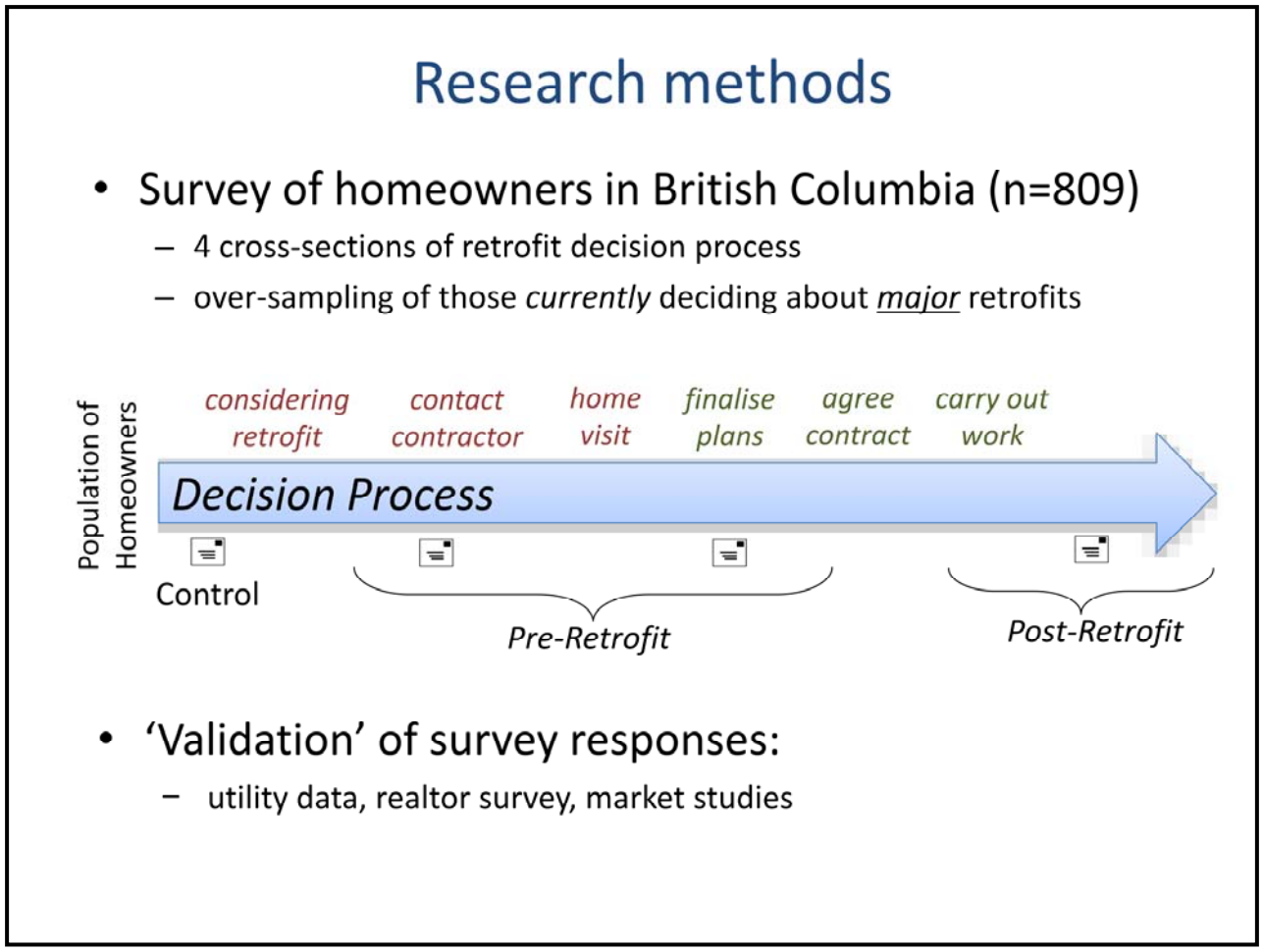
so we have to design policies to influence those decisions: information + incentives (+ assurance)

model of decision making as informed 'rational' (goal-oriented) decision makers

THIS IS MISCONCEIVED!

<u>poorly informed (as investment decision)</u>

• 69% of energy efficient renovators didn't know what to expect in terms of energy cost savings



Research Methods:

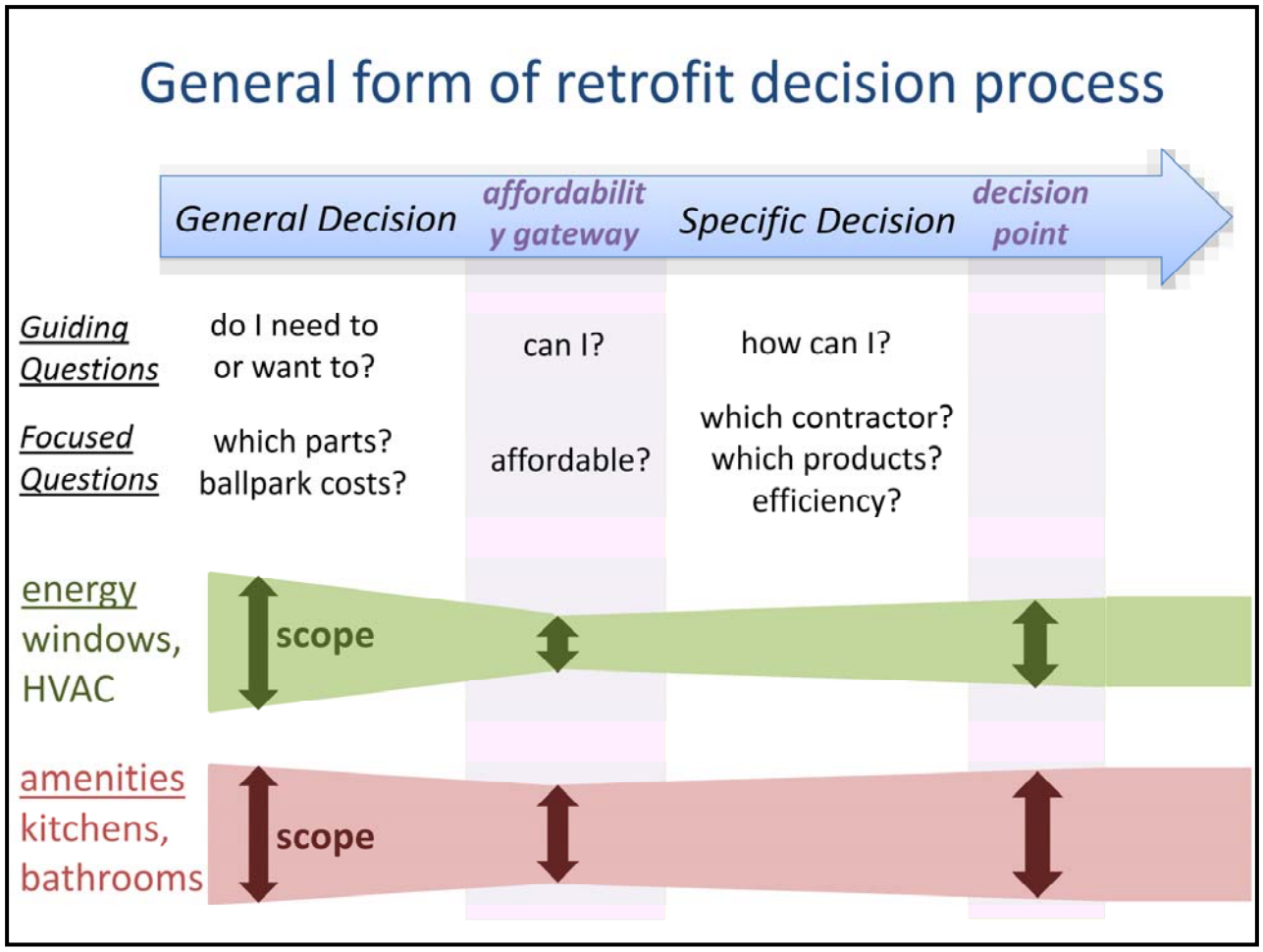
• survey of n=810 homeowners

• strategic sampling of energy efficient renovating homeowners

• sampling by stage of renovation decision w/ EnEffCo (first contact, audit, contract, work complete) + cross-checked by self-reported stage

• validation of stated preferences in survey with utility bills (energy costs) & realtor survey (property value impacts) & market data (e.g., expected cost savings)

• British Columbia (Canada) = low energy costs (6.5 c/kWh electricity, $11-13/GJ gas) + appreciating real estate markets (>15% p.a.)



Renovation Decision Process:

• GENERAL DECISION PROCESS – what should I? rough costs? (big ticket items)

-- initiated by big ticket items; capital stock turnover

• AFFORDABILITY GATEWAY – can I afford to? (ballpark)

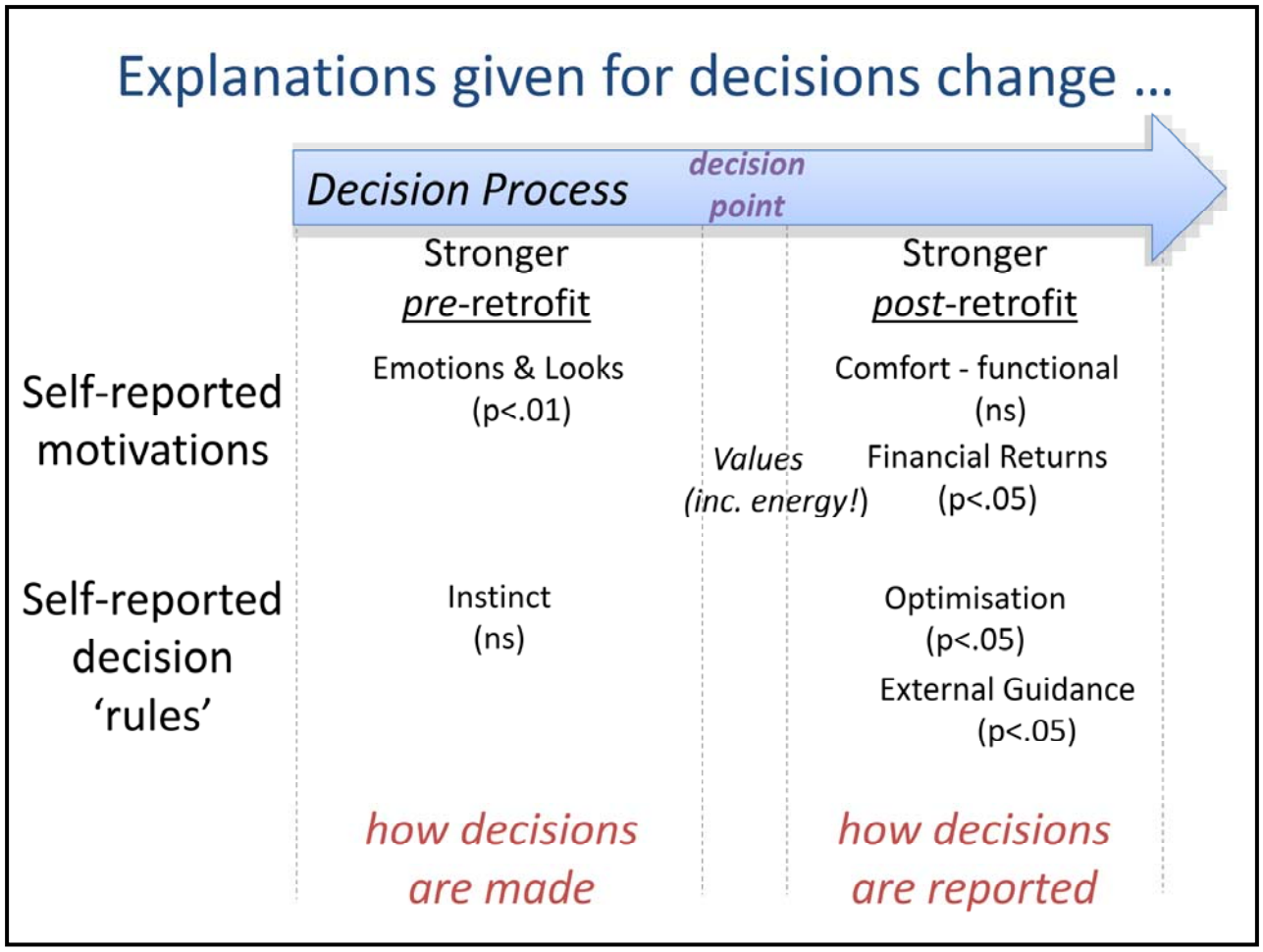
-- number of parts (and costs) reduces

• SPECIFIC decision process – how can I? what contractors? what specific items? when?

-- number of parts (and costs) increases (+ shifts to amenities); active information seeking, contractor selection, supply chain contact, etc.

Energy-Related Renovations

- less common
- core parts = windows, boilers
- perceived needs *weaker* – energy, looks
- motivations – Comfort, (Values)
- scope (no. of parts) constrained more by affordability



Self-Reported Motivations

Emotions & Looks – e.g., lighting, looks (inside, outside), feeling good

Financial Returns – e.g., market appeal, market value, maintenance

Values – e.g., environment, renewable energy, safety/security … energy costs

Comfort (functional) – e.g., noise, health, drafts

Self-Reported Heuristics

Instinct – emotions more important than what I think / I follow strong gut instincts

Non-Compensatory – choose based on 1 or 2 key factors / narrow options down, just compare the best

Optimisation – weigh up all the pros & cons of all options / know clearly what outcomes I want

External Guidance – follow the advice of friends / base decision on previous experience

Pre-renovation motivations / heuristics = how decisions are made i.e., influence the decision

Post-renovation motivations/ heuristics = how decisions are reported i.e., influence policy … which emphasizes information, incentives and is targeted at homeowners

Normative influences are downplayed …

stated *reasons* for renovating:	mean response (index):
i. self-regarding	8.7
ii. financial returns	8.4
iii. env. / social	7.8
iv. descriptive norms	7.0
	(p<.001)

general *beliefs* on energy efficiency:	correlation with efficiency of own renovation plans:	planning renovations vs. not planning renovations:
i. financial returns	.39 *(p<.01)*	*n/a*
ii. descriptive norms	.21 *(p<.01)*	t(628) = -3.67 *(p<.001)*
iii. self-regarding	.09 *(ns)*	t(700) = -0.72 *(ns)*
iv. env. / social	.01 *(ns)*	t(683) = -0.14 *(ns)*

Social norms = descriptive (prevalence) or injunctive (prevalence + implicit sanction/approval).

Normative biases not 'admitted' to directly (cf. rationalisation biases) so have to be detected indirectly.

ASKED DIRECTLY - reasons for renovating?

- self-regarding reasons = e.g., taking pride in my home, improve look of my home
- financial returns = energy + property value
- env. / social = environmental + social harm of energy use
- $p<0.001$ using repeated measures ANOVA

ASKED INDIRECTLY - general beliefs on energy efficiency & homes? renovation plans?

- those who thought financial returns and descriptive norms were important to energy efficiency were intending to do *more energy efficient* renovations (no. of parts)
- those who thought self-regarding reasons (personal responsibility) and environment were important for energy efficiency were not intending to do more energy efficient renovations (no. of parts)

RENOVATORS VS. NON-RENOVATOR – general beliefs on energy efficiency & homes?

- significant differences between renovators and control indicate beliefs that influence renovation decisions (and so shift non-renovators to renovators)
- only beliefs on descriptive norms are significantly higher in the renovating group

Why do we rationalise decisions *ex post*?

- 'Folk' models of behaviour
  - emphasize motivations behind intentions
  - attribute agency over (positive) outcomes

cf. rationality

- Select from "a pool of culturally supplied norms"
  - a-ha, really? *e.g., it's a great investment*
  - you what?! *e.g., everyone else is doing it*

Haidt 2001

- Susceptibility to self-serving biases
  - maintain self-image, reduce dissonance …
  - in inter-personal / social contexts … *like surveys*

7

'Folk' models (naïve psychology) - do not describe behaviour, but describe how individuals explain their behaviour.

***Intentional* behaviour is motivated by reasons** (desires for / beliefs about outcomes).

Individuals achieve desirable outcomes by performing behaviours of which they are capable.

So: emphasis on intention, outcomes, agency (i.e., rationality).

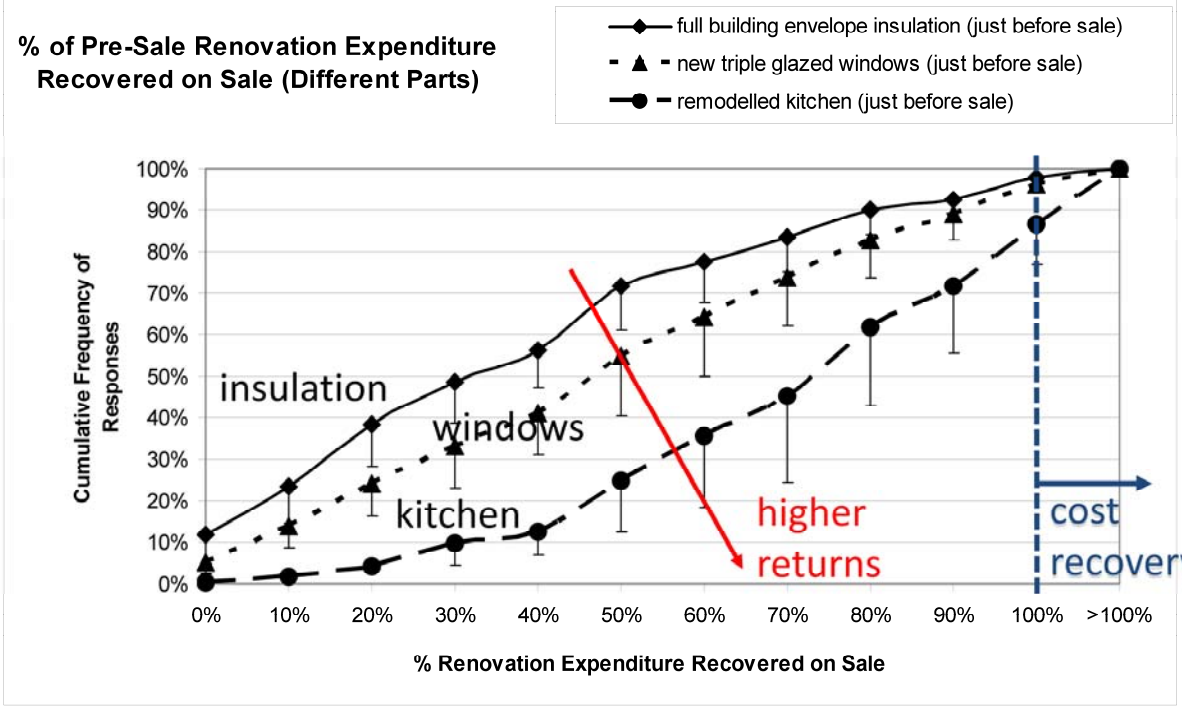
'Folk intentionality' susceptible to self-serving biases that **emphasize agency and rationality** …

helping to maintain self-esteem, enhance self-image, and reduce dissonance.

An example of self-serving biases is the tendency for individuals to take causal responsibility for successful or positive actions.

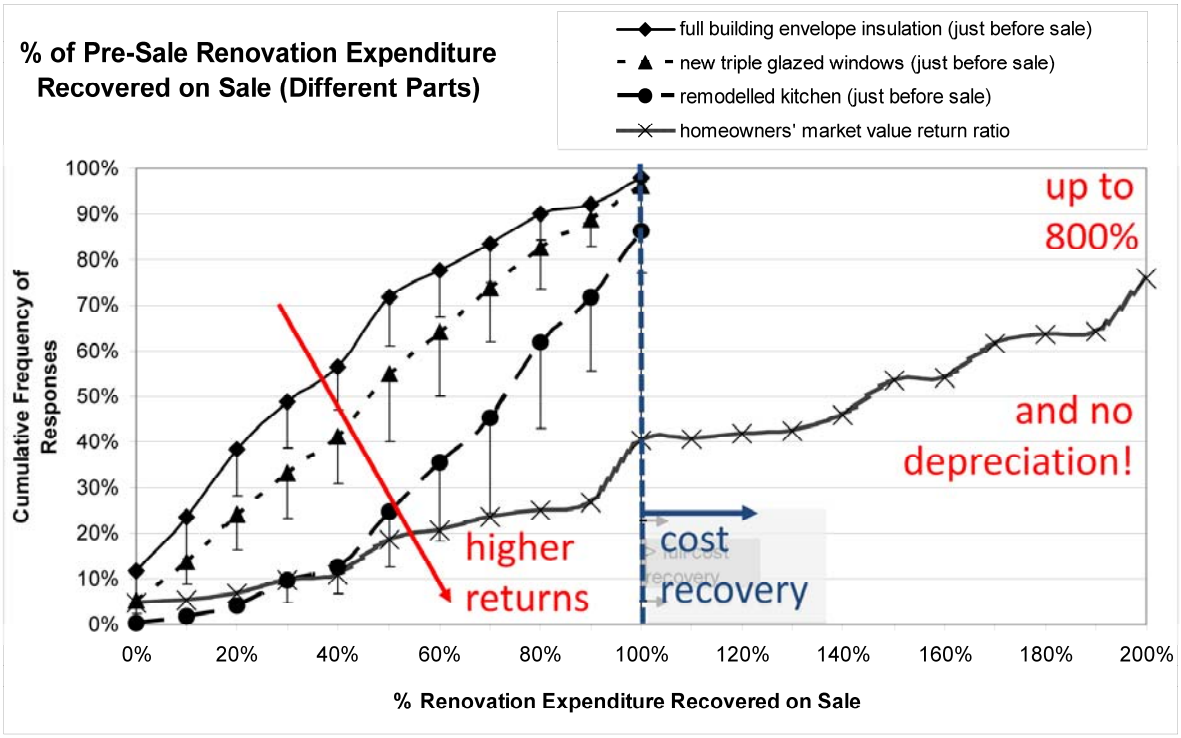
This bias in attribution generally takes place in an inter-personal or social context as such intentionality amplifies praise or approval.

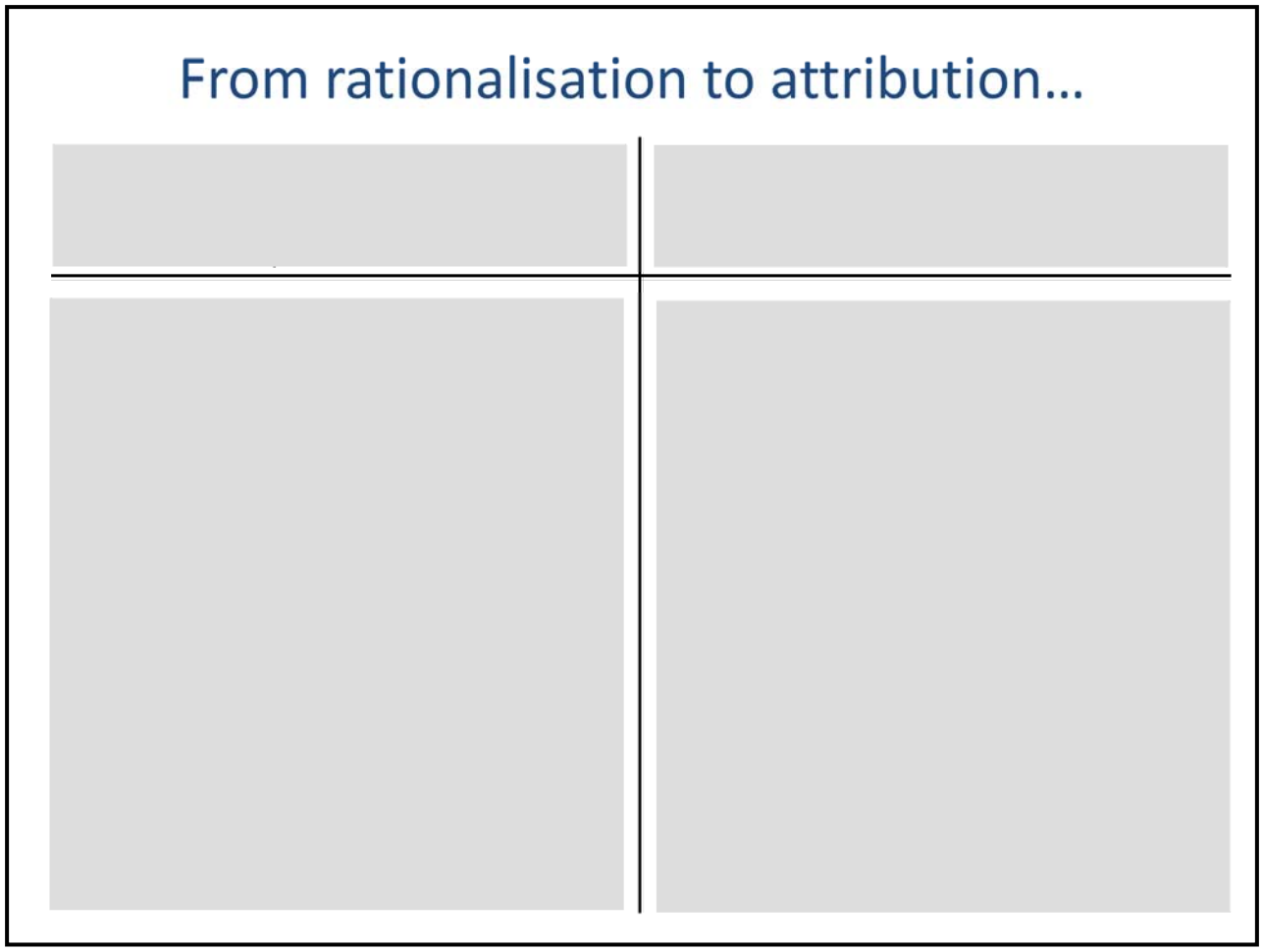
Attribution bias: are retrofits good financial investments? *What realtors say …*



Data points show average of min. and max. estimates; lower error bar shows min. (max. is symmetrical above line)

Are retrofits good financial investments?
What homeowners say …





Attribution biases: homeowner claims agency over general market movements (and omits depreciation)

Context: B.C. real estate markets – 15% p.a. appreciation (2006/7)

Individuals tend to take causal responsibility for desirable or positive outcomes in order to enhance their self-image.

- Both publicly (inter-personally) and privately.
- Agency and rationality are emphasised.

A converse type of attribution bias is to blame external factors for negative outcomes.

Self-serving biases are part of a more general tendency to reduce dissonance between all elements of cognition (knowledge, beliefs, attitudes, intentions, behaviours, etc.)

Conclusions

- Energy efficient retrofit decisions:
  - *rationalised* after the fact ≠ *rational* before the fact
  - downplayed *normative influence* even on large $ outlays
  - financial investment? *property value* >> energy savings
  - *biases*: rationalisation, attribution (+ information recall)
- Policy implications:
  - cautiously rely on what folk *say* are their motivations
  - *energy* retrofit decisions hard to *catalyse* …
  - … but easier to *influence existing* decisions

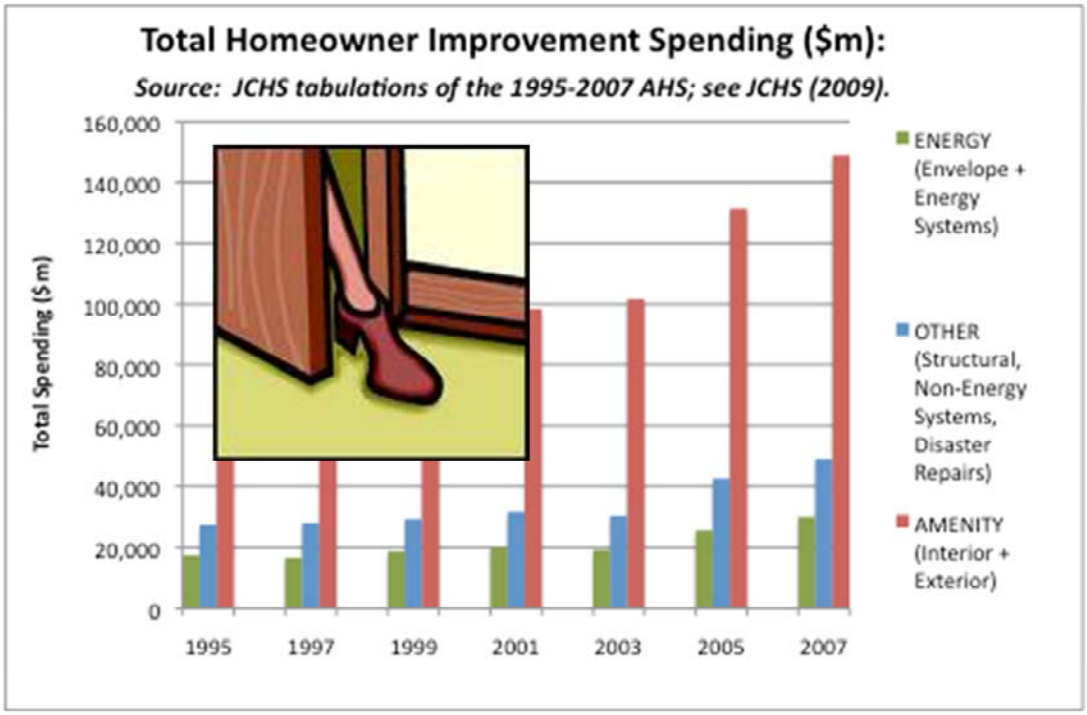
11

hard to catalyse energy decisions as they lack instinctive, emotional, normative, aesthetic drivers (hence: cap stock turnover)

… unlike amenities

SUPPLY CHAINS ARE MEANS TO MAKE EFFICIENCY THE DEFAULT OPTION FOR RENOVATIONS

‘Normal’ retrofits?
Amenities not energy efficiency



12

ENERGY = (1) Envelope (2) HVAC (3) Systems – Piping, Plumbing, Electricals (*so likely overestimate)*

AMENITY = (1) Indoor (2) Indoor complements e.g. flooring (3) Outdoor

OTHER = (1) Structural – Roof / Siding (2) Disaster Repair ?

Amenities expenditures dominate what households *are* spending money on – without inducements!

In BC ~1/3 of single family dwellings are renovated *each year* at an average cost of >$10,000.

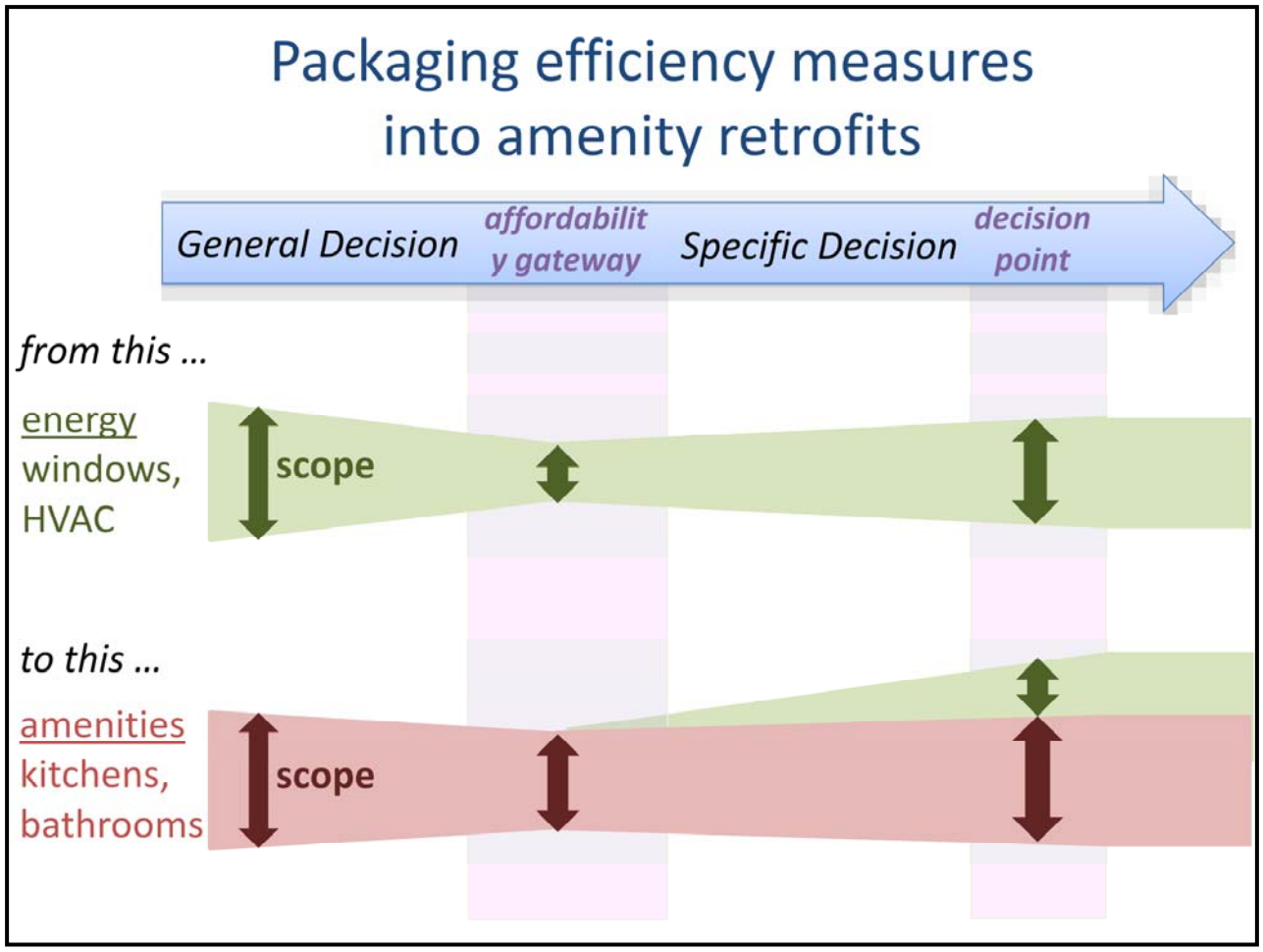
The amenities supply chain is the main contact point between final user and the ‘delivery agents’ (contractors & retailers).

i.e., amenities supply chain is the means to extend leverage of public policy over household decisions

- for promoting energy efficient capital stock at point of purchase / accelerating capital stock turnover
- for maintaining energy-related technologies appropriately
- for cross-selling (low cost) energy efficiency measures
- for setting efficiency as the default option

Remember that supply chain is during specific decision process when scope (parts, costs) is increasing

- i.e., opportunities to cross-sell efficiency measures through supply chain esp. contractors, retailers, tech. advisors, etc.
- particularly low cost efficiency measures (draft sealing, insulation, HVAC service & tune up … appliances?) at a (subsidised?) low marginal cost compared to total improvement job



Try what we think might work

there's an elephant's foot in the door

e.g., package low cost efficiency with a new kitchen

e.g., 'carbon army' of insulators posted to amenity firms

Don't market technologies *just* for their energy cost savings

- energy + property + useful services (appeal to rationality)
- *but also*: emotional appeal, visibility (appeal to other motives)

Real estate market transformation

- property value impact > energy cost savings
- realtor training, sellers' disclosure, target the flippers

Conclusions

- Energy efficient retrofit decisions:
  - *rationalised* after the fact ≠ *rational* before the fact
  - downplayed *normative influence* even on large $ outlays
  - financial investment? *property value* >> energy savings
  - *biases*: rationalisation, attribution (+ information recall)
- Policy implications:
  - cautiously rely on what folk *say* are their motivations …
  - *energy* retrofit decisions hard to *catalyse*
  - but potential to *influence existing* decisions … amenities!

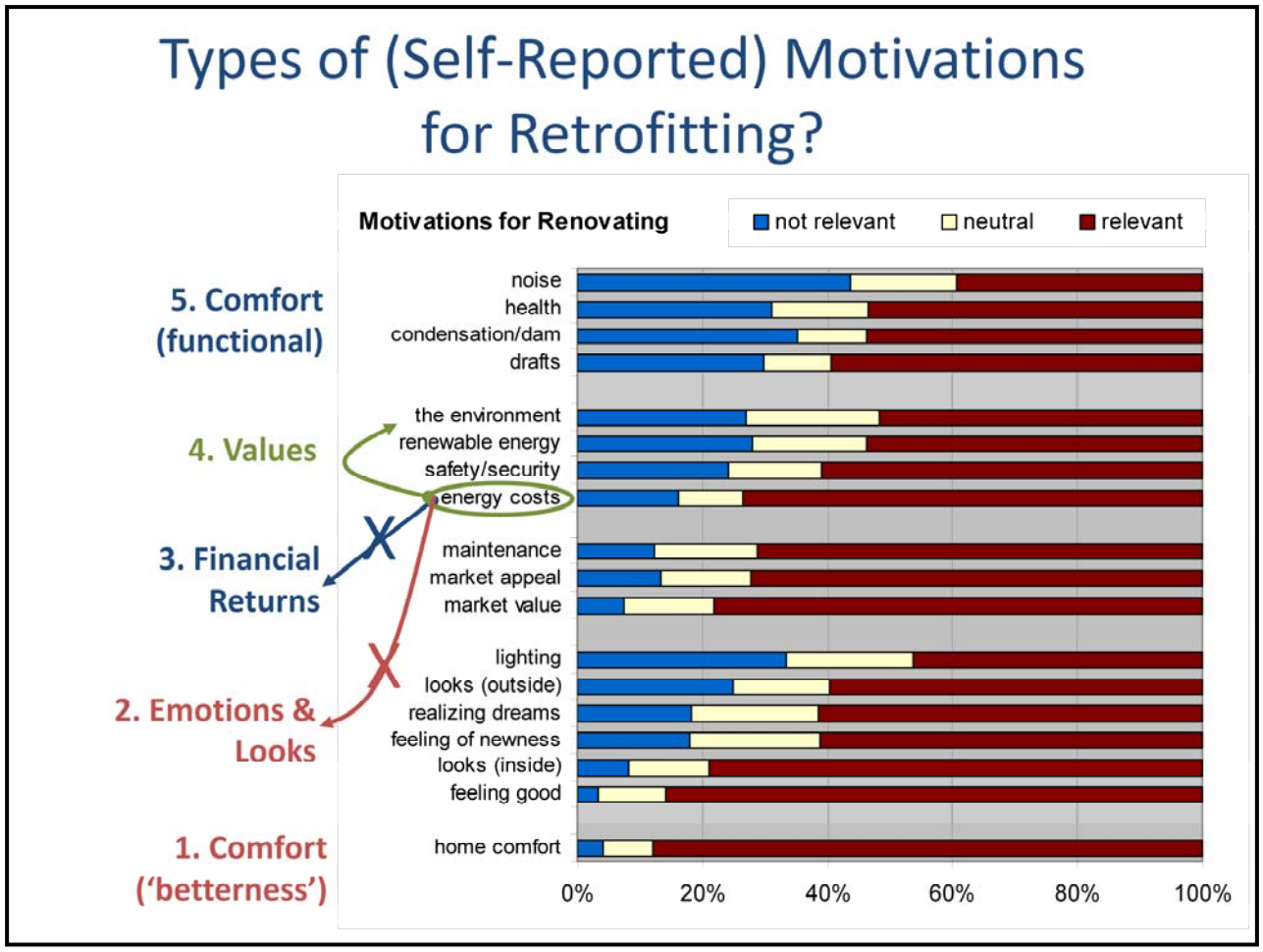
14

hard to catalyse energy decisions as they lack instinctive, emotional, normative, aesthetic drivers (hence: cap stock turnover)

… unlike amenities

SUPPLY CHAINS ARE MEANS TO MAKE EFFICIENCY THE DEFAULT OPTION FOR RENOVATIONS

Additional Slides



Self-Reported Motivations

Emotions & Looks – e.g., lighting, looks (inside, outside), feeling good

Financial Returns – e.g., market appeal, market value, maintenance

Values – e.g., environment, renewable energy, safety/security … energy costs

Comfort (functional) – e.g., noise, health, drafts

Self-Reported Heuristics

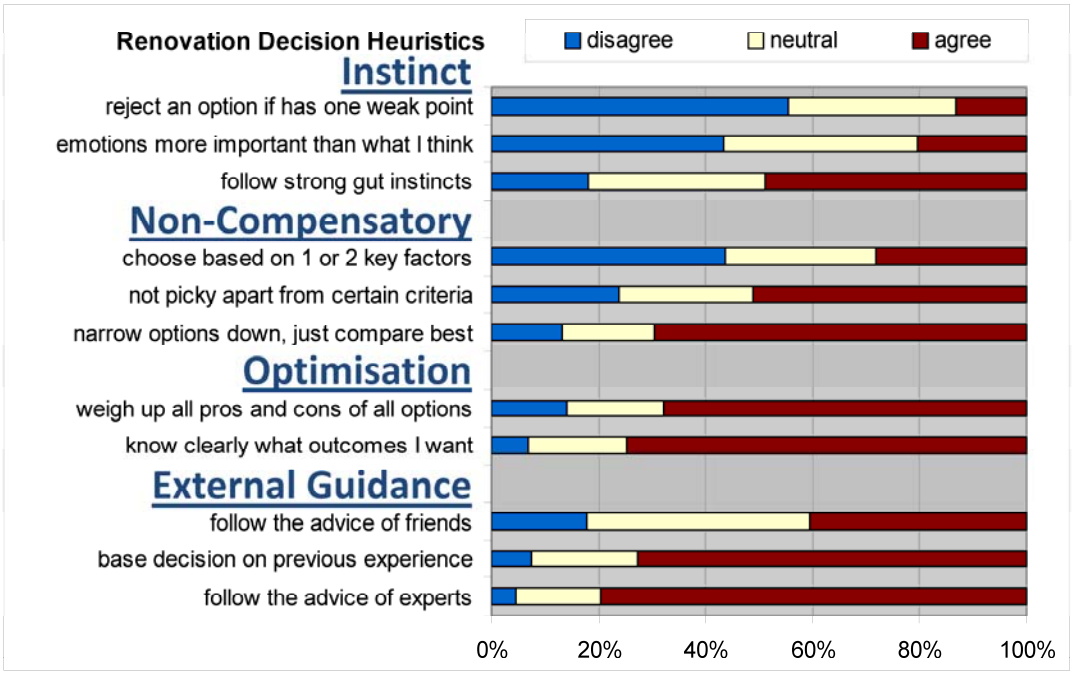
Instinct – emotions more important than what I think / I follow strong gut instincts

Non-Compensatory – choose based on 1 or 2 key factors / narrow options down, just compare the best

Optimisation – weigh up all the pros & cons of all options / know clearly what outcomes I want

External Guidance – follow the advice of friends / base decision on previous experience

Types of (Self-Reported) Decision Heuristics for Retrofitting?



Self-Reported Heuristics

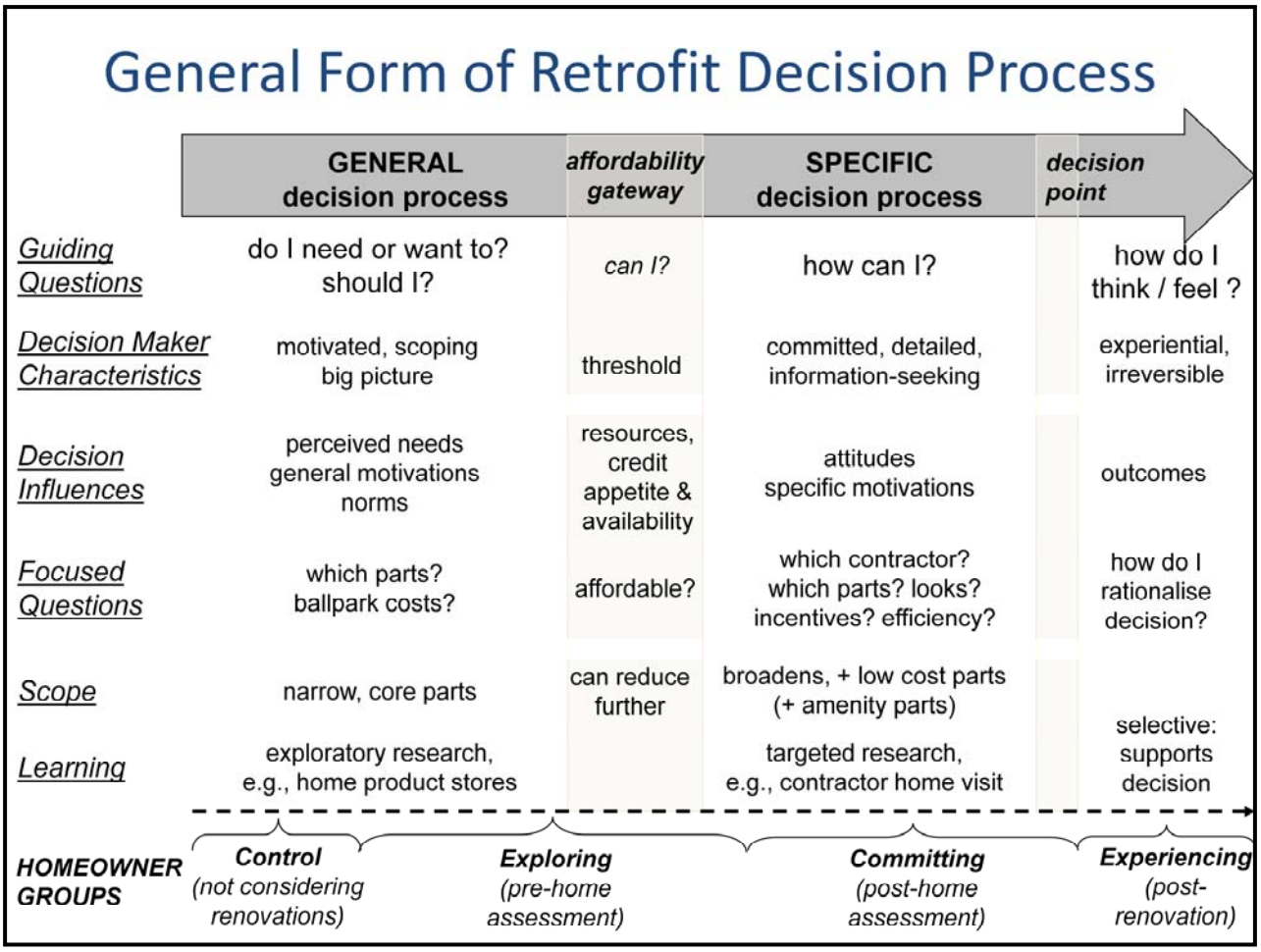
Instinct – emotions more important than what I think / I follow strong gut instincts

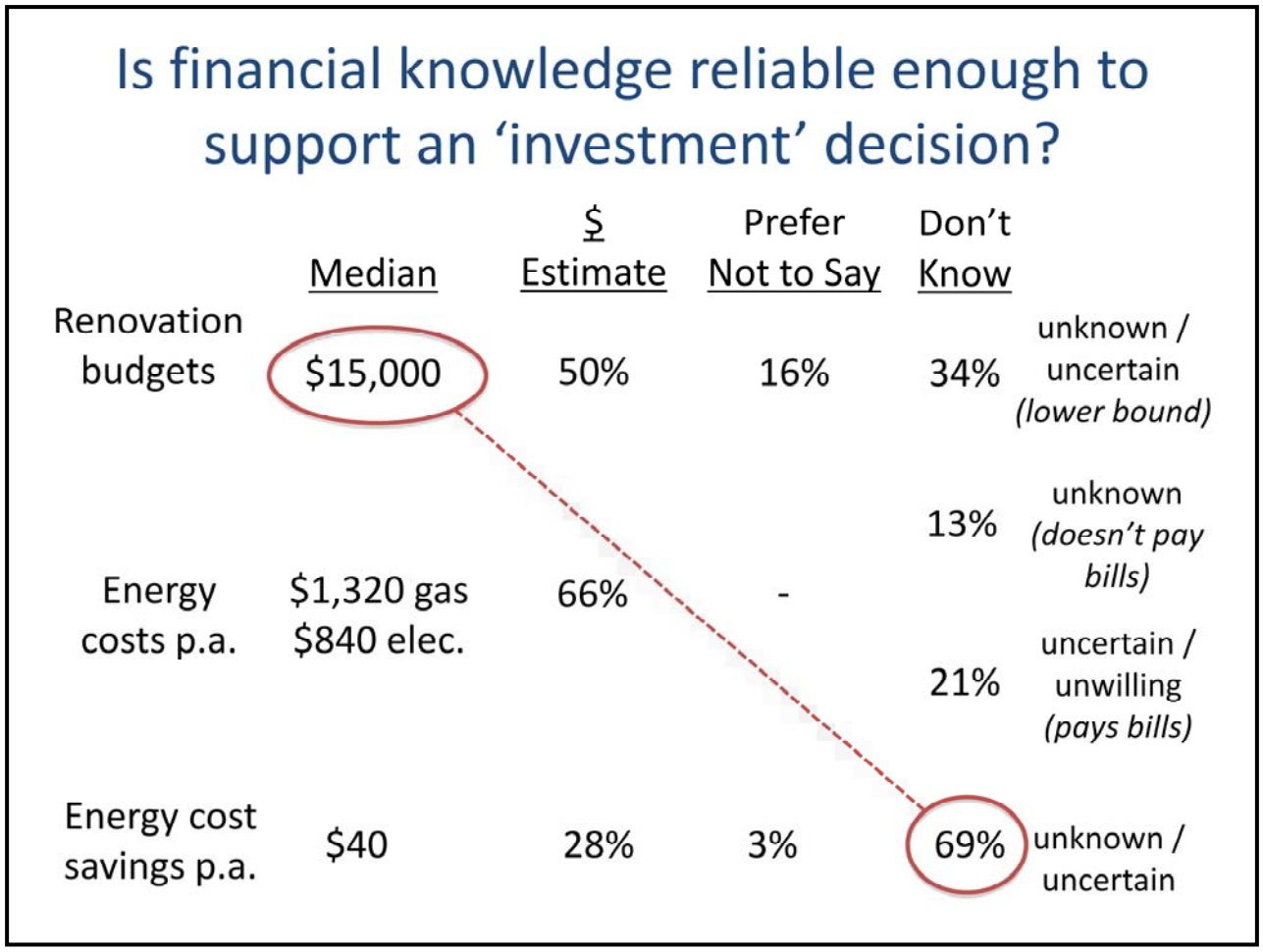
Non-Compensatory – choose based on 1 or 2 key factors / narrow options down, just compare the best

Optimisation – weigh up all the pros & cons of all options / know clearly what outcomes I want

External Guidance – follow the advice of friends / base decision on previous experience

General Form of Retrofit Decision Process





poorly informed (as investment decision)

- 69% of energy efficient renovators didn't know what to expect in terms of energy cost savings
- systematic over-estimation of energy costs (availability bias: salient winter bills)
- systematic over-estimation of returns on property value (cf. realtors: gains from broader market trends)