Beacon
TOGETHER, CREATING TOMORROW'S HOMES

Creating homes and neighbourhoods that work well into the future and don't cost the Earth

Turning serial renovators into sensible retrofitters

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Beacon Energy Retrofit Research

3 main research areas underway

- Establishing the impact of **typology** of existing dwellings on retrofit opportunities.
- Establishing how different **consumer segments** respond to retrofit opportunities (**landlords, high energy users, recent home buyers**).
- Establishing a series of retrofit packages that will provide effective retrofit responses for different dwelling typologies and target groups

House Typology

- Range of house types being explored
  - Early housing (pre 1890)
  - Villa (1880 – 1920)
  - Bungalow (1920 – 1930/40)
  - Art Deco (1925 – 1935)
  - State housing / mass housing (1930 / 1970)
  - 1960's multi unit housing
  - 70's house (1970 – 1978 pre-insulation)
  - 80's House (1978 – 1989)
  - Early 90's (1990 – 1996 pre re-vamped building code)
  - Last decade (1996 – 2007) (post insulation upgrade)
  - Apartment/multi unit dwelling

House Typology – selected findings Villas and Bungalows

- Good candidates for retrofit
- Good ‘bones’ with sound native timbers
- Retrofit insulation in ceiling and floor relatively easy
- Often oriented to the street as opposed to the sun
- Double glazing windows difficult

House Typology – selected findings
Art Deco Houses

- Bad candidates for retrofit
- Skillion roof difficult to retrofit
- Often with renovated roof on top due to previous failures
- Built low to the ground with lack of crawl space
- But highly valued (and stylish) – so owners may go the extra mile (or we may want to leave these alone)

House Typology – selected findings State Houses

- Good candidates for retrofit
- Well oriented
- Hipped roof with 40 degree pitch
- Good access in ceiling and floors
- Small spaces may prioritise heating systems such as heat pumps or inset wood burners
- High chance of success in meeting Beacon HSS™
- Big range though... 50’s classic up to 70’s standard

House Typology – selected findings 1960's multi-unit houses

- Possible demolition case…
- Uninsulated concrete slab
- High thermal mass with poor insulation
- Skillion roofs and lack of floor access
- However, interesting possibilities in terms of neighbourhood…retrofit of 6 units at once
- Modular design might assist in terms of solutions
- Possible renewable energy options?

House Typology – selected findings 1970's Housing (1970 – 1978 pre-insulation)

- Large numbers, built before insulation required
- Variable cladding (asbestos fibre cement, manufactured timber, stucco, concrete, plastics, weatherboard, concrete...)
- First aluminium, some glazing floor to ceiling, sliding doors
- Skillion roof... Exposed ceiling rafters... Retrofit... Renovate?
- 95% single storey but with garage underneath

House Typology – selected findings
Last decade housing (1996 – 2007)

- Reasonably airtight and well insulated
- Ventilation and IEQ may be the biggest issues
- Retrofitting of inset down lights in ceiling
- Untreated timber and construction techniques… leaky buildings…scary retrofit option
- Retrofit potentially an urgent but hazardous task

Houses and consumers

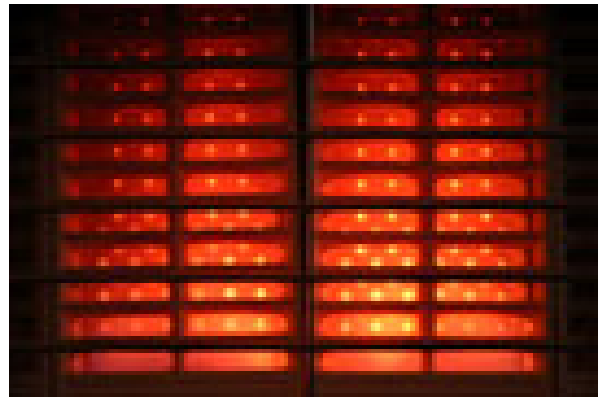
at the edge of the abyss…

Energy in homes by users and consumers

- 3 Surveys of selected consumer groups
  - High energy users (700 participants in telephone survey)
  - Recent home buyers (724 participants in postal survey)
  - Landlords (491 landlords in telephone survey 2,389 dwellings)
- Provides useful input to development of suitable retrofit packages
- Interesting findings (though slightly depressing)

Consumer research - selected findings
High Energy Users

- They think they are high users because they have lots of appliances and because they waste energy
- But their houses have major problems…
  - Only 16% are fully insulated
  - 2/3^{rds} have draughts
  - Nearly half use inefficient heating methods
  - Unlucky 13% use unflued gas heaters!
  - Nearly half say they are not warm – using lots of energy to be cold.



- When they renovate they mostly do cosmetic things (redecorate, kitchens bathrooms)
- They say retrofit is too expensive… and too inconvenient

Consumer research - selected findings
Recent Home Movers

- Quarter don't know if their home is energy efficient or not…. a third of them know it is **not** energy efficient
- They also have major problems…
  - Over ¾ of their houses are only partially insulated
  - Over half of their houses are draughty
  - Nearly half use inefficient heating
  - Over half of them use some sort of summer cooling

- Tend to do more things to address basic thermal efficiency than other group… but they still focus on appliances rather than the 'basics' of insulation
- Main barriers to retrofit are cost and available knowledge

Consumer research - selected findings
Landlords

- What a depressing bunch…
  - 40% have no ceiling insulation
  - 80% have no underfloor insulation
  - Over half are draughty
  - ¾ have inefficient heating
  - Nearly half said that they would retrofit if the government provided financial assistance
  - Over a third said they would consider it if asked by tenants
  - But nearly a quarter said that they wouldn't retrofit their houses

- Renovation and maintenance strongly directed to basic redecorating (with a tight wallet)

Consumer research - selected findings
Cold, mould and damp

- Primary response to cold, mould and damp is to install home ventilation systems, heat pumps and dehumidifiers… few think of improving the thermal performance of their dwelling
  - Nearly 50% of high energy users put in HRV/DVS system but less than 5% installed insulation
  - Recent Movers installed… 29% dehumidifiers, 20% HRV/DVS, 18% heat pumps. Less than 8% installing insulation despite 84% having only partial or no insulation
  - Nearly half of the samples of owner occupiers who have attempted to resolve their mould or damp continue to have problems…

Consumer research - selected findings
Willingness to spend

- Expense is the most common barrier to retrofit
  - Over quarter High Energy Users might act on retrofit recommendations that cost less than $500.
  - Over half High Users would take up measures costing between one and five thousand dollars.
  - Among the Recent Movers, almost two-thirds would spend less than $5,000 on recommended measures.
  - Over half or landlords would spend $1,000 or less and over a quarter reported willingness to spend up to $500 only.

Consumer research - selected findings
Conclusions

- Energy and thermal performance of dwellings could be significantly improved through quite simple retrofitting interventions (renovations)
- Getting a house to Beacon's HSS™ is a much bigger challenge
- Research suggests success lies in…
  - connecting retrofitting to the renovation decisions and investments that households make in relation to their dwellings
  - providing advice on the relative impacts and appropriate sequencing of retrofit products and packages
  - aligning renovation solutions that improve the thermal envelope to addressing concerns about cold, dampness and mould
  - developing a range of low cost retrofit packages / plans