Multifamily Housing, Energy, and Health

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SAVING ENERGY MEANS SAVING MONEY
But does it really? Bill payers are unsure
Property Management Sells Comfort
You Provide Comfort

Convenience...
Comfort...
Relaxation...

Premium location in Houston, Texas

National Center for
HEALTHY HOUSING
42% admit they regularly choose their comfort over the environment (and comfort is the real benefit they're seeking in more efficient, greener homes).

Source: Eco Pulse 2015

Gain a sustainable advantage

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Thanks to Suzanne Shelton of the Shelton Group
66% are at least somewhat concerned about indoor air quality.
84% think energy-efficient homes are healthier homes.
You Provide:
Physical Comfort
  Temperature
  Humidity
Mental Comfort
  Lighting
  Sound
Reliability
Physical Health
Better Indoor Environment

Convenience and control are the underlying drivers of comfort

Q25 – [Asked of those who chose “to make my home more comfortable” in Q22] Which of these messages about comfort would be most likely to influence you to make energy-efficient home improvements? (Choose two)

- 37% easy to keep a consistent temperature throughout my house
- 34% allows me to set my thermostat to a more comfortable setting without making my utility bill uncomfortable
- 29% cool in the summer
- 29% warm in the winter
- 22% prevents mold and mildew and helps my family breathe easier
- 18% comfortably lit for all the tasks I need to do
- 16% quiet - sound doesn’t carry between rooms, and outdoor noises are minimized

National Center for HEALTHY HOUSING

energypulse 2016
Studies Document Improved Well-Being After Energy Efficiency Measures

<table>
<thead>
<tr>
<th>Status</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>14%</td>
<td>11%</td>
</tr>
<tr>
<td>V. Good</td>
<td>26%</td>
<td>19%</td>
</tr>
<tr>
<td>Good</td>
<td>33%</td>
<td>34%</td>
</tr>
<tr>
<td>Fair</td>
<td>20%</td>
<td>26%</td>
</tr>
<tr>
<td>Poor</td>
<td>6%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Source: Watts-to-Well-being Study

National Center for
HEALTHY HOUSING
Sick Building Syndrome is Real

Less Air Exchange = More Contaminants Trapped in Home
Indoor Levels Eclipse Outdoor

- Carbon monoxide
- Nitrogen oxides
- Particulates
- Volatile organic compounds
- Formaldehyde
- Radon

"Formaldehyde is also a known Human Carcinogen"
Asthma

- Asthma directly affects over 25 million people in the US (7.9%)
- About 5% of the population incur health care costs related to their asthma each year (~$56 billion)
- 10 people die a day of asthma
- 60% of asthma “attacks” are triggered in part by allergens like pests and mold
Housing-Based Asthma Triggers

- Dust Mite
- Pest: Mice Feces
- Pest: Cockroach
- Pest: Cockroach Feces
- Moisture
- Tobacco Smoke
2004 Institute of Medicine Report on Health Effects Associated with Moisture and Mold

- Upper respiratory tract symptoms
- Coughing
- Wheezing
- Asthma
- Hypersensitivity pneumonitis
Moisture Supports a Host of Health Hazards

- Mold
- Dust mites, cockroaches, other pests
- Structural damage (wood rot)
- Paint failure (creating lead hazards in older housing)
## Multifamily Properties are Not Immune

<table>
<thead>
<tr>
<th>Multifamily</th>
<th>Non-Multifamily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily musty odors</td>
<td>Daily musty odors 17%</td>
</tr>
<tr>
<td>Inside water leak</td>
<td>Inside water leak 10%</td>
</tr>
<tr>
<td>Outside water leak</td>
<td>Outside water leak 10%</td>
</tr>
<tr>
<td>Cockroaches</td>
<td>Cockroaches 16%</td>
</tr>
<tr>
<td>Rodents</td>
<td>Rodents 12%</td>
</tr>
<tr>
<td>SHS at least weekly</td>
<td>SHS at least weekly 5%</td>
</tr>
<tr>
<td></td>
<td>*SHS = Second Hand Smoke entered dwelling</td>
</tr>
</tbody>
</table>

Source: American Housing Survey, 2015
Healthy Homes Principles

Keep It:

1. Dry
2. Clean
3. Ventilated
4. Pest-Free
5. Safe
6. Contaminate-Free
7. Maintained
# Green Rehabilitation

**Chicago**

## Compared occupant health in green rehab to 10 year old rehab, Chicago public housing

<table>
<thead>
<tr>
<th>Green elements:</th>
<th>Results:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Ventilation</td>
<td>- Improved child general health</td>
</tr>
<tr>
<td>- high efficiency heating systems</td>
<td>- Marginally improved adult general health</td>
</tr>
<tr>
<td>- Insulation</td>
<td>- Improved adult mental health (sadness, hopelessness)</td>
</tr>
<tr>
<td>- low toxic materials</td>
<td>- Improved adult angina, hay fever, and sinusitis</td>
</tr>
<tr>
<td>▪ roof/window flashing</td>
<td></td>
</tr>
<tr>
<td>▪ bath/kitchen fans</td>
<td></td>
</tr>
<tr>
<td>▪ moisture controls</td>
<td></td>
</tr>
<tr>
<td>▪ less carpet</td>
<td></td>
</tr>
</tbody>
</table>

2 other NCHH studies provide similar results

Green Rehab (con’t)

Asthma Benefits

Reduced adverse health effects
- asthma symptoms
  - 61% adults
  - 65% children
- headaches

Less urgent care for child asthma (20% reduction)
Fewer missed school/work days due to asthma (4%)
Recent/Ongoing Work

- Documented benefits of upgraded rooftop fans and air-sealed vent shafts as part of multifamily improvement plan in Coney Island, NY. Results compared to other units with fans/vents repaired.

  Relative humidity  Carbon Dioxide  Formaldehyde

- Currently investigating effects of ASHRAE 62 compliant rehabbed dwellings vs non-compliant rehabbed dwellings
Lessons Learned

• Energy efficiency and by extension, energy codes, offer a service that multifamily property owners want to sell: COMFORT
• Comfort serves as a catch-all term for improved perceptions of well-being, mental health, and physical health
• People feel better after energy efficiency that is properly done
• Energy efficiency is not without risk, but it is a risk that can be managed
  • Energy efficient projects and the codes that set the performance standards must recognize the risks of lower air exchange rates and increased contaminant levels; proper ventilation (e.g., ASHRAE 62) should be included
Thank you

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