Post Occupancy Evaluation of LEED-certified Home

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LEED for Home

- The number of LEED-certified homes increased tremendously over the past few years
- However, there is little information about the actual performance of LEED-certified homes from the occupants’ perspective in terms of energy efficiency, health impact, indoor environmental quality, resident satisfaction, and well-being.

Purpose of Study

- The purpose of this Post Occupancy Evaluation was to identify the actual performance of LEED-certified homes in order to identify the benefits and shortcomings of green home practices and to provide feedback for future LEED home projects.

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Demographics

- Gender: 51% Female, 49% Male
- Race: 78% White, 12% Black, 4% Asian
- Marital Status: 62% Married, 19% Never Married
- Age: M = 51.97 (SD = 16.43)

Home Ownership

- 110 home owners
- 110 renters
- 15 unidentified

Housing Types

- Single-family detached house 79.1%
- Apartment 9.9%
- Multi-family attached house 11.0

LEED Ratings

- Certified 73%
- Silver 30%
- Gold 4%
- Platinum 2%

Survey Participants

- Home owner
- Renter
- Unidentified

Home Owner Age Distribution

- 70 yrs + 2%
- 65-70 yrs 8%
- 60-64 yrs 12%
- 55-59 yrs 18%
- 50-54 yrs 11%
- 45-49 yrs 19%
- 40-44 yrs 19%
- 35-39 yrs 31%
- Less than 30 yrs 8%

Household Income

- Less than $30,000 9%
- $30,000 to $44,999 45%
- $45,000 to $59,999 10%
- $60,000 to $74,999 9%
- $75,000 to $99,999 8%
- $100,000 and over 45%

Education

- Some high school 3%
- High school diploma 15%
- Some college or technical school degree 20%
- Bachelor’s degree 35%
- Graduate or professional degree 10%

Employment Status

- Full time 60%
- Part time 10%
- Self-employed 10%
- Unable to work 5%
- Retired 8%
- Student 8%
- Unemployed 6%
- Other 1%
**Health Impact**

- 35.2% of respondents who had anxiety reported decreased anxiety level.
- 30.0% of respondents who had stress reported decreased stress level.
- 37.5% of respondents who had depression indicated decrease in their depression.

**Physical Health**

Respondents indicated decrease in their (or their family member’s) physical health problems since moving into their LEED-certified home.

- 73.3% of respondents reported decrease in asthma symptoms
- 42.8% of respondents reported decrease in sensitivities to chemicals
- 40.0% of respondents reported decrease in irritation in eye/nose/throat
- 32.2% of respondents reported decrease in headache/fatigue/dizziness

- 92.4% of home owners (N = 105) indicated their home was energy efficient.

- Monthly savings on gas bill (N = 51) compared to previous home:
  - 33.2% of respondents saved over $100
  - 31.3% of respondents saved $41 - $100
  - 20.4% of respondents saved under $40

**Energy Efficiency**

- Gas Bill & Energy Savings by LEED Rating:

  - **Winter**
    - Platinum: $145.55
    - Gold: $120.75
    - Silver: $90.90
  - **Summer**
    - Platinum: $180.13
    - Gold: $150.12
    - Silver: $122.09

**Improvement in quality of life since becoming a resident of a LEED home**

- More than 80% of LEED home owners indicated improvement in their living condition and their quality of life.
- More than half of home owners agreed on the improvement in their children’s school performance, family member’s health, and engagement with neighbors.

**Residential Satisfaction**

- 91.5% of all respondents (N = 232) are satisfied with their LEED home.
- 53.0% rated 7 point out of 7 for very satisfied with their home.
- LEED home owners were significantly more satisfied with their homes than renters.
- Residents of single-family detached house were more satisfied with their homes than those in condos, duplex, or apartment.
- There was no significant difference in home satisfaction depending on the LEED ratings.

**Quality Of Life**

Nearly 100% of LEED home owners rated high on their quality of life.

- 96.2% of respondents rated good or excellent on physical well-being
- 97.2% of respondents rated good or excellent on emotional state
- 97.2% of respondents rated good or excellent on enjoyment of life
- 99.1% of respondents rated good or excellent on overall quality of life

**Perceived IEQ**

LEED home owners were satisfied with their indoor environmental quality.

- More than 90% of respondents indicated their home as: Comfortable, attractive, safe, pleasant, convenient, stimulating, sanitary, healthy, and sustainable
- Higher satisfaction on:
  - space layout, size of space, air quality, amount of daylight, and quality of artificial light
- Lower satisfaction on:
  - visual privacy, outside views, humidity, acoustic quality
- 87.3% of home owners lived in smoke-free homes.

**Environmental Attitude**

- 48.6% of LEED home residents (including both home owners and renters) knew their homes’ LEED ratings correctly.
- 72.8% of the home owners and 27.8% of the renters knew their homes’ LEED ratings correctly.
- 21.1% of the home owners and 3.8% of the renters indicated that they had attended LEED classes.
- Home owners were more likely to participate in pro-environmental activities more than renters.