Postmortem: Do Ratings Systems Really Work?

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Remove the barriers to green building
SESSION CONTENT

• History of rating systems
• Project examples:
  • Layout background of who the client is.
  • Explain the context of the project and the project approach.
  • Successes.
  • Challenges.
• Conclusions from the above
• Facilitate dialogue & questions!
HISTORIC NARRATIVE OF RATING SYSTEMS:

...and some of their relationships to the changing codes NYC
The way we design...

Introduce a rating system...
A history of the codes that rating systems refer to…
(code = the minimum we do to not break the law)
Nutrition Facts
Serving Size (243g)
Servings Per Container

Energy & Atmosphere
Sustainable Sites
Indoor Env. Quality
Innovation

MATERIALS & RESOURCES
WATER EFFICIENCY

LEED

Amount Per Serving
Calories 290 Calories from Fat 80
% Daily Value
Total Fat 9g 14%
Saturated Fat 1g 5%
Trans Fat 0g
Cholesterol 0mg 0%
Sodium 250mg 10%
Total Carbohydrate 46g 15%
Dietary Fiber 12g 48%
Sugars 17g
Protein 22g

Vitamin A 35%  •  Vitamin C 15%
Calcium 20%  •  Iron 15%

Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Calories 2,000 2,500
Total Fat Less than 65g 80g
Saturated Fat Less than 20g 25g
Cholesterol Less than 300mg 300mg
Sodium Less than 2,400mg 2,400mg
Total Carbohydrate 300g 375g
Dietary Fiber 25g 30g

Calories per gram:
Fat 9  •  Carbohydrate 4  •  Protein 4
100 Point Scale

- **40 CERTIFIED**
- **50 SILVER**
- **60 GOLD**
- **80+ PLATINUM**
LEED is flexible enough to apply to all building types – commercial as well as residential. It works throughout the building lifecycle – design and construction, operations and maintenance, tenant fit-out, and significant retrofit.
LEED v4.1
Energy metrics include both cost and greenhouse gas emissions
LEED: FOCUSES ON A BROAD RANGE OF TOPICS BUT ITS ENGAGEMENT WITH EACH ONE MAY BE CONSIDERED SHALLOW.

PASSIVE HOUSE: FOCUSES NARROWLY ON ENERGY AND INDOOR AIR QUALITY BUT ENGAGES EACH VERY DEEPLY.
LENSES OF PASSIVE HOUSE

INSULATION + AIR-SEALING

WINDOWS + DOORS

VENTILATION

HEATING + COOLING
Building Envelope Representations

Typical Building Envelope  Passive House Building Envelope
Passive House Construction

ASHRAE Baseline Construction
Certification Matryoshkas

PHIUS: Up to 5 Story Residential

DOE Zero Energy Ready Homes

- ENERGY STAR v3
- HERS Rating
- EPA Indoor airPLUS Rating

PHIUS: Other Projects

- EPA Indoor airPLUS
- 2021: ENERGY STAR Multifamily
Timeline of Verification

1. **Design**
   - Initial plan review & REM/Rate model
   - Slab/foundation installation visit

2. **Construction**
   - Pre-drywall site visit
   - Duct leakage testing
   - Compartmentalization testing
   - MEP equipment / IAQ verification / Balancing verification
   - Whole-Building blower door testing

3. **Substantial Completion/Occupancy**
   - Complete model & program checklists, PHIUS Workbook
THE METAPHOR OF THE FLOWER

ROOTED IN PLACE AND YET:
Harvests all energy + water
Is adapted to climate and site
Operates pollution free
Is comprised of integrated systems
Is beautiful

A PHILOSOPHY BASED ON RESULTS

1. All Imperatives assigned to a Typology are mandatory.
2. Living Building Challenge certification is based on actual, rather than modeled or anticipated, performance.
113
CERTIFIED PROJECTS
AROUND THE WORLD
IT'S TIME TO STEP UP TO THE LIVING BUILDING CHALLENGE

World class efficiency and characteristics, reinforcing a fossil fuel free future.

- 100% building energy load offset with on-site renewables, driving efficiency
- Pathway for premium off-site renewables for certain project types

One pillar of deep regenerative design built on a holistic high-performance foundation.

All Core imperatives are required, plus the remaining Imperatives to complete either the Water, or Energy or Materials Petal.

ALL CORE IMPERATIVES

Water
06 Not Positive Water

Energy
08 Not Positive Carbon

Materials
13 Red List
14 Responsible Sourcing
15 Living Economy Sourcing
16 Not Positive Waste

Summit of holistic aspiration and attainment; fully restorative.
All Imperatives must be achieved to certify.

01 Ecology of Place
02 Urban Agriculture
03 Habitat Exchange
04 Human Scaled Living
05 Responsible Water Use
06 Not Positive Water
07 Energy = Carbon Reduction
08 Not Positive Carbon
09 Healthy Interior Environment
10 Healthy Interior Performance
11 Access to Nature
12 Responsible Materials
13 Red List
14 Responsible Sourcing
15 Living Economy Sourcing
16 Not Positive Waste
17 Universal Access
18 Inclusion
19 Beauty = Biophilia
20 Education = Inspiration
10 BEST PRACTICES FOR GREEN BUILDING

PLACE
HEALTH
WATER
EDUCATION
MATERIALS
TRANSPORTATION
ENERGY
EQUITABLE ACCESS
INCLUSION
BEAUTY + BIOPHILIA
LEED v4.1

Energy metrics include both cost and greenhouse gas emissions
Carbon Emissions in NYC

Citywide Carbon Emission Sources
- Transportations: 30%
- Buildings: 66%
- Waste: 4%

Citywide Building Areas
- Large multifamily: 29%
- Large commercial + medium buildings: 29%
- Small residential + commercial: 42%
- Not covered: 29%

Source: NYC Greenhouse Gas Inventory 2016
Source: NYC Department Of Planning Pluto Dataset 2017
NYC Carbon Emissions Cap: LL97

• Emissions caps on buildings >25,000 sf
• Includes onsite (site) and offsite (source) emissions in a single limit
• Increasingly stringent limits on carbon emissions / sf in 2024 and 2030
  • ~40% citywide emissions reductions by 2030 from a 2005 baseline

Occupancy Group
A – Assembly
B – Business
B – Ambulatory Health
E – Educational
F – Factory
I - Institutional
M – Mercantile
R1 – Hotel
R2 – Residential
S - Storage
NYC Building Efficiency Grade: LL33 / LL95

Beginning in 2020, buildings >25,000 sf must post building efficiency grades publicly in lobby
PROJECT EXAMPLES OF LEED, PH, AND LBC
LEED Project Example:

LEED Platinum project

STROUD WATER RESEARCH CENTER, MOORHEAD ENVIRONMENTAL COMPLEX
Since 1967, Stroud™ Water Research Center has focused on one thing — fresh water. We seek to advance knowledge and stewardship of freshwater systems through global research, education, and watershed restoration.

What We Do

FRESHWATER RESEARCH

ENVIRONMENTAL EDUCATION

WATERSHED RESTORATION

Featured Initiatives and Partnerships
SUCCESSES: getting all of the water right
SUCCESSES:

LEED®, or Leadership in Energy and Environmental Design, developed by the USGBC (USGREENBUILDINGCOUNCIL) promotes a whole-building approach to sustainability by recognizing these key categories:

**Sustainable Sites:** discourages development on previously undeveloped land; seeks to minimize a building’s impact on ecosystems and waterways; encourages regionally appropriate landscaping; rewards smart transportation choices; controls stormwater runoff; and promotes reduction of erosion, light pollution, heat island effect and construction-related pollution. (14 possible points)

**Water Efficiency:** encourages smarter use of water. Water reduction is typically achieved through more efficient appliances, fixtures and fittings inside and water-conscious landscaping outside. (5 possible points)

**Energy and Atmosphere:** encourages a wide variety of energy-wise strategies: energy-use monitoring; efficient design and construction; efficient appliances, systems and lighting; the use of renewable and clean sources of energy, generated on site or off site; and other innovative measures. (17 possible points)

**Materials and Resources:** encourages the selection of sustainably grown, harvested, produced and transported products and materials. It promotes waste reduction as well as reuse and recycling, and particularly rewards the reduction of waste at a product’s source. (13 possible points)

**Indoor Environmental Quality:** improve indoor air quality, natural daylight and views. (15 possible points)

**Innovation and Design:** promotes and provides credits for projects that use innovative strategies to improve a building’s performance beyond what is required by other LEED prerequisites. Green building considerations that are addressed elsewhere in other projects or for other projects for including a LEED Platinum team to ensure a holistic approach to design and construction.
SUCCESSES: inspirational charrette
A vision can only be carried forward if it is inspirational, strategic, communicated and memorialized.

— Drew Lavine, Re:Vision
CHALLENGES:

• Framework of the time

• LEED was not well enough known

• Was that necessary?
Passive House Project Example:
Liberty 52: Stephen F. Gold Community Residences
PHIUS 2015
Inhomogeneous layers
Thermal resistance: 36.997 / 40.338 hr ft² °F/ Btu (EN ISO 6946) / homogenous layer
Heat transfer coefficient (U-value): 0.026 Btu/hr ft² °F

Thickness: 9.501 in
Mr. Salmon,

I'm pleased to inform you that project #1560: Liberty 52 is now a pre-certified PHIUS-2015 project. Congratulations to you and your team.

In the next few days, please review the Project Details listed in the database and update them as necessary, as the project is now publicly visible. (We have set the ICEA, AIA PEs, and Home Load to match the energy model.) Also, if you have any new photos for marketing or publicity purposes, please upload these to the Photos tab.

Thank you for choosing PHIUS-2015, and best wishes to you and your team on achieving final certification. Please contact us when commissioning is complete and you are ready for final certification review, or earlier if you have any other items to discuss.

Lisa White
Graham S. Wright
James Cubas
Andres Pizzano
CONTINUOUS AIR + THERMAL BOUNDARY
CONTINUOUS AIR + THERMAL BOUNDARY
CONTINUOUS AIR + THERMAL BOUNDARY

BEFORE

AFTER
CONTINUOUS AIR + THERMAL BOUNDARY

Dashed line indicates path of continuous air barrier (vapor barrier under slab to face of zip sheathing at exterior wall).

Fluid applied flashing over metal flashing.

Brick veneer.

R-21 Kraft-faced batt insulation.

1" RB XPS rigid insulation as thermal break between slab/foundation.

1" Min. airspace.

10 mil polyethylene vapor barrier under slab route through and lap/tape to zip sheathing.

Keep holes @ 24" O.C. min.

Finish grade sloped away from building; see civil drawings.

Through wall metal flashing.

Mortar base w/mortar net.

Foamglass Perinsul high load insulation block as thermal break between brick/foundation.

2" EPS rigid insulation under slab.

2" EPS rigid insulation on both sides of foundation wall.

Reinforced CMU foundation wall; see structural drawings.

Liquid applied capillary break.

Thermal 2 seal wing nut anchors by Hohmann & Barnard 5 length-SP, 24" OC max spacing; horizontal & vertical.

PT 2x6 borate treated sill plate on sill sealer; anchor to slab per structural drawings.

Tape insulation seams.

6" stone base; refer to geotechnical report.
CONTINUOUS AIR + THERMAL BOUNDARY

• Understand the design intent

• Teamwork
- Sequencing
- Responsibility of Trades
- Anticipating details and coordinating with key trades
- Sum is greater than the parts
CONTINUOUS AIR + THERMAL BOUNDARY

Image: Kimchi & Kraut

TOO CLOSE

6” – 8” MIN
CONTINUOUS AIR + THERMAL BOUNDARY

No Insulation

Air Leakage
PASSIVE HOUSE DESIGN SUBSTITUTIONS

- Ask if other products might work
- Teamwork
PASSIVE HOUSE FIELD SUBSTITUTIONS

• Read specs carefully
Passive House

• Understand design intent
• It takes teamwork
  • constructability
  • sequencing
  • understand responsibility of trades
• Allow enough space for proper installation
• Verify substitutions meet benchmark before installing