

High Performance Buildings

2015 Energy Conference - NTAEE

An update of:

EPA ENERGY STAR for Buildings

USGBC LEED Rating Systems

GBI Green Globes Rating Systems

ASHRAE 189.1

Optimize Energy Efficiency with EPA's ENERGY STAR Portfolio Manager

ENERGY STAR is a voluntary partnership between business and government which provides an established framework to promote the environmental and financial benefits of improved building energy performance.

Portfolio Manager: www.energystar.gov/benchmark

- Free online Benchmarking tool
- All Buildings can Benchmark
- Measures Building Energy Intensity on a scale of 1-100
- Normalizes for Weather, operating hours, occupant density and other criteria
- Low-cost pre-audit
- Energy STAR Labeling for many building types
- LEED EBO&M Prerequisite

Energy Performance Rating

Commercial Building Energy Consumption Survey:
(CBECS) survey is conducted every 4 years to update data

Benchmark is a comparison to Similar buildings EUI:
(kBtu/SF/Year)

Multiple ways to enter energy data into Portfolio Manager:

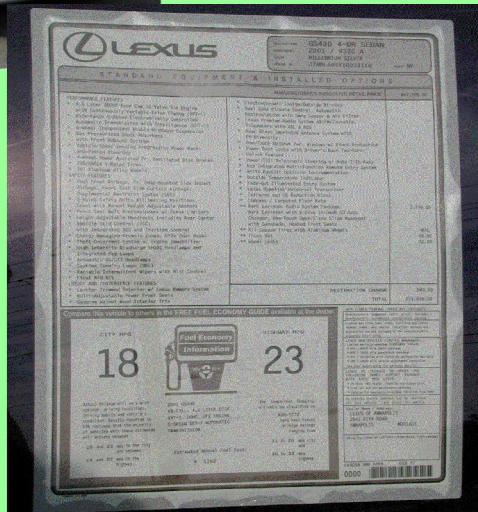
- Single Building - Enter into Portfolio Manager directly
- Multiple Buildings - Use Excel template to import data
- Automated Services - Approved energy services providers

Energy Performance Rating System Energy Use Index - EUI

Is 60 MPG high or low for an automobile? High!



Fuel Efficiency
MPG



Is 90 kBtu/SF/YR high or low for a building? Yes!!



Energy Efficiency
1 - 100

Energy

STATEMENT OF ENERGY PERFORMANCE
Building Name Here 2.11.1999

BUILDING OWNER
Name, Street Address
City, ZIP Zipcode
Contact Name
Phone # 18000

Money Isn't All You're Saving
Green Building Award?
Costs (in \$)

BUILDING SPACE USE SUMMARY

Area (SF)	Occupants	Operations (req'd)	Computers
OFFICE:			
DATA CENTER:			
LABORATORY:			
CREATIVITY HALL/SUMMARY			
Year Started/Status			
LABORATORY (req'd)	INFORM (req'd)	LABOR (req'd)	OTHER (req'd)
Total (COMBINATION)			

ENERGY STAR BENCHMARKING ASSESSMENT

This building qualifies for the ENERGY STAR label for buildings.

NORMALIZED BENCHMARK DATA

ENERGY USE (kBtu/SF/Year)	ENERGY STAR TARGET	YOUR ENERGY USE	Per Year
76	100	100	100%

PROFESSIONAL VERIFICATION

ENERGY USE: YES NO

SOURCES: ASBESTOS OTHER

PORTALIONS

CO2	NO2	NOx	Other and Labeled Group
NO2	NO2	NO2	
NO2	NO2	NO2	
NO2	NO2	NO2	

ENERGY COST:

Cost	Per Year
\$	\$
\$	\$

Based on the conditions observed at the time of my visit to this building. I certify that this assessment is accurate.

INDUSTRY ENVIRONMENT CREDENTIALS
INDUSTRY AIR POLLUTION CONTROL BOARD
ADEQUATE VERIFICATION PROVIDED?
TECHNICAL CREDENTIALS OR REFERENCE
AIR QUALITY MONITORING PROGRAM

ENERGY STAR LABEL - Eligible Spaces

(EUI Ranges: kBtu/sf/yr)

Supermarkets

(171-248)

Offices

(40-76)

K-12 Schools

(27-49)

Hospitals

(145-234)



Medical Offices

(49-75)

Hotels

(79-111)

Post Offices

(48-89)

Warehouses

(17-59 Non-Ref.)

(42-117 Ref.)

Data Centers

(92-371)

**Student Housing/
Dormitories**

(35-85)

Other Building Categories EUI*

• Food Service (Restaurants & Cafeterias)	339-818
• Convenience Store (With Gas Station)	233-407
• Convenience Store (No Gas Station)	124-323
• Public Safety (Detention/Jail/Penitentiary)	107-180
• Public Safety (Fire and Police Stations)	69-105
• Public Assembly (Movie Theater)	61-92
• Public Assembly (Courthouse)	50-90
• Retail (Stores and Shopping Centers)	30-86
• Public Assembly (Library/Culture)	46-83
• Religious Worship	26-60
• Parking Garage	29-58

*Note: Data from Lawrence Berkley Nat'l Labs (LBNL) – Building Performance Database (BPD) Survey Results

Recognize Achievements – Get the Label

ENERGY STAR Label for Buildings scoring 75+


**(Over 27,000 total to date/ 4B GSF)
(~2000 in Texas/ 385M GSF)**

Statement of Energy Performance is validated and minimum building system requirements (Site confirmation by the Data checklist) are sealed and signed by a Professional Eng. (PE)

**ENERGY STAR Leaders
Designed to Earn ENERGY STAR
ENERGY STAR Partner of the Year**



2004



STATEMENT OF ENERGY PERFORMANCE
Medium Office Building

Building ID: 28671
For 12-month Period Ending: January 31, 2004¹

Date SEP Generated:
February 05, 2004

Medium Office Building
567 Old Town Blvd
Nashville TN 37230

Gross Building Area: 247,500 ft²
Year Built: 1958

Owner
SPP Customer
Contact: Robert Williams
567 Old Towne Road
Nashville TN 37230
(240) 223-5542

Facility Space Use Summary

Space Type	Area(ft ²)	Occupants	Operating hours/week	Number of PCs
Computer Data Center	7,500	N/A	168	N/A
Garage	75,000	0	168	N/A
Office (General)	240,000	952	80	951

Site Energy Use Summary

Electricity (kBtu)	13,050,579
Natural Gas (kBtu)	2,957,000
Total Energy (kBtu)	16,007,579

Professional Verification
Bob La Rose
9300 Lee Hwy
Fairfax VA 22031
703-934-3589

Licensed Number: 1234567X
State: TN

Results

Energy Performance Rating ² (1-100)	85
Energy Intensity³	
Site (kBtu/ft ² -yr)	73.6
Source (kBtu/ft ² -yr)	145.8
Emissions	
CO ₂ (1000 lbs/yr)	38,133
SO ₂ (1000 lbs/yr)	916
NO _x (1000 lbs/yr)	547
Energy Cost	
Cost (\$/yr)	\$457,654
Intensity (\$/ft ² -yr)	\$1.91

Indoor Environment Criteria⁴

Indoor air pollutants controlled?	Yes
Adequate ventilation provided?	Yes
Thermal conditions met?	Yes
Adequate illumination provided?	Yes

Notes:

1. Application for ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of ENERGY STAR is not final until approval is received from EPA.
2. An energy performance rating of 75 is the minimum required rating to be considered eligible for ENERGY STAR.
3. Values represent energy intensity, annualized to a 365 day calendar.
4. Based on meeting ASHRAE Standard 62-1999 for indoor air quality, ASHRAE Standard 55-1992 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

Tracking Number: SEP200402050001003783

Professional Engineer Stamp

Based on the conditions observed at the time of my visit to this building, I certify that the information contained on this statement is accurate.

Green Building Rating and Certification Systems

Although other rating systems exist for green buildings, the most commonly used in North America and Texas are:

The United States Green Building Council (USGBC):

Leadership in Energy and Environmental Design (LEED) Rating Systems

Green Building's Institute (GBI):

Green Globes Rating System

Frequently Asked Question: Why are there Green Building Rating systems when we already have ENERGY STAR?

Answer: Energy Star is focused primarily on the Energy impact of buildings, while green building rating systems include other factors to rate a building's sustainability. In addition to Energy Performance "Green Building Rating Systems" include best practices in measuring a buildings environmental impact on the Building Site, Water Use, Materials Use & Waste Disposal, and Indoor Environmental Quality.

U.S. Green Building Council (USGBC)

Mission Statement:

- “The North Texas Chapter of the USGBC - Promote a sustainable, profitable and healthy built environment in the North Texas area through education, professional training and outreach”

History:

- **1993: USGBC National formed as a Non-Profit 501 (c) (3) Organization**
- **1997: DOE Grant (\$200,000) to develop a Green Building Rating System**
- **1998: LEED NC Pilot launched**
- **2000: LEED Workshops launched**
- **2000: LEED NC 2.0 launched and LEED NC Pilots recognized**
- **2001: LEED Accredited Professional program launched**
- **2001: First USGBC Chapters recognized,**
- **2002: USGBC North Texas Chapter was formed**
- **2003: LEED licensed to Canada GBC (LEED NC v1.0 modified)**
- **2004: LEED EB and CI adopted**
- **2006: LEED Core &Shell (CS) adopted**
- **2008: LEED Homes adopted**
- **2009: LEED V3 – Consolidated all NC Rating Systems to D&C / LEED EB to EBOM**
- **2015: LEED V4 – Shift to Market Specific Rating Systems (13 for D+C & 7 for O+M + 2 ND)**

LEED Rating System Results

LEED Certification – Buildings in North Texas

3,438 Registered Projects – 260 million GSF

- 2,220 LEED Homes (10,500 Single & MF units) – 40 million GSF
- 536 LEED NC/D+C – 77 million GSF
- 244 LEED EB/O+M – 90 million GSF
- 252 LEED CI – 14 million GSF
- 116 LEED CS – 38 million GSF
- 31 LEED Retail – 300,000 GSF
- 23 LEED for Schools – 2.5 million GSF

2,142 Certified (62%) – 145 million GSF (55%)

420 days average duration in Certification Process (Registration to Award)

All USGBC LEED Projects Information:

82,500 Registered Projects

59,500* Certified Projects (72%)

*Note: Awaiting confirmation from GBCI

LEED for Existing Buildings: Operations & Maintenance

LEED O+M

- I. **Used for Operations and Maintenance Specifications for LEED D+C projects.** Assures performance of awarded credits is obtained and maintained once the new building is occupied.

- II. **Used to Re-certify LEED D+C projects (Continual Improvement)**

- III. **LEED Certification in Existing Buildings:**
Operations & Maintenance Procedures & Building System Upgrades are defined and implemented to achieve O&M standards. Best suited for use in:
 - Federal, state, and local government; schools, colleges and universities
 - Corporate HQ and Commercial Office Buildings

LEED for Existing Building Rating System History:

- 2002-2004: Existing Building Pilot Program
- 2004: LEED EB v1.0 Approved
- 2005: LEED EB v2.0 Approved
- 2008: LEED for Existing Buildings: LEED EBOM Adopted
- 2009: LEED v3 LEED O+M
- 2015: LEED v4 LEED O+M (Added Schools, Retail, Data Center, Hospitality, Warehouse & Distribution Center, Multi-Family market versions of LEED O+M)
- 2015: Over 7900 Registered existing buildings

LEED O+M – Min. Requirements

- Comply with pertinent environmental codes
- Be a complete, permanent building or space
- Use a reasonable site boundary
- Minimum of 1000 SF
- Serves more than 1 FTE occupant
- Commit to sharing energy and water use data with USGBC
- Gross floor area to be not less than 2% of the gross land area within the LEED project site boundary

LEED O+M Point Distribution

<u>Points</u>	<u>Category</u>
26	Sustainable Sites
14	Water Efficiency
35	Energy and Atmosphere
10	Materials and Resources
15	<u>Indoor Environmental Quality</u>
100	Points Available
4	Innovation
1	Documenting Bldg. Cost Impact
4	Regional Priority Credits
1	<u>LEED Accredited Designer</u>
110	Total Points Available

4 Levels of Certification:

Certified	40-49 points
Silver	50-59 points
Gold	60-79 points
Platinum	80+ points

LEED O+M Sustainable Sites

(26 possible points)

Credit

- **Original Building LEED NC Certified – 4 points**
- **Building Exterior & Hardscape Management Plan – 1 point**
- **Integrated Exterior Site Management Plan – 1 point (Pest Control, Erosion Control & Landscape Maintenance)**
- **Alternative Commuting Transportation – 3-15 points**
 - **Carpool/Ride Share/Walk/Bicycle**
 - **Telecommuting**
 - **Public Transportation**
- **Reduced Site Disturbance - 1 point**
- **Storm water Management Control- 1 point**
- **Heat Island Reduction - up to 2 points (Roof & Site Surfaces)**
- **Light Pollution Reduction - 1 point**

LEED O+M - Water Use and Water Efficiency (14 possible points)

Prerequisites

- **Minimum Water Efficiency of Plumbing Fixtures (Energy Policy Act 1992 compliance)**

Credit

- **Water Efficient Landscaping - up to 5 points**
- **Additional Water & Wastewater Technology – up to 5 points**
- **Water Performance Measurement (Whole Building and Sub-metering) – up to 2 points**
- **Cooling Tower Water Reduction - up to 2 points**

LEED O+M - Energy and Atmosphere

(35 possible points)

Prerequisites

- **Energy Efficiency Best Management Practices – ASHARE Level I Energy Audit. Provide documentation of savings opportunity assessment.**
- **Minimum Energy Performance using ENERGY STAR**
- **Refrigerant Management Plan for management and elimination of Ozone depleting refrigerants.**

Credits

- **Optimize Energy Performance** up to 18 points
- **Commissioning** up to 6 points
- **On-site and Off-site Renewable Energy** up to 6 points
- **Enhanced Refrigerant Management** 1 point
- **Performance Measurement** up to 3 points
- **Emissions Reduction Reporting** 1 point

ENERGY STAR for LEED O+M E&A Prerequisite

Intent: Establish the minimum level of energy efficiency for the building and systems.

Requirements:

Demonstrate that the building has achieved an EPA-Energy Performance Rating (EPA Rating) of at least 69, using Portfolio Manager on the ENERGY STAR website: www.energystar.gov/benchmark.

Submittals – Initial LEED-O+M Certification

- .. Submit a Statement of Energy Performance generated from Portfolio Manager stating that the building energy has achieved an EPA Rating of at least 69.**
- .. Provide a summary of the annual energy bills, costs, and usage amounts (kilowatt-hours, therms, gallons, kBtu, etc.), for each energy source used in the building.**

OR

- .. If the building type is not addressed by EPA Rating Category, provide similar calculations using the Portfolio Manager alternative data benchmarking tool that compares similar facilities in the same climate zone to the prospective facility. The facility must perform at least 21% better than average energy performance to comply for the prerequisite.**

OR

- .. Use Historical data (Up to 6-years) Actual Energy Consumption of the building to develop a theoretical annual baseline. Use at least 3 consecutive years of data. Compare to most current 12 months of data.**

LEED O+M Optimize Energy Performance

Optimize Energy Performance: 1–18 Points

Achieve increasing levels of energy performance above the prerequisite standard of ENERGY STAR Rating of 69 to reduce environmental impacts associated with excessive energy use.

Demonstrate the EPA ENERGY STAR score that the building has achieved. Utilize the EPA ENERGY STAR Benchmarking Tool for building types addressed by ENERGY STAR (Alternates for non-ENERGY STAR Types per LEED-EB Reference Guide).

ENERGY STAR Score	LEED-EB Points
69	0 (Prereq.)
71	1
73	2
74	3
75	4
76	5
77	6
78	7
79	8
80	9
81	10
82	11
83	12
85	13
87	14
89	15
91	16
93	17
95	18

LEED O+M Materials and Resources

(10 possible points)

Prerequisites

- **Sustainable Goods and Products Purchasing Policy (Recycled content, produced in close proximity to site, etc.)**
- **Solid Waste Management Policy - Reduced mercury in lamps and lead/acid/heavy metals in batteries (Reference Guide)**

Credits

- **Sustainable Purchasing Tracking – up to 5 points**
 - Ongoing Consumables (1)
 - Durable Goods (2)
 - Facility Alterations & Additions (1)
 - Reduced Mercury in Lamps (1)
 - Food (1)
- **Waste Stream Audit – 1 point**
- **Solid Waste Management – up to 3 points**
 - Ongoing Consumables (1)
 - Durable Goods (1)
 - Facility Alterations & Additions (1)

LEED O+M - Indoor Environmental Quality

(15 points available)

Prerequisites

- **Outside Air Introduction and Exhaust Systems**
- **Environmental Tobacco Smoke (ETS) Control**
- **Green Cleaning Policy**

Credit

- **IAQ Management Program – 1 point**
- **Outdoor Air Delivery Monitoring - 1 point**
- **Increased Ventilation - 1 point (Counter to Energy Reduction)**
- **Reduce Particulates in Air Distribution - 1 point**
- **IAQ Management Plan - Facility Alterations & Additions - 1 point**
- **Occupant Comfort:**
 - **Compliance survey - 1 point**
 - **Occupant Controlled Lighting – 1 point**
 - **Thermal Comfort Monitoring – 1 point**
 - **Day lighting & Views – 1 point**
- **Green Cleaning Program – 6 points possible**

LEED O+M - Innovation Credits

(10 possible points)

- Use of LEED Accredited Professional - 1 point
 - Innovation in Operations - 4 possible points
- Exemplary Performance of certain existing credits by improving beyond prescribed performance amounts.
(Credits indicated in LEED O+M Reference Guide)
- Documenting Sustainable Building Cost Impact – 1 point
 - Regional Priority Credits – up to 4 points

Regional Priority Credits

(4 possible points)

- 6 Regional Credits for each LEED Rating System were identified as the “Highest Priorities” for each Region of the USGBC. These credits were determined by a consensus committee of the USGBC Chapters located in each Region, to meet the priority issues of concern for that geography
- The project Zip Code determines the Regional Credits available for consideration on a LEED Project
- If the project meets the criteria and is awarded a credit’s points designated as a Regional Priority, then the project will get an extra point automatically for each priority credit achieved, up to 4 extra credits

What's new @ USGBC?

Green Business Certification Inc. (GBCI):

GBCI is the certification and credentialing business of USGBC that administers project certifications and professional credentials and certificates for LEED and these new USGBC rating systems for use the in United States:

PEER – Performance Excellence in Energy Renewal

Power Grid Certification to rate the performance of Electrical Distribution Systems

WELL – International Well Building Institute Alliance

Building standard to rate the aspects of a building that have human impact

SITES – Sustainable Sites Initiative

Rating system to apply to site development and maintenance

GRESB – Global Real Estate Sustainability Benchmark:

- Independently operated subsidiary of GBCI to asses the Environmental, Social & Governance (ESG) practices of the Real Estate Investment Industry
- 150 Member Companies (50 Pension Funds) representing \$11.2 trillion in assets
- Used to optimize the risk/return profile of Real Estate Portfolios
- Aligned to the “Dow Jones Sustainability Index” (DJSI) & “Principals for Responsible Investment” (PRI) reporting frameworks

Green Building Initiative (GBI)

Green Globes (www.thegbi.com)

- Non Profit 501 (c) (3) organization governed by 15 directors representing from industry, NGOs, Construction, Design & Academia
- Similar rating system as LEED with same categories and credits. Minor differences in compliance for materials and resources is the primary difference in the Green Globes rating system.
- Less rigorous documentation submission and review process often means a lower cost to certify. Site Inspection provided.
- Rating System for New Construction and Existing Buildings
- Personnel Certification Program:
 - Green Globes Professional: Train to become proficient at providing technical support to individuals seeking building Certification
 - Green Globes Assessor: Train to become an authorized assessor
- Tools: On line Assessment tool for 1000 point scale assessment
- ANSI Standard Compliant

Green Building Initiative (GBI)

Green Globes

- **Certification Levels (Based on % of 1000 total points available):**
 - 1 Globe = 35-54
 - 2 Globes = 55-69
 - 3 Globes = 70-84
 - 4 Globes = 85-100
- **Certification for Federal Govt. Executive Order 13514 Compliance:**
 - Guiding Principal Compliance (GPC)
- **GBI Project Historical Data:**
 - 985 Buildings Certified to date
 - 726 Green Globes (304 new/413 existing bldgs./9 interior finish)
 - 259 GPC
- **GBI Texas Projects:**
 - 65 Certified
 - 12 new
 - 52 existing bldgs.
 - 1 interior finish)

ASHRAE and USGBC

Introduction to ASHRAE 189.1 and the GreenGuide

In 2002, both organizations entered into a Partnering Agreement and the ASHRAE Green Guide was developed to assist USGBC in their efforts at promoting sustainable design.

ASHRAE 189.1 development began in 2006 and includes input from ASHRAE, USGBC and the Illuminating Engineering Society of N. America (IESNA)

Formally adopted in January 2010

ASHRAE Green Guide & 189.1

- Green Guide was developed to provide guidance on how to apply green design techniques. A reference guide incorporating “Green Tips.” Third Edition: Nov. 2010
- ASHRAE Std. 189.1 – Developed to Codify Green Rating Systems for adoption by local authorities. Developed with USGBC and ASHRAE member input through a consensus based process.
- ASHRAE Standards utilized:
 - **90.1-2007 (Energy Efficiency)**
 - **62.1-2007 (Ventilation for Acceptable Indoor Air Quality)**
 - **55-2004 (Thermal Comfort Conditions for Human Occupancy)**
- ASHRAE Certified HQ with Green Globes in 2014

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Q&A

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