



2007 National Symposium on Market Transformation

March 21, 2007

Jean Lupinacci, US EPA



U.S. ENVIRONMENTAL PROTECTION AGENCY

Commercial buildings are big contributors

- CO₂ emissions
- Peak electricity demand
- Natural gas demand

Global Energy Concerns

- Electricity blackouts
- Natural gas shortages/costs
- Oil imports/prices
- Cost savings for clients



The Equation

BUILDINGS = ENERGY CONSUMPTION =
BURNING FOSSIL FUEL = CO2 EMISSIONS

Blueprints don't protect the climate, but
buildings using less energy do



What Can You Do NOW!

- Set energy design target based on realistic, yet aggressive performance
- Evaluate design decisions impact on energy use – early, early, early
- Monitor and measure actual consumption to verify performance



Good design matters

- ENERGY STAR qualified buildings use 40% less energy than average buildings
- Design strategies are key to controlling energy use

Architects can lead in promoting energy performance

- Design to operations



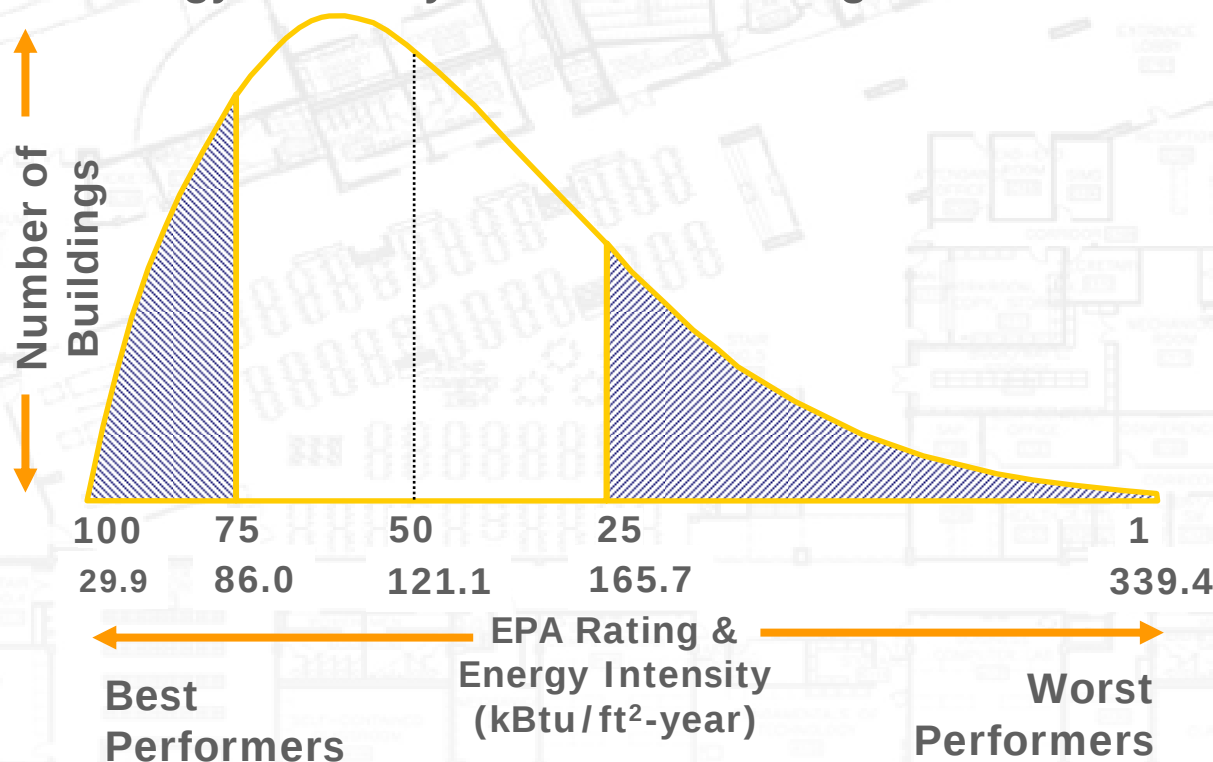
Call to Action

– 2030 Challenge position:

- “achieve a minimum **50 percent reduction** from the current level of consumption of fossil fuels used to construct and operate new and renovated buildings by the year 2010.”

Similar Buildings can Perform very Differently

Energy Intensity of Office Buildings



Technology $\neq$ Performance

- 60% fan systems oversized by 60%
- Chillers oversized 50% to 200%
- Improper installation and poor maintenance
- Buildings can exceed code and not perform as intended



Performance Ratings

Vehicles



Is 10 MPG
high or low
for an
automobile?



Fuel Efficiency Rating: MPG

Buildings

EPA Energy Performance Rating: kBtu/sf/yr

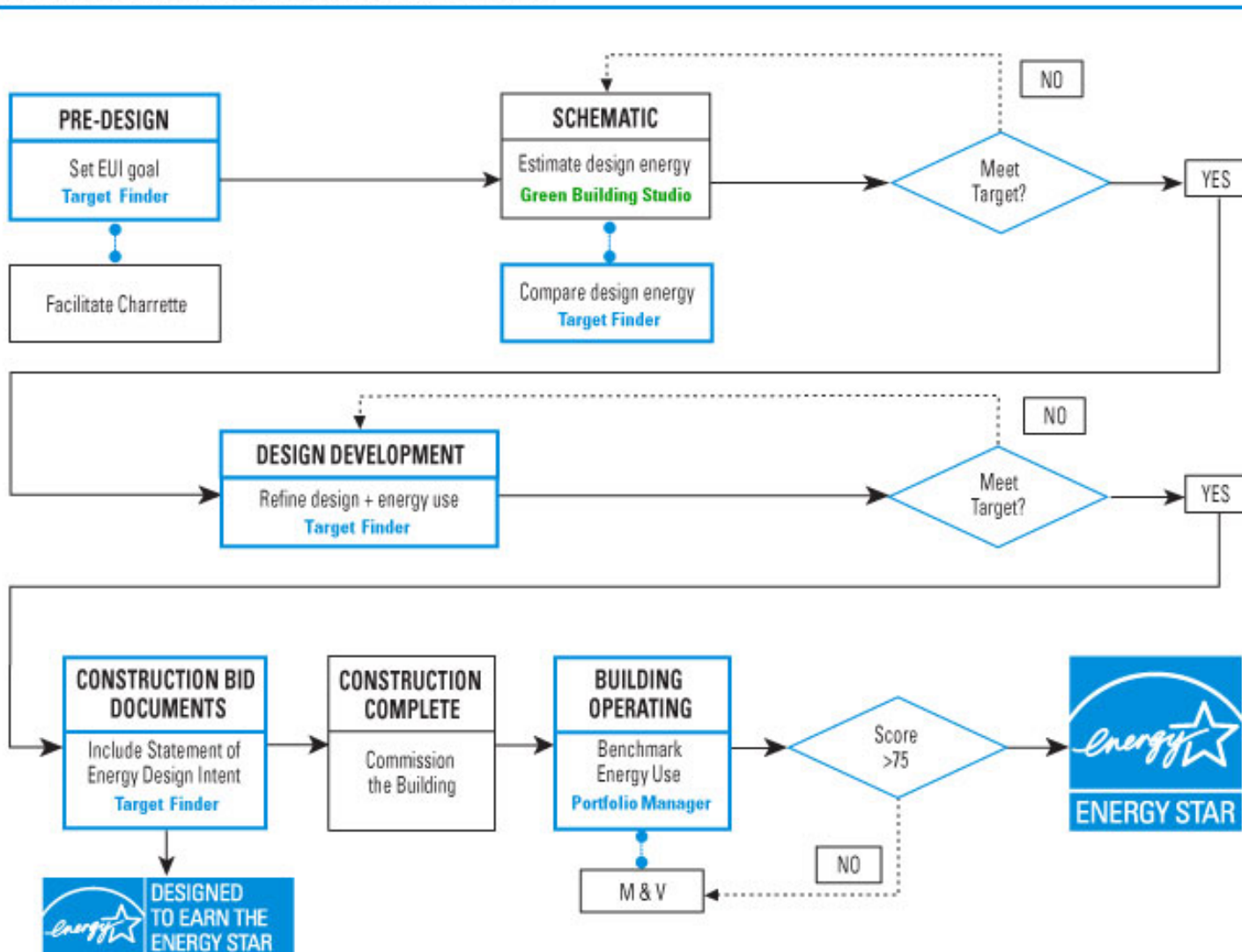
STATEMENT OF ENERGY PERFORMANCE			
Margrave High School			
Building ID: 152/125			
For 12-month Period Ending: January 31, 2004*			
		Date SEP Generated: March 18, 2005	
Margrave High School 12500 Hwy 42 Longwood ID 83209		Owner Catholics Group Contact: John Doe 1501 North 1st Street Suite 900 Adelphi VA 22009 (410) 242 4000	
Gross Building Area: 361,224 sq ft Year Built: 1980			
Facility Space Use Summary			
Space Type	Area (sq ft)	Number of Students	Number of PCs
Computer Data Center	138	N/A	420
K-12 Schools	361,224	1,221	N/A
Cooling Percent N/A 100			
Site Energy Use Summary			
Electricity (kBtu)	5,049,801	Professional Verification John Doe 1501 North 1st Street Suite 900 Adelphi VA 22009 (410) 242 4000	
Propane (Btu)	320,419	Unaudited Number: 123456789	
Heating Oil (Btu)	0	State: VA	
Total Energy (kBtu)	5,049,220		
Results			
Energy Performance Rating ¹ (1-100)	94		
Energy Intensity ²			
Site (kBtu/sf/yr)	17		
Source (kBtu/sf/yr)	49.4		
Emissions			
CO ₂ (1000 lbs/yr)	6,791		
SO ₂ (1000 lbs/yr)	305		
NO _x (1000 lbs/yr)	21		
Energy Cost			
Cost (\$/yr)	\$294,460		
Intensity (\$/ft ² /yr)	\$0.72		
Indoor Environment Criteria ³			
Indoor air pollutants controlled?	Yes		
Adequate ventilation provided?	Yes		
Thermal conditions met?	Yes		
Adequate illumination provided?	Yes		
Notes: 1. Accreditation for ENERGY STAR must be submitted to EPA within 4 months of the period ending date. Award of ENERGY STAR is not guaranteed. 2. kWh/kWh. 3. Values of electricity energy intensity are calculated to a 100.0% value. 4. Based on heating, ACH50, standard 10-1500 for minor air quality, ACH 100, standard 10-1500 for thermal comfort, and 15000 for lighting. Tracking Number: 5			

Is 65.7
kBtu/sf/yr high
or low for a
building?



Design Process & Energy

DESIGN PROCESS USING ENERGY STAR



Target Finder can help you set 'realistic' energy performance goals and receive an energy rating for design projects. By setting and achieving superior energy performance goals, architects can help their clients prevent greenhouse gas emissions associated with burning fossil fuels.

Using
Target
Finder is easy as 1, 2, 3

➔ Enter Target Finder



Target Finder:

EPA Energy Performance Rating

- Building design intent (no utility data)
 - Select Target: based on actual performance, CBECS
 - EPA Target 1 – 100 scale
 - AIA Energy Reduction (better average) 10% - 90%
- Recognizes Top Design Projects
 - Top 25% qualify for “Designed to Earn the ENERGY STAR”
 - Top 10% AIA Goal
- Rating based on *source* energy: GHG
- Green Building Ratings
 - Green Globes uses ENERGY STAR target
 - LEED-NC EA section requires consumption target in documentation



Tools & Resources

2. Facility	
[Space Types] --- Primary Space Types --- Office (General) *Select Space Type Office (Bank Branch) Office (Courthouse) Office (Financial Center) K-12 School Hospital (Acute Care or Children's) Hotel (Economy and Budget) Hotel (Midscale w/o Food and Beverage) Hotel (Midscale w/ Food and Beverage) Hotel (Upscale) Hotel (Upper Upscale) Medical Office Residence Hall/Dormitory Supermarket/Grocery Warehouse (Refrigerated) Warehouse (Unrefrigerated) --- Secondary Space Types --- Other Ambulatory Surgical Center Computer Data Center Garage Open Parking Lot Swimming Pool	
[Gross Floor Area] 50000	
Office (General)	
Delete	
*Number of PCs	*Operating Hours/Week
430	72 Hours
3. Target	
80	
*Choose	
results" to display associated energy use.	

[Return to ENERGY STAR Web site](#) > Target Energy Performance Results

Target Energy Performance Results

NOTE: Assumptions are 82% electricity and 18% % Natural Gas. The Target & Top 10% energy use for this facility are calculated based on the typical fuel mix in the zip code specified.

Your design **must** achieve a rating of 75 or higher to be eligible for "Designed to Earn the ENERGY STAR."

[View Statement of Energy Design Intent](#)

Target Energy Performance Results (estimated)			
Energy	Design	Target	Top 10%
Energy Performance Rating (1-100)	N/A	80	90
Energy Reduction (%)	N/A	31	45
Source Energy Use Intensity (kBtu/Sq. Ft./yr)	N/A	206.7	164.4
Site Energy Use Intensity (kBtu/Sq. Ft./yr)	N/A	77.7	61.8
Total Annual Source Energy (kBtu)	N/A	10,332,984.3	8,217,896.9
Total Annual Site Energy (kBtu)	N/A	3,883,198.0	3,088,335.4
Total Annual Energy Cost (\$)	N/A	\$ 85,384	\$ 67,906
Pollution Emissions			
CO2 Emissions (1000 lbs/year)	N/A	2,048.0	1,628.7
CO2 Emissions Reduction (%)	N/A	31%	45%

Designed to Earn the ENERGY STAR

- Achieve of rating 75 or higher
- Submit “Energy Design Intent” to EPA
- Get Recognized
 - Display the “Designed to Earn the ENERGY STAR” graphic on plans
 - Case Study on the EPA Web site: “Active A&E Firms”





Tools & Resources

Portfolio Manager:

EPA Energy Performance Rating

- Existing buildings (utility data)
 - Benchmark energy performance against similar buildings: CBECS
 - Rating scale: national by zip code
 - Same rating scale used for design
- Recognizes Top Performing Buildings as ENERGY STAR
- Recognizes Portfolio Improvement
 - Baseline improvements of 10, 20, and 30 percent
- Over 30,000 buildings representing 5 billions square feet rated

Assess Building Performance : ENERGY STAR - Microsoft Internet Explorer provided by ICF Consulting Group, Inc.

File Edit View Favorites Tools Help

Address http://www.energystar.gov/benchmark

ENERGY STAR®

ENVIRONMENTAL LEADERSHIP ADDS VALUE TO YOUR BOTTOM LINE AND CORPORATE REPUTATION

PRODUCTS HOME IMPROVEMENT NEW HOMES BUSINESS IMPROVEMENT PARTNER RESOURCES + WHAT IS ENERGY STAR? + NEWS ROOM

Home > [Business Improvement](#) > Assess Building Performance

[email this page](#) [print view](#)

Portfolio Manager

Assess Building Performance

Manage your entire portfolio of buildings online and take control of your energy performance. Whether you own, manage, or hold properties for investment, Portfolio Manager can help you to make smart energy choices. Portfolio Manager's many functions include:

- + **Benchmarking:** Rate the performance of your buildings on a scale of 1-100 relative to similar buildings nationwide using EPA's national energy performance rating system. The rating system accounts for the impacts of year-to-year weather variations, as well as building size, location, and several operating characteristics. Buildings rating 75 or greater may qualify for the ENERGY STAR.
 - See [eligibility requirements](#) for use of the national energy performance rating system
 - See [How to Apply for the ENERGY STAR](#)

Eligible space types, representing over 50% of US commercial floor space (with more to follow soon):

- Offices (general offices, financial centers, bank branches, and courthouses)
- K-12 Schools
- Hospitals (acute care and children's)

Take Portfolio Manager Tour

[APPLY for the ENERGY STAR for Your Buildings](#)

[Statement of Energy Performance](#)

[Support Documents on Benchmarking](#)

- + [Professional Engineer's Guide](#) (425KB)
- + [Indoor Air for Schools](#)

[Frequently Asked Questions](#)

Login to Portfolio Manager How

PORTFOLIO MANAGER

Login New User

[Learn More](#)

Guidelines for Energy Management

Tools & Resources

- + [Portfolio Manager](#)
- + [Target Finder](#)

Find Labeled Buildings

Find Expert Help:

- + [Service & Product Provider Directory](#)
- + [Directory of Energy Efficiency Programs](#)
- + [Find a Professional Engineer](#)

Small Business

Congregations

Partner List

Join Now

www.energystar.gov/benchmark



Energy Efficiency Smart Business

ENERGY STAR qualified offices demonstrate:

- 35% less energy use
- \$0.50 per square foot less to operate
- Energy performance persists over multiple years.

Other benefits/trends:

- Higher occupancy
- Increased asset value
- Lower carbon emissions
- Savings in operations/maintenance

+3,400 buildings earned ENERGY STAR

- +500 million square feet

