

BUILDING GREEN:  
THE SUCCESSES &  
FAILURES OF LEED

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# An Introduction to LEED



“LEED” stands for “Leadership in Energy and Environmental Design.”

Designed by the U.S. Green Building Council, LEED is a third-party green building verification system.

LEED combines:

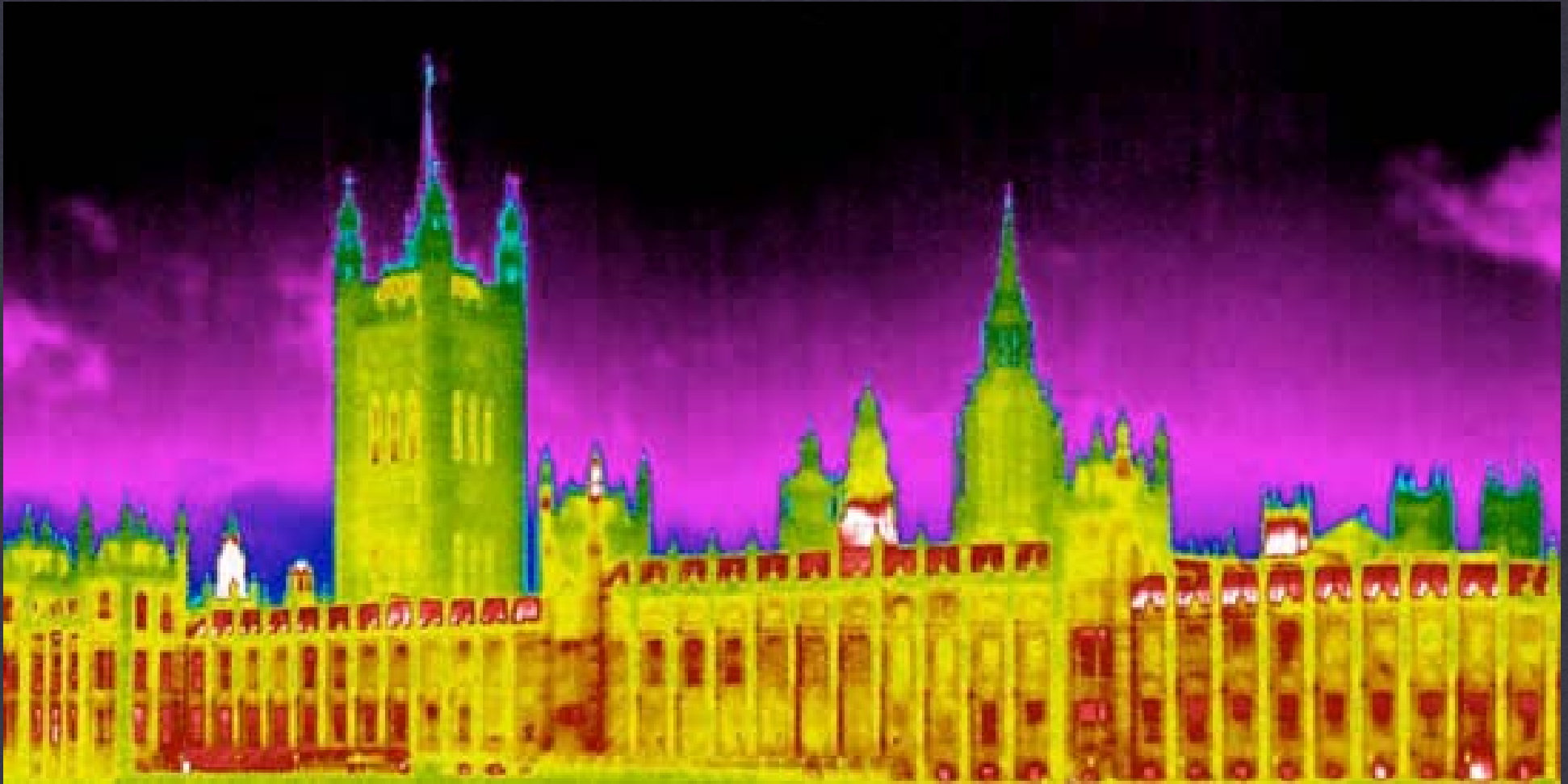
- “*Eco-labeling*” (branding a product so consumers can make environmentally based decisions), and
- “*Life cycle analysis*” (where total impacts of materials and energy use are quantified and evaluated)

# What Is LEED?

LEED is a *point system* that evaluates building design for:

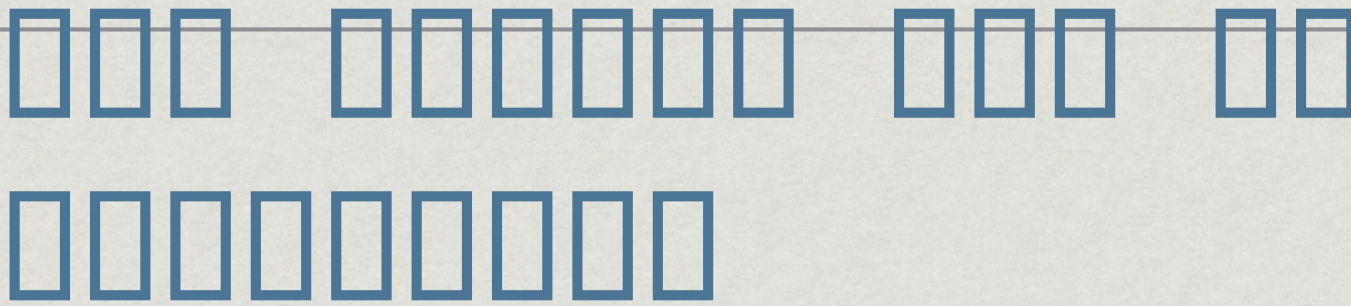
- Energy savings
- Water efficiency
- CO<sub>2</sub> emissions
- Indoor environmental quality
- Stewardship of resources & sensitivity to their impacts
- Innovation & design

# Why Do We Need LEED?



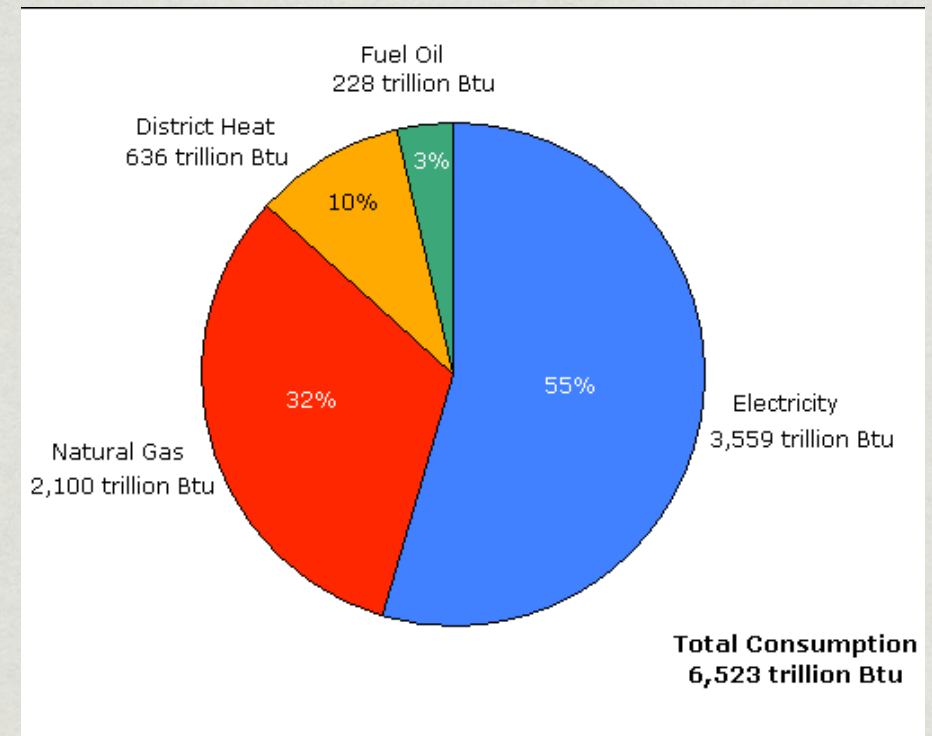
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In 2003, the Energy Information Administration estimated that:

- 4.9 million commercial buildings made up 71.6 billion ft.<sup>2</sup> of floor space
- Those buildings used 6,500 trillion Btu of energy
- (The 111.1 million households in the US used 10.4 quadrillion Btu in 2005)

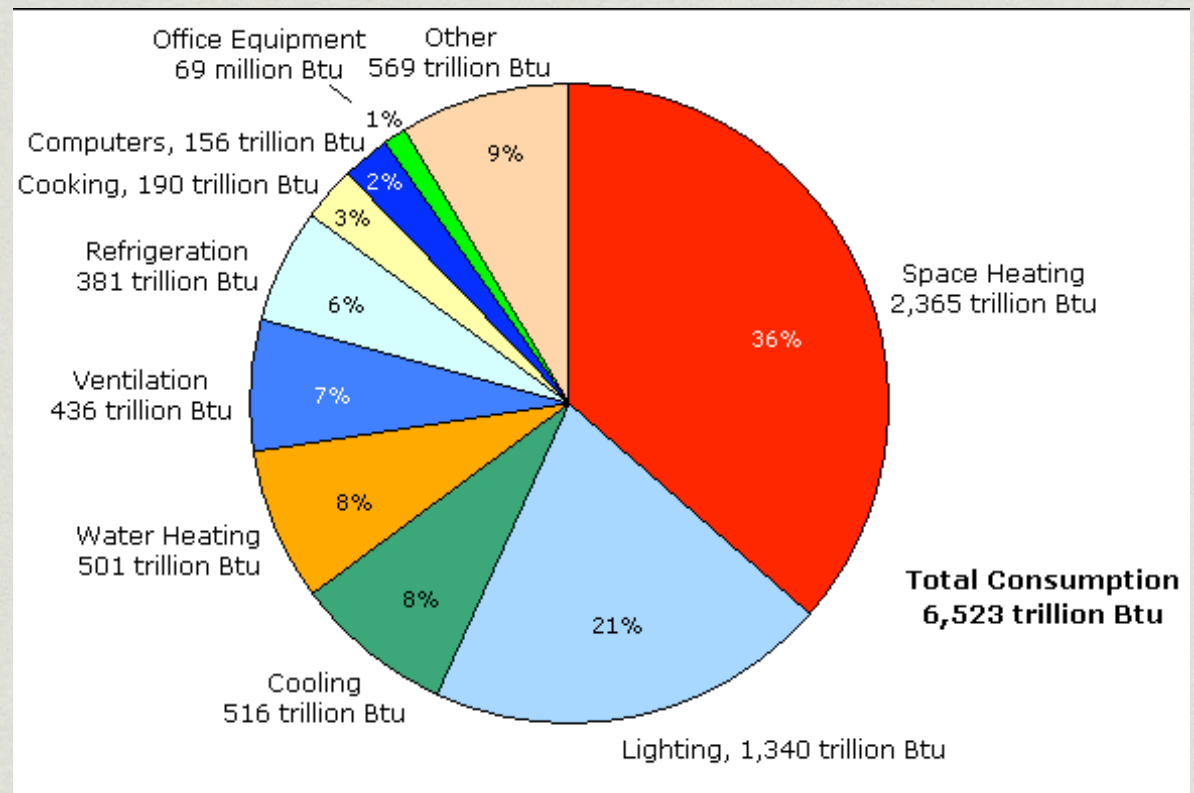


**Together, commercial and residential buildings use about 38% of all energy consumed in the US!**

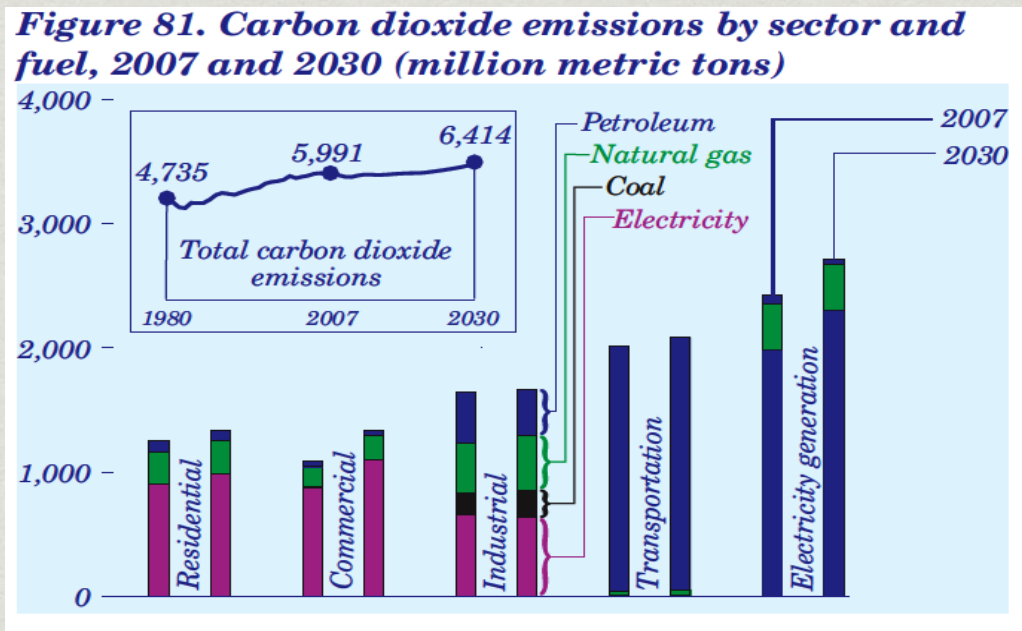
# Energy Use in Commercial Buildings

EIA also estimates that **over half** of the energy in commercial buildings is used for:

- heating and
- lighting



CO<sub>2</sub> emissions from buildings



EIA estimates that in 2007, residential and commercial buildings emitted 2,337 Mmt of CO<sub>2</sub> – 40% of the total!

That percentage will stay about the same through 2030.

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In 1993, the U.S. Green Building Council (USGBC) was formed. It is made up of voluntary committees and includes representatives of all stakeholders:

- architects,
- contractors,
- environmental groups,
- building products manufacturers, etc.

LEED has been adopted by private organizations, (e.g. Ford, Natural Resources Defense Council) and local and federal government bodies.

# What Is LEED's Purpose?

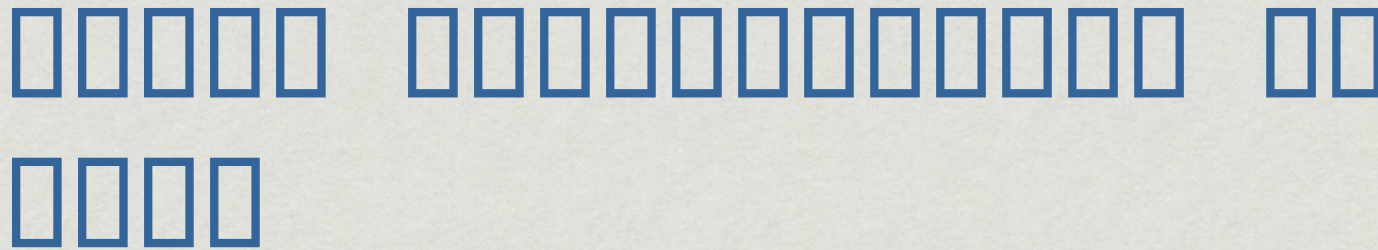
LEED was created to:

- Facilitate positive results for the environment, occupant health and financial return
- Define “green” by providing a standard of measurement
- Prevent “greenwashing” →
- Promote whole-building, integrated design processes

GREENWASHING



[WWW.SINSOFGREENWASHING.ORG](http://WWW.SINSOFGREENWASHING.ORG)



In 1998, the pilot version of LEED was introduced and resulted in 12 certified buildings.

By 2000, the second version of LEED was introduced and had extensive changes from the pilot program. Also, six different versions of LEED programs had been developed:

- \* New Construction
- \* Existing Buildings
- \* Commercial Interiors
- \* Core & Shell
- \* Multiple Buildings
- \* Residential

# LEED v2: Requirements & Certification

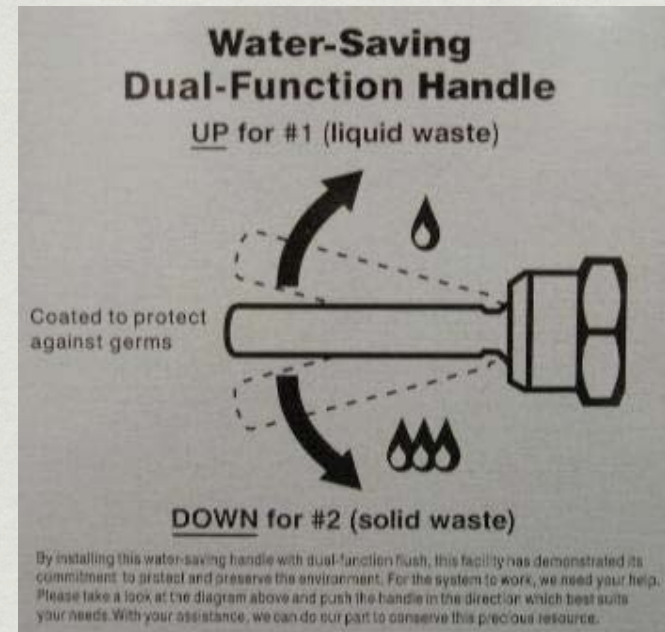
Certification under LEED v2 required a building to earn certain levels of points:

- Certified: 26-32 points
- Silver: 33-38 points
- Gold: 39-51 points
- Platinum: 52-69 points

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## *Water Efficiency:*

- 5 possible points
- Landscaping (xeriscaping)
- Indoor use reductions



# Indoor Environmental Quality: 15 possible points

## *Indoor Environmental Quality:*

- 15 possible points
- Low-emitting materials
- Control of comfort systems
- Access to daylight

Indoor Environmental Quality  
15 possible points  
Low-emitting materials,  
Control of comfort systems  
Access to daylight



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## *Energy & Atmosphere:*

- 17 possible points
- Optimizing energy performance
- Using renewable energy

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## *Materials & Resources:*

- 13 possible points
- Building reuse
- Construction waste reduction
- Local & regional materials



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This program focuses on:

- Optimized energy performance
- Building structure and envelope
- HVAC system



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Complements the Core & Shell section and focuses on tenant-controlled changes like:

- Alternative transit facilities
- Reducing water use
- Optimizing lighting & appliance use
- Reducing build-out waste & reusing resources
- Using low-emitting materials for build-out

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- Lets project managers coordinate the New Construction applications for a multi-building project where buildings share common spaces and/or design features.
- These projects are often on college or corporate campuses or government expansions.



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Focuses on more easily changeable areas like:

- Offering incentives & facilities for alternative transportation
- Changing landscaping to reduce water use
- Optimizing building operations & maintenance through education and monitoring
- Recycling collection
- Removing asbestos and using less polluting chemicals to clean the office

## LEED for Homes: Overview

LEED for Homes is for residential builders.

- USGBC contracts with Providers, companies that manage teams of Green Raters, to rate homes on a points system with similar categories to the New Construction system.

This is not yet a national program; USGBC promises a redeveloped program soon.

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# LEED v2: Mixed Results

Recall: LEED committees were made up of **industry stakeholders** and **interested parties**.

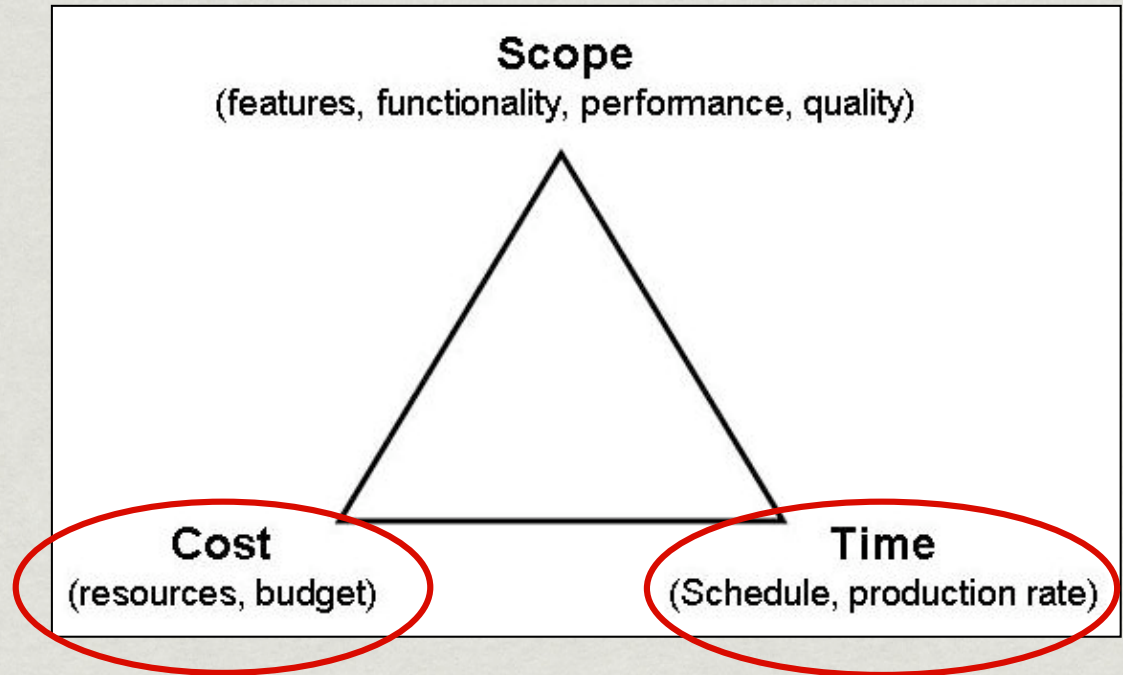
This led to:

- Watered-down environmental standards
- Projects focused on Points rather than Design
- Lack of proven energy savings over time

**The attacks were brutal . . .**

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“Obstacles to [LEED] adoption often stem from the two primary constraints on building projects: **budget** and **schedule.**”



– J. McLennan & P. Rumsey, “Is LEED the Holy Grail of Sustainable Design?” 7/11/03

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“[LEED has become] costly, slow, brutal, confusing, and unwieldy, a death march for applicants administered by a **soviet-style bureaucracy...**”

– R. Udall & A. Schendler, “LEED is Broken—Let’s Fix it,” Grist Magazine, 8/9/05



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“While an immense amount of effort went into the development of LEED[,] **it was by no means a scientific process.**”

– C. Scheuer & G. Keoleian, *Evaluation of LEED Using Life Cycle Assessment Methods*, National Institute of Standards and Technology, September 2002

# LEED 2009:

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Minimum Program Requirements are same across all rating systems. For example:

- *Sustainable Sites*: All sites must prevent construction pollution (e.g. soil erosion, water sedimentation)
- *Energy & Atmosphere*: All buildings must demonstrate 10% improvement of energy use in proposed building
- *Materials & Resources*: All buildings must collect and restore recyclables

# LEED 2009: Building for the Future

These standards are intended to:

- Give **clear guidance** to developers
- Protect the **integrity** of LEED
- **Reduce complications** during the certification process

# LEED 2009: Building for Sustainability

Credits are weighed differently, depending on impact.  
For example:

- In Core & Shell, buildings that improve energy performance by 48% compared to baseline can earn up to 21 points!
- In New Construction, buildings that are within 1/2 mile of trains or 1/4 of buses can earn up to 6 points.



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- Certified: 40-49 points
- Silver: 50-59 points
- Gold: 60-79 points
- Platinum: 80-100 points

This is a big shift from a maximum of 69 points under  
LEED v2!

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Four points can be based on regional environmental issues.

These points are based on an increased percentage of efficiency or savings for a particular credit in a particular zip code.



- For example, a new building in 60661 could earn an extra point by putting in a green roof on at least 50% of the roof.

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*Energy & Atmosphere:* Very heavy emphasis on optimizing energy use & use of on-site renewable energy

• 7-19 points; **35 possible, up from 17**

*Sustainable Sites:* Emphasis on access to public transit and development density

• 5-6 points; **26 possible, up from 14**

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*Water Efficiency:* Emphasis on overall reduction in water use

- 2-4 points; 10 possible, up from 5

*Regional Priority:* New category based on regional environmental issues

- 4 possible points

# LEED 2009: Green Building Rating System – Green Building

*Materials & Resources:* Emphasis on maintaining existing structural supports

- 1-3 points; 14 possible, up from 13

*Indoor Environmental Quality:* No increase in emphasis

- 15 possible points, same as v2

*Innovation in Design:* No increase in emphasis

- 6 possible points, up from 5

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- Any showing of non-compliance with the Minimum Program Requirements can result in revocation of LEED status
- Developers and building owners must commit to sharing energy and water use data for 5 years after certification



# Outlook: Not-so-bad

- ✿ It is not clear how effectively the Minimum Program Requirements will address complaints of time, cost and confusion
- ✿ But credit weightings and regionalization seem to have increased affect on environmental standards – and thus the integrity of LEED!
- ✿ If all goes well, the green building market (commercial & residential) will be worth \$96-140 billion by 2013, up from \$36-49 billion today!

# USGBC:

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