

Green Building

Trends, Issues and Opportunities

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When it looks impossible...

- *“Man will never reach the moon regardless of all future scientific advances.”*
- — Dr. Lee DeForest, Inventor of TV
- *“The bomb will never go off. I speak as an expert in explosives.”*
- — Admiral William Leahy, US Atomic Bomb Project
- *“640K ought to be enough for anybody.”*
- — Bill Gates, 1981
- *“This ‘telephone’ has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us.”*
- — Western Union internal memo, 1876

...think again...

- *“The wireless music box has no imaginable commercial value. Who would pay for a message sent to nobody in particular?”*
- — David Sarnoff’s associates in response to his urgings for investment in the radio in the 1920s
- *“The concept is interesting and well-formed, but in order to earn better than a ‘C,’ the idea must be feasible.”*
- — A Yale University management professor in response to Fred Smith's paper proposing reliable overnight delivery service. (Smith went on to found Federal Express Corp.)
- *“We don't like their sound, and guitar music is on the way out.”*
- — Decca Recording Co. rejecting the Beatles, 1962

Overview

- **Environmental issues**
- **Regulatory Structure**
- **Programs**
- **Case Studies**
- **Resources**

Buildings and Greenhouse Gas Emissions

- **Buildings account for 50% of all GHG's in US**
 - **Includes energy consumed and in construction**
 - **Production and transportation of materials to construction sites**
 - **Globally, % is higher**
- **US annual energy consumption is projected to increase by 37% (34 quadrillion BTU's = to 40 1000MW power plants) and GHG emissions by 36% over the next 20 years**

Increase in Building Sector Emissions

- **Buildings last 50 to 100 years**
- **By 2020, US projected to add 22 million buildings**
- **Much of the growth in power plant construction over this time will provide energy to buildings**
- **In addition, approximately 58% of the energy used to operate buildings is consumed by burning fuel on site**

Tackling the Building Emission Issue

- **Variety of proposals with common themes:**
 - **Set targets for emission reductions phased over time to reach “carbon neutral” status**
 - **Drive emission reductions through building performance standards in building codes for private sector buildings, and mandates for government buildings to meet energy efficiency targets**
 - **Incentive-based regulatory structures**

LEED Certification

- **Leadership in Energy and Environmental Design**
 - **Green building rating system by the non-profit US Green Building Council**
 - **De-facto standard for green buildings**
- **LEED-NC (New Construction/Major Renovations)**
- **LEED-EB (Existing Buildings)**
- **LEED-CI (Commercial Interiors)**
- **LEED-CS (Core and Shell)**

LEED-NC

- **69 possible points for a variety of sustainable design strategies**
- **Projects earn a certification level based on the number of LEED points the building achieves**
- **Certified: 26-32 points**
- **Silver: 33-38 points**
- **Gold: 39-51 points**
- **Platinum: 52-69 points**

Prerequisites to LEED Certification

- **Commissioning of the building's fundamental elements and systems**
- **CFC reduction**
- **Storing and collecting recyclables**
- **Controlling tobacco smoke**

Categories for Points and Prerequisites

- **Sustainable sites: 14 points**
- **Water efficiency: 5 points**
- **Energy and Atmosphere: 17 points**
- **Materials and Resources: 13 points**
- **Indoor Environmental Quality: 15 points**
- **Innovation & Design Processes: 5 points**

The Path to Certification

- **Project team registers with USGBC in early stages of design (optional to set certification goal at this time)**
- **Registration fee to USGBC**
- **Documentation templates for each category**
- **After project complete, paperwork submitted to USGBC for technical review**
- **Certification fee (double the registration fee)**
- **USGBC performs review and notifies project of certification decision; if not appealed in 30 days letter and plaque issued with certification level**

Challenges and Rewards

- **Staying on budget and schedule as project proceeds, largely due to material supply**
- **Coordinating designer with other project team members and consultants**
- **Requires a LEED-Accredited Professional for certification**
- **Reduced operational costs largest incentive**
 - **Boulder Community Hospital: \$1.6 MM premium for \$75 MM campus = 21% reduction in energy from similar facilities**

On the Horizon for LEED

- **More than 10,000 projects currently pursuing certification**
- **New rating scale proposed for 2009**
- **New weighting for credits with more emphasis on energy efficiency and bonus points for region-specific targets (e.g., water reduction in desert Southwest)**
- **Effort to decouple USGBC from being both the promulgator and evaluator of certification**

Alternatives to LEED: Green Building Initiative

- **GBI’s “Green Globes” management tool for commercial buildings that includes:**
 - **Assessment protocol**
 - **Rating system**
 - **Guide for environmental design**
 - **Facilitation of third-party verification**
- **Interactive, flexible, and affordable alternative to LEED**

Green Globes Rating System

- **Project Management – Policies and Practices**
- **Site**
- **Energy**
- **Water**
- **Resources, Building Materials and Solid Waste**
- **Emissions and Effluent**
- **Indoor Environment**

Green Globes Rating

- **Assessment that leads to 35% or more are rated on a scale of 1000 points**
- **35-54%: Basic**
- **55-69%: Excellence**
- **70-84%: Leadership**
- **85-100%: National or World Performance Leaders**

LEED and Green Globes Comparison

- **LEED the recognized de-facto national standard**
- **Green Globes requires no fees or authorized professionals to perform certification**
- **Green Globes is self-implementing**
- **LEED evolution in part from competition from Green Globes**

Federal Law: Current

- **Federal tax incentives**
- **Federal building codes, energy efficiency standards (10 CFR Parts 434-436)**
- **RPS and RES for federal agencies**

Federal Tax Incentives

- **Corporate Deduction**
 - **Energy Efficient Commercial Buildings Tax Deduction**
- **Corporate Exemption**
 - **Residential Energy Conservation Subsidy Exclusion (Corporate)**
- **Corporate Tax Credit**
 - **Energy-Efficient New Homes Tax Credit for Home Builders**
- **Personal Exemption**
 - **Residential Energy Conservation Subsidy Exclusion (Personal)**
- **Personal Tax Credit**
 - **Residential Energy Efficiency Tax Credit**

Federal Regulatory Programs

- **Appliance/Equipment Efficiency Standards**
 - Federal Appliance Standards
- **Energy Standards for Public Buildings**
 - Energy Goals and Standards for Federal Buildings
 - Energy Reduction Goals for Federal Agencies
- **Alternative Fuel and Vehicle Policies**
 - U.S. Department of Energy's Alternative Fuels Data Center

Federal Grant and Loan Programs

- **Federal Grant Program**
 - **USDA Rural Energy for America Program (REAP) - Grants**
- **Federal Loan Program**
 - **Energy Efficient Mortgage**
 - **USDA Rural Energy for America Program (REAP) – Loans**
- **Clean Cities**
 - **Competitive grant solicitations for energy efficient transportation technologies**

Building Technology Assistance

- **Energy Star**
 - **Provides market transformation support for energy efficient product manufacturers, commercial & industrial building owners, and home builders/contractors. The label is a nationally recognized symbol of energy efficiency.**
- **Energy Smart Schools**
 - **This program promotes the construction, renovation and operation of energy efficient schools through technical support, education initiatives, and energy management training.**

Energy Savings Performance Contracts

- **Energy Savings Performance Contracts (ESPCs) to finance, through the use of private sector investments, the implementation of efficiency improvements**
- **More than 400 ESPC projects have been awarded by 19 different federal agencies in 46 states**
- **\$1.9 billion has been invested in U.S. federal facilities through ESPCs, saving 16 trillion Btu annually, equivalent to the energy used by a city of about 450,000**

State Programs (OR & CA)

- **Appliance standards**
- **Public Benefit Funds for utility efficiencies**
- **Transportation (HOV; tax credits for hybrids)**
- **Tax credits and rebates for efficient products**
- **State building codes that exceed uniform standards**
- **Cap & Trade (OR only)**
- **Business Energy Tax Credits and Energy Loan Fund (OR)**

Innovative Local Programs

- **Portland Green Building Programs**
 - **PDC LEED requirements for private developers receiving funding assistance**
 - **Portland LEED Gold requirements for new city facilities and construction**
- **Proposed Carbon Tax**
 - **Fee for new construction that fails to exceed state building codes by 30%**
 - **Financial incentives (cash rebates, tech assistance and streamlined permitting) for projects which exceed state codes by 45%**

South Waterfront Example

- **Oregon Health Science University (OHSU)
Health and Healing Center**
- **Built on a Portland brownfield site**
- **LEED Platinum certification**
- **Anchor for green building throughout the
South Waterfront District**

South Waterfront: The District

- **140 acres of land, 6500 linear feet of Willamette River waterfront**
- **Prior uses include steel and lumber mills, municipal power plant, other industrial uses**
- **Contamination throughout the district**
- **Portland Brownfield Initiative and Showcase Project highlighted the benefits of the district of increased density, mix uses, multi-modal transportation**

Significant Planning Efforts

- **Willamette Greenway**
- **Transportation System Plan**
- **South Waterfront Plan: Zoning Code**
- **Greenway Design Guidelines**

Multi-Modal Transportation



MW - MERIWETHER
AT - ATWATER PLACE
JR - THE JOHN ROSS
37 - 3720
DC - DISCOVERY CENTER



Anchor Tenant: OHSU Health and Healing Center

- **16 story, 400,000 square foot building**
- **61% more energy efficient than required by state code**
- **Clinical offices, rehabilitation center, research laboratories, surgery suites, educational facilities, conference center, swimming pool, basketball court, optical shop, pharmacy, restaurant**
- **950 full and part time employees, plus students, patients and visitors**

Energy Highlights

- **60% reduction in potable water use**
- **100% sewage treated on-site in membrane bioreactors**
- **Integrated day-lighting system, naturally vented stair towers, radiant heating and cooling**
- **Rainwater and wastewater harvested, preventing 15,000 gallons per day from the city's sewer system**
- **Swimming pools integrated with heating and cooling as energy storage units**

Other Features

- **South-facing sun shades that contain solar panels**
- **Gas-fueled cogeneration system fired by five, 60-kw microturbines**
- **Chilled beams that combine convective cooling with displacement ventilation, cutting energy use by 20-30% and eliminating need for ducting**
- **Sustainable, low-toxicity and zero-VOC coatings and materials**
- **On site heat and power production saves 9 million pounds CO₂ per year, = 903 North American cars**

Contacts: Federal Buildings Programs

- **Commercial Building Tax Credits – John Ryan
202-586-8823**
- **Residential Tax Credits - Ed Pollock 202-586-
5778**
- **Energy Star - Marsha Quinn 202-586-2097**
- **Energy Smart Schools - Marsha Quinn 202-586-
2097**
- **Building Codes Development - Jean Boulin 202-
586-9870**
- **National Action Plan for Energy Efficiency -
David Rodgers, 202-586-5523**

Web Resources

- **Federal policies and programs: www.aceee.org (American Council for an Energy Efficient Economy)**
- **State Programs: www.ase.org (Alliance to Save Energy)**
- **LEED: www.usgbc.org**
- **Green Building Initiative: www.thegbi.org**
- **City of Portland: www.portlandonline.com**

Summary

- **Passing federal energy legislation**
 - **Subsidies on fossil fuel**
 - **Long-term incentives**
- **Integration of land use, environmental and energy policies**

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