

VERSION 2.0

Value Rating System for the Green Building Industry

Buildings Certified to Consensus Standards

Green Building Industry Value Rating System®

**September 2006
Updated May 2008**

Evolution Partners

1511 Wisconsin Avenue NW, Suite 200
Washington, DC 20007
202.997.3922 – p
202.338.2800 – f
EvolutionPartners.com



Market Transformation to Sustainability

1511 Wisconsin Avenue, NW
Washington, DC 20007
202-338-3131 – p
202-338-2800 – f
<http://mts.sustainableproducts.com>



*Accelerating the Global Market
Transformation to Sustainability*

This document falls within the exclusive jurisdiction of
the MTS Economic Benefits Committee

Don Reed, CFA, Principal, Ecos Corporation
Committee Chairman

CONTENTS

EXECUTIVE SUMMARY	3-5
1. RATIONAL BASIS FOR GREEN BUILDING RATING	6
Future Risks	6
Market Position/Penetration	7
Green Building Attributes	7
Green Building Investment	7
Prerequisite	8
2. VALUE/RISK FACTOR METHODOLOGY	8
3. VALUE/RISK CATEGORIES RATED	9
Mold	9
Commissioning / Operational Risk	10
Energy Use Reduction	10
Green Power	12
Indoor Air & Health	12
Location Value	13
Reduced Climate Risk	13
Improved Productivity / Increased Rents	13
Competitive Advantages	15
Lower Operating Costs	15
Added First Cost	16
Certification Time & Cost	16
Availability of Professionals	17
Lack of Auditing	17
Resistance to Change	17
4.0 RISK FACTORS DEFINED	18
5.0 ADJUSTMENT BASED ON QUALITY OF AVAILABLE DATA	19
6.0 RATING OF GREEN BUILDING INDUSTRY VALUE	20
7.0 SCORE SIGNIFICANCE	21
8.0 DATA QUALITY/QUANTITY	22
APPENDICES	
1. Bibliography	23-34

EXECUTIVE SUMMARY

Certified green buildings have captured upwards of 5% of the US commercial new construction market since 2000 and continue to grow at a 50-70% annual rate. The *Green Building Industry Value Rating System*® prepared by finance, legal and environmental experts shows that green buildings are more valuable and less risky than standard real estate assets. Real estate value is a combination of cash flow, timing and risk. Green buildings positively affect all three of these metrics.

Relevant factors for rating green buildings by the Rating Agencies have been quantified in a rating matrix evaluating 15 Risk Categories according to the following five Risk Factors:

1. Aggregated dollar size of risk
2. Potential for increasing risk over time
3. Reduced liability and litigation risk including transaction costs
4. Insurance risk from no or diminished coverage
5. Obsolescence risk / higher valued collateral

Scores are adjusted based on historical data available and business experience. A cumulative risk score is given showing a higher adjusted net score for certified green buildings after considering evaluation criteria for ratings, and accounting for data quality and quantity

Rating agencies serve their customers by accurately assessing various risk features of investments including tangible financial / default risks, as well as intangible risks that materially affect the underlying collateral. Rating agencies have a legally based fiduciary duty to their clients and the capital markets to incorporate various risk and risk reduction measures into their overall ratings for equity and debt financial instruments and issuances (Investment Advisors Act of 1940, & *The Investor's Advocate: How the SEC Protects Investors, Maintains Market Integrity, and Facilitates Capital Formation*, SEC 2006). Further, the laws in countries with capital markets require that this risk be reflected. (Legal Framework, Freshfields Law Firm & UNEP 2005).

A CMBS Credit Rating “is an opinion on the ability of the collateral to pay interest on a timely basis and to repay principal by the rated final distribution date, according to the terms of the transaction,” (S&P’s CMBS Property Evaluation Criteria 2004 at 9). Long term issue credit ratings like AAA, AA, A, etc., are expressed in terms of default risk. (Id).

In order to validate any improvement in performance of CMBS loans secured by LEED buildings, the metrics used in CMBS default models should be considered, especially the preeminence of the debt coverage ratio which in turn is driven by underwritten cash flow. It is worth noting at the outset that CMBS is in many ways driven by diversification and the laws of large numbers, with hundreds of assets in a pool necessitating a quantitative and statistical approach to measuring risk. One consequence is that the securitization process tends to put more emphasis on objective and quantitative measures (such as DSCR and LTV) vs. subjective, harder-to-quantify measures (such as quality of the asset and location, construction features, etc. which may include many potential “green” attributes). Examining the LEED categories of green building performance through the lens of CMBS real estate risk underwriting and sustainable cash flow may therefore be helpful in establishing a framework for evaluating these assets from a “green CMBS” perspective.

Green building investment standards are needed to advise investors on evolving best practices regarding investment approaches and risk reduction measures. Recent market events have led to the recognition of the value of green and sustainable technologies as evidenced by the continued growth of green building registrations and certifications, mandates by federal, state and municipal government, and various market measures including Fireman's Fund which now provides a 5% insurance discount for certified green buildings and Nationwide and Farmers Insurance who provide a 10% discount for hybrid vehicles.

The *Green Building Industry Value Rating System*® shows the greatest qualitative and quantitative value for:

- Reduced energy use and exposure to future energy pricing volatility (**VERY HIGH: 26**)
- Mold protection (**VERY HIGH: 26**)
- Reduced climate risk (**VERY HIGH: 23**)
- Commissioning/Operational risk (**HIGH: 22**)
- Improved indoor air quality and health (**HIGH: 20**)
- Lower operating costs and default risk (**HIGH: 17**)
- Improved tenant productivity and a corresponding increase in rents (**MEDIUM: 13**)

The greatest green building risk reduction accrues from (in order):

- Decreased dollar risks over time
- Reduced large dollar risks
- Increased collateral value / reduced obsolescence risk
- Reduced default risk from no or diminished insurance coverage
- Reduced liability risk

In addition to cited references throughout this Report, the Bibliography in Appendix 1 contains many references supporting the conclusions in this Report and are listed in the following categories:

- Commissioning
- Productivity
- Energy Costs / Trends
- Indoor Air Quality
- Carbon Emissions / Energy Cost Potential
- Climate Change
- Green Building Research Papers
- Business Opportunities
- Market Acceptance

The Adjusted Net Score of Lower Risk from Green Buildings is +116.

Here's what this score means:

1. The relatively high positive score confirms the value of certified green buildings based on a wide variety of risk/value measures. This is due to the greater number of positive risk categories versus negative risk categories for green buildings.
2. Most of the negative risk categories are attributed to non real estate related financial measures stemming from green building growth and adoption pains within the marketplace. As industry experience with green buildings continues to grow/mature, the negative risk factors identified significantly diminish on their own thereby increasing the Adjusted Net Score further.
3. The increased risk over time substantially grows for both the positive and negative green building risk factors in the Green Building Industry Value Rating in section 4.

4. Based on current industry experience with green buildings, there is a significant potential for additional added value beyond what is identified in this Rating System.

CAPITAL MARKET GREEN BUILDING RATING – GOALS AND OBJECTIVES

OBJECTIVE: Translate Green Features Into Financial Value (“Underwriting Overlay”)

GOALS:

1. Appropriate Recognition of Superior Assets
2. Underwriting Bonuses – Market Rent / Vacancy, OpEx, Reserves
3. Lower Risk-Adjusted Capital

METHOD: Green Buildings Rated As Higher Collateral

Well-Designed High-Performance Buildings	↑ Collateral Value
Top-Of-Market Rents (new / re-lease)	↑ Revenue
Financially Strong Tenants	↓ Default Risk
More Likely To Renew Upon Expiration	↓ Re-Lease Expense
Below BOMA Average Operating Costs	↓ Operating Costs
Reduced Maintenance / Upkeep	↓ Replacement Reserves
Lower Insurance Liability (Mold, IAQ, etc.)	↓ Op Ex / ↓ Default Risk

IMPACTS: Greater Cash Flow Certainty For Debt Service Coverage

CMBS AAA buyers receive higher quality assets in underlying pool
Buyers bid higher leading to spread reductions
BB Buyers (First Loss) Have Greater Margin For Error
Spread reductions lead to lower lending costs upon loan origination

1. RATIONAL BASIS FOR GREEN BUILDING INDUSTRY RATING

In the commercial mortgage backed securities (CMBS) market, rating agencies have developed both a quantitative system based on financial underwriting stress testing, and qualitative measures including the requirement of detailed consensus-based standards that address various other risks. Among these risk reduction standards is the consensus Phase One Environmental Assessment Standard ("Phase 1") which achieved higher ratings for securities that received a positive report, primarily due to defense-to-liability risk reduction, as well as the Property Condition Assessment ("PCA") report which is mandatory for all CMBS assets. The US Green Building Council's LEED® rating system, a consensus-based standard, is rapidly growing in market acceptance since its launch in 2000 and addresses several building and underwriting risks.

In the early 1980's rating agencies launched the Commercial Mortgage Backed Securities industry with the assistance of these types of rating systems. In order to reduce risk and uncertainty, higher ratings have been provided in the past to CMBS collateralized with properties evaluated under the Phase 1 Standard. For the same reason, the Rating Agencies also require consensus standards for CMBS such as the PCA.

Substantial work has been conducted to evaluate green building risk. This work includes the 2005 *Green & Energy Star Building Finance Summit* with over \$100 billion in real estate investment represented; participants concluded that green buildings are more valuable based on equity and debt sessions and many case studies. See also the Urban Land Institute and National Association of Industrial and Office Parks published textbooks and case studies on green buildings, various studies by the Royal Institute of Chartered Surveyors (2005), Cushman & Wakefield [Green Value Study 2005], PriceWaterhouseCoopers [3rd Quarter 2006 Korpacz Report], and other groups.

A good indicator of added market value from green buildings comes from asset-level case studies where these assets have demonstrated the ability to realize top-tier rents, show superior leasing demand metrics, lower operational costs, lower energy consumption, and better indoor air quality. An equally positive measure of added value is financial market recognition which is represented by Fireman's Fund's recent initiative providing a 5% discount to its customers with LEED certified buildings and the fact that Fireman's Fund is rebuilding to LEED certified standards after an insured loss.

The case for higher rated green building securities has been prepared for investment bankers and interest in this has been expressed by the risk rating agencies.

Substantial future risks to the economy and building industry from long term annually increasing energy costs are reduced by green buildings via lower operating costs from energy efficiency design measures, onsite green power, and/or switches to grid available renewable power which has lower price volatility. As a result of these and other measures, green buildings also substantially reduce climate risk which limits global damages (Reinsurance Chief Risk Officers Report & Lloyd's 360 Report 2006). As further evidence of concern and action of the insurance industry, in addition to Fireman's Fund's discounted rate for green buildings, Nationwide and Farmers Insurance provide a 10% discount for hybrid vehicles to address this added climate change risk.

Investment instruments that accurately reflect these risk reductions will have greater value since they are less exposed to negative economic impacts from increased costs and regulatory and liability risk. Green buildings do the most to reduce these impacts since buildings consume roughly 75% of electricity which is generated primarily from coal; coal-generated electricity causes approximately 50% of climate change pollution (AIA 2030 Imperative 2006).

Strength of Market Position and Penetration

The US Green Building Council (USGBC) released the consensus green building standard *Leadership in Energy & Environmental Design* (LEED™) in 2000. Since then, market acceptance and growth have been significant; LEED buildings now approximate 5% of the new construction market and have been growing at a 50%-75% annual rate for the last four years (USGBC 2006; see Appendix 2 slides for background). LEED is licensed in Canada and India and license agreements are being negotiated for Mexico and Brazil. Market growth and interest is such that LEED registered and/or certified buildings are in 24 countries. There are no competing consensus green building standards in the North American market.

LEED Description and Green Building Attributes

Separate LEED consensus standards exist for New Construction, Existing Buildings, Interiors, Core & Shell, Retail, Laboratories, Healthcare, and Homes. LEED is a green building rating system with minimum prerequisites for (1) Energy & Atmosphere, (2) Sustainable Sites, (3) Materials & Resources, (4) Indoor Environmental Quality & (5) Water Efficiency. Buildings are certified at *Certified, Silver, Gold & Platinum* levels based on how many points are achieved in each of the five categories with additional credits available for Innovation. See Appendix 3 LEED Points Breakdown from certified new construction buildings.

Commissioning is an important LEED prerequisite which serves to lower ongoing operating costs and risk by ensuring that all designed building features and operating equipment are functioning as intended. Just as the Property Condition Assessment Standard ensures that building failures will be identified and corrected thus lowering risk, commissioning goes further by requiring that buildings are built and operating as designed. The experience from commissioning has corrected a surprising number of material failures much to the satisfaction of owners (USGBC Congressional Briefing 2004).

Tenants are attracted to green buildings due to productivity benefits which are the top criterion for a well run company. Study after study shows higher productivity for tenants occupying green buildings.

Green Building Investment

Many leading companies and governments have made commitments to LEED buildings (see Appendix 2). LEED investments have been made by many large developers including Hines, Forest City Enterprises (NYSE: FCE) and Pyramid (Green Building Retail & Core & Shell Education Programs, MTS 2005). Several financial firms are pursuing LEED-focused private equity funds of varying structures including Thomas Properties (NASDAQ: TPGI), with consideration being given by Swiss RE. Liberty Property Trust, Corporate Office Property Trust, and Van City Enterprises (Canada) among others have adopted LEED standards for new buildings under development that they have an equity interest in. Hines and CalPERS initiated a \$120M private equity fund for LEED Core & Shell Buildings (Business Wire Sept. 27 2006).

Numerous financial institutions are building and/or certifying their own green buildings to reduce staff turnover, attract employees and increase productivity and brand value including PNC Bank, Bank of America, Goldman Sachs, JP Morgan, Citigroup, and HSBC. Conditions are ripe for greater green building investment to increase profits and reduce key risks associated with property ownership and operation.

Prerequisite – Rating Agency Experience With Consensus Standards

Voluntary consensus standards have regulated the building industry since 1898 ranging from tensile strength of steel to hardness of backfill, cement and concrete. The Rating Agencies have required consensus standards as a basis for differing treatment of building attributes in CMBS to reduce risk and uncertainty.

The leaders who developed the LEED standard also developed two ASTM consensus standards that are required components of CMBS ratings: Phase 1 Environmental Assessment, and at request of S&P, the Property Condition Assessment. Several years after the Phase 1 was approved, an investment banker and S&P developed Phase 1 qualified CMBS pools that were rated higher than conventional based on substantial risk reduction in avoiding loan defaults.

These leaders conducted the December 2005 *Green & ENERGY STAR Building Finance Summit* that evaluated the finance experience in green building debt and equity, concluding that green buildings are more valuable than conventional buildings based on the professional experiences of presenters, panel participants, and numerous case studies.

Consensus green building standards exist including LEED by the US Green Building Council, EPA's ENERGY STAR certification program, Green-e Renewable Power, *California Gold Sustainable Carpet*, and the SMART sustainable building products standards. The consensus EMERGENCY Zero Energy Building Standard is being jointly finalized by Market Transformation to Sustainability and the American Institute of Architects.

2. METHODOLOGY FOR ASSESSING RISK FACTORS (in priority order)

By ranking key factors within the building construction, investment, and ownership industry on a 1-10 scale, a macro-assessment of risk exposure can be quantitatively developed. Some 15 risk categories have been initially identified. The Green Building Value Rating Matrix (see Section 6) rates each of the following Risk Factors:

- 1. Aggregated dollar size of risk**
- 2. Historical data available and market experience**
- 3. Potential for increasing risk over time**
- 4. Reduced liability and litigation risk including transaction costs**
- 5. Insurance risk from no or diminished coverage**
- 6. Obsolescence Risk / Higher valued collateral**

For example, higher valued collateral is important since:

- CMBS AAA buyers receive higher quality assets in underlying pool
- Given higher quality assets, buyers bid higher leading to spread reductions
- BB buyers (1st loss) have less risk due to higher collateral value
- Spread reductions can lead to lower overall lending costs upon loan origination thereby providing either higher profits to the originator, or borrower lending incentives and/or rate reductions for green building construction and renovation.

3.0 VALUE CATEGORIES RATED

Critical value/risk elements addressed by green real estate design and construction are grouped in the following 15 categories below. Categories reducing certain risks are in black and those increasing other risks are in red. Qualitative and quantitative value/risk assessment is provided with each category rated qualitatively as either **VERY HIGH, HIGH, MEDIUM, MODERATE** or **LOW**. Following these categories is an overall quantitative assessment of value/risk attributed to these green building features.

1. Mold Prevention

Lower incidence of non-budgeted uninsured operating expenses and corresponding lower default risk from reduced mold and indoor air problems.

Default potential from mold liability risk is very substantial. Moreover, mold and IAQ cleanup and associated liabilities and damages are uninsurable. Average claims for mold are \$450,000 for first party cleanup and \$1.7M for third party liability per incidence and \$29 billion estimated national liability for first party cleanup alone with an additional \$109 billion in estimated third party liability, assuming conservatively that 10% of the building stock is infected. Examples of mold liability include:

- \$40M for Hilton Hotel in Oahu, HI
- \$37M for Polk County, FL Courthouse remediation
- \$26M for Santa Clara County, CA Courthouse remediation
- \$1M for South Carolina Governor's mansion (\$5m renovation just completed)
- \$49.3M bond approved by Austin voters for mold removal and preventive maintenance in 91 school buildings
- \$1M Maryville, TN school mold removal
- \$5-15M for newly constructed Ritz Carlton Hotel, Washington, DC including resulting toxic tort litigation (estimated for entire renovation due to mold)

Due to claims and liability, insurers have excluded mold from coverage. Best professional estimates are that mold is in 10% of existing and 4% of new buildings. See Moisture Management Market Opportunities Situation Analysis (Chelsea Group Sept. 2005). Mold occurs wherever there is water, leaks or excessive moisture. LEED EB provisions substantially reduce the risk. Due to claims and liability, insurers have excluded mold from coverage, and other IAQ claims are preempted by absolute pollution exclusions in policies (Italiano & Partners, P.C. & Environmental Assurance Group data 2005).

Average Mold Claim Amounts and Percent Buildings Infected

(from Environmental Assurance Group data (2005) assuming conservatively, \$4.50/SF for first party cleanup on average)

Assumptions

\$21.50 / SF per claim (first and third party)

10% of US commercial building stock infected with mold

64,500,000,000 US commercial floor space

6,450,000,000 SF commercial floor space infected

100,000 SF average building size per claim

64,500 potential claims x \$2,150,000 per claim = \$138,675,000,000 estimated US liability

Commercial Building Market Size. DOE Office of Energy Efficiency (Buildings Energy Databook 2004):

Value of new commercial building construction in US (2002): \$251 billion (2.7% of US GDP)

<http://buildingsdatabook.eren.doe.gov/docs/bed2004.pdf>

Total commercial floorspace 64.5×10^9 (2000)

Total buildings 4.6×10^6 (1995)

New commercial construction & renovation: 7.2 billion SF from 2000 to 2005

The following LEED-EB credits are the most effective for dealing with mold because they are based on a continual maintenance system. A single point-in-time mold prevention activity such as the Phase 1 or engineering Property Condition report requirements are less effective in addressing this risk.

- LEED Existing Building Standard O&M and IAQ Management credits for buildings systems management programs, monitoring including humidity, and maintenance & repair including water leaks, LEED EB Credits EA 3.1, 3.2 & 3.3.
- See also EPA Indoor Air Quality (IAQ) Green Buildings, *EPA Green Indoor Environments Program* (2006).

Risk Reduced / Value Added: VERY HIGH

2. COMMISSIONING PREREQUISITE, REDUCED MAINTENANCE, LOWER REPLACEMENT RESERVES

Total building commissioning is an independent, systematic quality assurance process ensuring a building performs in accordance with the written design intent thereby increasing the likelihood that a building will meet design expectations. The benefits of commissioning include reduced operating and maintenance costs, improved energy efficiency, better indoor air quality, and complete operating documents and warrantee information.

Historically, commissioning has been resisted due to higher up front costs during the development phase; the cost/benefit over the building life cycle is favorable with typical investment payback less than five years. Numerous sources show higher collateral from well designed and commissioned high performance buildings with superior NOI (RICS Green Building Study 2005, Green Building Finance Summit Briefing Book 2005, Green Building Market Summary, McGraw Hill 2005).

Commissioning is an important LEED prerequisite on the path to lowering ongoing operating costs and risk. Just as the Property Condition Assessment Standard ensures that building failures will be identified and corrected thus lowering risk, commissioning goes further by requiring that buildings are built and operate as designed. The experience from commissioning has corrected a surprising number of material failures stemming from construction errors (USGBC Congressional Briefing 2004).

The commissioning prerequisite within LEED results in a significantly better construction product along with proper documentation on operations and maintenance as well as staff systems training. Given extensive documentation and training coupled with advanced automated systems, green buildings experience lower default risk from reduced operation costs, maintenance inefficiencies, and lower incidence of equipment replacement (Pa. Green Building Maintenance Manual 2003; Johnson Controls & National Geographic Case Study 2005).

Risk Reduced / Value Added: HIGH

3. REDUCED ENERGY USE, COSTS AND CONVENTIONAL ENERGY PRICE VOLATILITY

LEED rewards buildings that achieve reduced energy consumption. Lower default risk results from lower energy costs below market peer group and/or BOMA average due to lower initial operating costs as well as reduced exposure to future energy cost volatility (Sustainability Report, Evolution Partners 2006). On average LEED projects reduce energy by 35% (LEED Point Breakdown 2005). EPA ENERGY STAR Buildings show a 44% energy use reduction over US commercial office buildings (*An Evaluation of America's First ENERGY STAR Buildings*, EPA 2000). As a measure of market progress, prior to LEED, a

lesser but significant savings occurred as shown by a 10% net dollar savings from energy efficiency for the total investment from 300 Johnson Controls energy efficient buildings (Leonardo Academy 2001).

A review of historical and projected energy costs shows this to be a substantial factor that could increasingly affect default risk from actual validated data from energy investment bankers (Simmons & Co., Draft Consensus Zero Energy Building Standard:

http://mts.sustainableproducts.com/Zero_Energy).

To realize value from energy use reduction, it is important to specify minimum LEED Energy Efficiency Credits since green buildings can be certified to the LEED standard without obtaining sufficient energy credits within LEED. For example, a newly constructed northeast high rise office achieved LEED certification yet did not pursue advanced energy points and therefore did not significantly reduce operating costs (M. Butkiewicz, 2006). The same experience occurred for a midwest high rise LEED certified office building (Chicago Green Building Council 2006). This situation is easily addressed by specifying minimum energy performance such as 60% optimized energy performance credit EA 1 and/or achieving the similar EPA ENERGY STAR rating. ENERGY STAR Credits are part of LEED EB.

It is important to recognize as context that many real estate and general business market participants expect energy costs to continue to rise. This is due in part to increasing awareness and concern about global warming, likely resulting action at the political/regulatory level, and associated impacts on utilities/producers of energy (greater hurdles to building new generation, impacts of monetizing carbon emissions via cap-and-trade schemes, etc). All of these may be traced back to growing perceptions of the public that are likely to influence politics, the regulatory climate, standards for new plants, etc. These perceptions may affect energy prices via the sentiments of energy traders as powerfully as underlying physical supply and demand fundamentals. To the extent these concerns reach or have reached a tipping point, the likely result will be higher energy costs going forward.

Another general observation and caveat is that energy costs vary widely by geography. Thus in evaluating a particular CMBS asset the value of energy efficiency measures and systems may be worth more or less depending on the context of the specific marketplace.

Who will bear the exposure to higher energy costs and what is the impact on building and mortgage performance? It may largely depend on the product type.

Landlord / Borrower exposures to rising energy costs: Office, hospitality, multifamily and industrial (that is not net-metered) are the primary product types where the landlord (borrower) generally bears direct exposure to operating cost increases. Sometimes this can be passed through to the tenant subject to market conditions and lease provisions (e.g. expense stops/base years). If not, in the short run the borrower absorbs these costs thereby eroding effective NOI, and the loan DSCR and quality erodes accordingly (as does the property value). Such an erosion may not be severe in the short run but over time, (particularly in situations where the landlord is unable to rework its lease structure), the cumulative impact could well put today's typical 80% LTV loan underwater. Conventional (inefficient) buildings with these lease characteristics may therefore face significant default implications.

Net leased property (retail, apartments, and office/industrial that is net leased) is a different case. Here the landlord is insulated to some degree by lease provisions allowing pass through of operating cost increases. However this may be limited by the specific expense recovery provisions negotiated, and/or by market conditions. In a soft leasing market the landlord may be forced to give tenant concessions on recovery of such expenses even when the lease provides for full recovery. This is because the alternative, declaring the tenant in default of the lease, is a fairly extreme remedy that can result in substantial tenant turnover expenses (downtime, TI's, LC's etc).

Tenant exposures to rising energy costs: Tenant exposure to rising energy costs depends on the type of business, tenant usage and plug loads, and its overall energy intensity. For a typical service business, real estate costs may comprise a relatively small portion (10-15%) of the total business overhead. Of this, approximately 60% is rent with the remaining 40% associated with real estate operating costs; roughly 30% of the operating cost figure reflects energy-related costs. Given these relationships, a doubling of utility costs might erode the operating margin of the “typical” service business by a little less than 2%. While that is not a life-threatening amount for a deep-pocketed institutional tenant, it could be of much greater significance for a:

- Small business owner on the edge of profitability
- Businesses that are more energy intensive in nature such as many tenants of industrial projects
- Any business in a recessionary economy where rising energy costs magnify the impact on stressed operating margins, thereby raising the potential for tenant default

The end result is influenced by the market and alternatives for tenants, particularly in markets where significant green/high performance building development has occurred where tenants can choose from more efficient alternatives. In these areas, conventional, inefficient and older buildings can be expected to experience lower effective rents, higher vacancies, and greater tenant turnover. The result will be to improve the relative performance of green buildings and the loan performance of these buildings in such markets, while at the same time contributing to greater loan defaults for conventional buildings. However in markets where such green building alternatives do not exist, on the margin there may still be more tenant failures given increased operating costs leading to increased risk of CMBS pools collateralized by conventional loans.

A final note on the LEED Energy/Atmosphere category – while up to ten (10) LEED points can be earned by “optimizing energy performance,” several of the potential points relate to features whose benefits may be more social vs. site specific such as renewable energy, ozone depletion, green power, etc. It is likely that few tenants in the for-profit sector will have interest in paying for these attributes in the form of higher rent – but may confer a marketing advantage to the building all else being equal. This scenario will change if conventional energy costs keep rising and green power costs fall.

Risk Reduced / Value Added: VERY HIGH

4. GREEN POWER AND RENEWABLE ENERGY

Green power costs are becoming more competitive when compared to rapidly rising conventional energy costs. Buildings that implement green power techniques provide a hedge against energy inflation and volatility. Projects that implement onsite green power can reduce operating costs over time, some with payback periods on the initial renewable energy investment approximating five years. Green power reduces energy price shock risk since renewable energy systems can produce energy at a stable price for decades (Zero Energy Building Standard© Sept. 2006).

Risk Reduced / Value Added: MEDIUM

5. INDOOR AIR QUALITY (IAQ), TENANT COMFORT & HEALTH

Projects that achieve IAQ credits under LEED have substantially lower risk of facing remediation and liability since investigating and remediating tenant IAQ concerns can result in significant unbudgeted monetary and time costs, business interruption liability, generally liability, and resultant damages. Poor IAQ can also result in lost tenants and the asset receiving a tainted market reputation. (Syracuse University IAQ Research 2005).

Green building designs that result in enhanced daylight, better IAQ, the use of low VOC carpet / paint / other materials, and implement advanced forms of individual temperature control are all tenant physical comfort and health issues. These features can lead to faster lease-up and the achievement of top tier rents as observed in the market. A positive statistical correlation was shown between employee sick leave and indoor air quality (Risk of Sick Leave, Indoor Air, Dc. 2000). The Surgeon General estimates that green buildings could provide \$75B savings in annual health care costs nationally (White House Sustainable Building Summit 2006).

Risk Reduced / Value Added: HIGH

6. LOCATION VALUE (E.G. LEED TRANSIT CREDIT)

Some 62% of LEED projects are on mass transit providing good location value for CBD sites (LEED Points Breakdown 2005). Long term studies document the added appraised value, higher lease up rates, and higher rents, and concomitant higher density development for CBD property near mass transit rail stops (e.g., *From the Ground Up*, L. Mumford 1956, *Handbook of Commercial Real Estate Finance*, MBA 1995, at 202). As an example, property value premiums near transit stops range from 20-53% higher in San Francisco, Santa Clara County, Washington, DC, Boston, New York and Dallas among other cities (*Rail's Effect on Taxable property Valuations*, U. of N. Texas, Center for Econ. Develop. 2003, On Common Ground: Realtors & SMART Growth National Association of Realtors, 2003, Cockerill,, *How Will the Centerline Affect Property Values in Orange County: Methodological Approaches*, Cal. State U., Fullerton 2002). *"The trick for real estate developers has always been identifying the hot transit system. Today, highways are out; urban transit systems are in (Ten Principles for Successful Development Around Transit, ULI 2003).*

Whether the LEED Sustainable Site Credit correlates to greater tenant receptivity and satisfaction, and thus translates to better economic performance over time, is dependent on product type and even then remains situational. For example, a CBD office project with good access to public transportation is viewed as a favorable or even necessary attribute. For suburban office and most types of retail, tenants generally insist on abundant parking (which is also embedded into zoning codes), and alternative forms of transport can be viewed as neutral or worse, particularly if they increase the cost basis reducing the project's competitiveness. Industrial sites generally thrive on low-cost land and proximity to freeways; alternative forms of transportation are in most cases not relevant.

As it pertains to non-CBD projects, if public policy measures are undertaken to reduce automobile dependence / increase public transit ridership these above-described dynamics will change. Whether the price and time-cost economics of higher gas prices and increased traffic congestion alone can drive such a shift is unclear. Therefore, it may be tenuous to draw direct correlation between the LEED Sustainable Sites credit and a non-CBD project's ability to attract and retain tenants over time; assets such as these should be underwritten on a case-by-case basis. For further discussion of the pros and cons of transit oriented, urban infill, mixed use development see Urban Land Institute *"High Density Development: Myth & Fact"*, (2005).

Risk Reduced / Value Added: MODERATE

7. REDUCED CLIMATE RISK

Impacts of climate change are being felt around the globe. Large numbers of governments, companies, foundations, and financial institutions are implementing measures to address these issues including recent legislation by California to introduce carbon caps and form a partnership with other like-minded states. In addition, the insurance market is implementing various forms of risk reduction focused on climate risk including Fireman's Fund's (FFIC) 5% discount for LEED certified buildings, and Nationwide's and Farmers Insurance's 10% policy discount for hybrid vehicles. Furthermore, FFIC rebuilds all buildings after a loss to LEED certified (FFIC Greenbuild 2006 presentation, Fortune Magazine Aug. 2006).

The UK projects climate change damages in 5-10 years to be 3.5% of global GDP or more than a trillion dollars based on expected rising global temperatures (*Special Report on Climate Change*, The Economist Sept. 2006). Thus green buildings will likely become more attractive investments over time as damages rise and pressure increases to take stronger mitigating actions.

Investment instruments reducing these risks will have much greater value since they will be less subject to economic harm from increased costs stemming from upstream and downstream regulatory, liability and energy price volatility risks. Green buildings do the most to reduce these impacts since buildings consume roughly 70% of electricity generated in the US of which half is generated primarily from coal-fired generation plants. Coal-generated electricity causes approximately 50% of climate change pollution. (AIA 2030 Imperative 2006).

The US Conference of Mayors adopted the American Institute of Architects directive to reduce energy use in buildings by 50% in four years, 60% by 2015, and become carbon neutral by 2030. European Mayors adopted the same directive. As a result, numerous cities are preparing financial incentives for green building investment. The Conference of Mayors' adoption of this policy has influenced energy policy. For example, Dallas, Houston and 14 other Texas cities said they will sue the State of Texas if it permits 16 planned new coal fired power plants that would emit 117 million tons of carbon dioxide/yr which would be more than the individual emissions of 33 states and 177 countries. Texas is already number one in greenhouse gas emissions of all states and seventh globally (Houston Chronicle Sept. 1, 2006).

California's recent climate change legislation will likely increase utility bills to end users and a number of States have sued electric utilities over climate change which could have a similar impact. This regulatory trend should continue given California's recent climate change suit against auto manufacturers; such nuisance lawsuits filed by the Attorneys General are how regulation of air, water and hazardous waste pollution started in the US as reflected in the liability schemes of US and State statutes based on longstanding common law precedent.

Risk Reduced / Value Added: VERY HIGH

8. IMPROVED PRODUCTIVITY / INCREASED RENTS

Tenants are attracted to green buildings due to productivity benefits which are a top criterion for a well run company. Study after study shows higher productivity for tenants occupying green buildings. At the asset level, this leads to green buildings attracting well-run companies and achieving top-of-market rents compared to market peers (Battery Park City, Finance Summit Briefing Book 2005, Green Building Market Summary, McGraw Hill 2005).

Increased productivity has been reported through numerous extensive case studies (Heschong Mahone 2004, UC Berkeley Center For Built Environment 2005), and 73% of owners and AEC firms in an extensive industry representative sample of 400,000 professionals report that they engage in green building to lower operating costs and increase productivity (McGraw Hill Green Building Market Summary

2005). PNC's reduced staff turnover from its LEED Silver Operating Center caused in large part its policy decision to make all of its buildings LEED certified (PNC/MTS Meeting 2004). USGBC's peer reviewed *Greening the Building & the Bottom Line (1995)* showed 6-16% productivity increases and reduced absenteeism from six green buildings. In a before and after productivity study on Herman Miller's Greenhouse office / light assembly building conducted by Battelle, DOE and USGBC, a 30% increase in productivity was identified between the former Class A building to the new Super Class A green building (Herman Miller 1993).

Intangible firm value represents approximately 40% of share value (*Enhancing Brand Value Through Corporate Social Responsibility*, Lippencott Mercer 2006). Intangible components of green buildings include cleaner air and more daylight which humans respond to positively since we depend on them as biological creatures.

Tenant Credit Quality: From a CMBS perspective, tenant credit quality is often a paramount concern in evaluating loan default, especially where there are lease concentrations and/or the property is located in a soft market. For this reason, green building's ability to attract top-tier tenants is a significant benefit to the underlying collateral value of a green CMBS. Further, government tenants are often found in green buildings due to various federal, state and municipal legislative mandates which results in high-credit tenants and longer lease terms. However, such tenants may be associated with other concerns – for instance some of these users can be hard on space resulting in major retrofit costs at lease expiration. Depending on the agency, market and location, they may also be viewed as undesirable co-tenants. Tenant credit quality tends to be situational; in general it appears green buildings attract higher quality tenants than the general market due to government and leading private company preference.

Risk Reduced / Value Added: MEDIUM

9. COMPETITIVE MARKET ADVANTAGES:

Green buildings achieve a great deal of market interest and resultant leasing traffic which generally results in faster lease up relative to market peers. Due to the superior indoor environments based on high IAQ, lower energy costs, and advanced daylighting techniques among others, green buildings face lower re-lease risk and associated expenses due to higher tenant retention (Gerding Edlin Brewery Blocks LEED Building, Finance Summit 2005, Solaire –Battery Park City LEED Building, Summit Briefing Book, *Green Building Market Summary*, McGraw Hill 2005).

Risk Reduced / Value Added: LOW to MODERATE

10. OPERATING COSTS BELOW BOMA AVERAGE

Certified green buildings' performance lowers exposure to increasingly rising operating costs, particularly energy use, water use, insurance, trash removal (due to mandatory recycling) landscaping, and repair/maintenance requirements resulting in lower default risk. Due to the increasing value of lower operating costs within green buildings, property owners are structuring green building leases as Full Service leases so operating cost advantages accrue to the building owners and investors. (LEED Existing Building Standard O&M & IAQ Management credits for buildings systems management programs, monitoring including humidity, and maintenance & repair including for water leaks; See also EPA IAQ Green Buildings, *EPA Green Indoor Environments Program* 2006).

Risk Reduced / Value Added: HIGH

11. ADDED GREEN BUILDING FIRST COST

Certified green buildings can be built at the same cost as conventional buildings through the use of competitive bidding and Integrated Design techniques that effectively capture cost/benefit tradeoffs. As example, the NMV Bank Building in Amsterdam is an excellent green building that was built at no added cost (Rocky Mountain Institute Case Study 1991) and the Oregon Health and Science building in Portland is slated to achieve LEED Gold status at no additional cost (River Campus Building One, Interface Engineering 2006).

Davis Langdon's point by point analysis of LEED credits in 600 buildings in 19 States concluded that there is a less than a 2% average premium to achieve LEED Silver and it was determined there was no statistically significant cost difference between a LEED certified building and a conventional building (Costing Green, A Comprehensive Cost Data Base Budgeting Methodology 2004).

Moreover, integrative design addresses inefficiencies within the linear design and construction process by bringing together key decision makers in design, construction and maintenance upfront on design and material decisions that positively affect ongoing operations, maintenance, and leasing costs. Integrated design costs tend to run higher upfront with the offsetting benefit of lowering substantially larger construction costs, change orders, and ongoing operations costs. (See *Draft Standard Guide for Integrative Design for Sustainable Buildings & Communities*© - Sept. 2006).

For certified green buildings, added first cost is a temporary market phenomenon due to rapid green building growth and limited material supplies. This market phenomenon with explosive technologies is usually relatively short-lived due to increasing education and market efficiencies.

Added Risk / Reduced Value: MODERATE

12. CERTIFICATION TIME AND COST

A challenge for the growth of the green building industry has been the time, cost and associated documentation necessary for LEED certification. Several new market-based tools were recently introduced to address these issues including Johnson Control's *Leedspeed* (www.LeedSpeed.com) which provides efficiencies in analyzing green building LEED points through an online submittal program. In addition, USGBC and Adobe implemented \$7 million in technology improvements to the LEED application process thereby enabling online certification and streamlining the certification process.

These are typical challenges of a new and rapidly accelerating market, and are expected to substantially decrease over time which is similar to the costs and efficiency experience for implementing the Phase 1 Site Assessment where the average cost dropped from \$50,000 to \$450 per assessment. To date, a number of consultants have been charging a premium for LEED documentation due to high market demand for their services, with Forest City's intended LEED Certified Westin Hotel as a notable example (personal communication with R. Ratner, Forest City 2004).

Added Risk / Reduced Value: MODERATE

13. AVAILABILITY OF QUALIFIED PROFESSIONALS TO BUILD/MAINTAIN GREEN BLDGS

There are now in excess of 40,000 LEED accredited professionals in the United States with major growth seen in the 2005/2006 time period. Green building awareness by US design professionals has rapidly grown so that almost every medium and major building design firm has a green building practice. Green building investment growth will strain this pool over the short term.

Added Risk / Reduced Value: HIGH

14. BARRIERS TO CERTIFICATION – PROCESS FLAWS

Certification of green buildings has not yet been delegated to design professionals as was intended within USGBC's original launch of LEED; certification is currently managed by several USGBC contractors. In order to satisfy high market demand, certification must be delegated to existing licensed design professionals who stamp and seal architectural drawings and plans followed by a independent third party certification audit. Without these process streamlines, there will be an inability to process any increased market demand for certified green buildings. The market demand for green buildings can be extended to include millions of buildings only by substantially delegating certification which will address current certification bottlenecks and bring down certification costs.

Added Risk / Reduced Value: VERY HIGH

15. MARKET RESISTANCE TO CHANGE

This occurs with any new product or process that changes an industry and challenges the status quo.

Added Risk / Reduced Value: LOW

16. INACCESSIBILITY TO CERTIFICATION

4.0 RISK FACTORS DEFINED

Dollar Size of Risk

This relates to the total dollar amount of risk, either positive or negative, for each risk category.

Example – Reduced Energy Use, Conventional Energy Costs & Price Volatility

Over the last several years energy costs have continued to rise due to increased energy demand, supply interruptions, and global depletion issues. Therefore, reduced conventional energy use is valuable to the building stock as tenants strive to reduce total occupancy costs, insulate from price volatility, and savings ultimately flow to bottom line NOI. Therefore, green buildings substantially reduce the total dollar size of the risk attributed to energy use and was scored an 8 on this factor.

Increased Risk Over Time

This relates to whether the risk category evaluated either reduces or increases over time.

Example – Lower Default Risk From Lower Operating Costs

Green buildings have lower operating cost profiles due to the mandatory commissioning process, lower energy cost profiles, and ongoing repairs and maintenance. This is significant over time given the cumulative effect of this savings. Lower operating costs result in higher NOI and more capital available to pay debt service as the loan seasons. Therefore, green buildings will maintain a stronger financial profile over time and substantially reduce the probability of loan default; this factor was scored a 7.

Liability Risk

This relates to the asset-specific risk of liability either increased or decreased and include associated transaction costs including attorney and professional fees.

Example – Improved IAQ/Health

Tenants and occupants in environments with superior IAQ will experience decreased exposure to contaminants and toxins. This results in fewer complaints, requests for reimbursement, and lawsuits for damages. Therefore, green buildings reduce liability as well as fees for attorneys and associated professionals, and the need to engage the owner's insurance carrier.

Increased Risk From No or Diminished Insurance Coverage

This addresses the ability or lack thereof to secure insurance for a particular risk category. This is not applicable to all categories but, for the where it does apply, is a material and significant risk.

Example – Mold Prevention

Currently, insurance carriers have eliminated prospective claims for mold. As a result, building owners are fully exposed to potential damages and face the difficulty of trying to litigate to recover expenses based on past insurance policies that may have been applicable to the claim. Green buildings substantially reduce the potential for mold through specific provisions that check for, monitor and seek to eliminate added or excess moisture which is necessary for mold to exist. Therefore, green building owners are less exposed to this uninsured risk.

Obsolescence Risk Over Time

This relates to an asset's market position as well as building features that the market values over time.

Example – Improved Productivity and Increased Rents

Tenants seeking to maximize their financial and operational profile are selecting green buildings due to increased employee satisfaction, enhanced ability to attract talented staff, and reduced turnover. Green buildings have measured improvements in indoor environmental quality, location, and overall occupancy cost efficiency that positively impact their market attractiveness. Green buildings reduce obsolescence risk as they command higher rents and greater tenant demand thus maintaining a higher rent profile as well as lower occupancy costs over a longer period of time.

5.0 ADJUSTMENT BASED ON QUALITY OF AVAILABLE DATA

The Value Rating Matrix applies an adjustment based on the estimated confidence in the amount and quality of data available for applying the Risk Factors to each Risk Category. This confidence level adjustment ranges from 50% to 95% and is applied to the sum of the Risk Factors to derive the Adjusted Total Score.

6.0 Green Building Value Rating Matrix

10 = greatest risk reduction -10 = greatest increased risk

Risk Categories	Risk Factors						Adjusted Total Score
	Dollar Size of Risk	Increased Risk Over Time	Liability Risk	Insurance Risk From No or Diminished Coverage	Obsolescence Risk / Higher Valued Collateral	Adjustment Based on Quality of Available Data	
Reduced Energy Use, Costs & Price Volatility	8	10	1	NA*	8	95 % confidence	26
Mold Prevention	10	4	6	10	7	70 %	26
Reduced Climate Risk	2	10	1	7	4	95 %	23
Commissioning & Reduced Maintenance & Reserves	6	7	5	1	5	90 %	22
Improved IAQ / Health	8	4	8	8	5	60 %	20
Lower Default Risk from Lower Operating Costs	6	7	1	NA*	4	95 %	17
Improved Productivity & Increased Rents	10	5	NA*	NA*	7	60 %	13
Green Power	3	10	4	NA*	3	60 %	12
Increased Location Value	4	3	NA*	NA*	6	60 %	8
Competitive Market Advantages	4	2	NA*	NA*	4	60 %	6
Barriers to Certification (Process Flaws)	-8	-9	-5	-2	-5	95 %	-28
Certification Time & Cost	-2	-2	-5	-2	NA	95 %	-10
Availability of Qualified Green Building Professionals	-3	-2	-1	-1	-4	95 %	-10
Added First Costs – Green Building Premium	-3	-2	-1	NA*	-3	80 %	-7
Market Resistance to Change	0	3	-1	-1	-1	80 %	-2
CUMULATIVE SCORE	+45	+50	+13	+20	+40	79 % Average Data Confidence	
Adjusted Net Score – Green Building Risk Reduction							+116

* Not Applicable at this time, however many market factors exist where this could change in the future.

7.0 SCORE SIGNIFICANCE

For reducing CMBS risk to investors, green buildings have an overall positive score. The scores depicted in this report are subject to best professional judgment based on:

- Data from reports prepared for and conclusions of 2005 Green & ENERGY STAR Building Finance Summit
- Over 10 years of US Green Building Council data, studies and experience
- Five years of MTS economic data, studies and experience
- Substantial industry case studies and data (in addition to specific Risk Factor and other citations other; see Appendix 1 – Bibliography)

The Adjusted Net Score of Lower Risk from Green Buildings is +116.

Here is what this score indicates:

- **The relatively high positive score confirms the value of certified green buildings based on a wide variety of risk/value measures.** This is due to the greater number of positive versus negative risk categories for green buildings.
- **Most of the negative value risk is not attributed to real estate related financial measures, but instead to green building growth pains. This negative risk continues to diminish over time thus continuing to increase the value inherent to green buildings within the real estate industry.**
- **The increased financial risk over time substantially grows when a positive green building risk factor like commissioning is not performed.** Similarly, the increased risk over time diminishes for all but one negative green building risk category such as “Added First Cost”. See Section 4 for specific details.
- **As data continues to be released into the market, the confidence intervals on the positive factors are trending upwards thereby furthering the value inherent to green buildings.**
- **Based on current industry experience, there is a significant potential for added value beyond the current scores identified in this Rating System.**

8.0 DATA QUALITY / QUANTITY

As discussed with a large cross section of real estate industry professionals including appraisers, finance experts, leasing agents, investment bankers, consultants and members of the design/construction industries, it has been concluded that there are significant barriers to obtaining specific data on a longitudinal scale to derive an exact measure of each risk category. Some of these limitations include time, costs, disparity of data points, system noise, and the need / lack of interest in obtaining more data. Future attempts to get additional data, market comparables, and/or conduct statistical evaluations will likely serve to only increase confidence levels within the model.

Historical precedent is such that Standard and Poor's decided that this level of effort was not needed for:

1. The implementation of its initial risk rating system and subsequent criteria for the securitization of commercial mortgages in the early 1990s which were used to help launch the commercial MBS industry (see S&P's CMBS Property Evaluation Criteria 2004).
2. Providing higher ratings for properties that successfully passed the Phase 1 Site Assessment criteria, or
3. Implementing the requirement of the Property Condition Assessment Standard for all CMBS assets.

In sum, there is a high likelihood that additional knowledge gained from such a data gathering and analysis effort would not materially change the above results. Importantly, substantial green building investment is proceeding on the basis of current data available and extensive industry experience to date.

Average data confidence within the Rating System is estimated at approximately 77 percent. The adjusted total scores when taking into account current data quality reduce the numerical score assigned based on the individual confidence level for each of the 15 identified Risk Categories in Section 4 of the *Green Building Industry Value Rating System*.

Appendices

Appendix 1:	Bibliography
Appendix 2:	USGBC Growth & Trend Slides
Appendix 3:	LEED Point Totals
Appendix 4:	Green CMBS Value Chain
Appendix 5:	Historical & Projected Energy Costs

GREEN BUILDING RESEARCH PAPERS

Royal Institute of Chartered Surveyors (2005): Green Building Study / Green Value Report

Athena Institute (2005): Business Case For Green Building In Canada

Cushman and Wakefield LePage (2005): Green Value Study

Urban Land Institute (2005): Green Office Buildings (textbook)

NAIOP (2006): Developing Green – Strategies For Success (textbook)

The Appraisal Journal (1998/1999): Evidence of Rational Market Valuations for Home Energy Efficiency

11th European Real Estate Society Conference (2004): Incorporating Sustainability in Commercial Property Appraisal – Evidence From the UK

Sustainable Property Appraisal Project – UK (2004): Incorporating Sustainability in Commercial Property Appraisal: Evidence From the UK

Sustainable Property Appraisal Project – UK (2003): Integrating Sustainability into the Appraisal of Property Worth: Identifying Appropriate Indicators of Sustainability

Sustainable Property Appraisal Project – UK (2002): Sustainability Indicators for Commercial Property Occupiers and Investors

State of California (2003): The Costs and Financial Benefits of Green Buildings: A Report of California's Sustainable Building Task Force

EPA Energy Star (2002): Building Performance Defined: ENERGY STAR National Energy Performance Rating System

Building Design and Construction (2004): Progress Report on Sustainability

Rocky Mountain Institute (2001): Greening the Building and the Bottom Line: Increasing Productivity Through Energy-Efficient Design

Turner Construction (2005/2006): Turner Construction Green Building Survey

McGraw Hill (2005): Green Building Smart Market Report

Rocky Mountain Institute (2001): Doing Well by Doing Good: The Benefits of Green Development

Davis Langdon (2004): Costing Green: A Comprehensive Cost Database and Budgeting Methodology

United States Government Services Agency: GSA LEED™ Cost Study

American Institute of Architects (2006): AIA Position Paper - Sustainable Development

Grist / Joel Makower (2006): The Benefits of Water Savings - Case Studies

World Business Council For Sustainable Development (2004): Water Facts and Trends

American Chemistry Council (2003): Analyzing the Cost of Obtaining LEED Certification

Building Design and Construction (2003): White Paper on Sustainability

Urban Land Institute (2004): Sustainable Development and Green Building Benefits of Integrated Design - Infrastructure Savings

Appendix 1

BIBLIOGRAPHY

2006 VERSION

GREEN BUILDING CASE STUDIES

US Department of Energy (2005/06): High Performance Buildings Database

National Real Estate Investor: Opus East to Develop LEED Silver Building for NOAA

NAREIT Magazine: Economic Impact of Green Buildings

AIA COTE (2006): 2006 Green Building Awards

Interface Engineering: Oregon Health and Science University LEED Gold Design

Economist (2005): The Rise of the Green Building

The New Yorker: Hearst Headquarters in NYC

New York Times: High Rises With Low Environmental Impact (One Bryant Park)

Globe Street: Sustainability is Good Business

New York Times: Hearst and 7 WTC Buildings Certified Green

PR Web: Chicago's Hyde Park Art Museum's Green Roof

Brookings Institution: "Who Lives Downtown"

National Geographic: The Solaire High Rise

CFO Magazine (2004): Greener Buildings, 'Greener' Bottom Line

Building Operating Management (2005): Assigning Value to Green Buildings

US Green Building Council Annual Conference: 2005 Leadership Awards

Johnson Controls (2004): National Geographic Facility Value Increases by \$24MM

AdvancedBuildings.org (2005): Green Building Case Studies

San Francisco Unveils First LEED Certified Hotel

Lennar Homes to Build Nation's Largest Solar Community

Case Study - Time Warner Center

Hines Set to Develop 12-Story 266,000 SF LEED Office Bldg in Irvine, CA

Canada's Green Building Gains Momentum

Green Building Update - 7 World Trade Center Inks 200,000SF Lease

Building Operating Management (2003): Green Economics

Top 10 Green Building Myths

EPA's 2005 National Awards for Smart Growth

Building Operating Management (2004): Green CMBS

WSJ: Koll/Prudential Announce National Roll Out For Green "Intellicenter" Design

Adobe Submits For LEED EB Platinum: \$1MM Investment and 1 Year Payback

Walgreens Implements Solar Energy on Nearly 100 Facilities

Green Star Office Interior Rating Tool Introduced in Australia

COMMISSIONING

National Conference on Building Commissioning (2003): Building Commissioning and Liability Minimization – Dodging the Lawsuit Bullet

HPAC Engineering (2005): The Cost Effectiveness of Commissioning – 224 Case Studies

National Conference on Building Commissioning (2001): Quantifying the Cost Benefits of Commissioning

HPAC Engineering (2002): The Role of Commissioning in LEED Certification

National Conference on Building Commissioning (2002): Communicating Scopes – Impacts on Commissioning Costs

Oregon Department of Energy (2006): Building Commissioning Savings

National Conference on Building Commissioning (2002): Commissioning LEED Buildings – What Owners Need to Know

Northwest Energy Efficiency Alliance (2006): LEED: Opportunities and Challenges for the Commissioning Industry

LACC Sustainable Conference (2005): LEED Commissioning

Portland Energy Conservation (2002): Establishing Commissioning Costs

HPAC Engineering (2006): Lessons Learned From Commissioning Green Buildings

New York State Energy Research Development Authority (2005): Twenty River Terrace

Energy Center of Wisconsin (2005): Thrivent Financial Bank

Energy and Power Management (2001): Understanding the Commissioning Process

National Conference on Building Commissioning (2006): LEED Commissioning of Innovative Systems: New Systems, Same Process

The Role of Commissioning in Daylight Harvesting for Energy Savings

FINANCE

Goldman Sachs Conference (2005): Top Ten Financial Risks to the Global Economy

Allianz Financial Group Report (2005): "Climate Change & The Financial Sector"

New York Times: Wall Street Develops Tools to Invest in Climate Change

CFO Magazine (2004): The Greening of GAAP

UNEP Finance Initiative CEO Briefing (2003): Materiality of Social, Environmental and Governance on Equity Pricing

UNEP Finance Initiative: Legal Framework for Integrating Environmental and Social Attributes in Investments

UNEP Finance Initiative: "Show Me The Money: Linking Environmental, Social and Governance Issues to Company Value"

Global Reporting Initiative (2005): G3 Sustainability Reporting Guidelines

World Resources Institute (2001): Stalking the Elusive Business Case For Corporate Sustainability

Carbon Disclosure Project: 2006 Report

CFO Magazine (2004): How Green Is My Company?

Climate Biz (2006): Green Finance: Wall Street Needs White House Leadership

McKinsey Quarterly: Mapping the Capital Markets

Business Week: Financial Service Leaders in Carbon Emission Reduction

New York Times (2005): Goldman Sachs Enacts Environmental Policy

WIRED Magazine (2006): Investors Bet on Global Warming

Strandberg Consulting (2005): The Future of Sustainability Finance

Goldman Sachs (2005): Energy, Environmental and Social Index

Forbes (2005): Profiting From Principled Investing

Fortune (2005): Global Accountability; Managing Beyond The Bottom Line

Dow Jones Sustainability Index (2005): 2005 Annual Review

Environmental Protection Agency / Innovest (2002): Energy Management and Investor Returns: The Real Estate Sector

Environmental Protection Agency / Innovest (2002): Energy Management and Investor Returns: The Retail Merchandising Sector

SustainAbility / Swiss RE (2006): The Changing Landscape of Liability - A Directors Guide to Trends in Corporate Environmental, Social, and Economic Liability

Katrina's Effect on CMBS

Financial Tool Places Valuation on Corporate Sustainability

Investment Analysts: Narrowly Focused on Financial Metrics in Buy/Sell Analysis

Investors Focus on Climate Change

PRODUCTIVITY

Carnegie Mellon eBIDS: Productivity and Health

Lawrence Berkeley National Laboratory: Health and Productivity IAQ Study

McKinsey Quarterly (2006): Measuring Performance and Productivity in Services Industry

Harvard Public Health Study: Sick Leave and Indoor Air Quality

Workforce Management (2005): The Cost of Turnover

Knowledge at Wharton (2006): Multiplier Effect – The Financial Consequences of Worker Absences

RICS QUT Research Week (2005): Productivity and the Knowledge Worker

Buildings.com: Lighting and its Link to Worker Productivity

Greenbiz (2006): Poll: 94% of Employees Prefer Energy Efficient and Environmental Workplaces

Lawrence Berkeley National Laboratory: Economizer System Cost Effectiveness: Accounting for the Influence of Ventilation Rate on Sick Leave

Daily Journal of Commerce (2006): Green Buildings and Productivity

Heschong, Mahone Group / PG&E Daylighting Initiative: Skylighting and Retail Sales: An Investigation into the Relationship Between Daylighting and Human Performance

Live Science: Carnegie Mellon's Intelligent Workplace

Workforce Management: The Coming Knowledge Drain

FacilitiesNet (2005): Can Buildings Boost Productivity?

McKinsey Quarterly (2006): The Link Between Management and Productivity

Workforce Management (2006): Worried About Indoor Air Quality or Ergonomics?

ASHRE Journal: How Indoor Air Quality Affects Health / Productivity

MSNBC: Carnegie Mellon Intelligent Workplace Center

Fast Company (2004): Employees Have More Input in Space Design

Innovative Design (2004): Analysis of Performance of Students in a Daylit School.

Kansas City Business Journal (2005): Office Environment Can Improve Facility Efficiency, Employee Productivity

Workforce Management (2005): Sears Turns Office Space Into Recruiting Tool

Washington Lawyer (2005): The Business of Law

INDOOR AIR QUALITY

Holland and Knight (2003): The Costs of Mold / Insurance Exclusions

Syracuse University Magazine (2005): Indoor Air Quality Research

US EPA (2000): Tenants Want Good IAQ But Are Not Yet Negotiating For It (BOMA Survey Results)

National Center for Energy Management and Building Technologies (2005): Moisture Management Market Opportunities and Situation Analysis

Center For Disease Control (2006): Environmental Hazards and Health Effects – Mold

US EPA (2006): Indoor Environmental Air Quality Index

National Center for Energy Management and Building Technologies (2005): Moisture Management Market Opportunities and Situation Analysis

Environmental Energy and Health Institute (2006): Buildings and Health

Occupational Safety and Health Administration (2006): Indoor Air Quality Technical Manual (Section III, Chapter 2)

National Center for Energy Management and Building Technologies (2006): Program on Filtration and Air Cleaning

CLIMATE CHANGE

Lloyds of London (2006): 360 Risk Project

Chief Risk Officers Briefing (2006): Emerging Risk Initiative – Position Paper

Columbia Journal of Environmental Law (2006): Climate Change Litigation Could Affect Companies' Market Value

James Hansen NASA (2005): Keeling Presentation

Harvard Center for Medicine: Health and Global Environment Report

The Guardian – UK (2006): History of the Climate Change Debate

CERES (2006): Corporate Governance and Climate Change – Making the Connection

BBC Op Ed (2006): Britain's Climate Ambassador Appeals to Stop Climate Change 'Whatever the Costs'

Brookings Institution (2006): Case Closed: The Debate About Global Warming

The Stern Review UK (2006): Economics of Climate Change

Reuters (2006): Major Cities Join Forces to Fight Global Warming

New York Times (2006): Global Warming Scientist Speaks Out at Misuse of Research by Global Warming Skeptics

MIT Technology Review (2005/06): Science of Energy and the Global Climate

BBC Report (2006): Climate Warming Underestimated; Risk Higher

Time Magazine Cover Story (2006): Global Warming: Be Worried

Washington Post (2006): Greenland Scientists Publish Global Warming Studies

CBS 60 Minutes (2006): Rewriting the Science of Climate Change

Economist (2006): The Debate Over Global Warming is Getting Rancorous

Economist (1997): Global Warming Report

New Yorker Magazine (2006): German Space Satellite Data – Antarctica Ice Disappearing

NASA: Greenland Ice Breaking Up at Twice the Rate as 5 Years Ago

New York Times (2006): Leading NASA Climate Scientist Says Administration Silenced Him

Business Week: The Race Against Climate Change

The New Yorker: Global Warming

Economist: United Nations Climate Change Conference in Montreal

Economist: Ocean Currents Changing

Economist: News on Climate Change

Climate Change Scientist Angry at Misuse of His Research by Global Warming Skeptics

Antarctic Ice Sheet in Significant Decline

Key argument against global warming evaporates

Britain Releases Global Warming Report - Risks May Be Greater Than Previously Thought

ENERGY COSTS / TRENDS

Knowledge at Wharton (2006): Experts Dissect Real Estate and Energy Industries

National Real Estate Investor (2006): How Rising Oil Prices Affect Real Estate

New York Times (2002): Geothermal Interest Spurred by Cost Savings

National Commission on Energy Policy (2006): Ending the Energy Stalemate - A Bipartisan Strategy to Meet America's Energy Challenges

National Defense Magazine (2006): Fuel Cell Technology Positioned as Viable Alternative to Generators

New York Times: Doubts Raised on Saudi Vow for More Oil

EPA (2006): National Action Plan for Energy Efficiency (led by Duke Energy CEO)

Business Week (2006): Impact of Demand-Driven \$100 Oil

National Geographic (2005): The High Cost of Cheap Coal

Reuters: New Emissions Standards Could Shut 500 Coal Plants

Economist (2006): Sunrise on Renewable Energy

Minnesota Star Tribune: US Racing the Clock to Find Alternative Fuels

USA Today: Has Oil Production Peaked?

USA Today: Staying Warm to Cost 90% More

Washington Post: Heating Costs Rising For Winter '05

CBSNews.com (2005): Winter Heating Costs To Soar

New York Times (2005): Winter heating bills looming large

US Department of Energy (2005): 2005 Energy Price Outlook

US Department of Energy (2005/06): Coal Spot Prices

MSNBC Technology: Crude Awakening

Houston Chronicle: Hurricane Katrina's aftermath only hints at what will happen when demand for crude outstrips supply

CNN Money: Oil: Is the end at hand?

Salon.com: Running on Empty

Wall Street Journal: Experts debate "Peak Oil"

Boston Globe OpEd: Peak Oil

BBC: 'Peak Oil' enters mainstream debate

Fox News: The Heat Is On - Peak Oil

MSNBC: Can Saudi Arabia meet its oil promises?

Sunday Herald (UK): Bush's energy adviser forecasts the global economy misjudged oil supply

Washington Post: Saudi Oil Supplies Interview Transcript

National Geographic (2005): The End of Cheap Oil

Canada - The problem of peak oil

Green Power Purchase Programs and Financial Incentives Offer More Options For Alternative Energy

"Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy"

"An Energy Tsunami Ahead"

"Depletion and Peak Oil - Serious Issue or Over Exaggerated Fear"

SoCal Edison and Stirling Energy announce plans for a 4,500 acre solar generation station

INTERVIEW: Financial Sense Online

California Adopts \$2.9 Billion Solar Power Plan

ONLINE BOOK - Winning the Oil End Game

California Regulators Unveil Solar Power Plan

High Oil Prices Push Up Building Supply Prices

California Leads Nation in Energy Initiatives

Clean Energy Trends 2006

Wisconsin Law to Require 10% Renewable Energy

Oil Prices and Global Warming Issues Fuel Renewable Energy Investments and Initiatives

CARBON EMISSIONS

(RELATES TO FUTURE ENERGY COST INCREASE POTENTIAL THROUGH CAP/TRADE INITIATIVES AND/OR REDUCTIONS)

ClimateBiz Backgrounder (2006): Carbon Offsets

CNN: Britain and California Prepare Pact for CO2 Trading

Forbes: Trading Emissions Sees "Significant Price Tension" for Carbon Credits Starting in 2008

Carbon Disclosure Project (2006): Second Edition Report

Carbon Disclosure Project (2006): Background and Information

BBC (2006): American Corporations Prepare for Post-Bush Administration Environmental Realities

McKinsey Quarterly (2004): Preparing For a Low-Carbon Future

Knowledge at Wharton (2005): Market-Based Pollution Solutions

Business Week (2006): Cinergy Answers Burning Questions

Business Week (2006): Business Gets Serious About Emissions

American Association of Architects (2006): Calls For 50% Reduction in Fossil Fuel Usage

Reuters (2006): US Companies Preparing For Greenhouse Gas Emissions Limits

Emissions Trading on European Stock Exchanges

US CO2 Policy: Change is Near

California Caps Greenhouse Gas Emissions

International Energy Agency Calls For Action on CO2 Emissions

Global Warming Treaty Update - CO2 Trading Progress

CO2 Trading On The Horizon

BUSINESS OPPORTUNITIES

Environmental Quality Management (2000): Creating Corporate Value and Environmental Benefit with Improved Energy Performance

International Herald Tribune (2006): Money To Be Made From Fossil Fuel Transition

Scientific American (2006): Energy Future Beyond Carbon

McKinsey Quarterly (2005): When Social Issues Become Strategic

Knowledge at Wharton (2005): Doing Well By Doing Good

Knowledge at Wharton (2004): Social Investing Is Big Business

McKinsey Quarterly (2005): 10 Trends to Watch in 2006

McKinsey Quarterly (2006): Environmental Risk Management

Economist (2006): The Greening of General Electric

McKinsey Quarterly (2006): What is the Business of Business? Melding of Business Strategy and Social Issues

Time Magazine: CEO Brief - Going Green

MSNBC: BP to double investment in greener energy

New York Times: More and More Big Businesses Embrace Environment

Hyundai Seeks Competitive Edge - Opens Environmental Technology Center

FedEx completes California's largest private corporation solar project

800 Top Wal Mart Executives / Suppliers - Inside Look at Environmental Strategy Session

2006 Global 100 Most Sustainable Companies

Top 10 "Green" Companies of the Year

Wal Mart Embraces Sustainability and Global Warming

GE Unveils "EcoImagination" and Commitment

GREEN BUILDING MARKET ACCEPTANCE

New York City (2006): Creates Office of Long Term Planning and Sustainability

DOE / EPA (2006): National Action Plan for Energy Efficiency

Federal Government (2006): Summit Unites Federal Agencies on Sustainability

Wall Street Journal (2006): 2006 Energy Act - New Green Incentives

Wall Street Journal (2006): Tax Incentives For Zero-Energy Homes

Great Lakes Governors (2005): Sign Water Treaty in Preemptive Protection Maneuver

City of Irvine (2005): Adopts Residential Green Building Guidelines

New York City Council: Passes Green Building Legislation

US GSA (2006): Recognized as a Top Green Power Purchaser

The New York Times Magazine (December 2005): Nature vs. Neon - Can Sustainable Design Save Money and the Environment? (Autodesk)

New York Times (2006): Green Building - It's Getting Easier To Be Green

New York Times Special Section (May 17, 2006): The Business of Green

CNN Money.com (2006): Green Goes Mainstream

Fortune Magazine (2006): USGBC Special Section

Environmental Business News (2005): Making the Case for Green Building

Metropolis Magazine (2004): Report Disputes Extra Cost of Building Green

Washington Post (2006): As Power Bills Soar, Companies Embrace Green Buildings

USA Today (2006): Building Green Reaches New Level

Newsweek – Cover Story (2006): Green America

NFL (2006): Super Bowl XL is NFL's Second Carbon Neutral Super Bowl

Business Week (2006): New Urbanism Thrives

Newsweek (International Edition): Green Building in China

Tampa Bay Business Journal: On a Mission For Greener Buildings

MSNBC (2006): America Gets Serious About Green Lifestyles

Economist (2005): The Greening of China

Torto Wheaton (2005): Class A in Name Only

UN Agency Launches Worldwide Green Construction Initiative

Company Profile: Durst Development Corporation

Connecticut Sees Growth in Green Building

APPENDIX I

BIBLIOGRAPHY

GREEN BUILDING CASE STUDIES

US Department of Energy (2005/06): High Performance Buildings Database

National Real Estate Investor: Opus East to Develop LEED Silver Building for NOAA

NAREIT Magazine: Economic Impact of Green Buildings

AIA COTE (2006): 2006 Green Building Awards

Interface Engineering: Oregon Health and Science University LEED Gold Design

Economist (2005): The Rise of the Green Building

The New Yorker: Hearst Headquarters in NYC

New York Times: High Rises With Low Environmental Impact (One Bryant Park)

Globe Street: Sustainability is Good Business

New York Times: Hearst and 7 WTC Buildings Certified Green

PR Web: Chicago's Hyde Park Art Museum's Green Roof

Brookings Institution: "Who Lives Downtown"

National Geographic: The Solaire High Rise

CFO Magazine (2004): Greener Buildings, 'Greener' Bottom Line

Building Operating Management (2005): Assigning Value to Green Buildings

US Green Building Council Annual Conference: 2005 Leadership Awards

Johnson Controls (2004): National Geographic Facility Value Increases by \$24MM

AdvancedBuildings.org (2005): Green Building Case Studies

San Francisco Unveils First LEED Certified Hotel

Lennar Homes to Build Nation's Largest Solar Community

Case Study - Time Warner Center

Hines Set to Develop 12-Story 266,000 SF LEED Office Bldg in Irvine, CA

Canada's Green Building Gains Momentum

Green Building Update - 7 World Trade Center Inks 200,000SF Lease

Building Operating Management (2003): Green Economics

Top 10 Green Building Myths

EPA's 2005 National Awards for Smart Growth

Building Operating Management (2004): Green CMBS

WSJ: Koll/Prudential Announce National Roll Out For Green "Intellicenter" Design

Adobe Submits For LEED EB Platinum: \$1MM Investment and 1 Year Payback

Walgreens Implements Solar Energy on Nearly 100 Facilities

Green Star Office Interior Rating Tool Introduced in Australia

APPENDIX I

GREEN BUILDING RESEARCH PAPERS

Royal Institute of Chartered Surveyors (2005): Green Building Study / Green Value Report

Athena Institute (2005): Business Case For Green Building In Canada

Cushman and Wakefield LePage (2005): Green Value Study

Urban Land Institute (2005): Green Office Buildings (textbook)

NAIOP (2006): Developing Green – Strategies For Success (textbook)

The Appraisal Journal (1998/1999): Evidence of Rational Market Valuations for Home Energy Efficiency

11th European Real Estate Society Conference (2004): Incorporating Sustainability in Commercial Property Appraisal – Evidence From the UK

Sustainable Property Appraisal Project – UK (2004): Incorporating Sustainability in Commercial Property Appraisal: Evidence From the UK

Sustainable Property Appraisal Project – UK (2003): Integrating Sustainability into the Appraisal of Property Worth: Identifying Appropriate Indicators of Sustainability

Sustainable Property Appraisal Project – UK (2002): Sustainability Indicators for Commercial Property Occupiers and Investors

State of California (2003): The Costs and Financial Benefits of Green Buildings: A Report of California's Sustainable Building Task Force

EPA Energy Star (2002): Building Performance Defined: ENERGY STAR National Energy Performance Rating System

Building Design and Construction (2004): Progress Report on Sustainability

Rocky Mountain Institute (2001): Greening the Building and the Bottom Line: Increasing Productivity Through Energy-Efficient Design

Turner Construction (2005/2006): Turner Construction Green Building Survey

McGraw Hill (2005): Green Building Smart Market Report

Rocky Mountain Institute (2001): Doing Well by Doing Good: The Benefits of Green Development

Davis Langdon (2004): Costing Green: A Comprehensive Cost Database and Budgeting Methodology

United States Government Services Agency: GSA LEED™ Cost Study

American Institute of Architects (2006): AIA Position Paper - Sustainable Development

Grist / Joel Makower (2006): The Benefits of Water Savings - Case Studies

World Business Council For Sustainable Development (2004): Water Facts and Trends

American Chemistry Council (2003): Analyzing the Cost of Obtaining LEED Certification

Building Design and Construction (2003): White Paper on Sustainability

Urban Land Institute (2004): Sustainable Development and Green Building Benefits of Integrated Design - Infrastructure Savings

APPENDIX I

COMMISSIONING

National Conference on Building Commissioning (2003): Building Commissioning and Liability Minimization – Dodging the Lawsuit Bullet

HPAC Engineering (2005): The Cost Effectiveness of Commissioning – 224 Case Studies

National Conference on Building Commissioning (2001): Quantifying the Cost Benefits of Commissioning

HPAC Engineering (2002): The Role of Commissioning in LEED Certification

National Conference on Building Commissioning (2002): Communicating Scopes – Impacts on Commissioning Costs

Oregon Department of Energy (2006): Building Commissioning Savings

National Conference on Building Commissioning (2002): Commissioning LEED Buildings – What Owners Need to Know

Northwest Energy Efficiency Alliance (2006): LEED: Opportunities and Challenges for the Commissioning Industry

LACC Sustainable Conference (2005): LEED Commissioning

Portland Energy Conservation (2002): Establishing Commissioning Costs

HPAC Engineering (2006): Lessons Learned From Commissioning Green Buildings

New York State Energy Research Development Authority (2005): Twenty River Terrace

Energy Center of Wisconsin (2005): Thrivent Financial Bank

Energy and Power Management (2001): Understanding the Commissioning Process

National Conference on Building Commissioning (2006): LEED Commissioning of Innovative Systems: New Systems, Same Process

The Role of Commissioning in Daylight Harvesting for Energy Savings

APPENDIX I

FINANCE

Goldman Sachs Conference (2005): Top Ten Financial Risks to the Global Economy

Allianz Financial Group Report (2005): "Climate Change & The Financial Sector"

New York Times: Wall Street Develops Tools to Invest in Climate Change

CFO Magazine (2004): The Greening of GAAP

UNEP Finance Initiative CEO Briefing (2003): Materiality of Social, Environmental and Governance on Equity Pricing

UNEP Finance Initiative: Legal Framework for Integrating Environmental and Social Attributes in Investments

UNEP Finance Initiative: "Show Me The Money: Linking Environmental, Social and Governance Issues to Company Value"

Global Reporting Initiative (2005): G3 Sustainability Reporting Guidelines

World Resources Institute (2001): Stalking the Elusive Business Case For Corporate Sustainability

Carbon Disclosure Project: 2006 Report

CFO Magazine (2004): How Green Is My Company?

Climate Biz (2006): Green Finance: Wall Street Needs White House Leadership

McKinsey Quarterly: Mapping the Capital Markets

Business Week: Financial Service Leaders in Carbon Emission Reduction

New York Times (2005): Goldman Sachs Enacts Environmental Policy

WIRED Magazine (2006): Investors Bet on Global Warming

Strandberg Consulting (2005): The Future of Sustainability Finance

Goldman Sachs (2005): Energy, Environmental and Social Index

Forbes (2005): Profiting From Principled Investing

Fortune (2005): Global Accountability; Managing Beyond The Bottom Line

Dow Jones Sustainability Index (2005): 2005 Annual Review

Environmental Protection Agency / Innovest (2002): Energy Management and Investor Returns: The Real Estate Sector

Environmental Protection Agency / Innovest (2002): Energy Management and Investor Returns: The Retail Merchandising Sector

SustainAbility / Swiss RE (2006): The Changing Landscape of Liability - A Directors Guide to Trends in Corporate Environmental, Social, and Economic Liability

Katrina's Effect on CMBS

Financial Tool Places Valuation on Corporate Sustainability

Investment Analysts: Narrowly Focused on Financial Metrics in Buy/Sell Analysis

Investors Focus on Climate Change

APPENDIX I

PRODUCTIVITY

Carnegie Mellon eBIDS: Productivity and Health

Lawrence Berkeley National Laboratory: Health and Productivity IAQ Study

McKinsey Quarterly (2006): Measuring Performance and Productivity in Services Industry

Harvard Public Health Study: Sick Leave and Indoor Air Quality

Workforce Management (2005): The Cost of Turnover

Knowledge at Wharton (2006): Multiplier Effect – The Financial Consequences of Worker Absences

RICS QUT Research Week (2005): Productivity and the Knowledge Worker

Buildings.com: Lighting and its Link to Worker Productivity

Greenbiz (2006): Poll: 94% of Employees Prefer Energy Efficient and Environmental Workplaces

Lawrence Berkeley National Laboratory: Economizer System Cost Effectiveness: Accounting for the Influence of Ventilation Rate on Sick Leave

Daily Journal of Commerce (2006): Green Buildings and Productivity

Heschong, Mahone Group / PG&E Daylighting Initiative: Skylighting and Retail Sales: An Investigation into the Relationship Between Daylighting and Human Performance

Live Science: Carnegie Mellon's Intelligent Workplace

Workforce Management: The Coming Knowledge Drain

FacilitiesNet (2005): Can Buildings Boost Productivity?

McKinsey Quarterly (2006): The Link Between Management and Productivity

Workforce Management (2006): Worried About Indoor Air Quality or Ergonomics?

ASHRE Journal: How Indoor Air Quality Affects Health / Productivity

MSNBC: Carnegie Mellon Intelligent Workplace Center

Fast Company (2004): Employees Have More Input in Space Design

Innovative Design (2004): Analysis of Performance of Students in a Daylit School.

Kansas City Business Journal (2005): Office Environment Can Improve Facility Efficiency, Employee Productivity

Workforce Management (2005): Sears Turns Office Space Into Recruiting Tool

Washington Lawyer (2005): The Business of Law

APPENDIX I

INDOOR AIR QUALITY

Holland and Knight (2003): The Costs of Mold / Insurance Exclusions

Syracuse University Magazine (2005): Indoor Air Quality Research

US EPA (2000): Tenants Want Good IAQ But Are Not Yet Negotiating For It (BOMA Survey Results)

National Center for Energy Management and Building Technologies (2005): Moisture Management Market Opportunities and Situation Analysis

Center For Disease Control (2006): Environmental Hazards and Health Effects – Mold

US EPA (2006): Indoor Environmental Air Quality Index

National Center for Energy Management and Building Technologies (2005): Moisture Management Market Opportunities and Situation Analysis

Environmental Energy and Health Institute (2006): Buildings and Health

Occupational Safety and Health Administration (2006): Indoor Air Quality Technical Manual (Section III, Chapter 2)

National Center for Energy Management and Building Technologies (2006): Program on Filtration and Air Cleaning

APPENDIX I

CLIMATE CHANGE

Lloyds of London (2006): 360 Risk Project

Chief Risk Officers Briefing (2006): Emerging Risk Initiative – Position Paper

Columbia Journal of Environmental Law (2006): Climate Change Litigation Could Affect Companies' Market Value

James Hansen NASA (2005): Keeling Presentation

Harvard Center for Medicine: Health and Global Environment Report

The Guardian – UK (2006): History of the Climate Change Debate

CERES (2006): Corporate Governance and Climate Change – Making the Connection

BBC Op Ed (2006): Britain's Climate Ambassador Appeals to Stop Climate Change 'Whatever the Costs'

Brookings Institution (2006): Case Closed: The Debate About Global Warming

The Stern Review UK (2006): Economics of Climate Change

Reuters (2006): Major Cities Join Forces to Fight Global Warming

New York Times (2006): Global Warming Scientist Speaks Out at Misuse of Research by Global Warming Skeptics

MIT Technology Review (2005/06): Science of Energy and the Global Climate

BBC Report (2006): Climate Warming Underestimated; Risk Higher

Time Magazine Cover Story (2006): Global Warming: Be Worried

Washington Post (2006): Greenland Scientists Publish Global Warming Studies

CBS 60 Minutes (2006): Rewriting the Science of Climate Change

Economist (2006): The Debate Over Global Warming is Getting Rancorous

Economist (1997): Global Warming Report

New Yorker Magazine (2006): German Space Satellite Data – Antarctica Ice Disappearing

NASA: Greenland Ice Breaking Up at Twice the Rate as 5 Years Ago

New York Times (2006): Leading NASA Climate Scientist Says Administration Silenced Him

Business Week: The Race Against Climate Change

The New Yorker: Global Warming

Economist: United Nations Climate Change Conference in Montreal

Economist: Ocean Currents Changing

Economist: News on Climate Change

Climate Change Scientist Angry at Misuse of His Research by Global Warming Skeptics

Antarctic Ice Sheet in Significant Decline

Key argument against global warming evaporates

Britain Releases Global Warming Report - Risks May Be Greater Than Previously Thought

APPENDIX I

ENERGY COSTS / TRENDS

Knowledge at Wharton (2006): Experts Dissect Real Estate and Energy Industries

National Real Estate Investor (2006): How Rising Oil Prices Affect Real Estate

New York Times (2002): Geothermal Interest Spurred by Cost Savings

National Commission on Energy Policy (2006): Ending the Energy Stalemate - A Bipartisan Strategy to Meet America's Energy Challenges

National Defense Magazine (2006): Fuel Cell Technology Positioned as Viable Alternative to Generators

New York Times: Doubts Raised on Saudi Vow for More Oil

EPA (2006): National Action Plan for Energy Efficiency (led by Duke Energy CEO)

Business Week (2006): Impact of Demand-Driven \$100 Oil

National Geographic (2005): The High Cost of Cheap Coal

Reuters: New Emissions Standards Could Shut 500 Coal Plants

Economist (2006): Sunrise on Renewable Energy

Minnesota Star Tribune: US Racing the Clock to Find Alternative Fuels

USA Today: Has Oil Production Peaked?

USA Today: Staying Warm to Cost 90% More

Washington Post: Heating Costs Rising For Winter '05

CBSNews.com (2005): Winter Heating Costs To Soar

New York Times (2005): Winter heating bills looming large

US Department of Energy (2005): 2005 Energy Price Outlook

US Department of Energy (2005/06): Coal Spot Prices

MSNBC Technology: Crude Awakening

Houston Chronicle: Hurricane Katrina's aftermath only hints at what will happen when demand for crude outstrips supply

CNN Money: Oil: Is the end at hand?

Salon.com: Running on Empty

Wall Street Journal: Experts debate "Peak Oil"

Boston Globe OpEd: Peak Oil

BBC: 'Peak Oil' enters mainstream debate

Fox News: The Heat Is On - Peak Oil

MSNBC: Can Saudi Arabia meet its oil promises?

Sunday Herald (UK): Bush's energy adviser forecasts the global economy misjudged oil supply

Washington Post: Saudi Oil Supplies Interview Transcript

National Geographic (2005): The End of Cheap Oil

Canada - The problem of peak oil

APPENDIX I

Green Power Purchase Programs and Financial Incentives Offer More Options For Alternative Energy

"Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy"

"An Energy Tsunami Ahead"

"Depletion and Peak Oil - Serious Issue or Over Exaggerated Fear"

SoCal Edison and Stirling Energy announce plans for a 4,500 acre solar generation station

INTERVIEW: Financial Sense Online

California Adopts \$2.9 Billion Solar Power Plan

ONLINE BOOK - Winning the Oil End Game

California Regulators Unveil Solar Power Plan

High Oil Prices Push Up Building Supply Prices

California Leads Nation in Energy Initiatives

Clean Energy Trends 2006

Wisconsin Law to Require 10% Renewable Energy

Oil Prices and Global Warming Issues Fuel Renewable Energy Investments and Initiatives

APPENDIX I

CARBON EMISSIONS

(RELATES TO FUTURE ENERGY COST INCREASE POTENTIAL THROUGH CAP/TRADE INITIATIVES AND/OR REDUCTIONS)

ClimateBiz Backgrounder (2006): Carbon Offsets

CNN: Britain and California Prepare Pact for CO₂ Trading

Forbes: Trading Emissions Sees "Significant Price Tension" for Carbon Credits Starting in 2008

Carbon Disclosure Project (2006): Second Edition Report

Carbon Disclosure Project (2006): Background and Information

BBC (2006): American Corporations Prepare for Post-Bush Administration Environmental Realities

McKinsey Quarterly (2004): Preparing For a Low-Carbon Future

Knowledge at Wharton (2005): Market-Based Pollution Solutions

Business Week (2006): Cinergy Answers Burning Questions

Business Week (2006): Business Gets Serious About Emissions

American Association of Architects (2006): Calls For 50% Reduction in Fossil Fuel Usage

Reuters (2006): US Companies Preparing For Greenhouse Gas Emissions Limits

Emissions Trading on European Stock Exchanges

US CO₂ Policy: Change is Near

California Caps Greenhouse Gas Emissions

International Energy Agency Calls For Action on CO₂ Emissions

Global Warming Treaty Update - CO₂ Trading Progress

CO₂ Trading On The Horizon

APPENDIX I

BUSINESS OPPORTUNITIES

Environmental Quality Management (2000): Creating Corporate Value and Environmental Benefit with Improved Energy Performance

International Herald Tribune (2006): Money To Be Made From Fossil Fuel Transition

Scientific American (2006): Energy Future Beyond Carbon

McKinsey Quarterly (2005): When Social Issues Become Strategic

Knowledge at Wharton (2005): Doing Well By Doing Good

Knowledge at Wharton (2004): Social Investing Is Big Business

McKinsey Quarterly (2005): 10 Trends to Watch in 2006

McKinsey Quarterly (2006): Environmental Risk Management

Economist (2006): The Greening of General Electric

McKinsey Quarterly (2006): What is the Business of Business? Melding of Business Strategy and Social Issues

Time Magazine: CEO Brief - Going Green

MSNBC: BP to double investment in greener energy

New York Times: More and More Big Businesses Embrace Environment

Hyundai Seeks Competitive Edge - Opens Environmental Technology Center

FedEx completes California's largest private corporation solar project

800 Top Wal Mart Executives / Suppliers - Inside Look at Environmental Strategy Session

2006 Global 100 Most Sustainable Companies

Top 10 "Green" Companies of the Year

Wal Mart Embraces Sustainability and Global Warming

GE Unveils "EcoImagination" and Commitment

APPENDIX I

GREEN BUILDING MARKET ACCEPTANCE

New York City (2006): Creates Office of Long Term Planning and Sustainability

DOE / EPA (2006): National Action Plan for Energy Efficiency

Federal Government (2006): Summit Unites Federal Agencies on Sustainability

Wall Street Journal (2006): 2006 Energy Act - New Green Incentives

Wall Street Journal (2006): Tax Incentives For Zero-Energy Homes

Great Lakes Governors (2005): Sign Water Treaty in Preemptive Protection Maneuver

City of Irvine (2005): Adopts Residential Green Building Guidelines

New York City Council: Passes Green Building Legislation

US GSA (2006): Recognized as a Top Green Power Purchaser

The New York Times Magazine (December 2005): Nature vs. Neon - Can Sustainable Design Save Money and the Environment? (Autodesk)

New York Times (2006): Green Building - It's Getting Easier To Be Green

New York Times Special Section (May 17, 2006): The Business of Green

CNN Money.com (2006): Green Goes Mainstream

Fortune Magazine (2006): USGBC Special Section

Environmental Business News (2005): Making the Case for Green Building

Metropolis Magazine (2004): Report Disputes Extra Cost of Building Green

Washington Post (2006): As Power Bills Soar, Companies Embrace Green Buildings

USA Today (2006): Building Green Reaches New Level

Newsweek – Cover Story (2006): Green America

NFL (2006): Super Bowl XL is NFL's Second Carbon Neutral Super Bowl

Business Week (2006): New Urbanism Thrives

Newsweek (International Edition): Green Building in China

Tampa Bay Business Journal: On a Mission For Greener Buildings

MSNBC (2006): America Gets Serious About Green Lifestyles

Economist (2005): The Greening of China

Torto Wheaton (2005): Class A in Name Only

UN Agency Launches Worldwide Green Construction Initiative

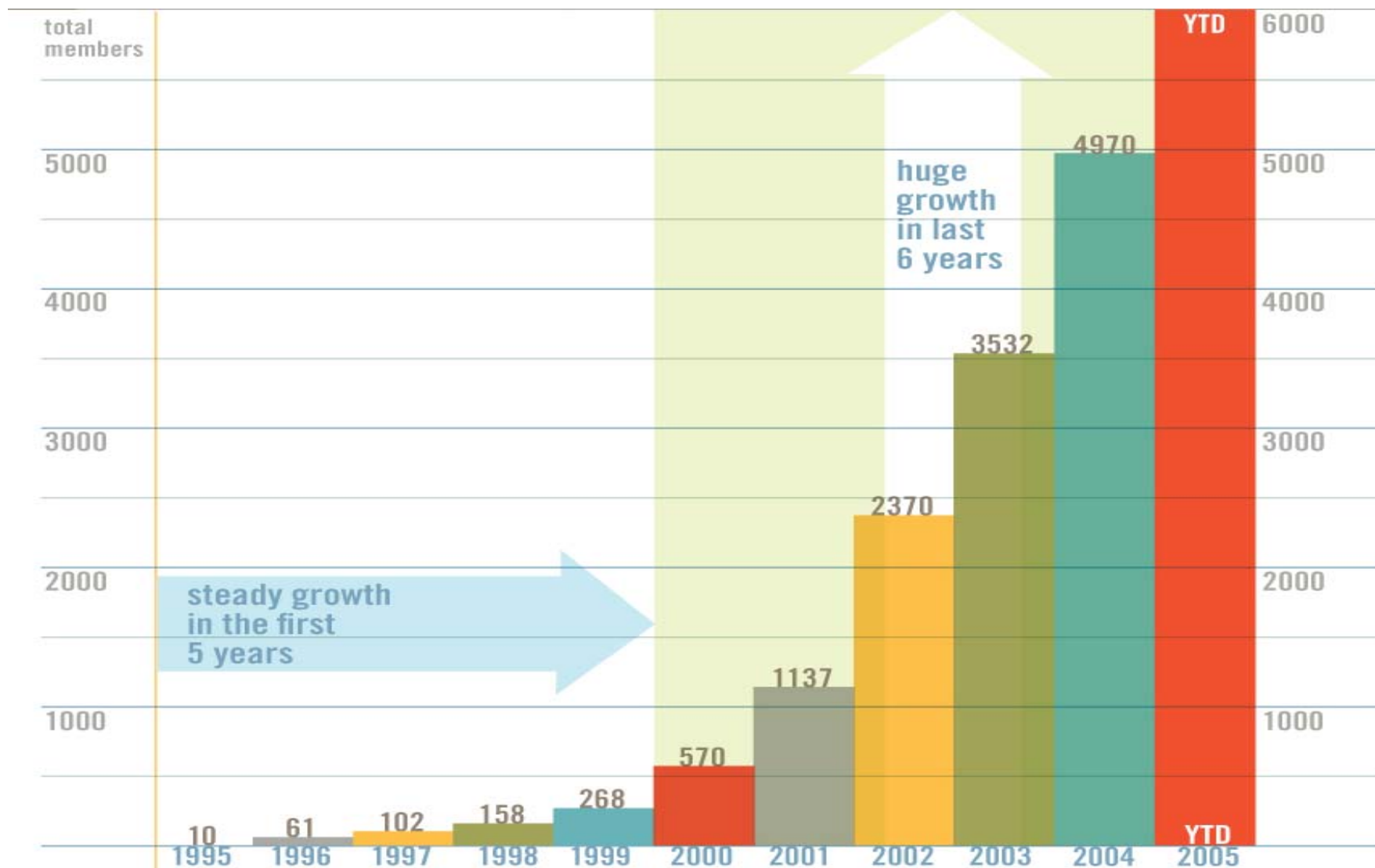
Company Profile: Durst Development Corporation

Connecticut Sees Growth in Green Building

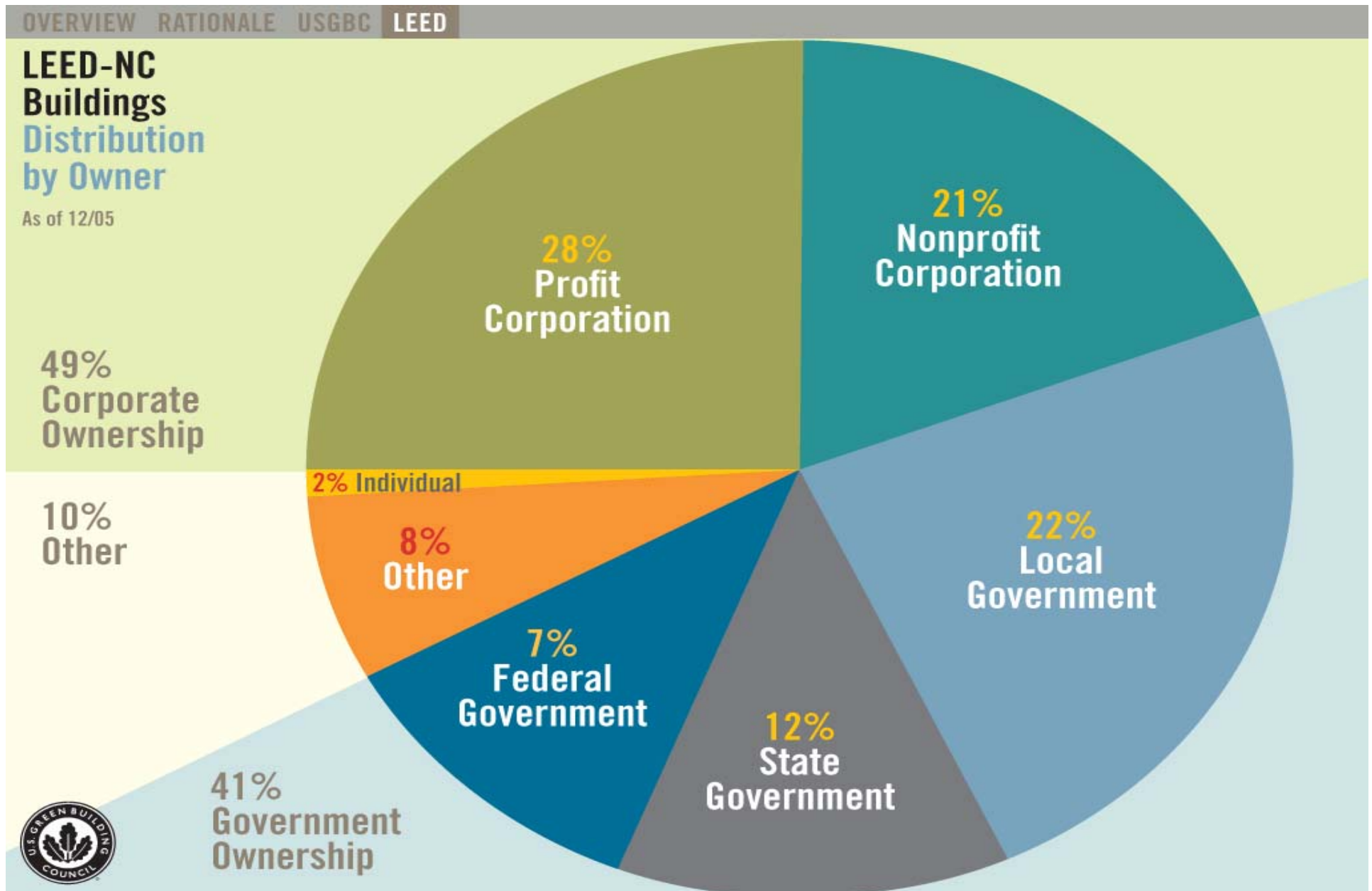
Appendix 2

Phenomenal USGBC Member Growth

*We Gave The Market What It Wanted:
consensus green building standard*



Who's Driving Growth? *Everyone*

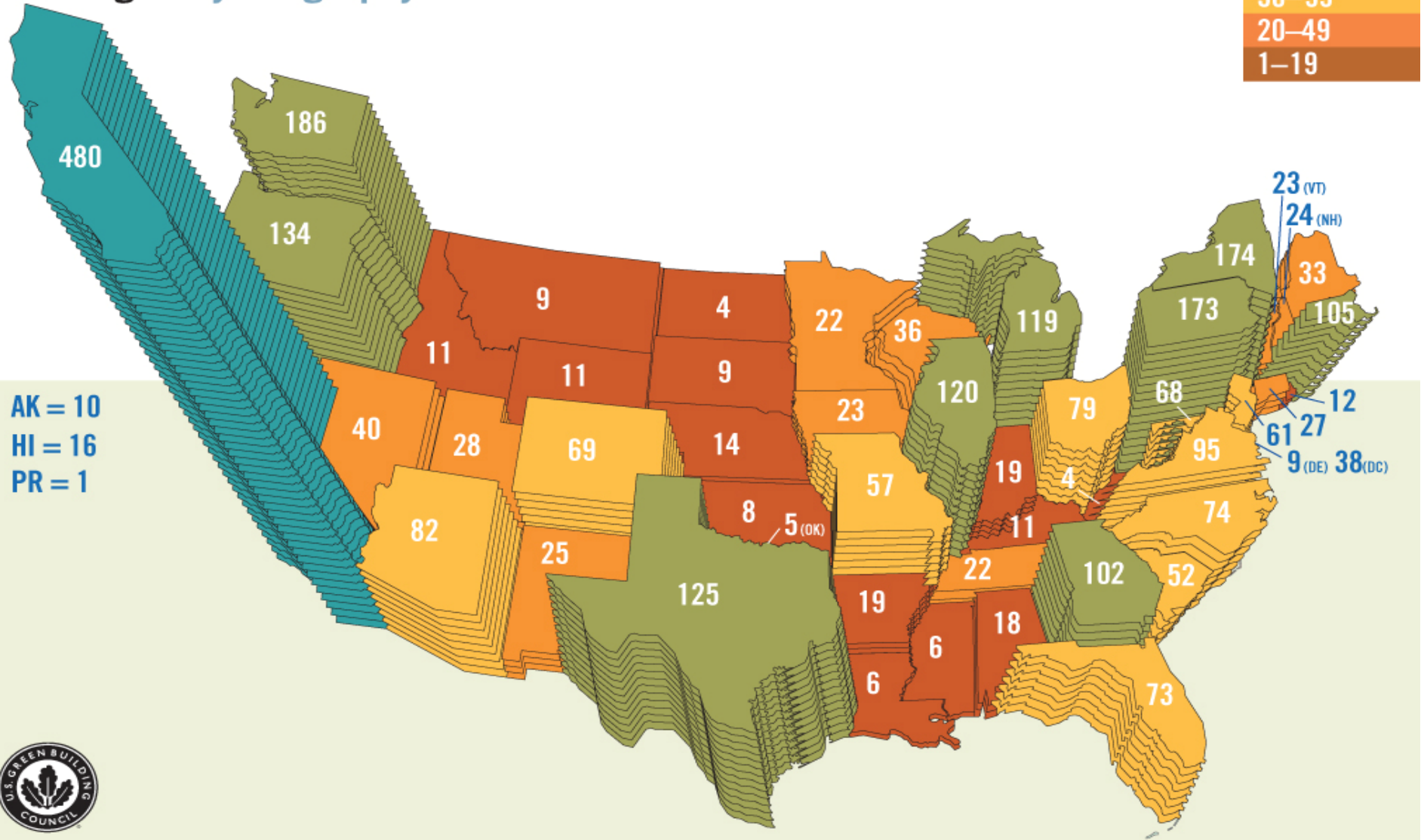


LEED Green Building US Distribution

LEED-NC
Buildings

Distribution
by Geography

As of 12/05



Appendix 3

LEED Points Breakdown - 100 Project Analysis

Sustainable Sites		Possible Pts	Size-Weighted Impact	Project-Weighted Impact
Prereq 1	Erosion & Sedimentation Control			
Credit 1	Site Selection		72%	85%
Credit 2	Urban Redevelopment		44%	16%
Credit 3	Brownfield Redevelopment		20%	11%
Credit 4.1	Alternative Transportation , Public Transportation Access		73%	62%
Credit 4.2	Alternative Transportation , Bicycle Storage & Changing Rooms		81%	90%
Credit 4.3	Alternative Transportation , Alternative Fuel Refueling Stations		37%	35%
Credit 4.4	Alternative Transportation , Parking Capacity		54%	65%
Credit 5.1	Reduced Site Disturbance , Protect or Restore Open Space		29%	35%
Credit 5.2	Reduced Site Disturbance , Development Footprint		48%	68%
Credit 6.1	Stormwater Management , Rate and Quantity		20%	37%
Credit 6.2	Stormwater Management , Treatment		39%	43%
Credit 7.1	Landscape & Ext Design to Reduce Heat Islands , Non-Roof		69%	62%
Credit 7.2	Landscape & Ext Design to Reduce Heat Islands , Roof		65%	57%
Credit 8	Light Pollution Reduction		43%	55%
Water Efficiency		Possible Points	By Size	By Project
Credit 1.1	Water Efficient Landscaping , Reduce by 50%		79%	90%
Credit 1.2	Water Efficient Landscaping , No Potable Use or No Irrigation		60%	70%
Credit 2	Innovative Wastewater Technologies		27%	23%
Credit 3.1	Water Use Reduction , 20% Reduction		61%	73%
Credit 3.2	Water Use Reduction , 30% Reduction		50%	56%
Energy & Atmosphere		Possible Points	By Size	By Project
Prereq 1	Fundamental Building Systems Commissioning			
Prereq 2	Minimum Energy Performance			
Prereq 3	CFC Reduction in HVAC&R Equipment			
Credit 1.1	Optimize Energy Performance , 20% New / 10% Existing		86%	82%
Credit 1.2	Optimize Energy Performance , 30% New / 20% Existing		67%	65%
Credit 1.3	Optimize Energy Performance , 40% New / 30% Existing		32%	35%
Credit 1.4	Optimize Energy Performance , 50% New / 40% Existing		13%	19%
Credit 1.5	Optimize Energy Performance , 60% New / 50% Existing		7%	10%
Credit 2.1	Renewable Energy , 5%		7%	13%
Credit 2.2	Renewable Energy , 10%		7%	11%
Credit 2.3	Renewable Energy , 20%		6%	10%
Credit 3	Additional Commissioning		79%	53%
Credit 4	Ozone Depletion		44%	47%
Credit 5	Measurement & Verification		31%	29%
Credit 6	Green Power		17%	29%

Materials & Resources		Possible Points	By Size	By Project
Prereq 1	Storage & Collection of Recyclables			
Credit 1.1	Building Reuse , Maintain 75% of Existing Shell		10%	14%
Credit 1.2	Building Reuse , Maintain 100% of Existing Shell		2%	5%
Credit 1.3	Building Reuse , Maintain 100% Shell & 50% Non-Shell		0%	1%
Credit 2.1	Construction Waste Management , Divert 50%		88%	86%
Credit 2.2	Construction Waste Management , Divert 75%		67%	61%
Credit 3.1	Resource Reuse , Specify 5%		4%	13%
Credit 3.2	Resource Reuse , Specify 10%		2%	5%
Credit 4.1	Recycled Content , Specify 25%		93%	90%
Credit 4.2	Recycled Content , Specify 50%		86%	75%
Credit 5.1	Local/Regional Materials , 20% Manufactured Locally		99%	99%
Credit 5.2	Local/Regional Materials , of 20% Above, 50% Harvested Locally		69%	60%
Credit 6	Rapidly Renewable Materials		2%	5%
Credit 7	Certified Wood		22%	28%

Indoor Environmental Quality		Possible Points	By Size	By Project
Prereq 1	Minimum IAQ Performance			
Prereq 2	Environmental Tobacco Smoke (ETS) Control			
Credit 1	Carbon Dioxide (CO₂) Monitoring		82%	65%
Credit 2	Increase Ventilation Effectiveness		36%	26%
Credit 3.1	Construction IAQ Management Plan , During Construction		67%	66%
Credit 3.2	Construction IAQ Management Plan , Before Occupancy		80%	68%
Credit 4.1	Low-Emitting Materials , Adhesives & Sealants		81%	82%
Credit 4.2	Low-Emitting Materials , Paints		80%	87%
Credit 4.3	Low-Emitting Materials , Carpet		92%	97%
Credit 4.4	Low-Emitting Materials , Composite Wood		61%	47%
Credit 5	Indoor Chemical & Pollutant Source Control		77%	67%
Credit 6.1	Controllability of Systems , Perimeter		10%	28%
Credit 6.2	Controllability of Systems , Non-Perimeter		22%	19%
Credit 7.1	Thermal Comfort , Comply with ASHRAE 55-1992		59%	65%
Credit 7.2	Thermal Comfort , Permanent Monitoring System		57%	55%
Credit 8.1	Daylight & Views , Daylight 75% of Spaces		32%	40%
Credit 8.2	Daylight & Views , Views for 90% of Spaces		60%	69%

Appendix 4



Green MBS Added Value

Buildings Owners / Developers

Achieve lower costs, higher asset value, more productive work environments & possibly a lower cost of capital via mortgage rate

Investment Bankers

Achieve value through profit & differentiation surrounding structure & distribution of Green MBS pool

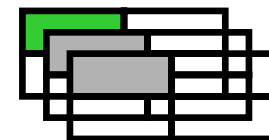
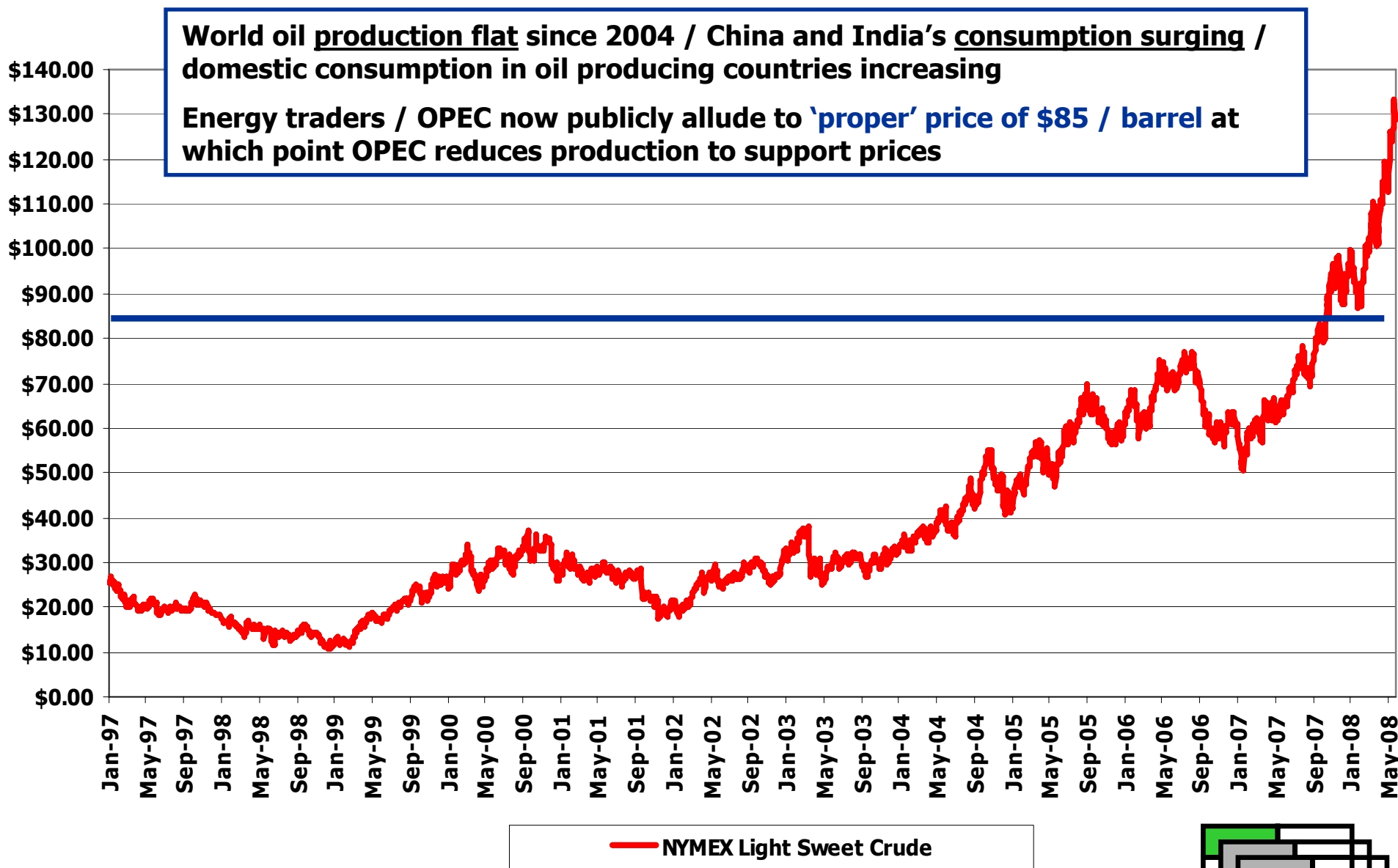
Ratings Agencies

Reduce risks of Green MBS pool and receive commission

Investors

Purchase Green MBS backed by assets that are worth more, viewed as less risky, & more closely aligned with investor goals of purchasing sustainable assets

Crude Oil – Actual (Jan 1997 thru May 26, 2008)



Saudi Oil Fields – Production Estimates

Four super giant fields have anchored Saudi Arabia's Oil Supply

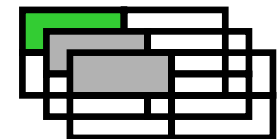
		MMB/D	
	Discovery	Peak Production	Current (Estimate)
Ghawar	1948	5.8	4.5
Abqaiq	1946	1.2	0.5
Berri	1964	0.8	0.4
Safaniyah	1951	1.6	0.6

Three giant fields have supplied most of the balance:

Zuluf	1965	0.8	0.5
Shaybah	1967	0.5	0.5
Marjan	1966	0.3	0.2

"84 million barrels a day times 365 days is 30 billion barrels of oil a year that we're depleting. All of the world's [oil] industry doesn't even come close to replacing 30 billion barrels of oil. We don't spend enough money to even give ourselves a chance to replace 30 billion barrels. It may be because the prospects are not there. I rather imagine that's what the answer is to that."

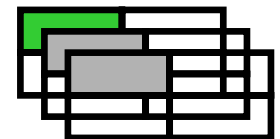
- T. Boone Pickens



Fundamental Issues

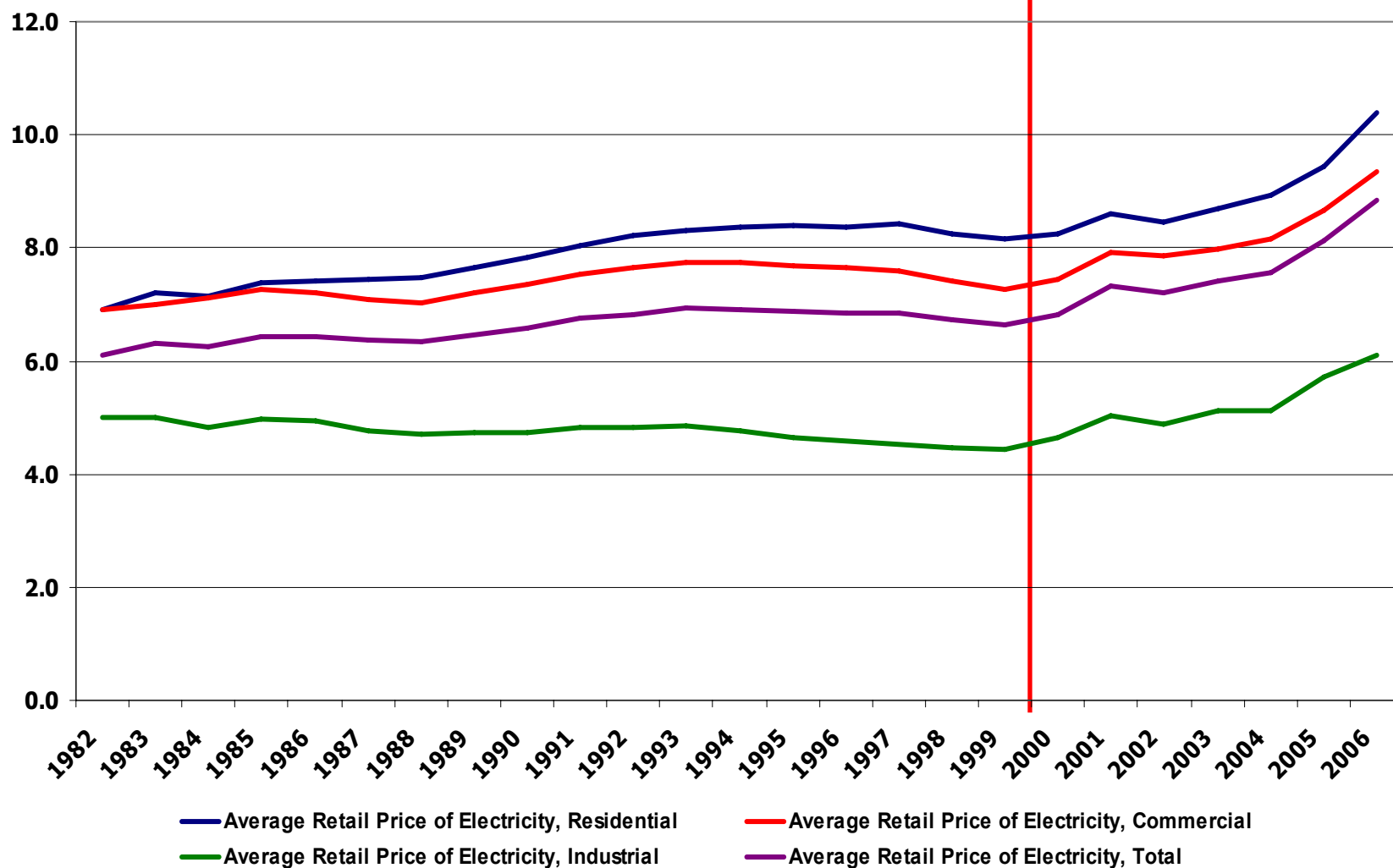
- **Fossil fuel energy formed over 500 million years of geologic time**
 - The world currently burns 8 million geologic years of oil every year
- **US consumes 102 quintillion joules (exajoules) of commercial energy annually**
 - Petroleum 39%
 - Natural Gas 24%
 - Coal 23%
 - Nuclear 8%
 - Renewable 6% **NOTE: Mostly hydroelectric and biomass – wind/solar <2%**
- **US consumption of crude oil and natural gas has grown 100x since 1900**
 - Crude era began in late 1930's
 - Crucial in WWII
- **US Geologic Survey World Petroleum Estimate 2000 estimates:**
 - 50/50 odds that earth holds 2.4 Trillion barrels of oil
 - World has consumed ~900 Billion barrels
 - Remaining oil = 1.5 Trillion barrels
 - World burns 30 Billion barrels per year
 - 37 years remaining assuming 1.9% annual consumption growth

BOTTOM LINE – These dynamics cannot be sustained

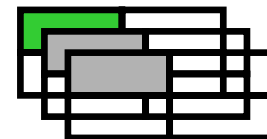


Electricity Prices (1982 – 2006)

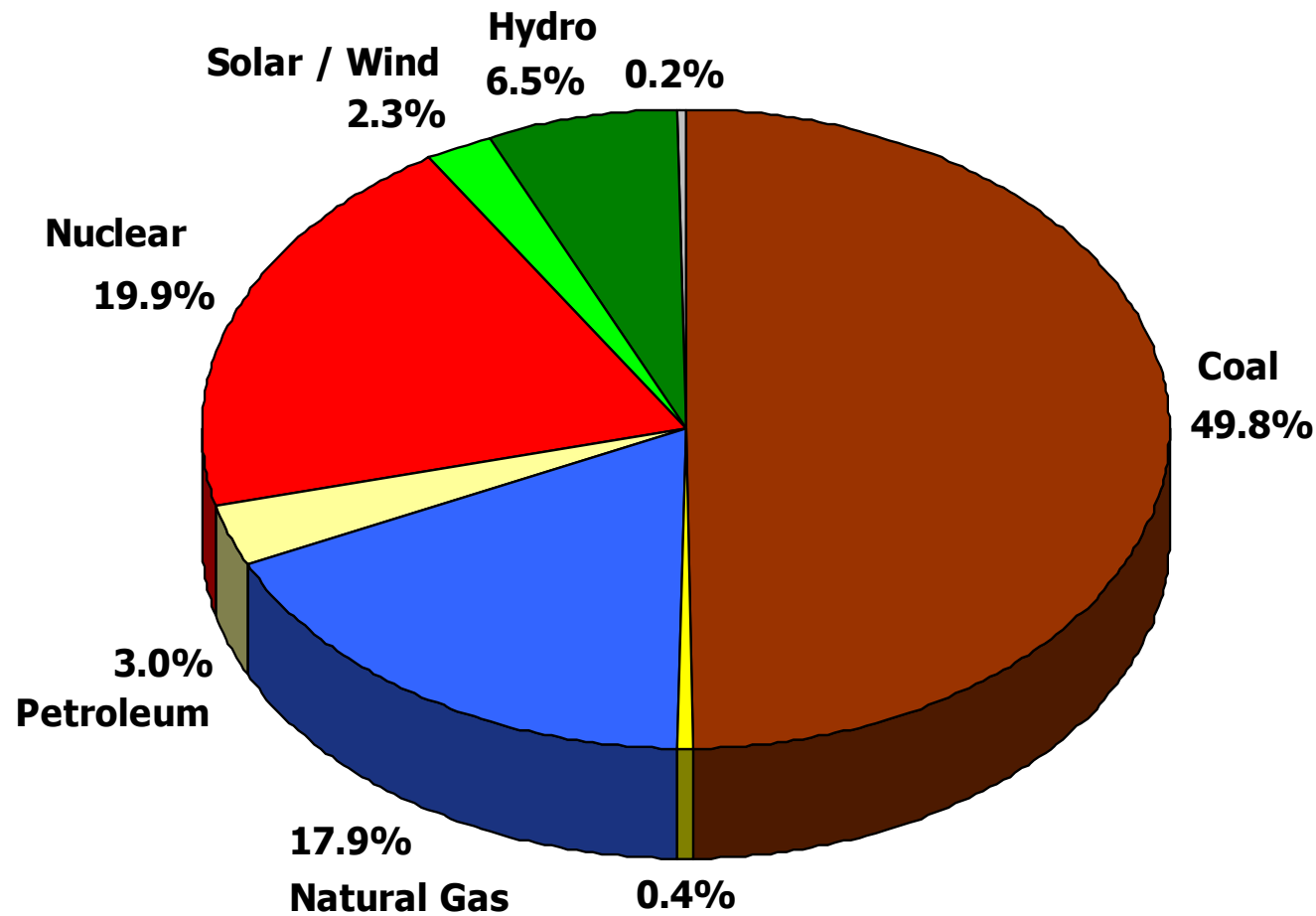
¢ / kwh



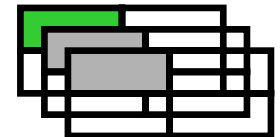
Source: US Department of Energy
<http://www.eia.doe.gov/fuelelectric.html>



US Electric Power Generation Sources (2007)

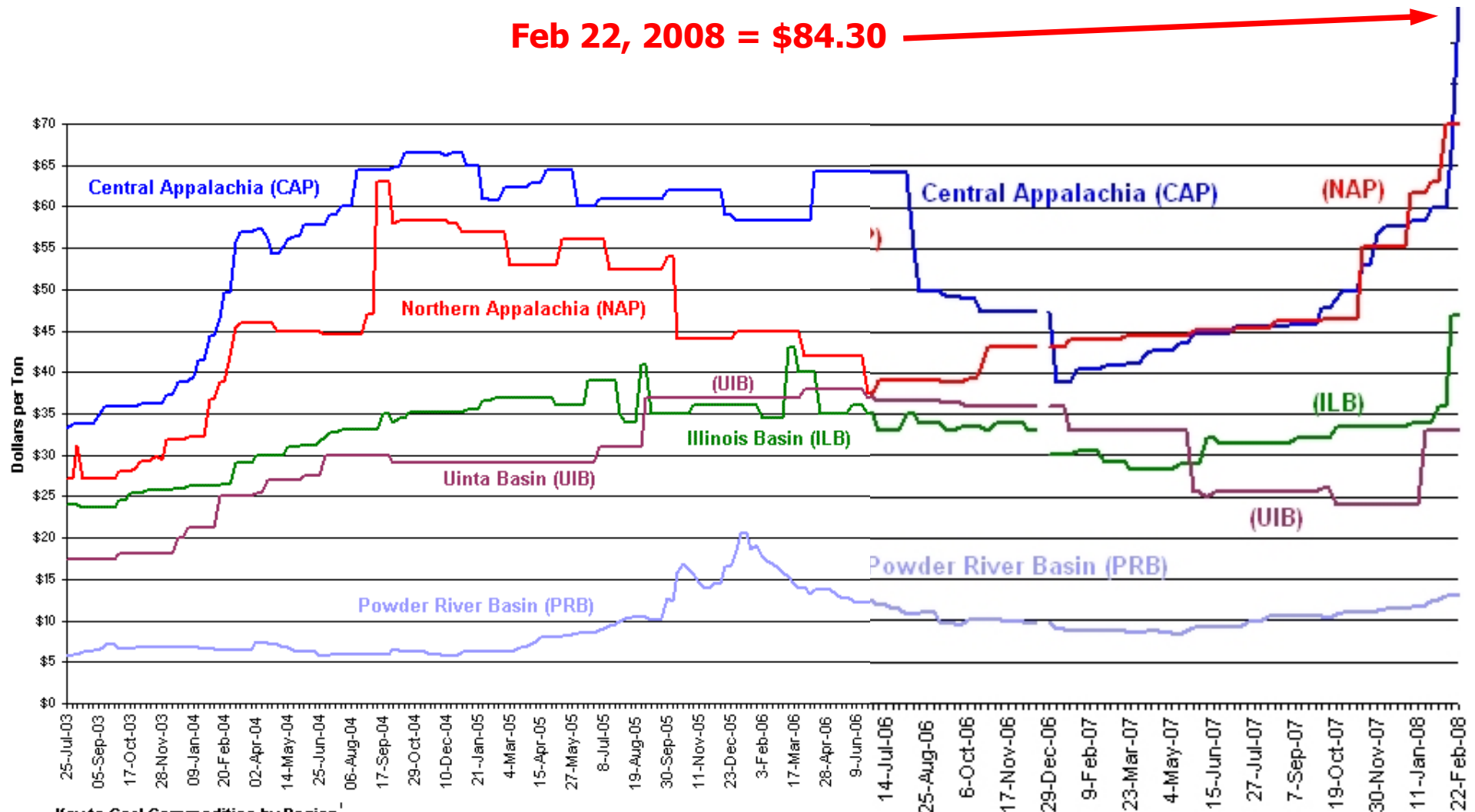


■ Coal ■ Other Gasses ■ Natural Gas ■ Petroleum ■ Nuclear ■ Solar / Wind ■ Hydroelectric ■ Other



Coal Prices – June 2005 to Feb 2008

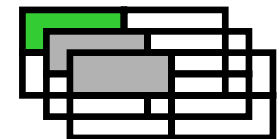
Feb 22, 2008 = \$84.30



Key to Coal Commodities by Region¹

Central Appalachia: Big Sandy/Kanawha 12,500 Btu, 1.2 lb SO₂/mmBtu
Northern Appalachia: Pittsburgh Seam 13,000 Btu, <3.0 lb SO₂/mmBtu
Illinois Basin: 11,800 Btu, 5.0 lb SO₂/mmBtu

Powder River Basin: 8,800 Btu, 0.8 lb SO₂/mmBtu
Uinta Basin in Colo.: 11,700 Btu, 0.8 lb SO₂/mmBtu



REUTERS

LATEST NEWS < > CIA SAYS USED WATERBOARDING THREE TIMES



Deals Today

The latest Reuters articles on M&A, IPOs, hedge funds and more
[Subscribe Now >](#)

Important Information

Register now for a free RLS guide and

You are here: [Home](#) > [Business & Finance](#) > [Industries](#) > [Industrials, Materials & Utilities](#) > Article

HOME

BUSINESS & FINANCE

Markets

Deals

Industries

All Industries

Financial Services & Real Estate

Technology, Media & Telecommunications

Healthcare

Consumer Goods & Retail

Energy

Industrials, Materials & Utilities

Industry Summits

Stocks

Stock Buzz

Funds

ETFs

JP Morgan raises 2008 coal price forecast

Tue Jan 29, 2008 8:02pm EST

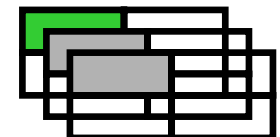
[Email](#) | [Print](#) | [Share](#) | [Reprints](#) | [Single Page](#) | [Recommend \(0\)](#) [-]

RELATED NEWS

- ▶ [Fresh snow adds to China holiday havoc](#)
31 Jan 2008
- ▶ [China Coal launches \\$4.5 billion Shanghai IPO](#)
20 Jan 2008
- ▶ [UPDATE 7-Weak global economy hits copper sentiment](#)
15 Jan 2008
- ▶ [Coal shares fall after Merrill downgrade](#)
03 Jan 2008
- ▶ [EU carbon price up on oil, supply worries](#)

SYDNEY, Jan 30 (Reuters) - JP Morgan has forecast 2008 thermal coal contract prices between Australian miners and Japanese utilities will jump by over 60 percent, citing Indian coal demand and global infrastructure constraints.

JP Morgan raised its contract price forecast to \$90 a tonne, a 61.7 percent increase from last year's agreed price of \$55.65 and a 28.5 percent increase from its earlier forecast of \$70.



Looming Supply / Demand Challenges

washingtonpost.com

Hello danielwinters
Change Preferences | Sign Out

The Washington Post
Print Edition | Subscribe

Advertisement

Lufthansa is changing the language of air travel.
All for this one moment.
>>> learn the language

NEWS POLITICS OPINIONS LOCAL SPORTS ARTS & LIVING CITY GUIDE

SEARCH: go ☒ washingtonpost.com ☐ Web: Results by Google™ | Search

washingtonpost.com > Nation > Special Reports > Global Warming

Power Plant Rejected Over Carbon Dioxide For First Time

By [Steven Mufson](#)
Washington Post Staff Writer
Friday, October 19, 2007; Page A01

The Kansas Department of Health and Environment yesterday became the first government agency in the United States to cite carbon dioxide emissions as the reason for rejecting an air permit for a proposed coal-fired electricity generating plant, saying that the greenhouse gas threatens public health and the environment.

The decision marks a victory for environmental groups that are fighting proposals for new coal-fired plants around the country. It may be the first of a series of similar state actions inspired by a Supreme Court decision in April that asserted that greenhouse gases such as carbon dioxide should be considered pollutants under the Clean Air Act.

In the past, air permits, which are required before construction of combustion facilities, have been

[Enlarge This Photo](#)



EvolutionPartners.com
© Copyright 2008

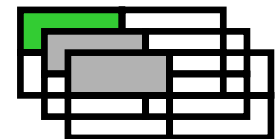
"There will need to be **\$350 billion invested in power generation over the next decade. Transmission represents another **\$150 billion** of needed investment -- the distribution infrastructure in our cities has really deteriorated. Environmental retrofits on existing plants are going to cost another **\$50 billion**, and that doesn't include carbon capture. Efficiency investments are going to be another **\$50 billion**."**

Mac MacFarland

VP of Corporate Development
Exelon Energy

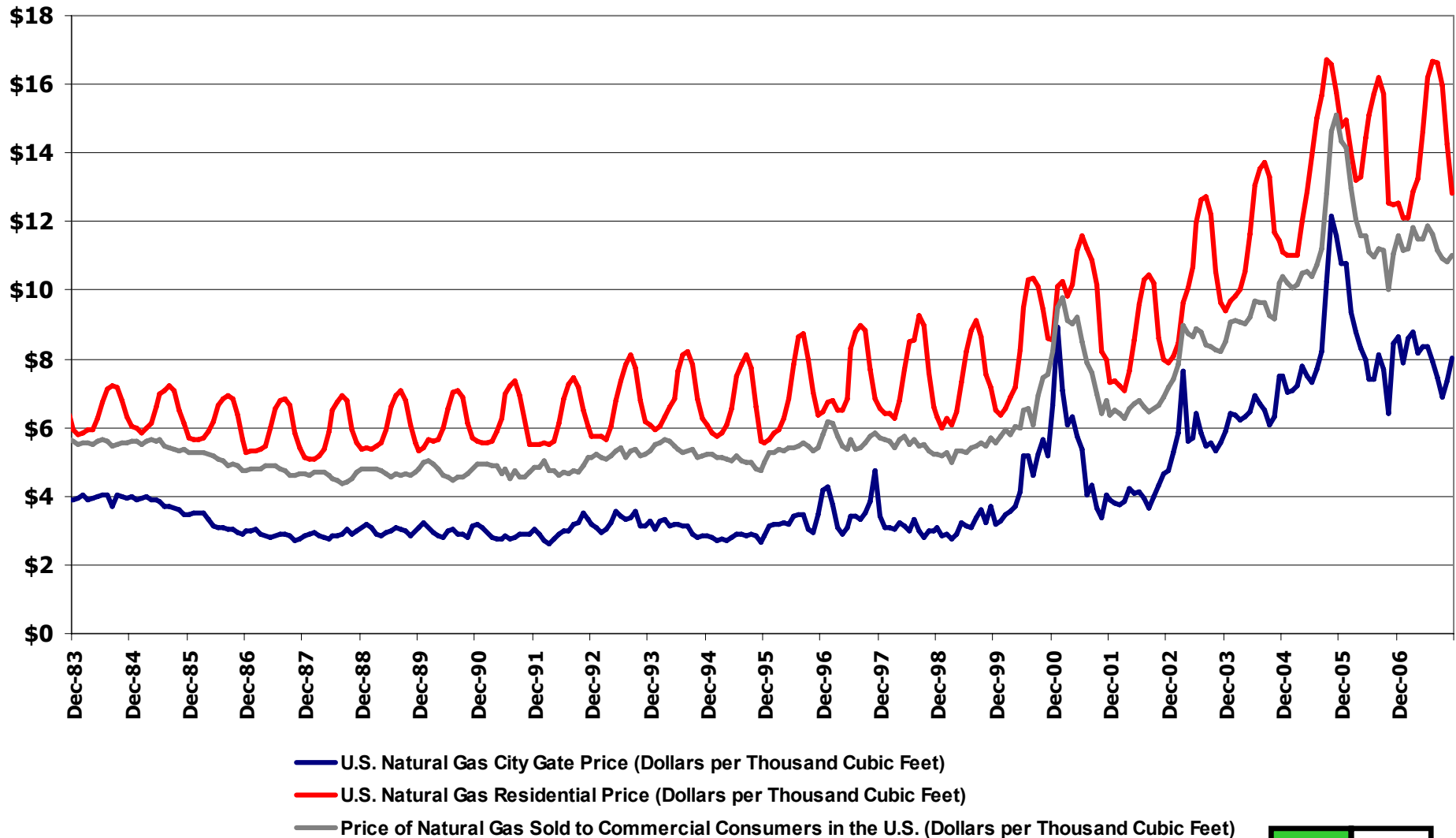


Source: Knowledge at Wharton
<http://knowledge.wharton.upenn.edu/article.cfm?articleid=1881>

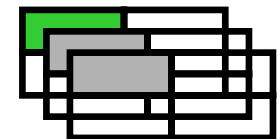


Natural Gas Spot Prices (Jan '84 – Nov '07)

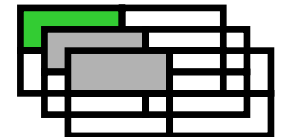
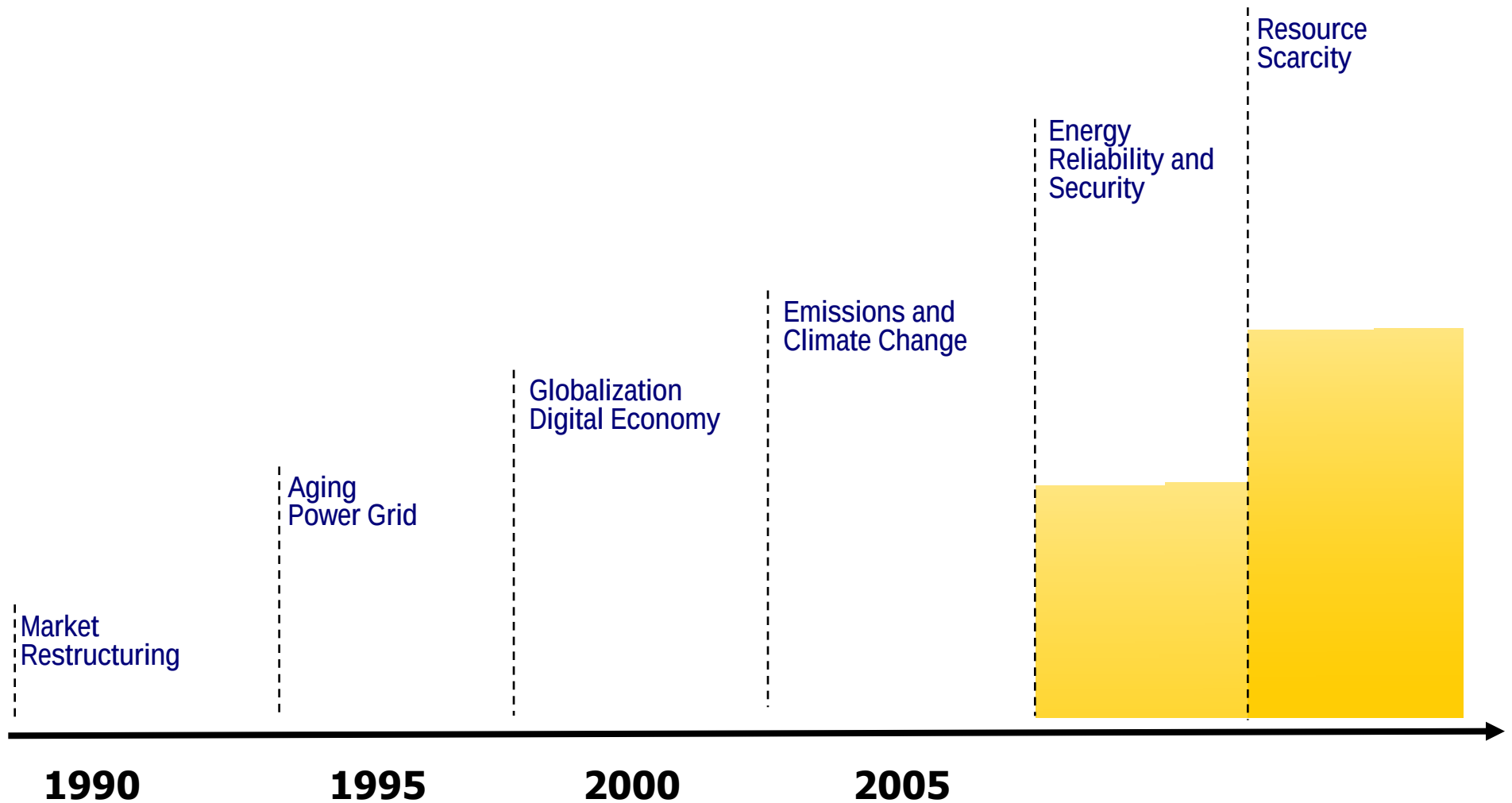
Average Consumer Prices



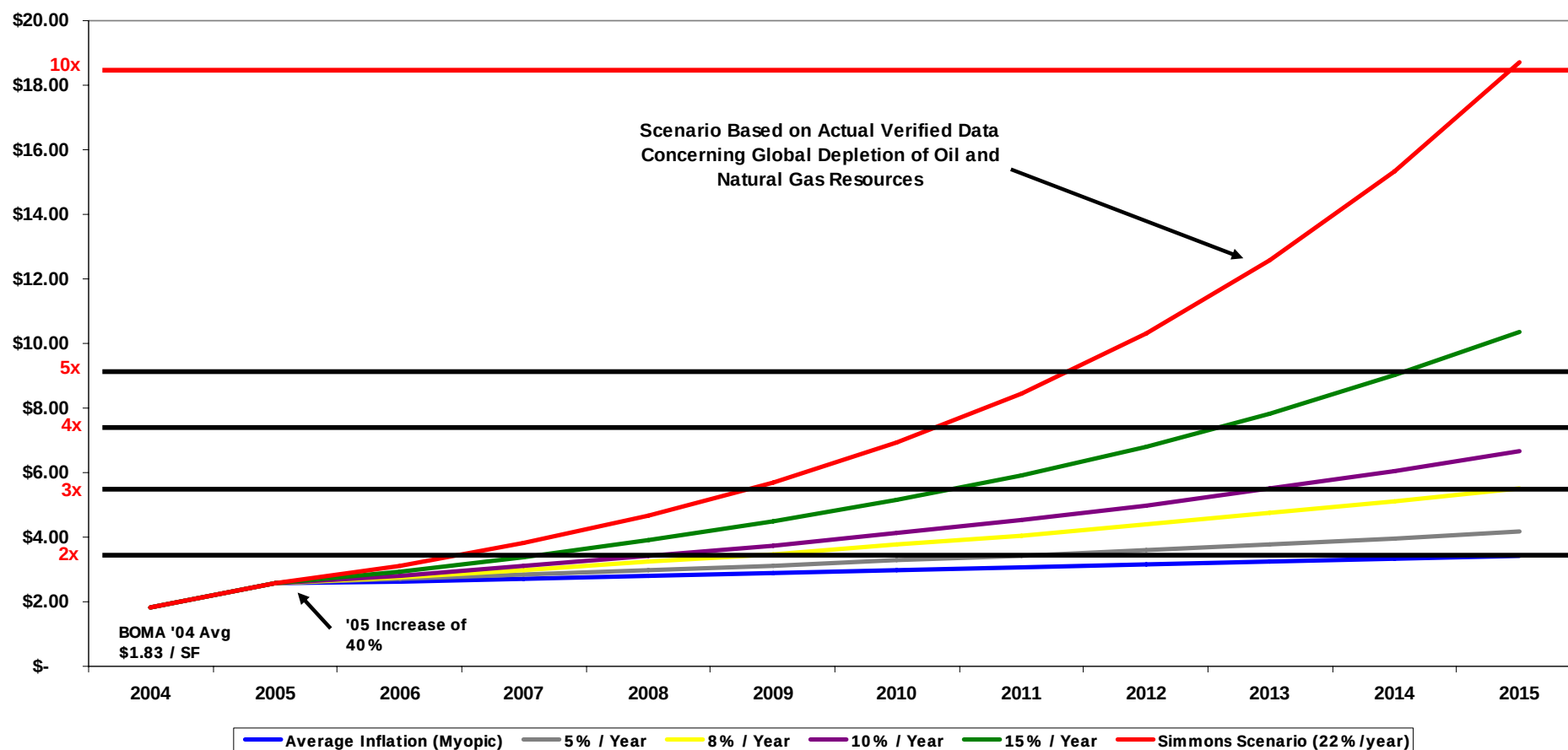
http://www.eia.doe.gov/oil_gas/natural_gas/info_glance/natural_gas.html



Energy Market Drivers



Utility Cost Increase – Projections



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Avg. Inflation @ 3% (Myopic)	1.83	2.56	2.64	2.72	2.80	2.88	2.97	3.06	3.15	3.25	3.34	3.44
5% / Year	1.83	2.56	2.69	2.82	2.97	3.11	3.27	3.43	3.60	3.79	3.97	4.17
8% / Year	1.83	2.56	2.77	2.99	3.23	3.49	3.76	4.07	4.39	4.74	5.12	5.53
10% / Year	1.83	2.56	2.82	3.10	3.41	3.75	4.13	4.54	4.99	5.49	6.04	6.65
15% / Year	1.83	2.56	2.95	3.39	3.90	4.48	5.15	5.93	6.81	7.84	9.01	10.36
Simmons Scenario (22%/year)	1.83	2.56	3.13	3.81	4.65	5.68	6.92	8.45	10.31	12.57	15.34	18.71

