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GREENING OUR CITY:
2012 Report on Sustainable Buildings in Houston

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**TEXAS GULF
COAST CHAPTER**

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Sincerely,
David Ronn LEED AP
2012 Chapter Chair
U.S. Green Building Council – Texas Gulf Coast Chapter

Lora-Marie Bernard
Executive Director
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WITH SPECIAL THANKS TO:

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Angela Bejarano
City of Houston
Houston Endowment
Institute of Real Estate Management Houston
National USGBC

Tim Murray LEED AP

Tim Murray is the Sustainability Director at Apollo BBC, Inc. and is an active participant in the U.S. Green Building Council (USGBC), currently serving as a member of the national Chapter Steering Committee and a voting member of the national LEED Steering Committee. He is Past Chair of the USGBC South Central Regional Committee and previously served two years as Chair of the local USGBC Texas Gulf Coast Chapter. He is also the co-chair of the Greater Houston Partnership's Green Building Sub-committee.

Angela Berjarano BArch, MSc

Angela Berjarano is the research coordinator for the U.S. Green Building Council-Texas Gulf Coast Chapter. She is an Innovative professional with significant experience in the different stages of the building design process and strong background in green building design in the United Kingdom and Colombia. She has extensive experience in commercial, residential and industrial architectural projects, with a focus on green design and environmental conservation. She has earned a Master of Science, Renewable Energy and Architecture, from The University of Nottingham, United Kingdom. She earned a Bachelor's degree in Architecture from Pontificia Universidad Javeriana in Bogota, Colombia.

EXECUTIVE SUMMARY

Tim Murray

This report is an effort to establish a benchmark of Houston's progress in the adoption of green building practices, primarily via the prevalence of LEED projects.

LEED adoption is influenced by numerous factors: the local economy, prevailing business ideology, cultural input and social attitudes. Buoyed by Houston's relatively strong economy as it emerges from the recession, we look at numerous criteria that contribute to a robust use of LEED. The top two local employment sectors are Professional/Business Services and Government. Both of these sectors are heavy implementers of LEED. Also, as Houston is the first major economy to emerge to pre-recession levels, there has been more recent building in Houston than other regions. The Oil and Gas industry and expansion of the Port of Houston are other significant drivers in increased construction. So while the entire U.S. had a sizeable drop in registered buildings during the recession, local registrations were year to year positive in 2011, following two successive years of decline.

Our primary data for the benchmarking is Houston's ranking of the number of LEED buildings in cities around the United States. We also looked at the number of LEED APs and focused on two different building sectors to get greater detail in the use of LEED. Commercial projects are by far the leading type of LEED building in Houston, with project teams classifying at least part of 71.8% of all LEED projects as commercial.

The research finds the following:

- Houston ranks 5th in overall number of LEED projects certified
- Houston ranks 4th in the number of Commercial projects certified
- Houston ranks 3rd in the overall square footage of LEED-certified projects
- Houston ranks 11th in the number of LEED APs
- Houston ranks 13th in the number of LEED APs per capita
- Houston ranks 5th in the number of certified schools
- Houston ranks 2nd in the number of registered schools
- Houston ranks 3rd in the number of LEED Healthcare project (certified and registered)

Houston has done well overall. Our best-performing category is schools. Houston Independent School District has registered many of their most recent school projects along with a handful of private schools. HISD is to be the only major ISD in the City of Houston that is pursuing LEED, but with a recently announced bond program, we should continue to fare well.

While third place in Healthcare appears respectable, that industry has been reluctant to embrace LEED nationwide. So our third place showing only reflects an abysmal 1.84% of LEED projects in the Houston area. Given the amount of Healthcare construction in Houston, it is shameful that Houston is not leading by example.

We are faring poorly in accrediting LEED APs, most likely a reflection of our more conservative attitudes toward the environment than anything else. While the lack of LEED APs does not seem to be affecting the number of LEED projects, it is probably making certification more difficult as the AEC industry lacks knowledgeable professionals on LEED project teams.

INTRODUCTION

Angela Bejarano

It is interesting to note that in comparing the growth of LEED projects between Houston, Washington DC and Chicago, the growth pattern is almost identical—and yet these three cities represent distinctly different approaches to green building. Houston is market-driven, Chicago is incentive based with the local government as an early adopter, and Washington DC has mandated LEED for commercial buildings over a certain size.

The benchmarking finds that Houston has shown leadership in many aspects of green building and has done remarkably well in the absence of initiatives and mandates. Houston's continued construction due its strong economy has been an advantage. However, other cities have taken more proactive steps to encourage the use of LEED and it is questionable whether Houston can maintain the pace of LEED progress once other city's economies recover. Will Houston be able to maintain a leadership position?

Without a doubt, Houston is becoming greener. Class A office definition now includes LEED with large tenant demand and increasing market expectations of higher performance. Our economy is shifting toward greener practices with concerns of energy efficiency, employee retention and attraction. An ever-increasing international influence is encouraging new environmental outlooks and a more service-based economy is prompting decision-makers to address quality of life issues. Will LEED be able to influence Houston enough to spur larger shifts in the way we create our places? Will Houston embrace LEED's full potential of increased public transportation, increased density, urban infill, reduced imperviousness, walkable neighborhoods, along with many more possibilities? As successful as we have been in the adoption of LEED, much of its promise remains unfulfilled. It is our desire that this report leaves you surprised at how far the city has come in such a short amount of time, inspired to do more and hopeful that the transformation that LEED promises becomes more of a reality with each passing year.

Tim Murray
Sustainability Director at Apollo BBC

Leadership in Energy and Environmental Design (LEED), the internationally recognized green building certification system, is the third-party verification tool, developed and implemented by the US Green Building Council Nationwide. The growth of LEED certified buildings across the country has been instrumental, as it reflects a growing green building market that started in 2005 with 2% and grew to 35% in 2010.¹ Currently, 1.8 billion square feet of building space are LEED certified in the country, and despite the challenges faced by the building industry during the recent economic down cycle, green practices are transforming the construction industry.² For instance, it is estimated that by 2015, 40-48% of new nonresidential construction by value will be green, equating to a \$120-145 billion opportunity for investment and employment in the sector across the country.³

This document aims to present the current benchmarking of LEED buildings in the city of Houston. Rated as a global city, Houston is currently the 4th largest city in the country with the fastest economy recovery after recession bottom in 2008.⁴ In this context of growth and expansion, joint efforts to develop green initiatives from governmental and private sectors are showing positive results. Today the city of Houston ranks in 5th place among the top cities with the greatest number of LEED certified buildings nationwide. The city's 160 LEED certified buildings are equivalent to an area of 54,567,810 ft² that ranks Houston as the 3rd city with the largest LEED-certified area. To a great degree, the commercial sector is the leading sector of green buildings in the city, followed by retail. Other sectors such as schools and healthcare are also ranking the city among the top 5 in the country by the growing number of certified and registered LEED projects.

Houston is at the moment a multicultural city and one of the most affordable cities in which to live, work and attract business at national and international levels. This situation works in favor of the different initiatives from the local government, non-governmental organization and private enterprises to shift towards greener practices and stimulate a growing market and community acceptance of the green building industry.

All data in this report only uses project locations indicated by the city input by the project team in the Green Building Certification Institute (GBCI) database. Our report does not use Metropolitan Statistical Areas or USGBC chapter territories. It is only fair to note that this will give some disadvantage to regions that consist of many incorporated municipalities, such as Phoenix or Dallas. Also, all of the data excludes confidential projects and LEED for Homes projects. Please make note of the statistical descriptions with each chart, especially in regards to registered or certified projects.

1. *McGraw Hill Construction (2010)*. Green Outlook 2011: Green Trends Driving Growth.

2. LEED is referenced in project specifications for 71% of projects valued at \$50 million and over. *McGraw Hill Construction (2010)*. Green Outlook 2011: Green Trends Driving Growth.

3. *McGraw Hill Construction (2010)*. Green Outlook 2011: Green Trends Driving Growth.

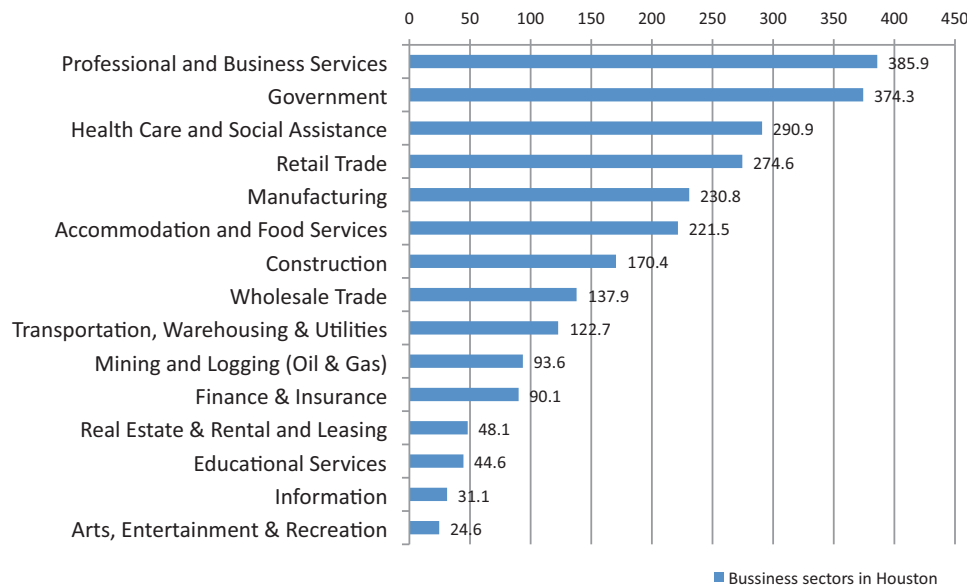
4. GREATER HOUSTON PARTNERSHIP 2012 EMPLOYMENT FORECAST, December 8, 2011.

CITY IN CONTEXT

The City of Houston has been well known as the “Energy Capital of the World”; however, this global importance today expands beyond oil and gas sectors to other sectors such as health care, transport and trade. Holding a population close to 2,100,000, it is the 4th largest city in the country and the largest in the state of Texas. The city’s dynamics are greatly affected by its interaction within the growing Houston metropolitan area that holds three times the city’s population.

During the last 12 months, the metropolitan area is showing the fastest increase in employment in the nation: over 3.2%, which doubles the annual national growth. Also, Houston is one of only two metropolitan areas that have returned to pre-recession employment levels; the other is Washington D.C. Graph 1 below shows the employment distribution by business sector in Houston, where professional and business services lead, followed by governmental, retail trade, and manufacturing sectors. Although the Mining and Logging sector (oil and gas) seems low in the distribution chart, the sector experienced the fastest job growth rate: over 11.7% compared to the previous year. The construction sector remains as slow to recover; however, the Greater Houston Partnership forecasts a gain of 9,800 construction jobs by the end of 2012 and the American Institute of Architects consensus report forecasts a stronger growth in 2013.⁵

Distribution of Employment by Business Sector



Graph 1: Employment Distribution by business sector - Number of jobs (1,000s) Metropolitan of Houston . Data from Greater Houston Partnership. *The Economy at Glance, Houston, May 2012.*

With recovery comes expansion, and Houston has become the 5th largest metropolitan area in the nation. While many other cities and metropolitan areas in the country are losing residents, Houston shows, in addition to its natural population growth, the 4th largest migration rate nationwide with an even distribution shared between international and domestic new residents, transforming Houston into a more multiethnic city.

As the fastest-growing custom district in the nation, the Port of Houston is today the most modern, efficient and fastest-growing container port on the U.S. Gulf Coast.⁶ Its current expansion due to cargo redistribution will prepare for an expected increased activity of 15% after the completion of the Panama’s canal super cargo lane in 2014.⁷ In addition, The Houston Airport system (HAS) presented a significant increase over the first quarter in the passenger traffic, besides the recently approved expansion of Hobby airport to allow international flights.

In contrast, Houston is at the moment one of the most affordable cities to live, work and trade, at national and international levels. The devaluation of the dollar has allowed the city’s economy to open clear opportunities for services and goods that can be offered at affordable prices in local and oversize markets.⁸ The low cost of commercial square footage ranks Houston as the 4th most affordable city nationwide, and it is an example that reflects the low cost of doing business.⁹ These facts combined with other positive commodities make the city of Houston the second most attractive city in U.S. for numerous multinationals to house their corporate headquarters.¹⁰

In this fast-changing landscape, environmental sustainability and energy conservation need to be at the top of the agenda to attract the most innovative companies and talented individuals. At the moment, the region needs to grow into a much more environmentally and aesthetically appealing urban destination — and different programs are gradually shaping this future.¹¹ For instance, in 2009 the Clinton Climate Initiative selected Houston as the initial promoter of the energy efficient retrofit program comprising 11 million square feet. Today the city has 80 municipal buildings under energy efficiency analysis expected to payback in 6-10 years. In addition, the City of Houston has set the Green Houston program to implement measures to promote a greener building environment. As an example, Houston is currently the number one purchaser of renewable energy in the country, supplying 50 percent of its total power demand. Equally, the private sector and non-governmental organizations are developing green initiatives as part of their practices that contribute to promote Houston as the energy city of the future.

5. According to GHP, over the last 12 months, the private sector created 90,000 new jobs, mostly in private education, health and health services with the largest employment gain followed by trade, transport and utilities. *The Economy at glance Greater Houston Partnership Volume 21, Number 5 • May 2012*

6. Houston custom district has grown at a compound monthly rate of 1.8 percent since recession bottom. *The Economy at glance Greater Houston Partnership Volume 21, Number 5 • May 2012*

7. Port of Houston Authority, Press release June 23, 2011

8. GREATER HOUSTON PARTNERSHIP 2012 EMPLOYMENT FORECAST, December 8, 2011.

9. R.S. Means costs comparisons: Office buildings. www.rsmeans.com

10. According to fortune 500, headquarters, of the world’s 100 largest non-U.S. based corporations, 66 have a presence in Houston. Houston is third among metropolitan statistical areas in the number of Fortune 500 headquarters. GHP Data.

11. The Kinder Houston Area Survey – 2012 *Perspectives on a city in transition.* Rice University Kinder Institute.

LEED BUILDINGS IN THE CITY OF HOUSTON

Since 2005, the US Green Building Council – Texas Gulf Coast Chapter has been at the core of the green building movement by promoting education and raising public awareness throughout the Houston metropolitan area.

Joint efforts have been set between the City of Houston, Institute of Real Estate Management, Building Owners and Managers, American Institute of Architects Committee on the Environment, and American Society of Heating, Refrigeration, and Air Conditioning Engineers to encourage green initiatives as best building practices. For instance, The City of Houston is currently adopting new building codes and implementing programs such as the Green Office Challenge, among other initiatives, with the goal to be #1 in LEED and green buildings nationwide. Additionally, the growing demand for LEED certified buildings is also linked to economic benefits as demonstrated by the leading developers in the industry.

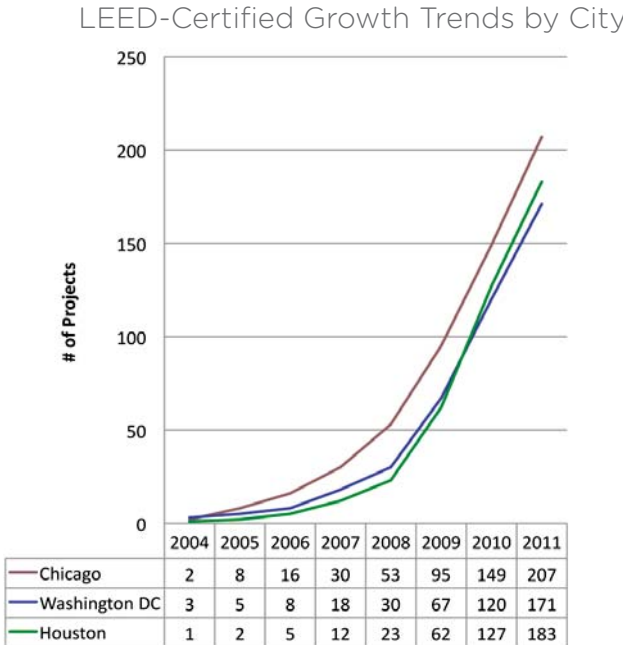
Houston has seen the number of LEED certified buildings grow by 500% during the last 3 years: the number increased from 34 buildings in May 2009 to 160 LEED certified buildings in April 2012. In comparison with other major cities across the country, Houston ranks 5th for the number of LEED certified buildings. (Graph 2) Furthermore, the city shares a 4th place for the number of commercial LEED buildings with Chicago. (Graph 8)



Graph 2: LEED-certified buildings Top 10 cities in the U.S. Data taken from GBCI database.

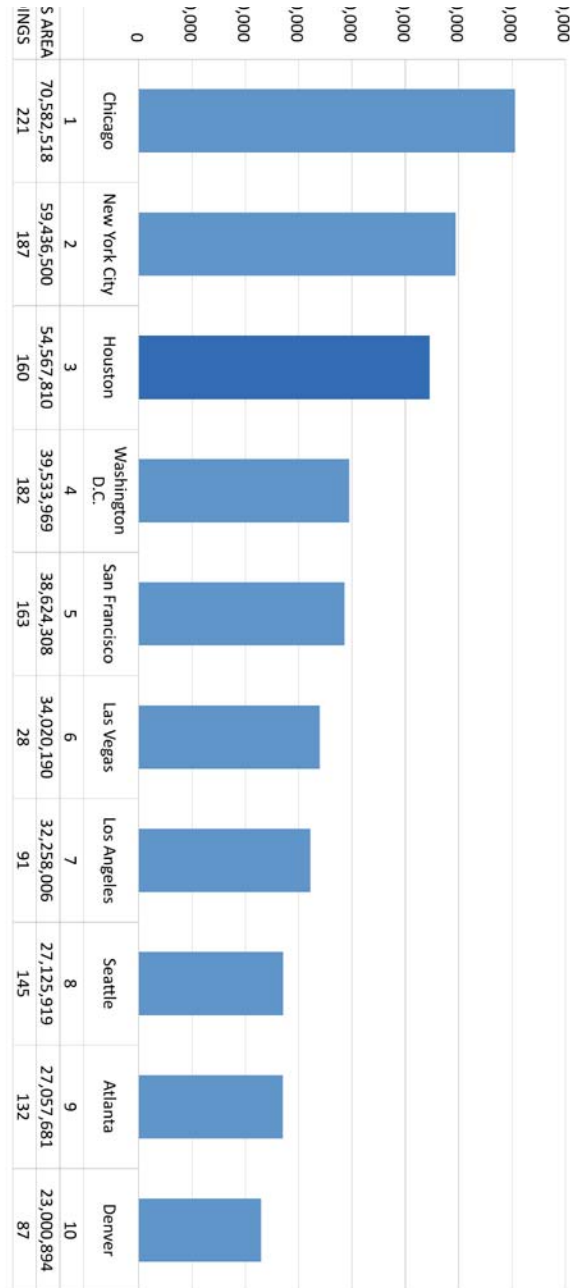
The graph below compares the growth trend of LEED certified projects between the cities of Washington DC, Chicago and Houston since 2004. Note how Houston has closely followed the same growth trend. Although the city began at a slower pace, the growth of LEED certified projects has increased since the recession bottom in 2008. Chicago’s early demand for green buildings has been incentive-based driven by the local government. Washington DC has mandated LEED for commercial buildings over a certain size. Houston’s growth has been mostly market-driven. The evident expansion of the city due to an increasing population and job opportunities creates the moment for the building sector to shift the market towards greener practices.

Houston’s LEED certified area is currently 54,567,810 ft², ranking the city in 3rd place after New York City. (Graph 4). This is an important indicator that the city has a clear potential for improvement, since Houston has been rated as the most affordable city and the second most attractive city to settle local and international business in the US.



Graph 3: Cumulative chart of LEED certified buildings in Chicago, Washington and Houston

LEED-Certified Buildings Area (ft²)
Top 10 Cities



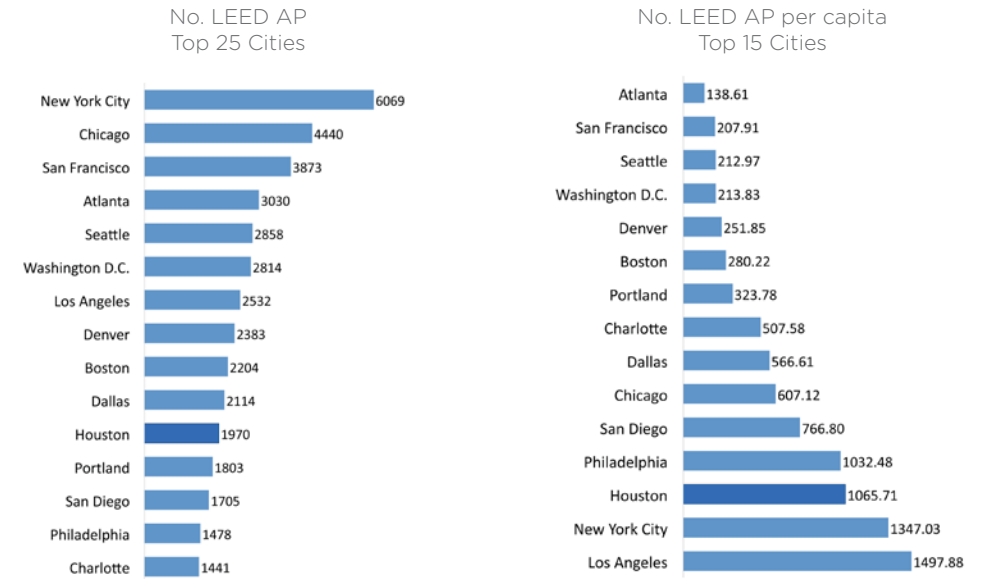
LEED-Certified buildings area (ft²)
Top 10 cities

The growing market for green buildings in Houston demands LEED Accredited Professionals in the building industry to guide the certification process from design throughout construction up to completion. Today the city offers 1970 LEED Accredited Professionals from different disciplines and ranks 11th by the number of LEED APs nationwide. If we look at the distribution of LEED APs per capita, Houston ranks 13th, offering one accredited professional per 1065 residents.

The demand for professionals seeking for accreditation is expected to increase, as the employment market seems to show companies' trend to recruit and retain young professionals already with green-oriented practices. However, as previously advised by the Kinder Report, this is an area that needs attention if the city aims to attract the most innovative companies and talented individuals. Besides the environmental and aesthetically urban development, Houston needs to build the research centers that will fuel the engines of growth in the knowledge economy.¹²

Nationwide, the industry sectors with the highest penetration of green buildings are offices, schools and healthcare.¹³

Based on project team building type definitions when registering, Houston shows commercial (offices) by far the predominant sector followed by retail and education. (Graph 7) While commercial projects account for 47.48% of LEED certified buildings nationally, in Houston the commercial sector accounts for 71.8% of LEED certified buildings.

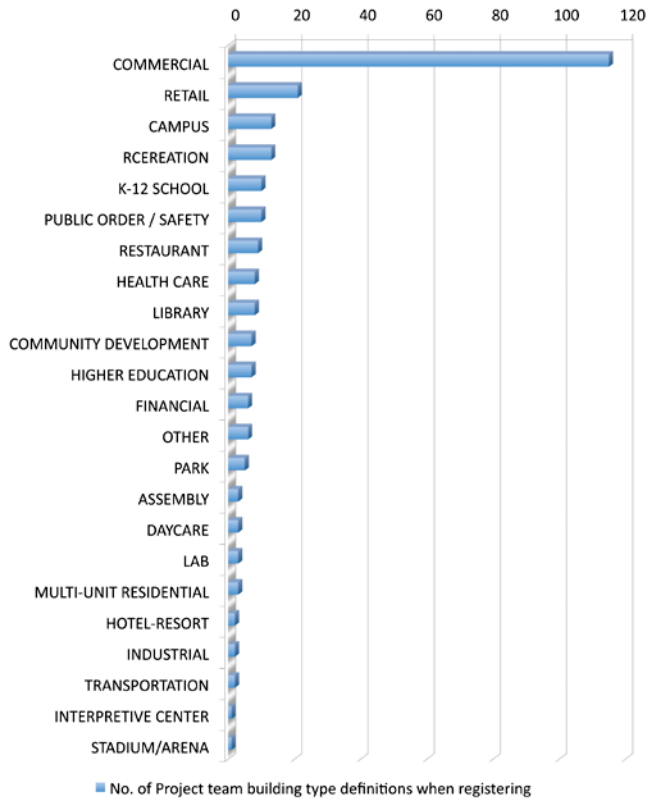


Graph 5 & 6: LEED Accredited Professionals Top 15 cities in the U.S. Data taken from GBCI database.

12. The Kinder Houston Area Survey – 2012 Perspectives on a city in transition. Rice University Kinder Institute.

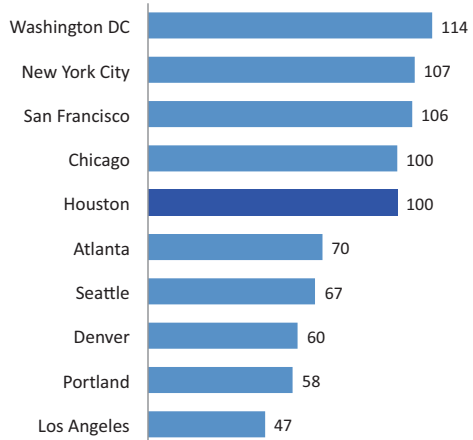
13. McGraw Hill Construction (2010). Green Outlook 2011: Green Trends Driving Growth.

Houston LEED Certified Building Types



Graph 7: LEED Accredited Professionals Top 15 cities in the U.S. Data taken from GBCI database.

LEED Certified Commercial Projects Top 10 Cities

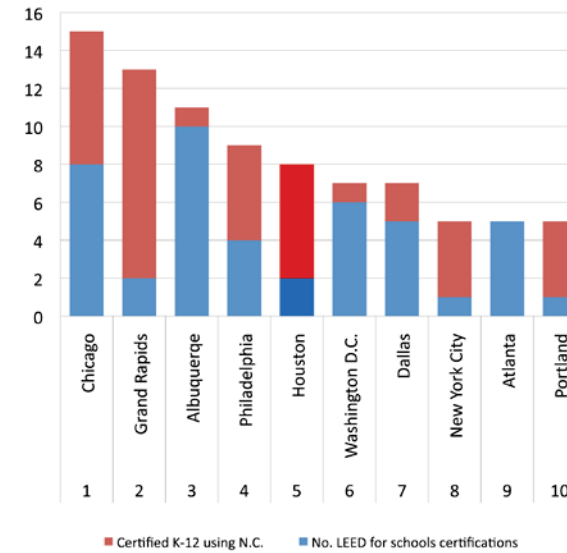


Graph 8: LEED-certified commercial projects Top 10 cities Data taken from GBCI database. Commercial projects as listed by building type in LEED database, Includes mixed-use projects and all rating systems. Excludes Higher Education and Healthcare projects

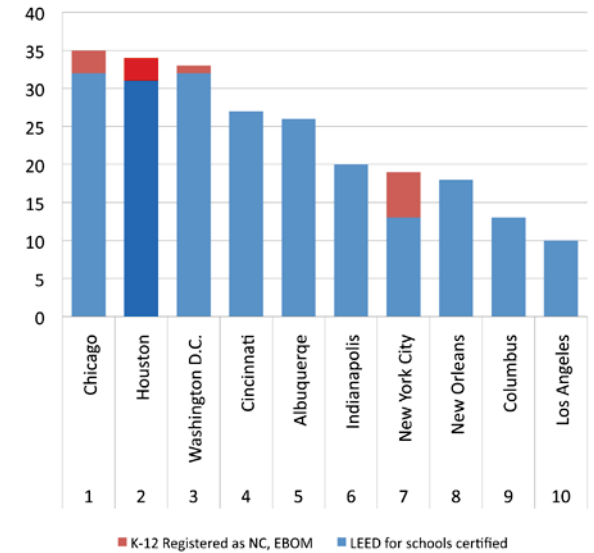
Currently, Houston has 8 LEED Certified schools, between those registered as LEED for New Construction and those following the LEED for Schools Certification. (Graph 9) The number is very much influenced by an increasing number of new schools in the Houston Independent School District (HISD), the largest school district in Texas.

HISD is committed to adopt energy efficient schools, following the Better Buildings Challenge. So far, HISD is the only school district in the City of Houston that focuses on green schools and its efforts are taking the city to a 2nd place with the greatest number of LEED registered schools (Graph 10). From the 34 registered schools in Houston, 25 are HISD campuses and 9 are private.

LEED Certified Schools Top 10 Cities



LEED Registered Schools Top 10 Cities

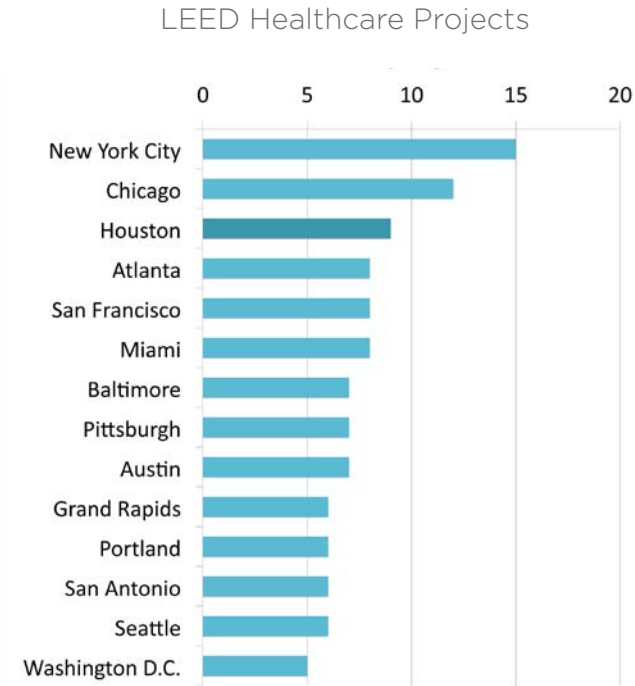


Graph 9 & 10: LEED-certified schools and LEED registered schools - Top 10 cities in the U.S. Data taken from GBCI database

DO GREEN BUILDINGS REALLY DELIVER?

Results from GSA Public Building Service ¹⁵

In the Healthcare sector, Houston ranks a favorable 3rd place. While Houston does well comparatively, the Healthcare sector as a whole is dismal nationwide regarding LEED participation. According to NAIOP, healthcare construction accounts for about 12.2% of all construction costs in 2010 nationally.¹⁴ Yet only 1.16% of LEED projects are identified as healthcare projects. Healthcare accounts for only 515 projects out of a total of 44,333 LEED projects. Given Houston’s extensive healthcare industry, the city should be doing much better in this sector and leading by example.



Graph 11: LEED-certified and LEED registered Healthcare projects - Top 14 cities in the U.S. Data taken from GBCI database

In 2011 the General Services Administration selected 22 green buildings from its National portfolio, to evaluate their environmental performance, financial metrics, and occupant satisfaction. Overall the results confirmed that GSA’s green-designed buildings use less energy and water, emit less CO2, cost less to maintain, and have occupants who are more satisfied than those working in typical buildings. GSA’s 12-year commitment to green building practices is paying off.

KEY FINDINGS

FINDING 1: FULLY INTEGRATED DESIGN DELIVERS HIGH PERFORMANCE

25% less energy use, on average buildings in the study surpassed national averages. Particularly LEED Gold buildings achieve a 27% lower energy use. (62 kbTu/sf/yr vs. 88 kbtu/sf/yr)

FINDING 2: GSA’S GREEN BUILDINGS COST LESS TO OPERATE

19% lower operational cost compared to national average. LEED Gold buildings are among the top performers, as sustainability is integral to every aspect of a building. Consistent good results are expected when building, system’s efficiency, and sustainable O&M practices are integrated.

FINDING 3: SUSTAINABLE DESIGN SUPPORTS OCCUPANT SATISFACTION

27% higher occupant satisfaction compared to national average. Although the top third of the buildings in study show 76% higher occupant satisfaction, lighting and acoustics are areas that require close attention from the outset of the project.

FINDING 4: GREEN BUILDINGS HELP GSA MEET FEDERAL MANDATES

36% fewer CO2 emissions. GSA’s green buildings followed an executive order established by the current government, and other federal mandates, where integrated strategies towards sustainability and reduction of green house gas emissions must be set as the priority among federal agencies, Today GSA’s green buildings serve as benchmarking for the public in general to implement their sustainable strategies and achieve high standards.

14. The Contribution of Office, Industrial and Retail Development and Construction to the U.S. Economy. NAIOP research foundation & McGraw Hill Construction (2010).

15. GREEN BUILDING PERFORMANCE, A Post Occupancy Evaluation of 22 GSA Buildings, US General Service Administration Public Building Service. August 2011.