2012

World's Tallest Green Building: Taipei 101 Tower

Presented by:
Mr Simon Sue
Division Director of Sustainable Design
SL + A International Asia Inc

Selangor Global State Green Seminar

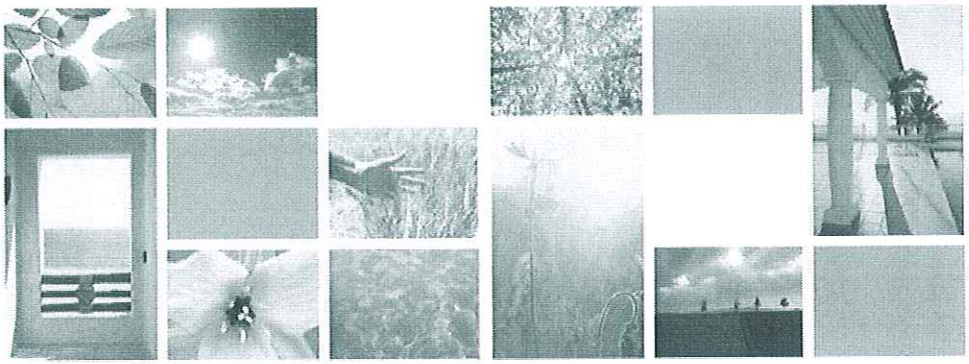
Surfing the Green wave

Organiser: SSIC

Supported by: Taipei Economic and Cultural Office in Malaysia 駐馬來西亞臺北經濟文化辦事處

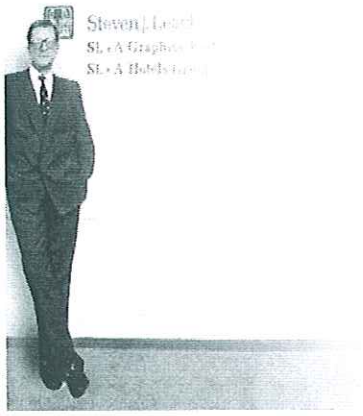
Co-organisers: KCCCI 巴生中華總商會; MyGBA Malaysia Green Business Association; Technology Advanced Sdn Bhd

Media Partner: 财经



Sustainable Design Division | StevenLeach Partners in creative solutions 李肇勳集團綠建築設計部

www.sla-green.com www.sla-group.com



【Steven Leach Associates】

History

The Steven Leach Group was founded in Hong Kong by Steven J. Leach Jr. (1940 – 1996) in 1972 as an interior design practice specializing in corporate offices

The practice was expanded to Singapore in 1974 and Manila in 1975 with further expansion throughout Asia in the late 1980's early 1990's as well as expansion of the practice to include hospitality, food and beverage, institutional and retail design.

The firm is currently managed by 6 Directors and a large number of associates.

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WHERE ARE WE

【Global Locations】

With 8 offices (covering 2 continents) & approximately 300 staff, we offer to our clients the advantage of consistent professional design, across Asia & into Eastern Europe.

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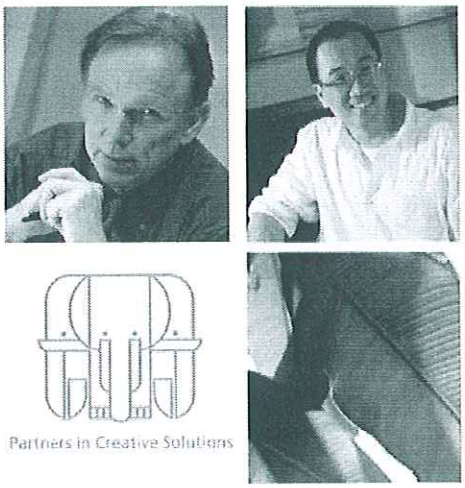
WHO WE ARE – SUSTAINABLE DESIGN DIVISION



Partners in Creative Solutions

Steven Leach Associates

Sustainable Design Division - established in 2007

David Pipkin AIA, LEED AP
Group Director

Simon Sue, P.E. LEED AP, CxA
Division Director of Sustainable Design
USA Licensed Professional Engineer
ACG Certified Commissioning Authority

12 LEED AP's on staff

Taipei & Shanghai Office:
7 LEED Accredited Professional (LEED AP)
2 LEED Green Associate (LEED GA)

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SUSTAINABLE DESIGN DIVISION

USGBC Member & LEED AP Certificate

US AABC Commissioning Group Member and CxA Certificate

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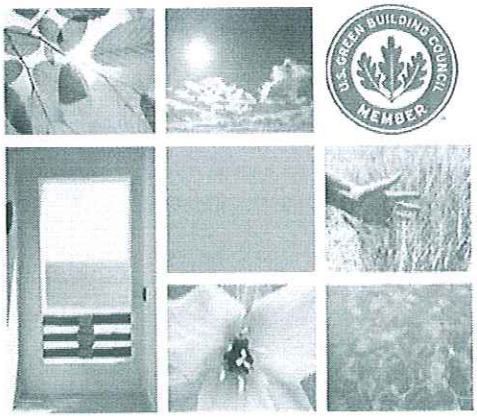
SUSTAINABLE DESIGN DIVISION



The Steven Leach Group has advocated healthier sustainable spaces for people for many years and has now made a substantial investment in putting our beliefs into practice by establishing a Division of Sustainable Design in 2007.

The Steven Leach Group believes we as professionals must join with our clients, communities, and governments to work towards the goal of delivering the built environment at Zero Carbon Emissions through sound sustainable planning, design, technology, construction, and operating policies for our building projects.

Our service includes:

- ❑LEED Consulting Service, Feasibility Study
- ❑LEED Certification Project Management & Consulting
- ❑LEED technical consulting service for architectural, interior, mechanical, electrical and plumbing design.
- ❑Computer Modeling: Energy Modeling, Daylight Simulation
- ❑Commissioning: Fundamental & Enhanced.
- ❑Existing Building Energy Audit

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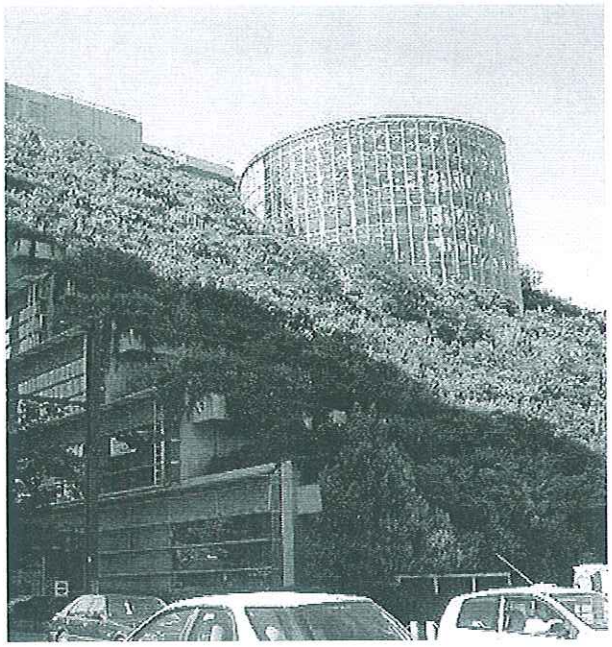
WHAT IS GREEN BUILDING



Green building is a building compatible with the ecological environment, also provides and maintains a comfortable and healthy living.

In addition to using a variety of technology and design in the construction process to reduce consumption of resources; green building should also achieve **reduction**, **reuse** and **recycle** of water, energy, waste and the impacts to the surrounding environment in maintenance and operation.

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WHEN IS A BUILDING GREEN?

green building index

綠色建筑标识 GREEN BUILDING LABEL

LEED US

breeam UK / HK

greenstar

Singapore

Taiwan

CASBEE 建築物総合環境性能評価システム Japan

Since the definition is NOT created by using absolutes, there is more grey area. In order to prevent Green Washing, an Analysis tool was created by governments or organizations to establish a baseline for **"Green" Rating System.**

For example:
Malaysia Green Building Index
China 3-Star Green Building Label
USA LEED
UK BREEAM
Australia Green Star
Singapore Green Mark
Taiwan EEWH
Japan CASBEE

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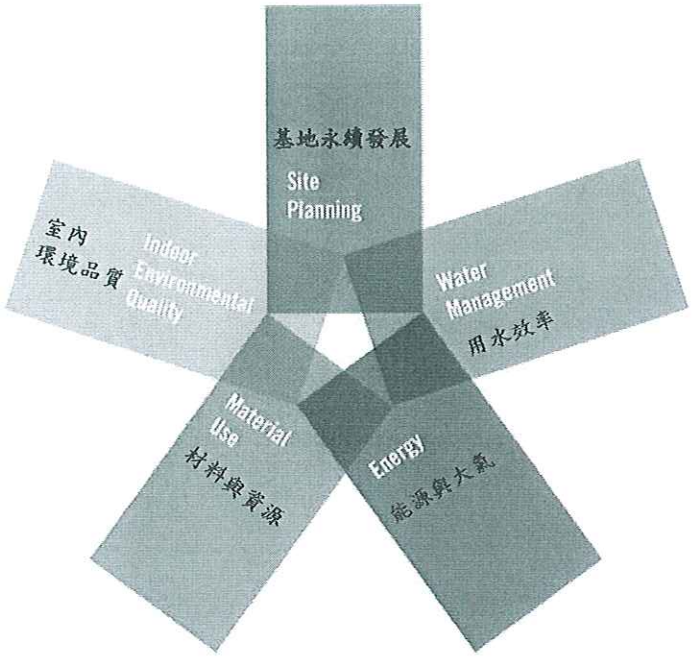
GREEN BUILDING FOCUS ON



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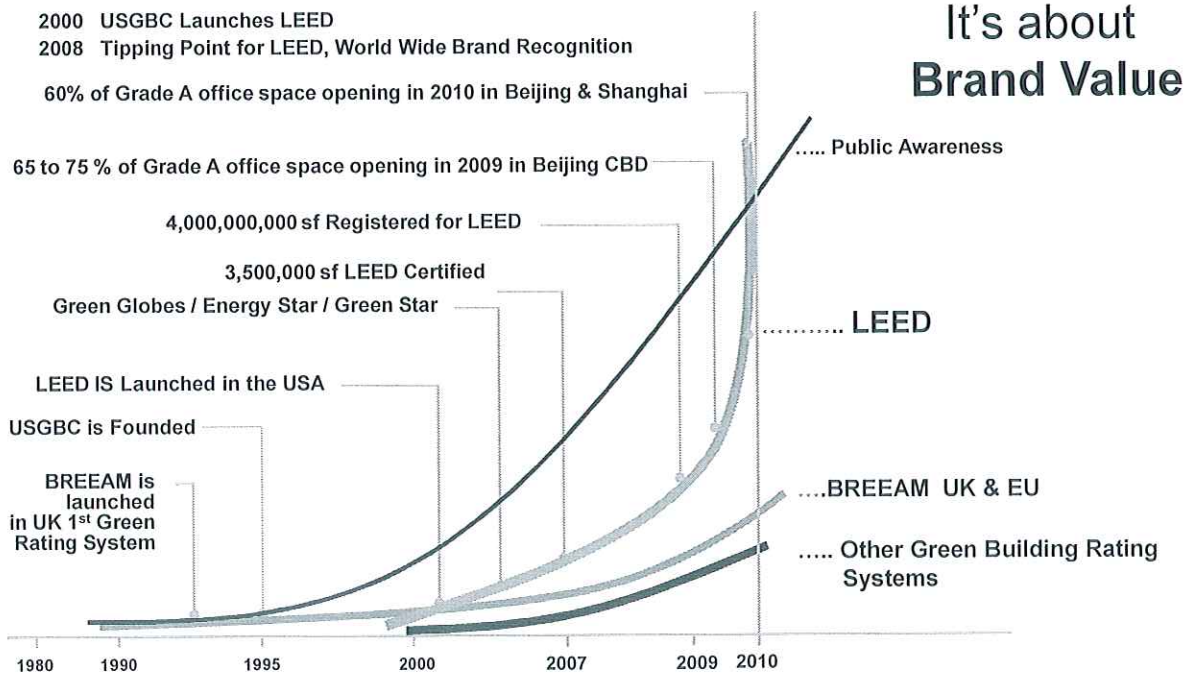
GREEN BUILDINGS GROWTH INTERNATIONALLY



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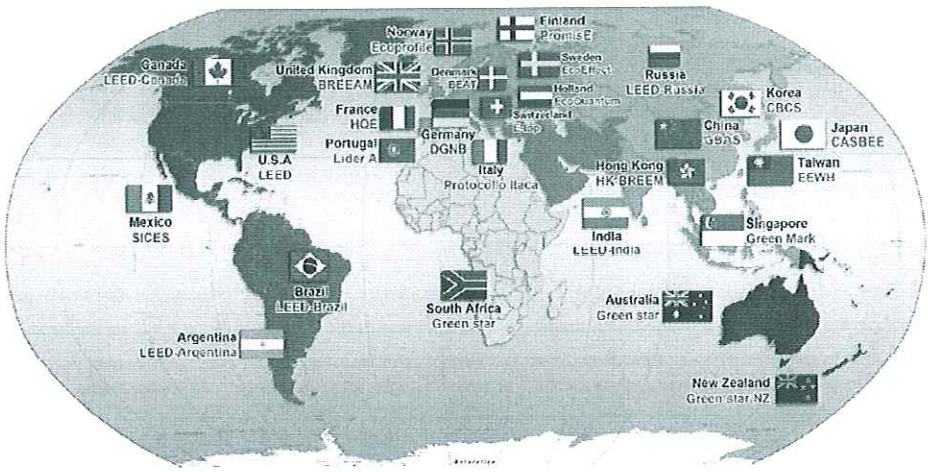
COUNTRIES WITH GREEN BUILDING RATING SYSTEM



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LEED CASE

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WHY LEED?

- **LEED** provides a specific, consistent framework for procedures & for performance measurement of green building.
- **LEED** certified buildings cost less to operate & maintain, are energy- and water-efficient.
- **LEED** is rapidly becoming the leading standard for measuring a building's environmental performance.
- **LEED** is the internationally accepted benchmark for the design, construction, and operation of high-performance green buildings.

LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

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WHAT IS LEED?

- **LEED** stands for **L**eadership in **E**nergy and **E**nvironmental **D**esign
- **LEED** is a point-based Green Building Rating System and is the world's largest and fastest-growing Green Building Rating System
- The **LEED** green building rating system -- developed and administered by the U.S. Green Building Council, a Washington D.C.-based, non-profit coalition of building industry leaders.

LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

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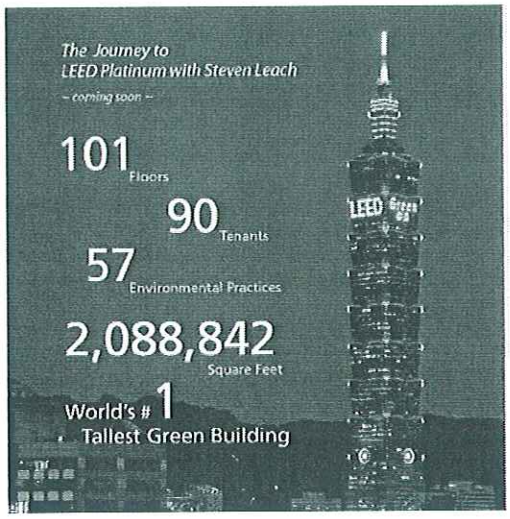
LEED – EB:O&M – Case Study

TAIPEI 101 CASE STUDY

TAIPEI 101 Office Tower-LEED Platinum

LEED Consultant:

SL+A Sustainable Design Division



Construction Started:1998 (Tower & Podium)
Floor Areas: 989,358 square feet/60,000 Ping (Tower)
Occupant: 10,765
Achieved: LEED-EB:O&M 2009 Platinum

Why Go Green:

- December 2008 Steven Leach approached TAIPEI 101 about LEED
- August 2009, signed the LEED consulting contract with SL+A
- LEED Team: Steven Leach、EcoTech & Siemens
- **Three Major Phases: Preliminary Analysis、Implementation & Data Collection, Performance Period**
- Preliminary Analysis: about 6 months: LEED feasibility study & certification level.
- Implementation: about 10 months. Capital improvement and optimized building performance. Updated building operation and maintenance programs.
- Data Collection: Collect measurable performance data during the performance period.
- LEED documents 2 months. Review and certification, 3 months.
- **TAIPEI 101 manpower: devoted about 10,000 hours**
- Applied 57 credits、SL+A involved in all credits and was fully responsible for implementing and documenting 51 credits.

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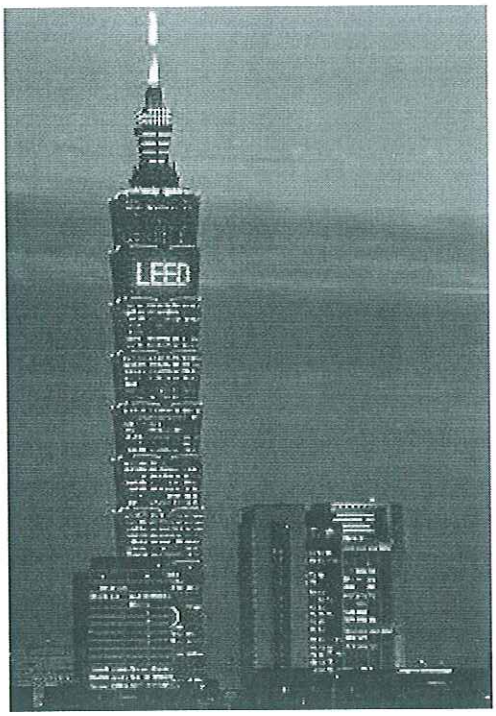
LEED – EB:O&M – Case Study



TAIPEI 101 Office Tower

LEED Platinum

LEED Consultant:
SL+A International Asia Inc. Taiwan Branch

Year Built: 1998
Floor Areas: 989,358 M^2
Occupants: 10,765

Achieved:

- No potable water used for irrigation
- Energy Use Intensity is 30% lower than average ,
- EUI = 227 kwh/m2-year
- Reduce potable water usage by 39% compares to baseline.
- 84% occupants using public transportation systems
- Implemented Green Cleaning & Indoor Pest Control programs to ensure indoor environment quality
- Implemented waste management program, 70% construction waste and 55% solid waste are diverted from landfill.

Green Investment: NTD 60,000,000/USD 2,000,000, about 10,000 man hours

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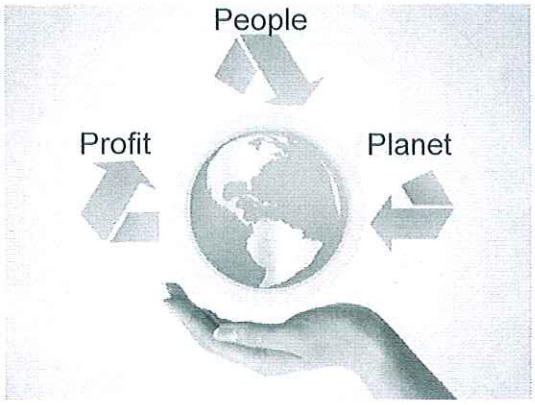
TAIPEI 101 ONE YEAR AFTER LEED CERTIFICATION



More than 50,000 people used the interactive Green-ON touch screen Educational Display.

>1,300 people attended the Green Tour

From July 2011 to July 2012

PROFIT

Energy Cost Savings: NTD 12,000,000 /year

Energy Saving: about 6%

Occupancy Rate increased 10%

PEOPLE

Implement Green Cleaning Policy. Increase OA quantity 30% above ASHRAE minimum requirements and using MERV13 filters to improve indoor air quality.

Using Low Mercury light bulbs

Temperature & Humidity Control, Daylight & views

PLANET

Using 100% reclaimed rain water for irrigation

Reduced potable water usage by 20% ， about 8 millions 500cc bottle water

84% occupants using public transportation for commuting

90% construction wastes diverted from landfill

Reduce CO_2 Emissions 4.1 Million Kg, about 804 cars a year.

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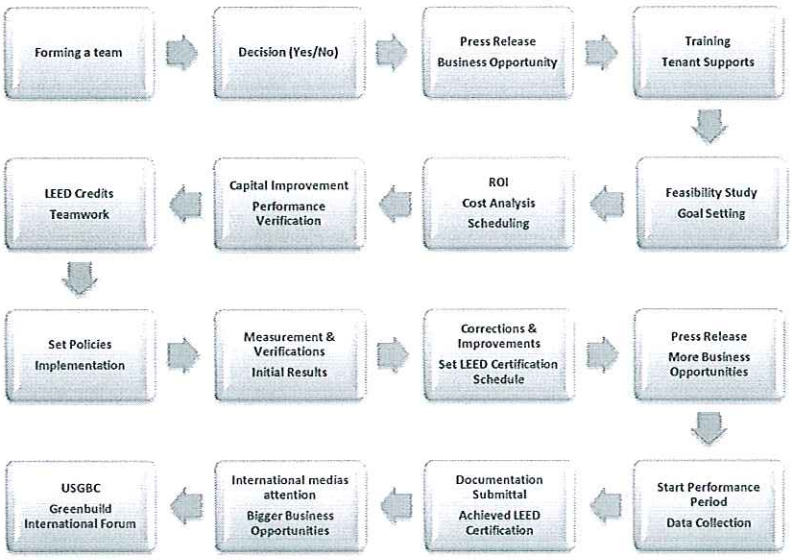
LEED - EBOM – Case Study

TAIPEI 101 Office Tower-LEED Platinum

The Process

1 Why Go Green?	2 Forming the Team	3 Evaluation & Decision Making
4 Staff Training & Tenant Involvement	5 Site Improvements	6 Water Savings
7 Optimize Energy Performance	8 Purchasing & Waste Management Operations	9 Indoor Environmental Quality & Comfort
10 Public Awareness	11 Achievement, Benefits, & Savings	12 Recertification & On-going Sustainability



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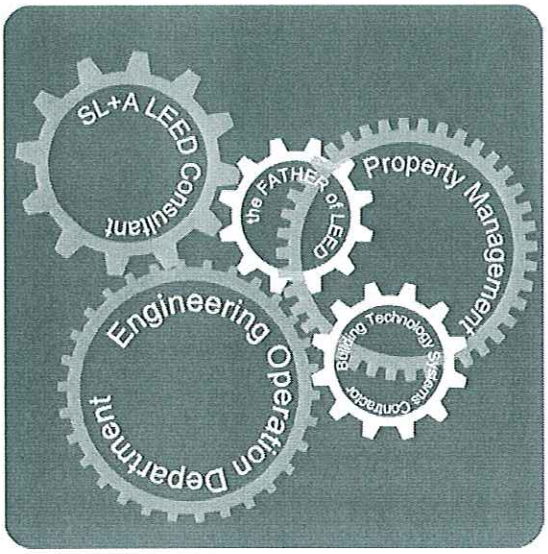
LEED - EBOM – Case Study



TAIPEI 101 Office Tower-LEED Platinum
Keys to Success
LEED Consultant : Steven Leach

- **Great Team Work/Integrated Process**
- **From Top Down**
- **Dedicated TAIPEI 101 Team**
- **Tenant Support**
- **Contractor's participation and cooperation**
- **Government**
- **And....**
- **The world's greatest Green Consulting Team**

- TAIPEI 101 LEED Platinum Series: www.sla-green.com

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LEED - EBOM – Case Study

The Riviera Hotel, Taipei

LEED Consultant:
SL+A International Asia Inc. Taiwan Branch

Year built: 1992

Floor Area: 8508 M^2

Employee: 120
Hotel Rooms: 112

LEED-EBOM 2009 Gold

Achieved:
•No potable water used for irrigation
•Energy Use Intensity is 25% lower than average
•Reduce potable water usage by 35% compares to baseline.
•Implemented Green Cleaning & Indoor Pest Control programs to ensure indoor environment quality
•Implemented waste management program, minimum 70% construction waste and 50% solid waste are diverted from landfill.
•Installed Green Roof to reduce heat island effect.

Green Investment: NTD 10,000,000

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EXISTING MANUFACTURING FACILITIES

Taiwan Semiconductor Manufacturing Company FAB 12 P1 & P2

LEED-EB:O&M 2009 Platinum

World's first LEED Platinum Semiconductor Facility

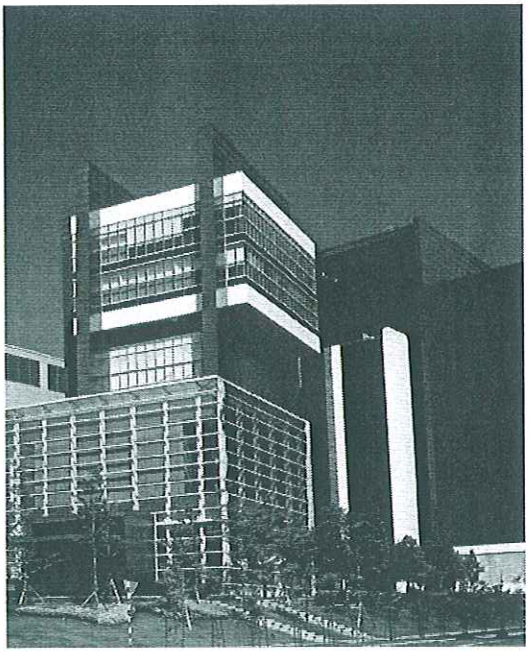
Year Built: 2001
Floor Area: 220,063 M^2
Occupancy: 3504 人

Achieved:

•No potable water used for irrigation
•surpasses average of other semiconductor facilities in the same climate zone by 80%.
•Out performing 99% of semiconductor facilities in the same climate zone.
•Use 100% reclaimed water for toilet room flushing
•91% cooling tower make-up water from reclaimed process water
•63% employees use buses provided by TSMC for commuting
•85% solid waste diverted from landfill. 100% electronic wastes are recycled.

Green Investment: NTD 8,000,000
about 8,000 man hours

LEED EXISTING CAMPUS



Taiwan Semiconductor Manufacturing Company Headquarters

LEED-EB:O&M 2009 Gold

Taiwan first LEED Campus Program

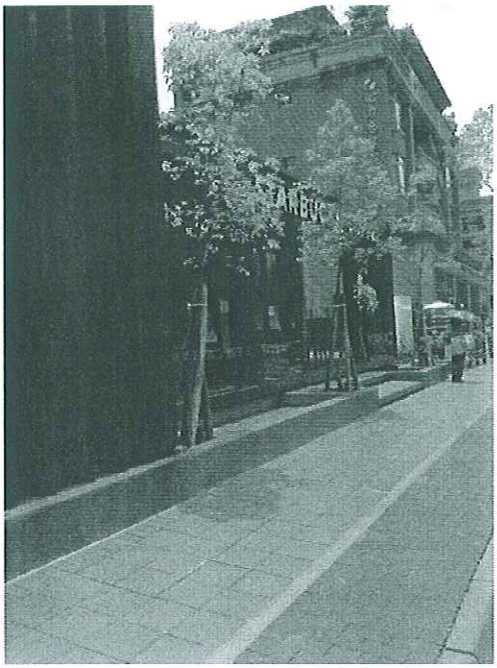
Year Built: 2001
FAB Floor Area: 220,063 M^2
Office Floor Area: 55,167 M^2
Campus Site Area: 73,066 M^2

Achieved:

•LEED Campus Program
•All site lighting with shield to reduce light pollution
•Headquarter Office Energy Performance is 43% better than other office building average energy use in the same climate.
•EUI = 503.8kwh/m2-yr
•IT Data Center uses 44.5% of total Electricity，or 24.8% of total energy

•Achieved LEED certification for both building and Master site within 15 months.

COMMERCIAL INTERIOR – VOLUME CERTIFICATION



Starbucks Coffee Neihu & TAIPEI 101 Branch LEED- CI Retail Volume Certification Pilot Program

Year Built: 2011

Floor Area: 284 M2

Seats: 42

Target: LEED-CI v2.0 Retail Silver

Taiwan first restaurant chain apply for LEED-CI Retail
First retail chain participate LEED Volume Certification

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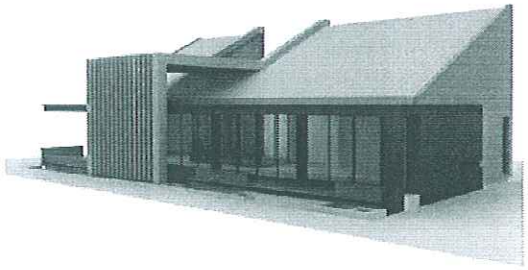
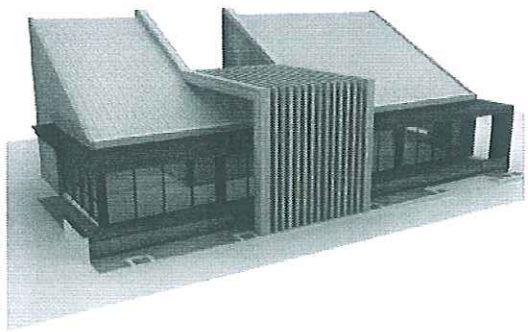
COMMERCIAL INTERIOR – VOLUME CERTIFICATION

Starbucks Coffee Neihu & TAIPEI 101 Branch





Achieved:

•Using 100% collected rain water for irrigation
•Individual AC zone control › Provides ASHRAE required OA
•Reduce potable water and process water usage by 56% › about 1.3 million 500ml bottle water
•Bicycle rack and repair kit.
•Lighting Power density is 57% lower than ASHRAE baseline. 9.6 million watts savings per year.
•92% construction waste diverted from landfill
•52% of the construction materials are made within 500 mile radius.

Target : LEED-CI v2.0 Retail Silver

Business performance is two times better than expected revenue.

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LEED - CI – Case Study

Citibank Taiwan Limited Business Dept.

LEED CI Gold

Citibank Building 1F & 2F

LEED Consultant:
SL+A International Asia Inc. Taiwan Branch

Year Completed: 2009

Floor Area: 3310 M^2

Employee: 250

The First LEED Commercial Interior project achieved LEED certification in Taiwan

The First LEED project in Taipei

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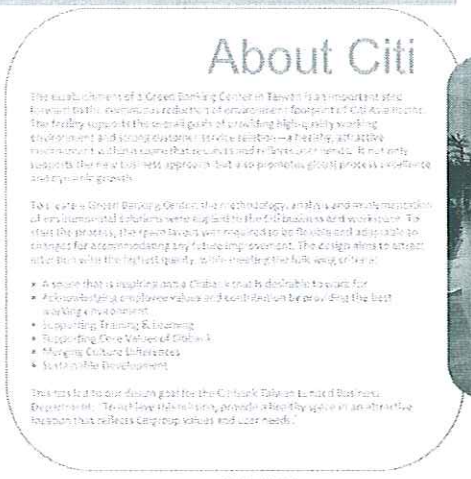
LEED - CI – Case Study

Citibank Taiwan Limited Business Dept.



- 36.5% Water Use Reduction
- Heat Island Reduction 100% of building parking is underground.
- Optimize Energy Performance
  Reduce lighting power density to 17.5% below baseline.
  93.8% of ENERGY STAR eligible equipment is ENERGY STAR rated.
  Daylight responsive controls in all regular occupied space within 15 feet of windows.
- Daylight & View – Views for 91.6% of seated spaces
- Low-Emitting Materials
  Paints & Coating, Carpet Systems, System Furniture & Seating
- Construction Waste Management Divert 56.2% from Landfill

- Recycled Content
  14.2% of total building materials (by cost value) have been manufactured using recycled materials
- Regional Materials
  71.8% of total building materials (by cost value) have been manufactured within 500 miles of the project site.
  33.2% of total building materials (by cost value) have been extracted, processed & manufactured within 500 miles of the project site.
- Outside Air Delivery Monitoring
  A CO_2 sensor is installed within each densely occupied space. Space outdoor air quantity is monitored.
- Construction IAQ M

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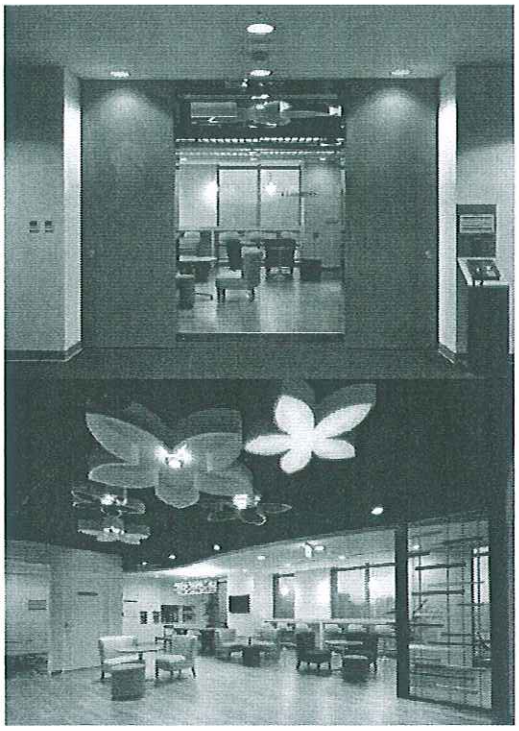
LEED - CI – Case Study



DBS Business Center, Taiwan
LEED CI Certified

LEED Consultant:
SL+A International Asia Inc. Taiwan Branch

Floor Area: 5790 M2
Xin-Yi A12 Building 15，16 & 17F, Taipei, Taiwan

Attempting:
•Reduce Lighting Power Density by 15% compares to baseline.
•90% electronic devices and appliances have Energy Star(USA) label
• Use 20% regional materials，use minimum 10% of materials with recycled contain, use 100% certified carpet system。
•Minimum 50% construction waste to be diverted from landfill
•Use low VOC paint. Provide required outdoor air with CO2 monitoring systems.
•Thermal Comfort – provides HVAC zone controls.

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LEED Projects

正在進行案例

Chang Gang Hospital
Seeking : LEED Health Care Platinum

Client : **Chang Gang Hospital**

• LEED Consultant : **Steven Leach Taipei &** Siemens

Farglory Global Headquarters

Seeking LEED NC Gold

• Client : **Farglory**

• LEED Consultant : **Steven Leach Taipei &** Siemens

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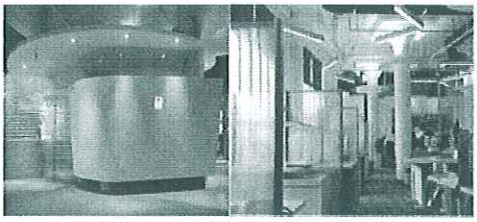
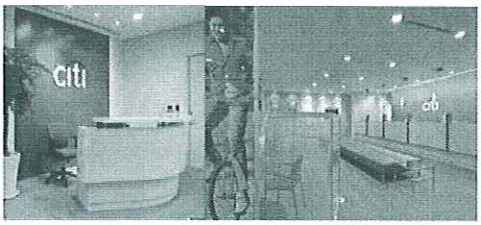
LEED Projects Successful Case





Steven Leach Shanghai Office

LEED CI Gold

- Interior Designer : **Steven Leach Shanghai**
- LEED Consultant : **Steven Leach**
- Completion 2011

Steelcase Global Shared Service

LEED CI Silver

- Interior Designer : **Steven Leach KL , MY**
- LEED Consultant : **Steven Leach, Taipei**

Citibank Song San , Tu Cheng & San Min Branches

LEED CI v3.0 Silver & Gold

- Interior Designer : **Steven Leach Taipei**
- LEED Consultant : **Steven Leach**
- Completion 2011

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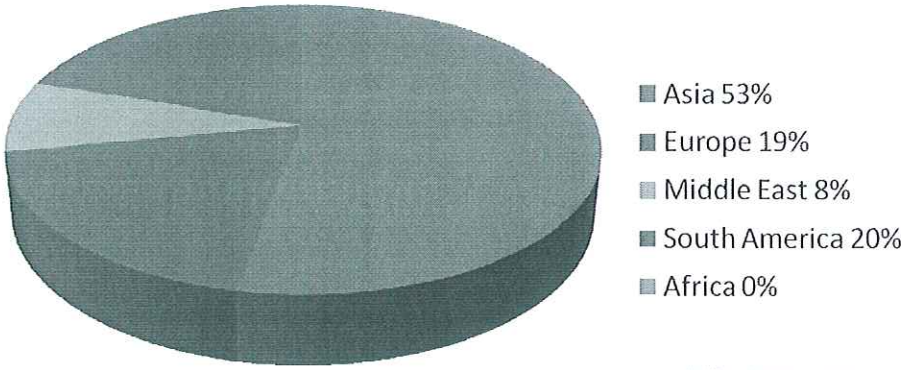
LEED TRENDS

Commercial LEED Registered Projects: > 40, 000*

Commercial LEED Certified Projects: >11,000* *As of June 2012

In 2011 the overall international project floor areas exceeds the floor areas in the North America.

2011 LEED by Region excluding North America
(% of Registered LEED Floor Space)



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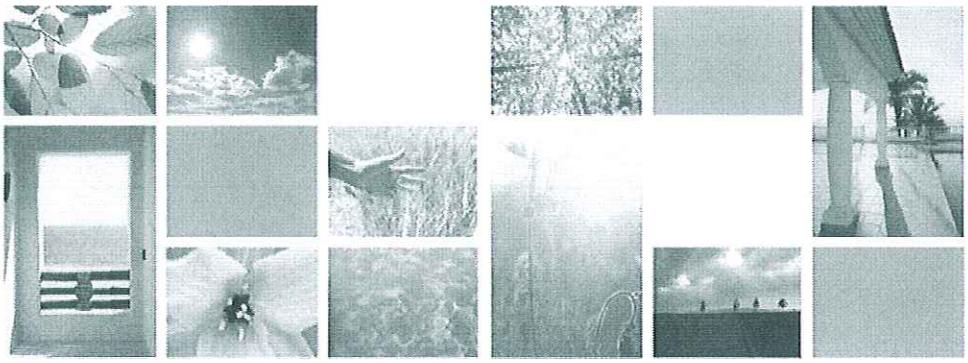

Thank You
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