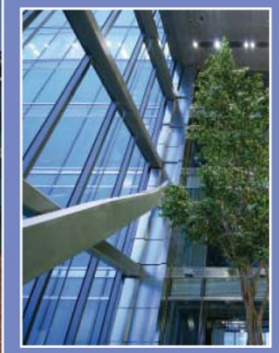
LEED Building Certification & Case Studies

Euro-Construction: International Conference on Sustainable Constructions and Energy Efficiency



EPSTEIN

May 15, 2012

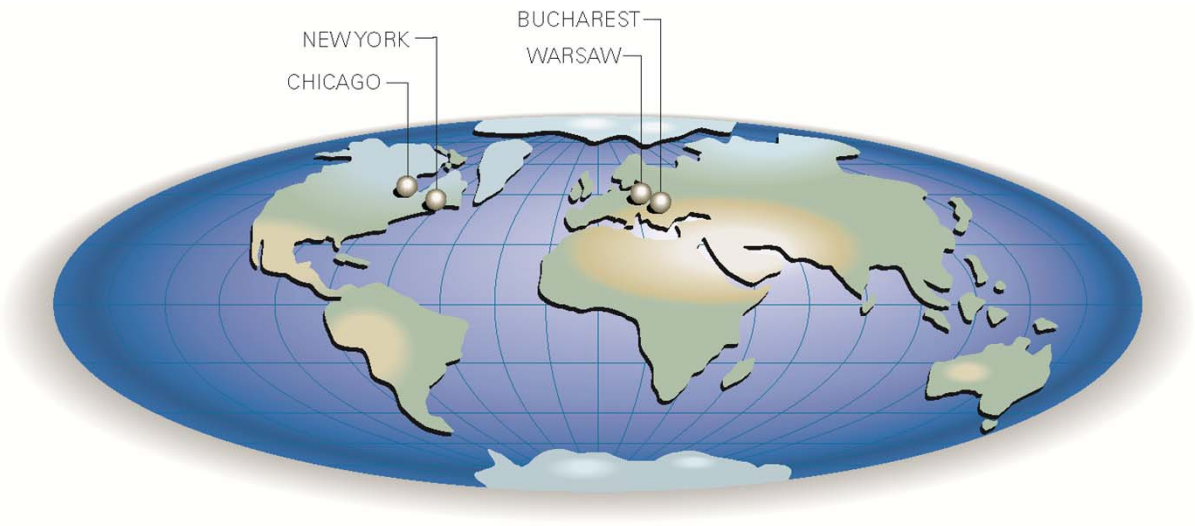
Presentation by: Randy Tharp, Reg. Architect
Epstein – Managing Director Romania

Epstein Services and Office Locations

Architecture & Planning
Civil Engineering
Construction
Interior Design
Engineering
Strategic Services

LEED/Sustainability

- Sustainable Design
- Energy Audits
- Carbon Footprint Analysis
- LEED Consulting
- LEED Feasibility Assessments
- Alternative Energy Design
- BREEAM Building Assessments

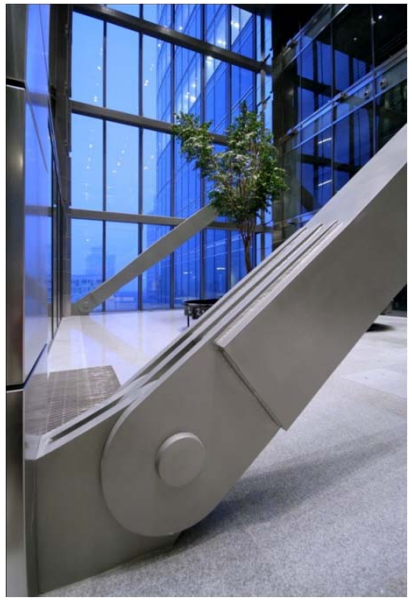
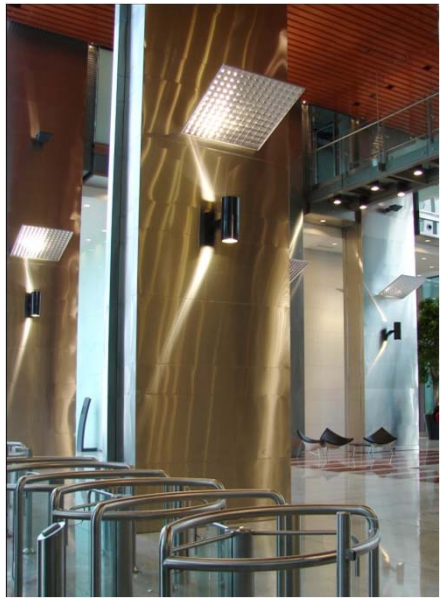


Epstein Experience and Lessons Learned in Sustainable Design/LEED Certification on 1.1 million sqm of building projects.

Over 3% of all registered LEED projects have involved Epstein.

Agenda

- Why Green Certification for Buildings?
- What is LEED?
- Developing a LEED/Sustainable Existing Building
- Case Study - RONDO 1
- Developing a LEED/Sustainable New Building
- Case Study – Platinum Business Center

Why Green Building Certification?

Several Green Building Certification Programs

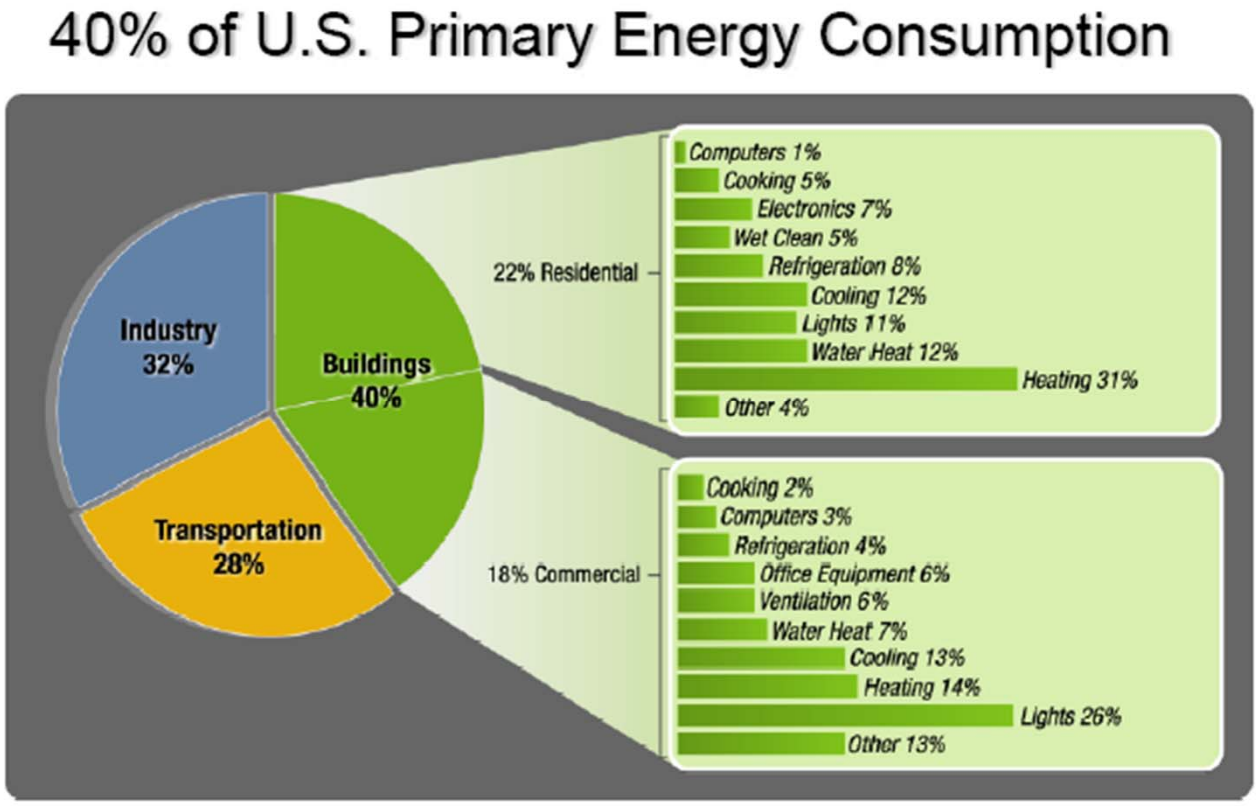
- LEED – US Green Building Council
- BREEAM – Building Research Establishment
- DGNB - Germany
- Estidama – Abu Dhabi
- Green Star – Australia

All Promote/Provide

- Lower Operating Costs
- Energy Efficiency/Reduction
- Water Efficiency
- Healthier Places to Live, Work, Study & Play
- CO_2 Emissions Reduction
- Differentiation in the Marketplace & Higher Reputation/Marketability
- Improved Indoor Environmental Quality
- Recycling/Conservation of Natural Resources
- Better Stewardship of the Environment

Why Green Building Certification?

Reduce the Impact on Our Environment



Why Green Building Certification?

Improve the Workplace Environment

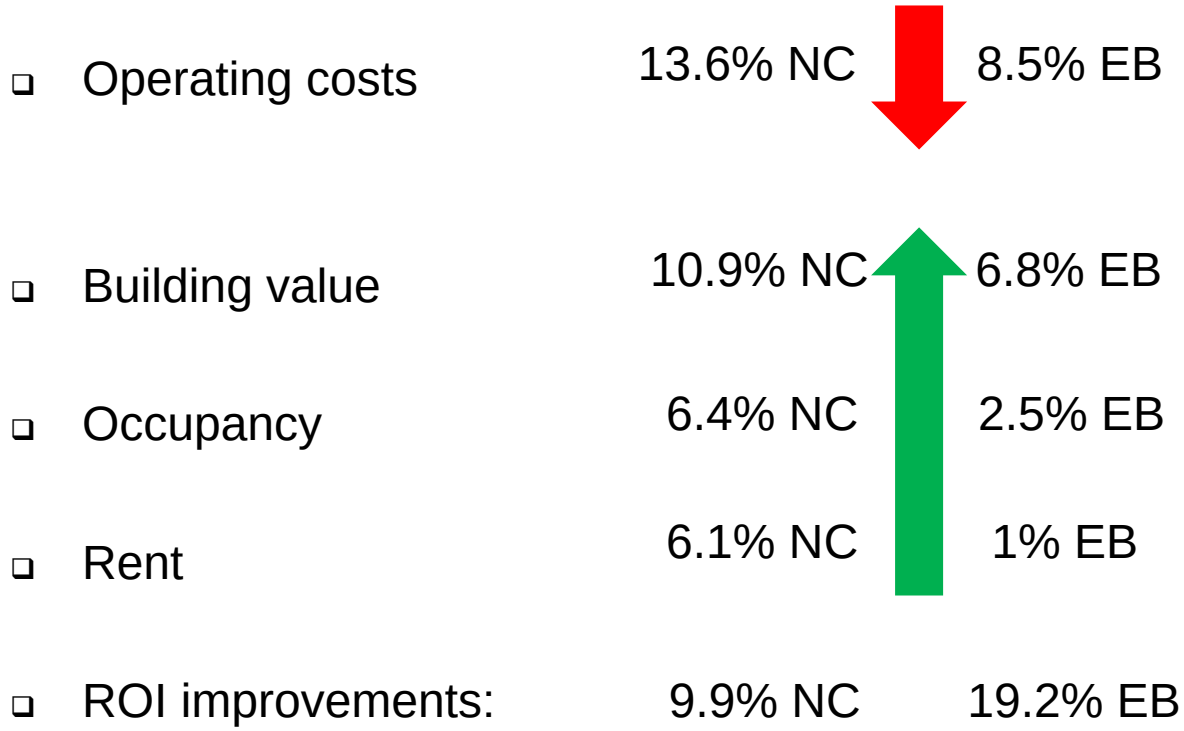
- Better Air Quality
- Improved Lighting
- Better Views
- Reduced Absenteeism
- Higher Worker Productivity

Table 5. Predicted costs and benefits from increasing ventilation in an office building [34].

Change in Ventilation Rate (L/s-person)	Annual Cost Increase (€ per person)			Increase in Performance		Benefit-Cost Ratio
	Energy Consumption	Maintenance	Equipment (annualized)	%	€ per person	
6.5 to 10	4.4	4.7	22.5	1.0	300	9.4
6.5 to 20	22.5	13.3	63	2.3	690	7.0
10 to 20	18.1	8.5	41	1.4	420	6.2

Why Green Building Certification?

Benefits Reported by Owners from Green Projects:



NC - new construction projects

EB - existing buildings-retrofit/renovation green projects

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

What is LEED?

LEED (**L**eadership in **E**nergy and **E**nvironmental **D**esign)

- Internationally Recognized
- **Green Building Certification Program**
- Third-Party Verification
- Administered and Awarded by the U.S. Green Building Council

Promotes buildings that are **environmentally responsible, profitable,** and **healthy places to live and work.**

Uses strategies aimed at improving the following environmental metrics:

- Energy savings
- Water efficiency
- CO_2 emissions reduction
- Improved indoor environmental quality
- Stewardship of resources and sensitivity to their impacts

What is LEED?

Various LEED rating systems provide flexibility for **all building types**:

LEED for Green **Building Design and Construction**

- **LEED-CS**, (Core & Shell for Multi-tenant)
- **LEED-NC**, (New Construction)
- **LEED for Schools**

LEED for Green **Interiors Design and Construction**

- **LEED-CI** (Commercial Interiors)

LEED for Green **Building Operations and Maintenance**

- **LEED-EBOM** (Existing Building Oper. & Maint.)

Other:

- LEED for Neighborhood Development
  - **LEED-ND** (Neighborhood Development)
- LEED for Homes
- LEED Application Guide for Healthcare

What is LEED?

Certification Levels:

LEED **CERTIFIED**		**40 to 49 Points**
LEED **SILVER**		**50 To 59 Points**
LEED **GOLD**		**60 to 79 Points**
LEED **PLATINUM**		**80 to 110 Points**

What is LEED?

Point Distribution for Main LEED Categories

Areas of Emphasis	NC – New Construction	CS – Core & Shell	EBOM – Existing Bldg. Oper. & Maint.
Sustainable Sites	**26**	**28**	**26**
Water Efficiency	10	10	14
Energy & Atmosphere	**35**	**37**	**35**
Materials & Resources	14	**13**	10
Indoor Environmental Quality	**15**	12	**15**
Innovation & Design Process	6	6	6
Regional Priority Credits	4	4	4

LEED in Romania

LEED Certified Buildings

- Nokia Jucu Factory – LEED NC 2.2 Gold (Nokia)

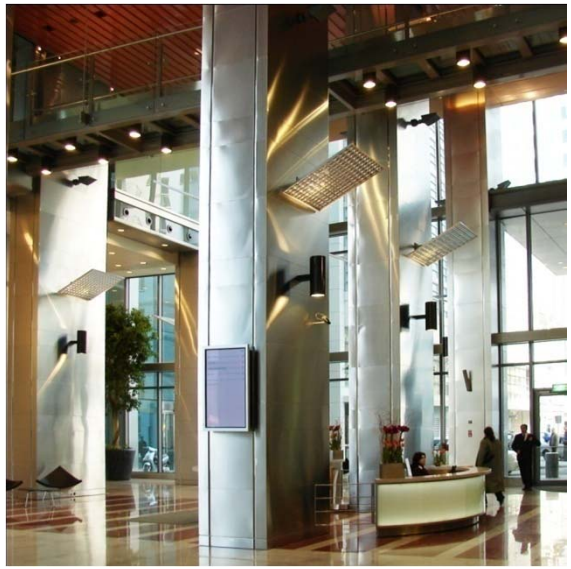
Buildings Registered or Pursuing LEED Certification

- Ana Tower – LEED-CS (GTC Romania)
- City Gate North Tower – LEED-EB:OM (GTC Romania)
- City Gate South Tower – LEED-EB:OM (GTC Romania)
- Floreasca 169 A – LEED-EB:OM (Portland Trust s.r.o)
- Cathedral Plaza – LEED – NC (Willbrook Development)
- Platinum Business Center – LEED – NC (Willbrook Development)

Developing a LEED/Sustainable Existing Building

Key Areas of Focus:

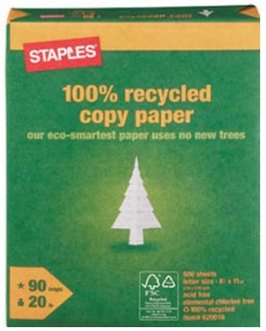
- Operations and Maintenance
- Reporting and Verification
- Awareness and Participation



Operations and Maintenance

Policies and Plans:

- **Purchasing**
  - Environmental and Economical Impacts



- **Waste Management**
- **Water Reduction**
- **Pest Management**
- **Green Cleaning**
  - Interior
    - Products
  - Exterior
    - Hand Cleaning - **Saves Energy, Less Pollution, Less Noise**

LEED EB:OM

Operations and Maintenance

Audits:

- **ASHRAE Energy Audit -** (American Society of Heating, Refrigerating and Air-conditioning Engineers)
  - Major renovations
  - Low-cost changes

  Improves energy usage & maintenance cost savings

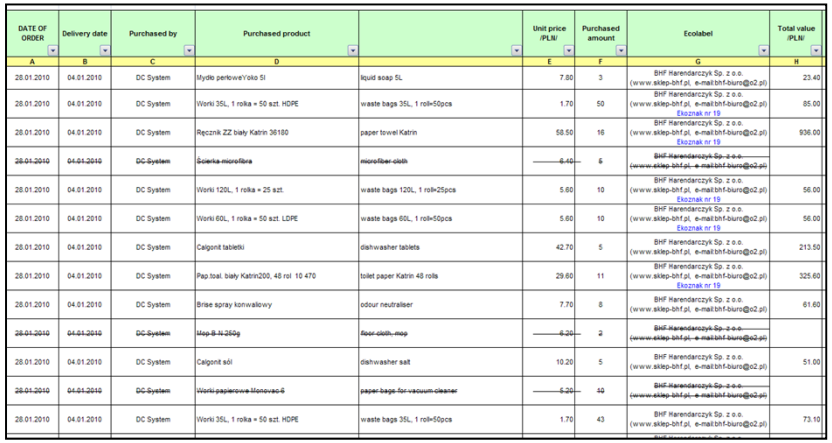
- **Indoor Air Quality Audit**

- **Manufacturer Recommendations**
  - Calibration
  - Accuracy
  - Full use of Equipment

Reporting and Verification

Reporting:

- Tracking
- Maintenance Logs
- Metering
- Energy and Water Bills



DATE OF ORDER	Delivery date	Purchased by	Purchased product		Unit price /PLN/	Purchased amount	Ecolabel	Total value /PLN/
A	B	C	D		E	F	G	H
28.01.2010	04.01.2010	DC System	Mydło perłowe Yoko 5l	liquid soap 5L	7.80	3	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)	23.40
28.01.2010	04.01.2010	DC System	Worki 35L, 1 rolka = 50 szt. HDPE	waste bags 35L, 1 roll=50pcs	1.70	50	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl) Ekoznak nr 19	85.00
28.01.2010	04.01.2010	DC System	Ręcznik ZZ biały Katrin 36180	paper towel Katrin	58.50	16	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl) Ekoznak nr 19	936.00
~~28.01.2010~~	~~04.01.2010~~	~~DC System~~	~~Ścierka microfibra~~	~~microfiber cloth~~	~~6.40~~	~~5~~	~~BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)~~	
28.01.2010	04.01.2010	DC System	Worki 120L, 1 rolka = 25 szt.	waste bags 120L, 1 roll=25pcs	5.60	10	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl) Ekoznak nr 19	56.00
28.01.2010	04.01.2010	DC System	Worki 60L, 1 rolka = 50 szt. LDPE	waste bags 60L, 1 roll=50pcs	5.60	10	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl) Ekoznak nr 19	56.00
28.01.2010	04.01.2010	DC System	Calgonit tabletki	dishwasher tablets	42.70	5	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)	213.50
28.01.2010	04.01.2010	DC System	Pap.toal. biały Katrin200, 48 rol 10 470	toilet paper Katrin 48 rolls	29.60	11	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl) Ekoznak nr 19	325.60
28.01.2010	04.01.2010	DC System	Brise spray konwallowy	odour neutraliser	7.70	8	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)	61.60
~~28.01.2010~~	~~04.01.2010~~	~~DC System~~	~~Mop B N 250g~~	~~floor cloth, mop~~	~~6.20~~	~~2~~	~~BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)~~	
28.01.2010	04.01.2010	DC System	Calgonit sól	dishwasher salt	10.20	5	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)	51.00
~~28.01.2010~~	~~04.01.2010~~	~~DC System~~	~~Worki papierowe Monovac 6~~	~~paper bags for vacuum cleaner~~	~~5.20~~	~~10~~	~~BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)~~	
28.01.2010	04.01.2010	DC System	Worki 35L, 1 rolka = 50 szt. HDPE	waste bags 35L, 1 roll=50pcs	1.70	43	BHF Harendarczyk Sp. z o.o. (www.sklep-bhf.pl, e-mail:bhf-biuro@o2.pl)	73.10

Verification (for LEED Certification):

- Review by Maintenance Personnel

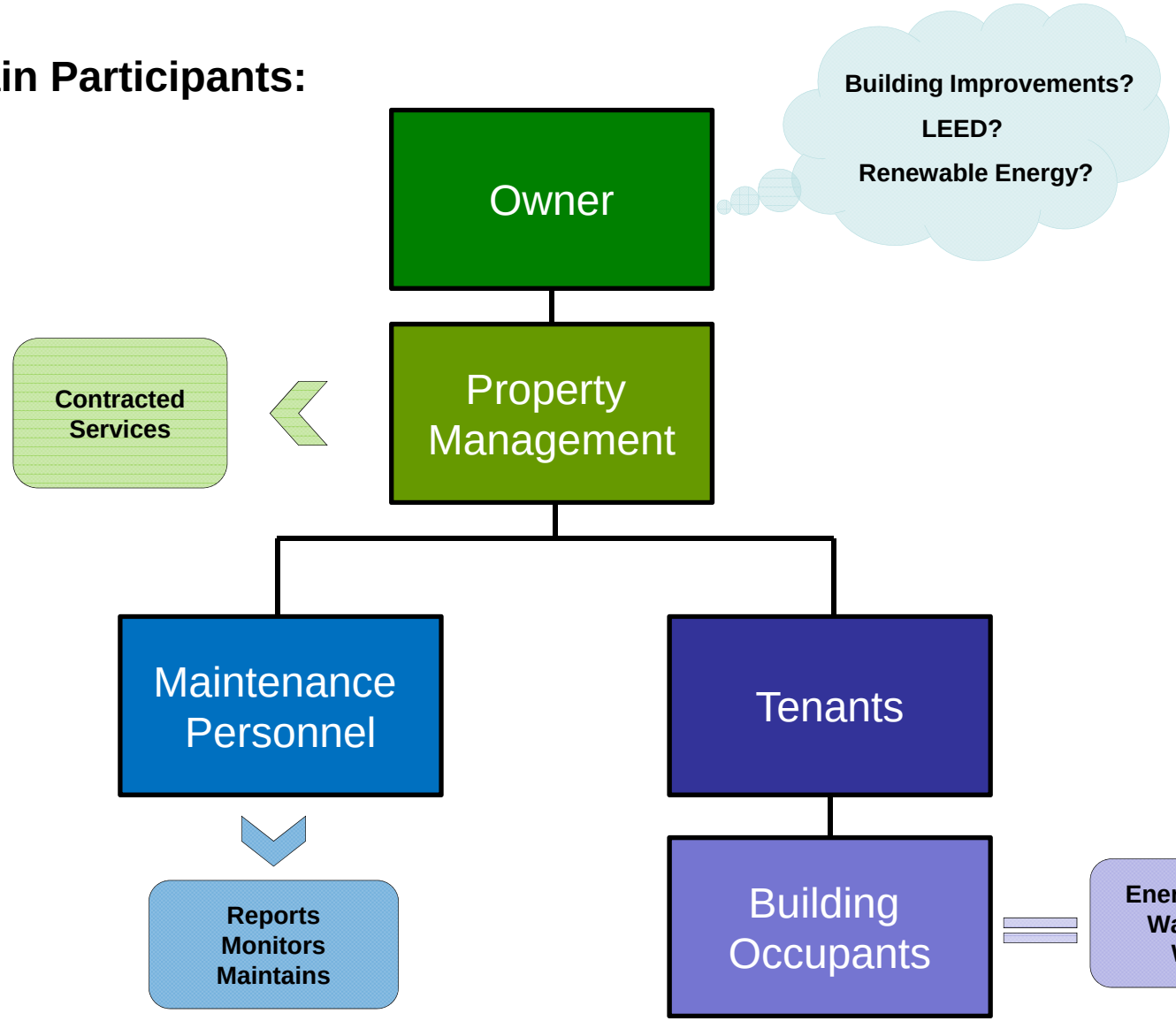
  Review for any abnormalities

- Review by a LEED Consultant
  - LEED is strict and complex
  - Consultant is a knowledge base
- Submitted to a USGBC review team

  Third party review team

Awareness and Participation

Main Participants:



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Associated Costs

- **USGBC Fees**

<u>Other Potential Costs for LEED EB:OM:</u>

- **Major Renovation Upgrades**

  Examples:
  - Green Roof
  - PV Panels
  - Equipment upgrades

- **Low Cost Upgrades**

  Examples:
  - Additional aerators, meters, lamps, maintenance equipment etc.
  - Increased Contracted Services Costs
  - Premiums for Environmentally Friendly Products

- **Employee Time**

- **LEED Consultant**

***** Costs are based entirely on the individual project****

RONDO 1

Site Address:
Rondo ONZ 1
PL 00-124 Warszawa
Poland

2 Buildings
Building A : 9 Levels
Building B: 42 Levels
(not including underground parking)

63 Tenants

Building Area:
102,438 m2 (1,102,633.46 ft2)

Site Area:
5832 m2 (62,775.13 ft 2)

Year Built:
2006

LEED Scorecard

CERTIFIED
40 – 49 points

SILVER
50 – 59 points

GOLD
60 – 69 points

PLATINUM
80 – 110 points

LEED EB:OM

LEED for Existing Building: Operations & Maintenance v 2009

Rondo 1
Certification Level: Gold
February 2, 2011

61 Points Achieved — **Points Possible: 110**

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

15 Sustainable Sites — Possible Points: 26

	Credit 1	LEED Certified Design and Construction	4
1	Credit 2	Building Exterior and Hardscape Management Plan	1
1	Credit 3	Integrated Pest Management, Erosion Control, and Landscape Management	1
12	Credit 4	Alternative Commuting Transportation	3 to 15
	Credit 5	Site Development- Protect or Restore Open Space	1
	Credit 6	Stormwater Quantity Control	1
1	Credit 7.1	Heat Island Reduction - Non-Roof	1
	Credit 7.2	Heat Island Reduction - Roof	1
	Credit 8	Light Pollution Reduction	1

7 Water Efficiency — Possible Points: 14

Y	Prereq 1	Minimum Indoor Plumbing Fixture and Fitting Efficiency	Required
2	Credit 1	Water Performance Measurement - whole building metering	1 or 2
5	Credit 2	Additional Indoor Plumbing Fixture and Fitting Efficiency	1 to 5
5	Credit 3	Water Efficient Landscaping	1 to 5
	Credit 4	Cooling Tower Water Management	1 to 2

16 Energy & Atmosphere — Possible Points: 35

Y	Prereq 1	Energy Efficiency Best Management Practices	Required
Y	Prereq 2	Minimum Energy Efficiency Performance	Required
Y	Prereq 3	Refrigerant Management - Ozone Protection	Required
11	Credit 1	Optimize Energy Efficiency Performance	1 to 18
2	Credit 2.1	Existing Building Commissioning - Investigation and Analysis	2
2	Credit 2.2	Existing Building Commissioning - Implementation	2
	Credit 2.3	Existing Building Commissioning - Ongoing Commissioning	2
1	Credit 3.1	Performance Measurement - Building Automation System	1
	Credit 3.2	Performance Measurement - System-Level Metering	1 to 2
	Credit 4	Renewable Energy - On-site 3% / Off-site 25%	1 to 6
	Credit 5	Refrigerant Management	1
	Credit 6	Emissions Reduction Reporting	1

3 Materials & Resources — Possible Points: 10

Y	Prereq 1	Sustainable Purchasing Policy	Required
Y	Prereq 2	Solid Waste Management Policy	Required
	Credit 1	Sustainable Purchasing - Ongoing Consumables	1
	Credit 2	Sustainable Purchasing - Durable Goods	1
	Credit 3	Sustainable Purchasing - Facility Alterations and Additions	1
1	Credit 4	Sustainable Purchasing - Reduced Mercury in Lamps	1
	Credit 5	Sustainable Purchasing - Food	1
1	Credit 6	Solid Waste Management - Waste Stream Audit	1
	Credit 7	Solid Waste Management - Ongoing Consumables	1
1	Credit 8	Solid Waste Management - Durable Goods	1
	Credit 9	Solid Waste Management - Facility Alterations and Additions	1

8 Indoor Environmental Quality — Possible Points: 15

Y	Prereq 1	Outdoor Air Introduction and Exhaust Systems	Required
Y	Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
Y	Prereq 3	Green Cleaning Policy	Required
	Credit 1.1	IAQ Best Management Practices - IAQ Management Program	1
	Credit 1.2	IAQ Best Management Practices - Outdoor Air Delivery Monitoring	1
	Credit 1.3	IAQ Best Management Practices - Increased Ventilation	1
1	Credit 1.4	IAQ Best Management Practices - Reduce Particulates in Air Distribution	1
	Credit 1.5	IAQ Best Management Practices - IAQ Management for Facility Alterations and	1
	Credit 2.1	Occupant Comfort - Occupant Survey	1
1	Credit 2.2	Occupant Comfort - Occupant Controlled Lighting	1
1	Credit 2.3	Occupant Comfort - Thermal Comfort Monitoring	1
1	Credit 2.4	Occupant Comfort - Daylight and Views	1
1	Credit 3.1	Green Cleaning - High Performance Cleaning Program	1
1	Credit 3.2	Green Cleaning - Custodial Effectiveness Assessment	1
	Credit 3.3	Green Cleaning - Sustainable Cleaning Products and Materials	1
	Credit 3.4	Green Cleaning - Sustainable Cleaning Equipment	1
1	Credit 3.5	Green Cleaning - Indoor Chemical and Pollutant Source Control	1
1	Credit 3.6	Green Cleaning - Indoor Integrated Pest Management	1

3 Innovation & Design Process — Possible Points: 6

1	Credit 1	Innovation in Operations	1 to 4
1	Credit 1.1	Exemp Performance of SSc7.1	1
	Credit 1.2	Exemp Performance MRc9	1
1	Credit 1.3	Exemp Performance MRc4 (Mercury 70 pictograms)	1
	Credit 1.4	Innovation in Operation, Education Plan	1
1	Credit 2	LEED® Accredited Professional	1
1	Credit 3	Documenting Sustainable Building Cost Impacts	1

4 Regional Priority — Possible Points: 4

1	Credit 1.1	WEc1: Water Performance Measurement	1
1	Credit 1.2	WEc2: Additional Indoor Plumbing Fixture and Fitting Efficiency	1
1	Credit 1.3	WEc3: Water Efficient Landscaping	1
1	Credit 1.4	EAc1: Optimize Energy Performance	1

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GREEN FEATURES

1 Alternative Transportation

63%

2 Exterior Hardscape Management

Deicer

Hand Cleaning

Eco-Flower

3 Indoor Pollutant Source Control

Entrance Mats

4 Underground Parking

100%

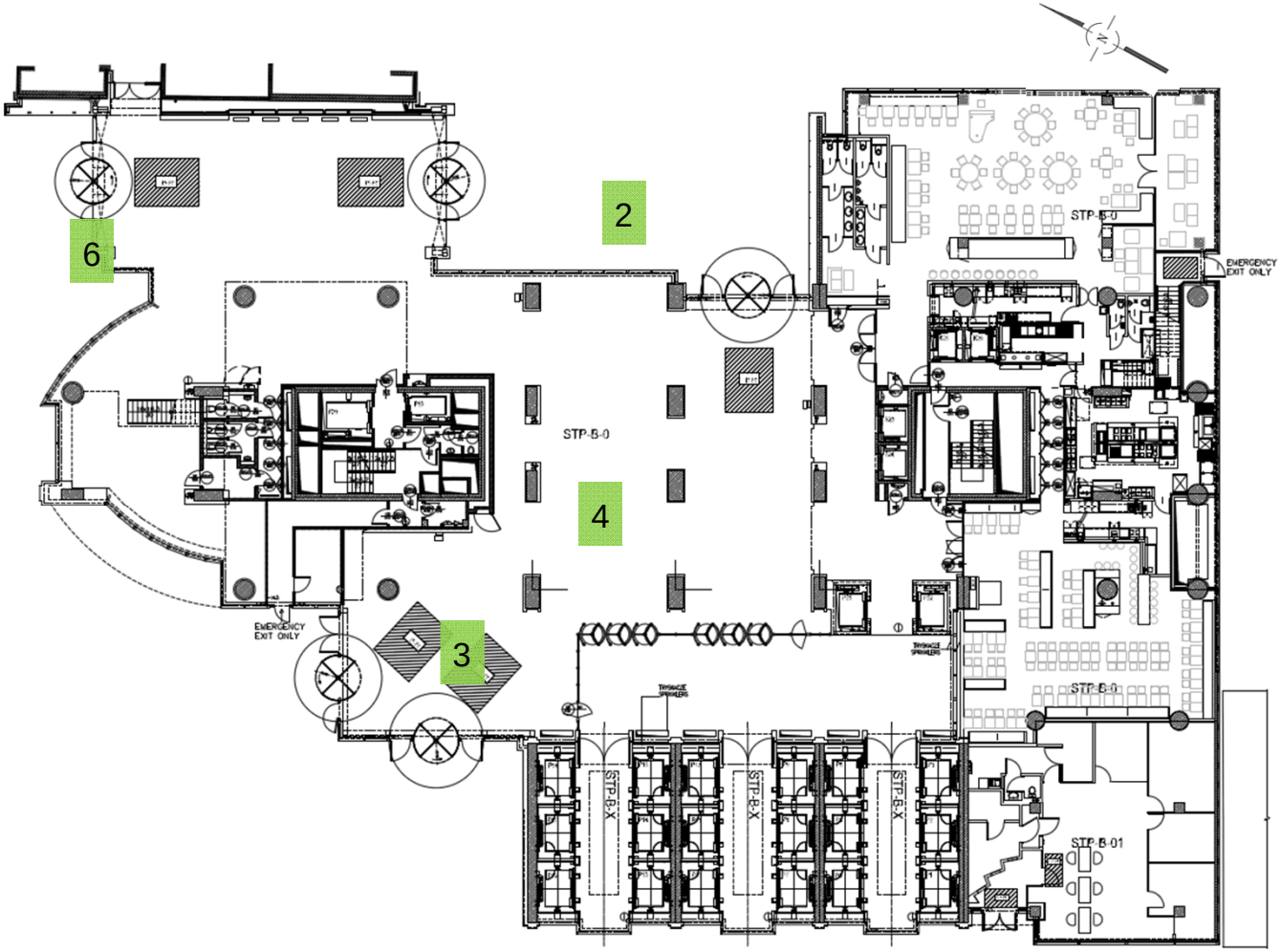
5 Green Roof

Low Maintenance

Zero Irrigation

6 No Smoking

Designated Smoking

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GREEN FEATURES

1 Water Efficiency

31.5%

2 Energy Efficiency

85

EnergySTAR Score

3 Recycling Program

44%

4 User Controllability

64%

Individual

100%

Multi-Occupant

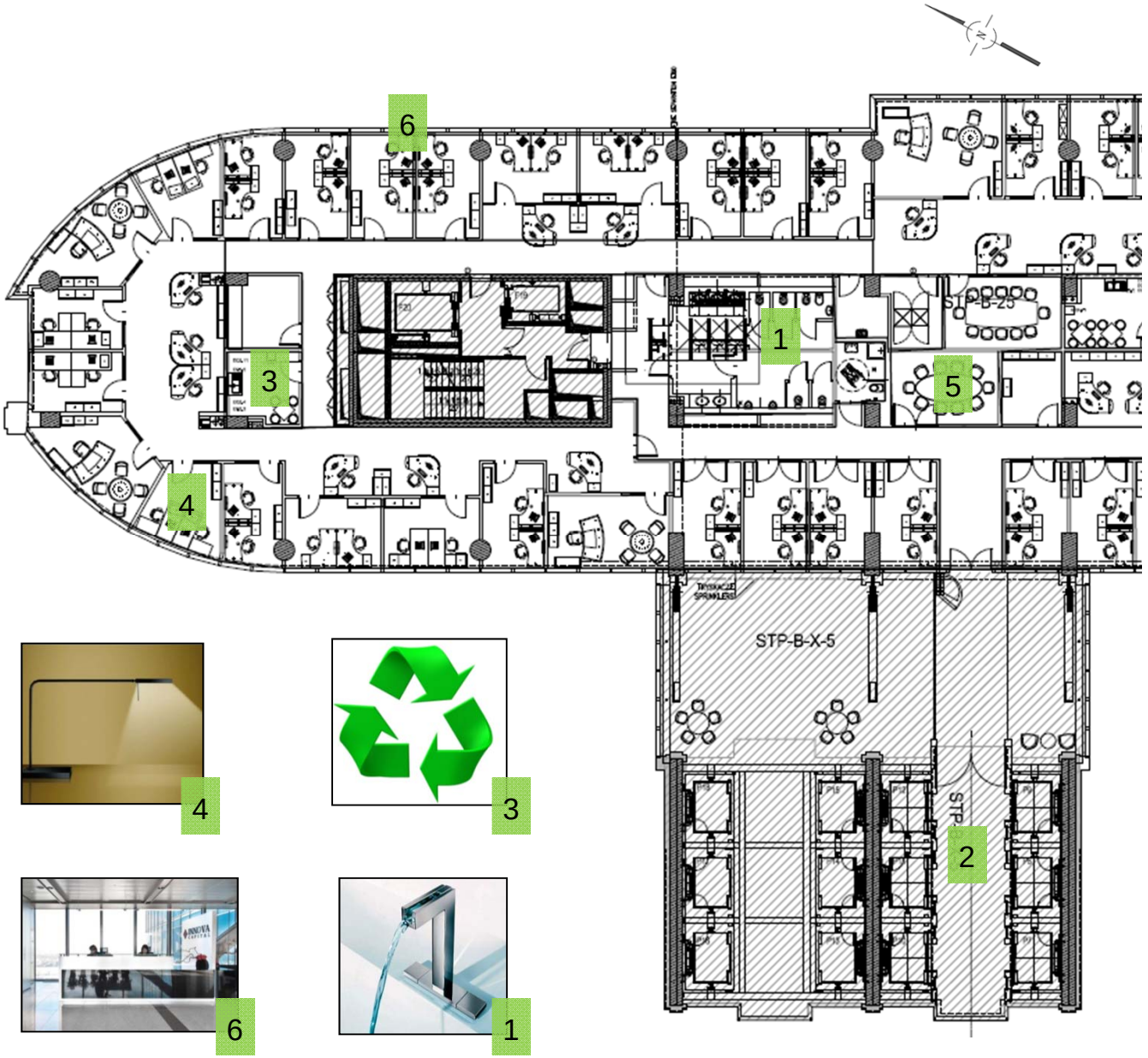
5 Lamps

Efficient

Low-Mercury

6 Daylighting Views

86%



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Creative Solutions for a Sustainable Future

Success Facts

- Estimated Annual Water Usage:
  Baseline Building - **2852.76** kGal
  Rondo 1 - **2139.6 kGal**
  Estimated water savings: 713.16 kGal/yr
  1 gal = about 1 flush , equal to about 700,000 flushes a year

- **ZERO** Permanent Irrigation

- **1554** People Took Public Transportation (**63%** of the Total Number of Occupants)

- **2120** Workstations and Private Offices have Individual Lighting Control

- Estimated Annual Energy Intensity:
  U.S. National Average - **335** kBtu/SF **US EPA Energy Star Portfolio Manager Data
  Rondo 1 - **225 kBtu/SF**
  Estimated Energy Savings : 110 kBtu/SF
  Approximately 1,100,000 SF in Rondo 1
  Estimated Total Annual Savings: 121,000,000 kBtu

- New **Tenant Awareness**

Developing a LEED/Sustainable New Building

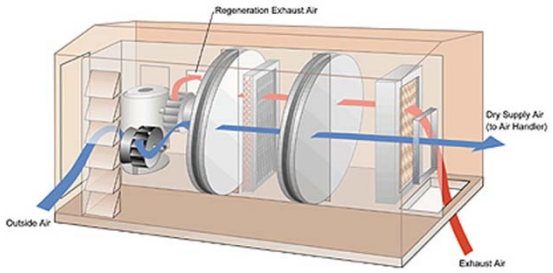
Key Areas of Focus:

- Energy Consumption – HVAC & Lighting
- Building Envelope/Enclosure
- Site Design & Transportation Access
- Renewable Energy
- Commissioning, Documentation & Reporting

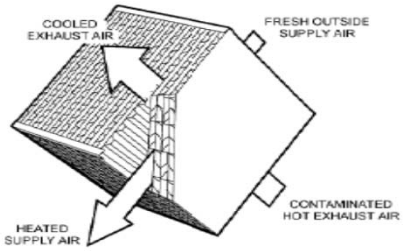
Energy Consumption – HVAC

HVAC

- High Efficiency Equipment
- Economizer Cycles
- Heat Recovery
- Friendly Refrigerants
- Separate Metering
- Smart Controls – BMS (Building Management System)
- Demand & Local Controls



Heat Wheel



Air to Air Exchanger

Demand Ventilation

Individual Metering

Absorption Chillers

Energy Consumption – Lighting

Lighting

- LED Fixtures
- Task Lighting
- High Efficiency Fluorescent
- Natural Daylighting
- Photocell / Motion Control
- Separate Metering
- Smart Controls – BMS (Building Management System)

Roof Skylights

LED Task Light

Individual Metering

Motion Light Control

High Efficiency Fluorescent

Building Envelope/Enclosure & Site Considerations

Building Enclosure

- High Efficiency Glazing – E films, Double Glazing
- Higher Thermal Insulation
- Reflective Roofing
- Green Roof

Green Roof

Reflective Roof

Site Considerations

- Access To Transportation
- Bike & Alternative Vehicle Accommodations
- Storm Water Control
- Parking
- Landscape Irrigation

Biking to Work

Onsite Storm Water Detention Pond

Alternative Vehicles

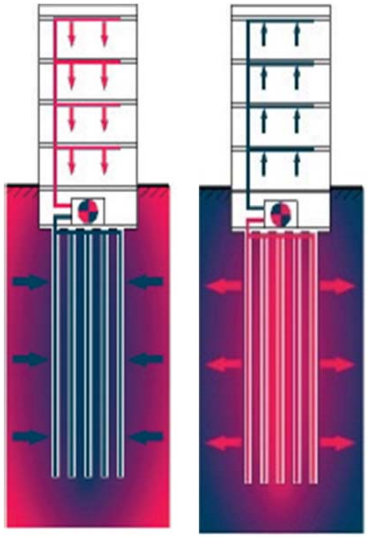
Renewable Energy

Renewable Energy Sources

- PV (Photovoltaic) Panels
- Wind Turbines
- Solar Heating
- Geothermal Heating & Cooling

Blade Turbine

Axial Wind Turbine



Geothermal Drilled Systems

Solar Collector – Hot Water

PV Electric Panels

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Creative Solutions for a Sustainable Future

Platinum Business Center

Site Location:
DN1 Baneasa
Bucharest, Romania

2 Buildings
Including Office,
Convention Space and
Underground Parking

Building Area:
64,462 square meters

Certification:
Pursuing LEED Silver/Gold

Year Completed:
2011

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Creative Solutions for a Sustainable Future

GREEN FEATURES

1 Alternative Transportation

Bus Access

FEV Parking

Bicycle Racks & Showers

2 Extensive Daylighting & Views

Interior Courtyards

Large Perimeter Windows

3 Reflective Roof

Reduce Heat Island Effect

Reduce Heat Gain to Building

4 Underground Parking

Reduce Heat Island Effect

Reduce Paved Surface

5 HVAC

High Efficiency Units

Building Management System

6 Green Parking

Permeable Parking Areas with Grass

U.S. GREEN BUILDING COUNCIL LEED GOLD USGBC

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Creative Solutions for a Sustainable Future

GREEN FEATURES

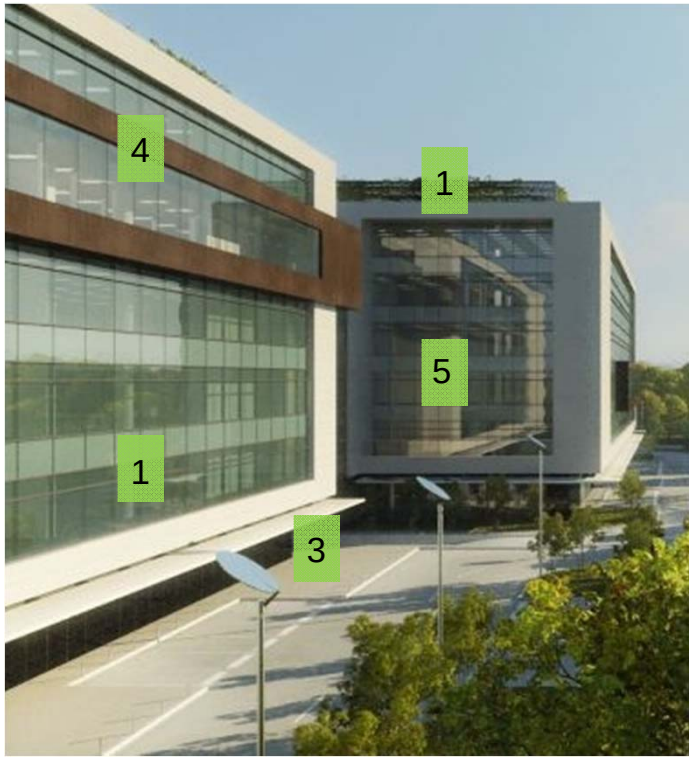
1 Insulated Envelope

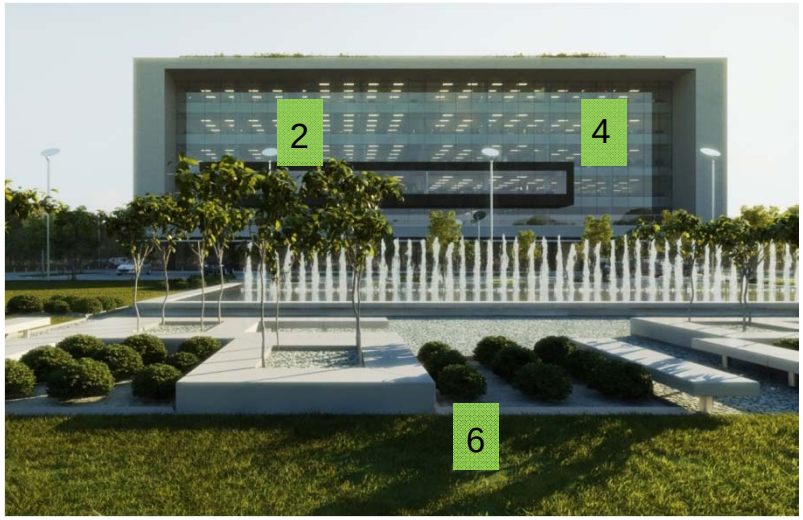
Hi-Efficency Glazing & Walls

Highly Insulated Roof

2 Extensive Daylighting & Views

Large Perimeter Window Areas





3 Materials

Recycled & Green Materials

Local Materials

4 Interior Lighting

Hi-Efficency Fixtures

Daylight & Motion Controls

5 Interior Water Conservation

Low-Flow Fixtures

Grey Water System

6 Exterior Water Conservation

Permeable Parking Areas

Storm Water Irrigation Tank

U.S. GREEN BUILDING COUNCIL LEED GOLD USGBC

EPSTEIN

Creative Solutions for a Sustainable Future

Thank You