LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

where art meets engineering

Austin Dallas Denver Houston Kansas City Miami Nashville Phoenix Richmond Washington DC

PRESENTERS

Paulina Diaz, PE

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OUTLINE

① LEED
- Definition
- Versions to date
- Rating Systems

② Professional Level
- Accreditations

③ Project Level
- Certification Process
- Award levels

④ LEED System
- Categories

⑤ ccrd LEED Projects

⑥ LEED V4

DEFINITION / VERSIONS / RATING SYSTEMS

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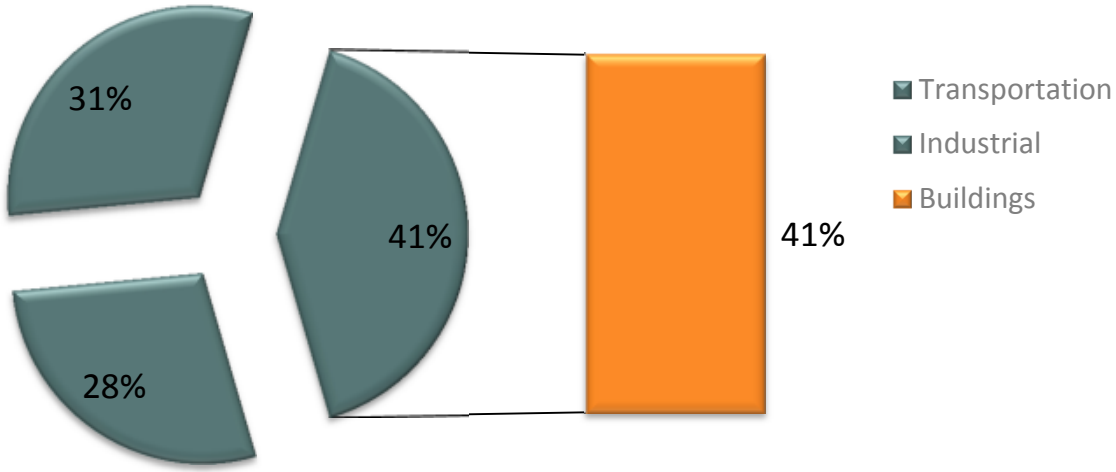
LEED - IMPORTANCE

Why is LEED *important*?

Energy Consumption



Other factors:

- Increasing energy prices
- Higher utility bills
- Resources availability
- Environment
- Technology
- Clients

LEED - DEFINITION

L: Leadership
E: Energy
E: Environmental
D: Design

LEED

"…green building tool that addresses the entire building lifecycle recognizing best-in-class building strategies."

"…provides third-party verification of green buildings."

www.usgbc.org

LEED – DEFINITION CONTINUED

LEED
Robert K. Watson
1993 – 2000
Current Founder & CEO of
ECOTech International

USGBC
Rick Fedrizzi
David Gottfried
Mike Italiano
1993 - 2013

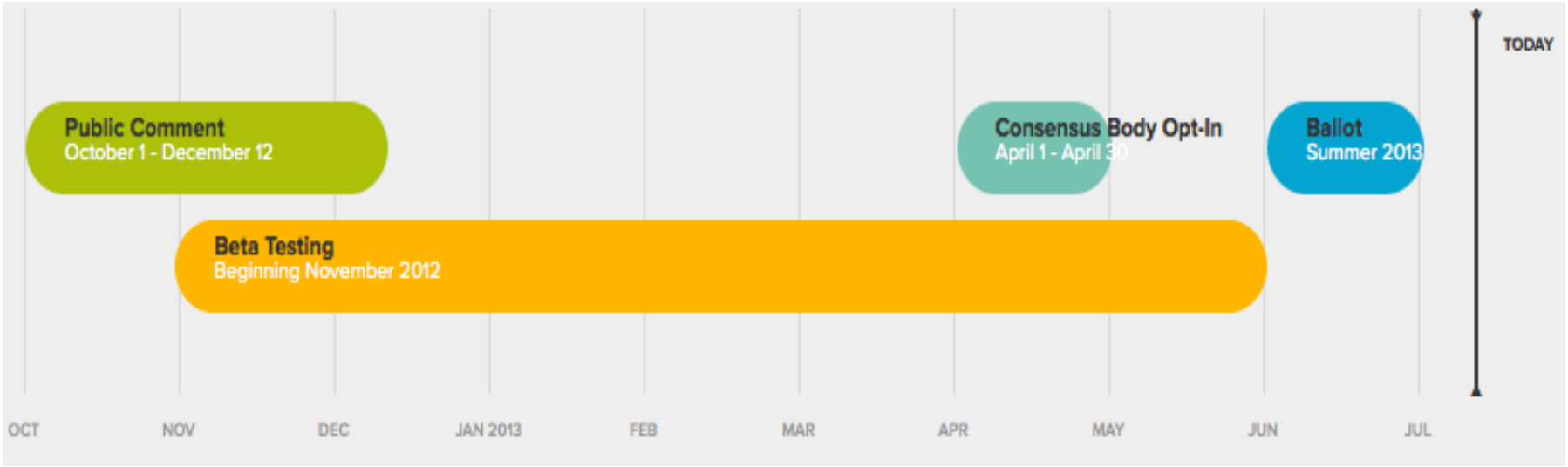
LEED facts…

- To date there are approximately 1.5 billion ft^2 of development area.
- US $50 Billion in construction value.

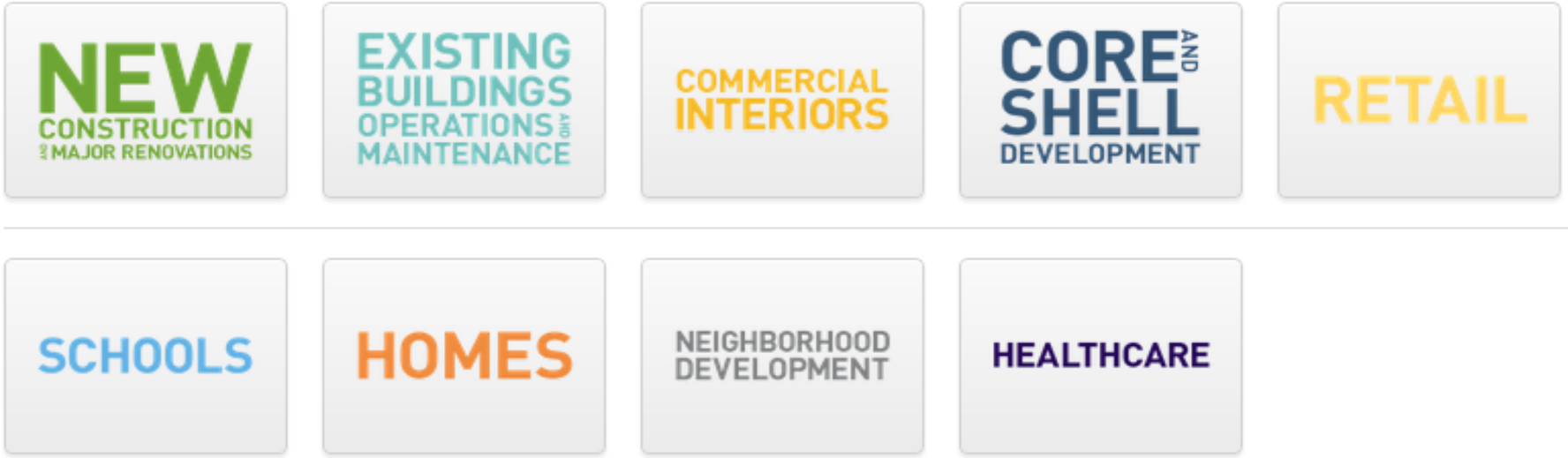
LEED – VERSIONS

1998	2005	2009	2013
LEED V1.0 PILOT VERSION	LEED V2.2	LEED V3	LEED V4
LEED V2.0 ADOPTED			

LEED V4 current status:



RATING SYSTEMS



PROFESSIONAL LEVEL - LEED ACCREDITATIONS

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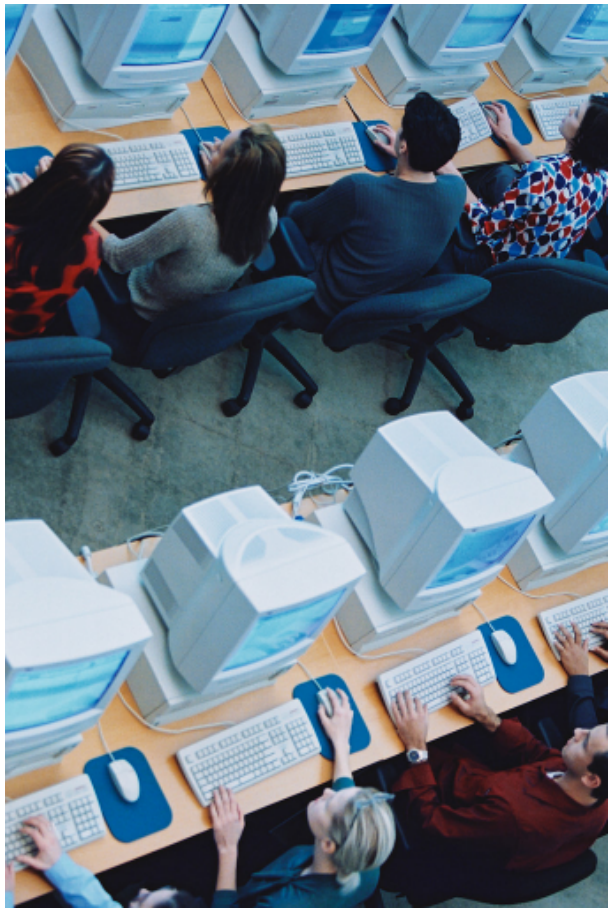
LEED ACCREDITATIONS

- LEED Green Associate
  - No prerequisites
  - Test over MPR, certification levels, certification process, and categories
- LEEP AP
  - Must have worked on a LEED project
  - Pick an emphasis (NC+D, O&M, etc)
  - Complete credits
  - Perform calculations
- LEED Fellow
  - Nominated



LEED CERTIFICATION PROCESS / LEVELS

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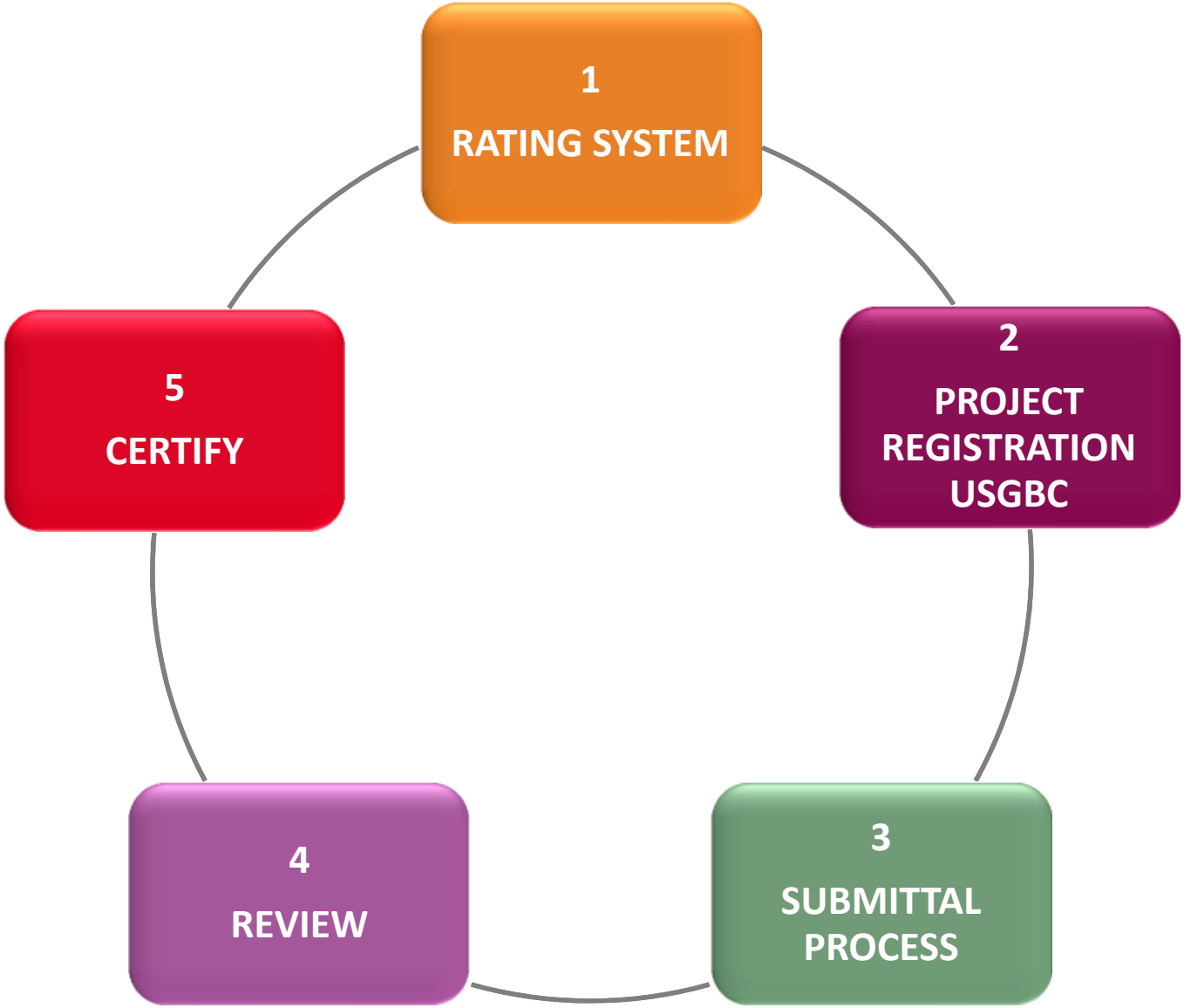
LEED CERTIFICATION PROCESS



LEED – CERTIFICATION LEVELS

Certified	Silver	Gold	Platinum
40 – 49 Points	50 – 59 Points	60 -79 Points	80+ Points

LEED CATEGORIES

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LEED CATEGORIES

- SS – Sustainable Site
- WE – Water Efficiency
- MR – Materials and Resources
- EA – Energy and Atmosphere
- IEQ – Indoor Environmental Quality
- ID – Innovation in Design

LEED - SCORECARD

LEED for New Construction and Major Renovations (v2009)

SUSTAINABLE SITES		POSSIBLE: 26
SSp1	Construction activity pollution prevention	REQUIRED
SSc1	Site selection	1
SSc2	Development density and community connectivity	5
SSc3	Brownfield redevelopment	1
SSc4.1	Alternative transportation - public transportation access	6
SSc4.2	Alternative transportation - bicycle storage and changing rooms	1
SSc4.3	Alternative transportation - low-emitting and fuel-efficient vehicles	3
SSc4.4	Alternative transportation - parking capacity	2
SSc5.1	Site development - protect or restore habitat	1
SSc5.2	Site development - maximize open space	1
SSc6.1	Stormwater design - quantity control	1
SSc6.2	Stormwater design - quality control	1
SSc7.1	Heat island effect - nonroof	1
SSc7.2	Heat island effect - roof	1
SSc8	Light pollution reduction	1

WATER EFFICIENCY		POSSIBLE: 10
WEp1	Water use reduction	REQUIRED
WEc1	Water efficient landscaping	4
WEc2	Innovative wastewater technologies	2
WEc3	Water use reduction	4

ENERGY & ATMOSPHERE		POSSIBLE: 35
EAp1	Fundamental commissioning of building energy systems	REQUIRED
EAp2	Minimum energy performance	REQUIRED
EAp3	Fundamental refrigerant Mgmt	REQUIRED
EAc1	Optimize energy performance	19
EAc2	On-site renewable energy	7
EAc3	Enhanced commissioning	2
EAc4	Enhanced refrigerant Mgmt	2
EAc5	Measurement and verification	3
EAc6	Green power	2

MATERIAL & RESOURCES		POSSIBLE: 14
MRp1	Storage and collection of recyclables	REQUIRED
MRc1.1	Building reuse - maintain existing walls, floors and roof	3
MRc1.2	Building reuse - maintain interior nonstructural elements	1
MRc2	Construction waste Mgmt	2
MRc3	Materials reuse	2
MRc4	Recycled content	2

MATERIAL & RESOURCES		CONTINUED
MRc5	Regional materials	2
MRc6	Rapidly renewable materials	1
MRc7	Certified wood	1

INDOOR ENVIRONMENTAL QUALITY		POSSIBLE: 15
EQp1	Minimum IAQ performance	REQUIRED
EQp2	Environmental Tobacco Smoke (ETS) control	REQUIRED
EQc1	Outdoor air delivery monitoring	1
EQc2	Increased ventilation	1
EQc3.1	Construction IAQ Mgmt plan - during construction	1
EQc3.2	Construction IAQ Mgmt plan - before occupancy	1
EQc4.1	Low-emitting materials - adhesives and sealants	1
EQc4.2	Low-emitting materials - paints and coatings	1
EQc4.3	Low-emitting materials - flooring systems	1
EQc4.4	Low-emitting materials - composite wood and agrifiber products	1
EQc5	Indoor chemical and pollutant source control	1
EQc6.1	Controllability of systems - lighting	1
EQc6.2	Controllability of systems - thermal comfort	1
EQc7.1	Thermal comfort - design	1
EQc7.2	Thermal comfort - verification	1
EQc8.1	Daylight and views - daylight	1
EQc8.2	Daylight and views - views	1

INNOVATION		POSSIBLE: 6
IDc1	Innovation in design	5
IDc2	LEED Accredited Professional	1

REGIONAL PRIORITY		POSSIBLE: 4
RPc1	Regional priority	4

TOTAL	110

40-49 Points	50-59 Points	60-79 Points	80+ Points
CERTIFIED	SILVER	GOLD	PLATINUM

SS – SUSTAINABLE SITES

Sustainable Sites		Possible Points: 26
Prereq 1	Construction Activity Pollution Prevention	
Credit 1	Site Selection	1
Credit 2	Development Density and Community Connectivity	5
Credit 3	Brownfield Redevelopment	1
Credit 4.1	Alternative Transportation—Public Transportation Access	6
Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehi	3
Credit 4.4	Alternative Transportation—Parking Capacity	2
Credit 5.1	Site Development—Protect or Restore Habitat	1
Credit 5.2	Site Development—Maximize Open Space	1
Credit 6.1	Stormwater Design—Quantity Control	1
Credit 6.2	Stormwater Design—Quality Control	1
Credit 7.1	Heat Island Effect—Non-roof	1
Credit 7.2	Heat Island Effect—Roof	1
Credit 8	Light Pollution Reduction	1

SS – SUSTAINABLE SITES

SSc7.1 - Heat Island Effect Non-Roof

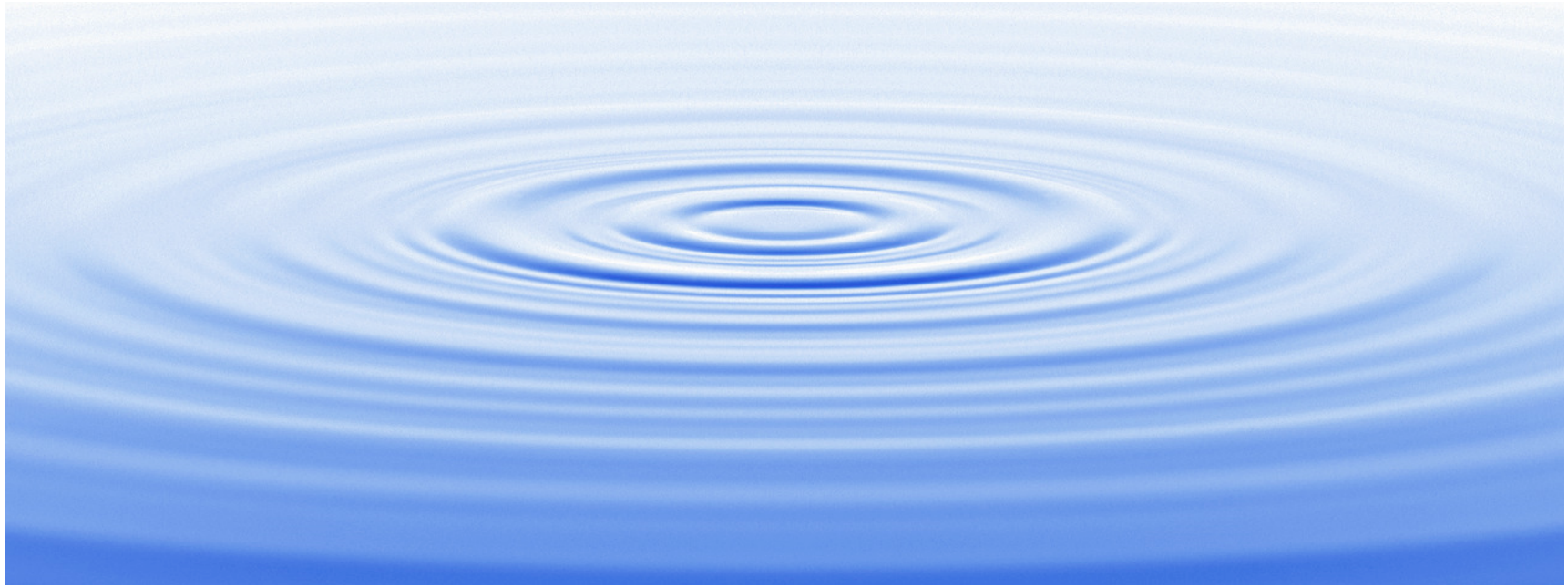
- 50% pervious open grid pavers
- Plant trees

SSc8 - Light Pollution Reduction

- Interior Lighting Requirements
  - No light spillage from windows OR nighttime shut off
- Exterior Lighting Requirements
  - 90° cut off
  - 0.1 fc at property line

WE – WATER EFFICIENCY

WATER EFFICIENCY		POSSIBLE: 10
WEp1	Water use reduction	REQUIRED
WEc1	Water efficient landscaping	4
WEc2	Innovative wastewater technologies	2
WEc3	Water use reduction	4



WE – WATER EFFICIENCY

WEp1 Water Use Reduction

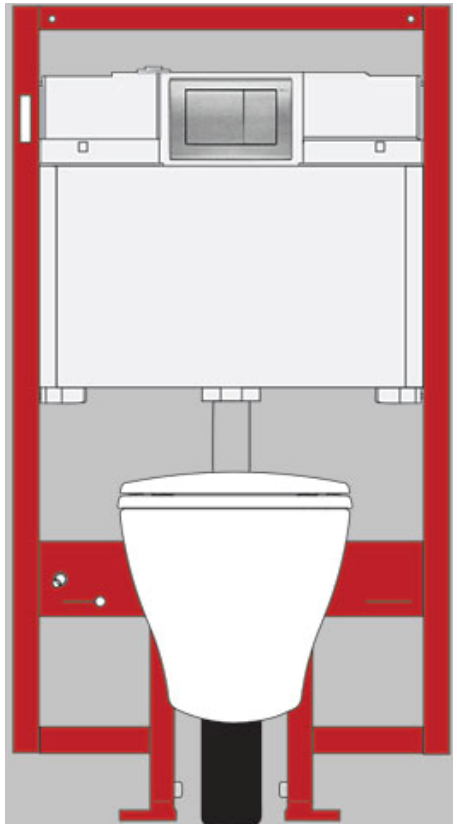
Fixture, Fitting, & Appliances	Baseline Building	Proposed Building
Commercial Tlt's	1.6 gpf	1.0 gpf
Commercial Urinals	1.0 gpf	.5 gpf
Commercial Lavatories	2.2 gpm	1.6 gpm
Commercial pre-rinse valves	Flow rate< 1.6 gpm	1.0 gpm

Codes		
	Uniform Plumbing Code (UPC)	EPA – Water Sense Label
	International Plumbing Code (IPC)	

WE – WATER EFFICIENCY

WEp1 Water Use Reduction

Toto Dual Flush Toilet
1.6 gpf – 0.9 gpf
Average 1.28 gpf



EA – ENERGY & ATMOSPHERE

ENERGY & ATMOSPHERE		POSSIBLE: 35
EAp1	Fundamental commissioning of building energy systems	REQUIRED
EAp2	Minimum energy performance	REQUIRED
EAp3	Fundamental refrigerant Mgmt	REQUIRED
EAc1	Optimize energy performance	19
EAc2	On-site renewable energy	7
EAc3	Enhanced commissioning	2
EAc4	Enhanced refrigerant Mgmt	2
EAc5	Measurement and verification	3
EAc6	Green power	2

EA – ENERGY & ATMOSPHERE

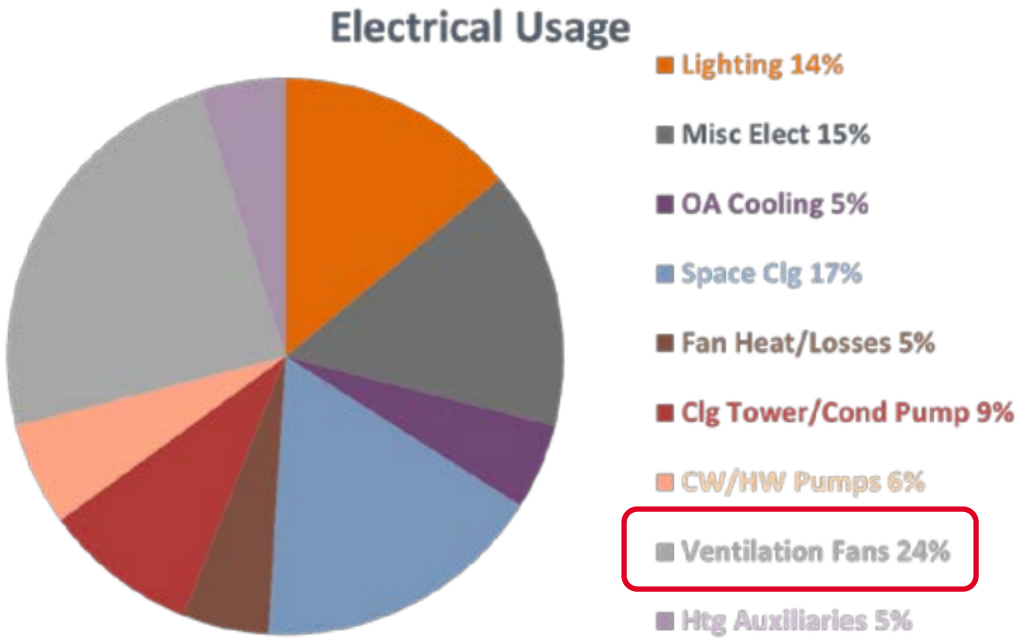
EAc1 – Optimize Energy performance

- Energy Modeling
  - Integrative design process
  - ANSI/ASHARE 90.1-2007
    - Building Envelope
    - HVAC Systems
    - Service Water Heating
    - Power
    - Lighting
- Energy Modeling Software
  - Carrier – HAP
  - Trane – Trace
  - DOE 2
  - Blast
  - Energy Plus

EA – ENERGY & ATMOSPHERE

EAc1 – Optimize Energy performance

- Building Energy Consumption Chart
  - Building in ASHRAE Weather Zone – 3A



EA – ENHANCED COMMISSIONING

EAc3 – Enhanced Commissioning (Cx)

…"quality oriented process for achieving, verifying & documenting that the performance of facilities, systems & assemblies meet defined objectives and criteria."

(ASHRAE Guideline – 0)

How do we meet objectives & criteria?

- Basis of Design (BOD)
- Owner Project Requirements (OPR)
- Enhanced Cx costs
  - Soft costs
  - Hard costs

MR – MATERIALS RESOURCES

Materials and Resources		Possible Points: 14
Prereq 1	Storage and Collection of Recyclables	
Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
Credit 2	Construction Waste Management	1 to 2
Credit 3	Materials Reuse	1 to 2
Credit 4	Recycled Content	1 to 2
Credit 5	Regional Materials	1 to 2
Credit 6	Rapidly Renewable Materials	1
Credit 7	Certified Wood	1

MR – MATERIALS RESOURCES

MRc2 - Construction Waste Management

- Divert 50% of waste or more from landfills
  - Reuse
  - Recycle

IEQ – INDOOR ENVIRONMENTAL QUALITY

Indoor Environmental Quality		Possible Points: 15
Prereq 1	Minimum Indoor Air Quality Performance	
Prereq 2	Environmental Tobacco Smoke (ETS) Control	
Credit 1	Outdoor Air Delivery Monitoring	1
Credit 2	Increased Ventilation	1
Credit 3.1	Construction IAQ Management Plan—During Construction	1
Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
Credit 4.3	Low-Emitting Materials—Flooring Systems	1
Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
Credit 5	Indoor Chemical and Pollutant Source Control	1
Credit 6.1	Controllability of Systems—Lighting	1
Credit 6.2	Controllability of Systems—Thermal Comfort	1
Credit 7.1	Thermal Comfort—Design	1
Credit 7.2	Thermal Comfort—Verification	1
Credit 8.1	Daylight and Views—Daylight	1
Credit 8.2	Daylight and Views—Views	1

IEQ – INDOOR ENVIRONMENTAL QUALITY

IEQc1 - Outdoor Air Delivery Monitoring

- Provide/Install monitoring systems to ensure that ventilation systems maintain minimum requirements.
  - CO2 sensors shall be provided in spaces with high occupant density.

IEQ – INDOOR ENVIRONMENTAL QUALITY

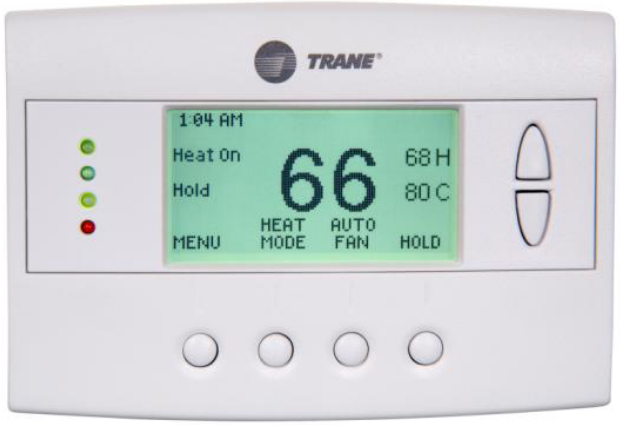
IEQc6.1 - Controllability of Systems: Lighting

- All multi-occupant rooms have lighting controls
- 90% control for individual spaces
- Private patient rooms
  - Lighting controls accessible from bed
  - Shade control accessible from bed

IEQ – INDOOR ENVIRONMENTAL QUALITY

IEQc6.2: Controllability of Systems: Thermal Comfort

- All multi-occupant rooms have control (t-stat)
- Individual control in each patient room (t-stat)
- 50% control in all individual occupant type spaces



INNOVATION IN DESIGN

Innovation and Design Process		Possible Points: 6
Credit 1.1	Innovation in Design: Specific Title	1
Credit 1.2	Innovation in Design: Specific Title	1
Credit 1.3	Innovation in Design: Specific Title	1
Credit 1.4	Innovation in Design: Specific Title	1
Credit 1.5	Innovation in Design: Specific Title	1
Credit 2	LEED Accredited Professional	1

INNOVATION IN DESIGN

IDc1: Mercury Reduction

- Low-mercury type lamps
- LED Exit signs

LEED V4

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LEED – V4 BALLOT SCORECARD DRAFT

LEED for New Construction and Major Renovations (v4-draft)

		POSSIBLE: 1
IPc1	Integrative process	1

LOCATION & TRANSPORTATION		POSSIBLE: 16
LTc1	LEED for Neighborhood Development location	16
LTc2	Sensitive land protection	1
LTc3	High priority site	2
LTc4	Surrounding density and diverse uses	5
LTc5	Access to quality transit	5
LTc6	Bicycle facilities	1
LTc7	Reduced parking footprint	1
LTc8	Green vehicles	1

SUSTAINABLE SITES		POSSIBLE: 10
SSp1	Construction activity pollution prevention	REQUIRED
SSc1	Site assessment	1
SSc2	Site development - protect or restore habitat	2
SSc3	Open space	1
SSc4	Rainwater Mgmt	3
SSc5	Heat island reduction	2
SSc6	Light pollution reduction	1

WATER EFFICIENCY		POSSIBLE: 11
WEp1	Outdoor water use reduction	REQUIRED
WEp2	Indoor water use reduction	REQUIRED
WEp3	Building-level water metering	REQUIRED
WEc1	Outdoor water use reduction	2
WEc2	Indoor water use reduction	6
WEc3	Cooling tower water use	2
WEc4	Water metering	1

ENERGY & ATMOSPHERE		POSSIBLE: 33
EAp1	Fundamental commissioning and verification	REQUIRED
EAp2	Minimum energy performance	REQUIRED
EAp3	Building-level energy metering	REQUIRED
EAp4	Fundamental refrigerant Mgmt	REQUIRED
EAc1	Enhanced commissioning	6
EAc2	Optimize energy performance	18
EAc3	Advanced energy metering	1
EAc4	Demand response	2
EAc5	Renewable energy production	3
EAc6	Enhanced refrigerant Mgmt	1
EAc7	Green power and carbon offsets	2

MATERIAL & RESOURCES		POSSIBLE: 13
MRp1	Storage and collection of recyclables	REQUIRED
MRp2	Construction and demolition waste Mgmt planning	REQUIRED
MRc1	Building life-cycle impact reduction	5
MRc2	Building product disclosure and optimization - environmental product declarations	2
MRc3	Building product disclosure and optimization - sourcing of raw materials	2
MRc4	Building product disclosure and optimization - material ingredients	2
MRc5	Construction and demolition waste Mgmt	2

INDOOR ENVIRONMENTAL QUALITY		POSSIBLE: 16
EQp1	Minimum IAQ performance	REQUIRED
EQp2	Environmental tobacco smoke control	REQUIRED
EQc1	Enhanced IAQ strategies	2
EQc2	Low emitting materials	3
EQc3	Construction IAQ Mgmt plan	1
EQc4	IAQ assessment	2
EQc5	Thermal comfort	1
EQc6	Interior lighting	2
EQc7	Daylight	3
EQc8	Quality views	1
EQc9	Acoustic performance	1

INNOVATION		POSSIBLE: 6
INc1	Innovation	5
INc2	LEED Accredited Professional	1

REGIONAL PRIORITY		POSSIBLE: 4
RPc1	Regional priority	4

TOTAL	110

40-49 Points	50-59 Points	60-79 Points	80+ Points
CERTIFIED	SILVER	GOLD	PLATINUM

REFERENCES

- David N. Schurk, DES,LEEP AP. Automated Logic “Healthcare Energy Savings: What Road are You On?”

- USGBC
  http://www.usgbc.org/

- Wikipedia
  http://ww.wikipedia.org

- Cottrell, Michelle. *Guide to the LEED Green Associate Exam*. Hoboken, NJ: Wiley, 2010. Print.

PRESENTERS

If you have any questions about this presentation or would like to speak in greater detail, please feel free to contact ccrd.

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Thank You!

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