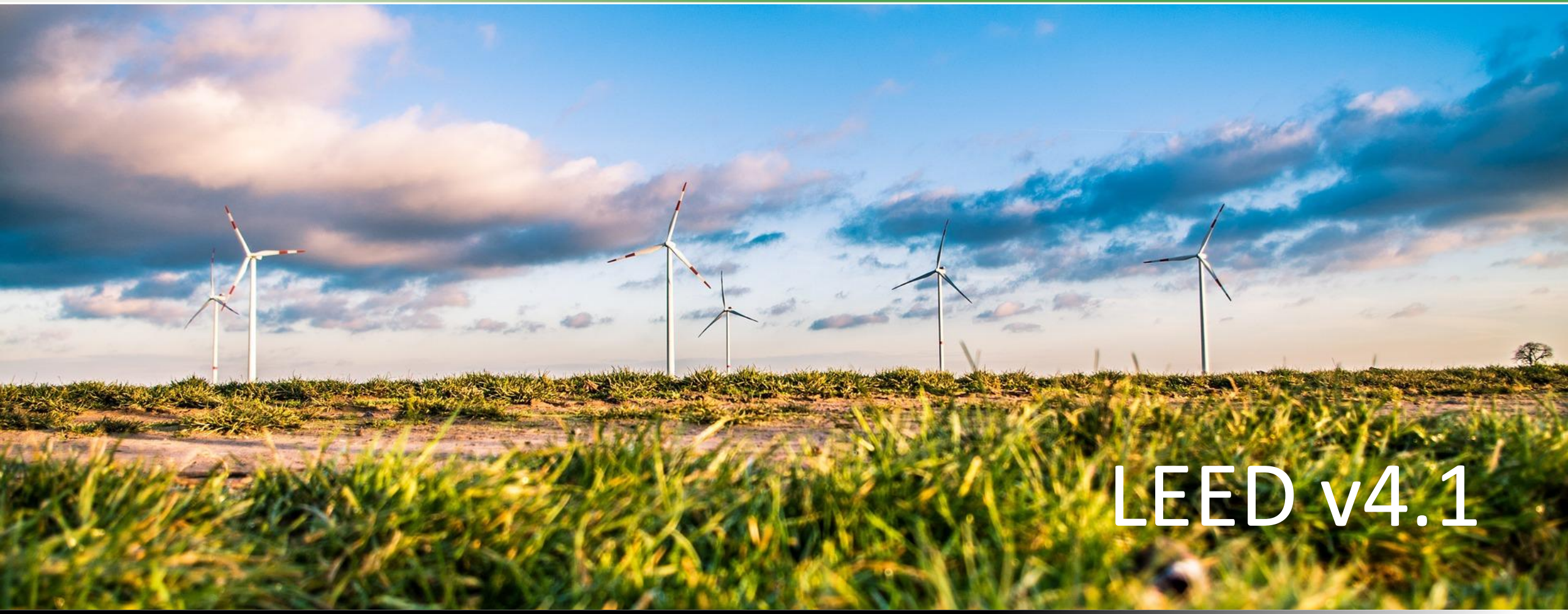
Heapy Engineering
MEP Design Technology Planning Commissioning Energy
Nationally Recognized Leader in Sustainability



LEED v4.1

ABOUT OUR TEAM

Heapy Engineering
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Building Optimization Practice

PRACTICE FOCUSED ON:

- Commissioning and Retro Commissioning Services
- Building Analytics, Energy Analysis, & Optimization Services
- Sustainability Consulting Services

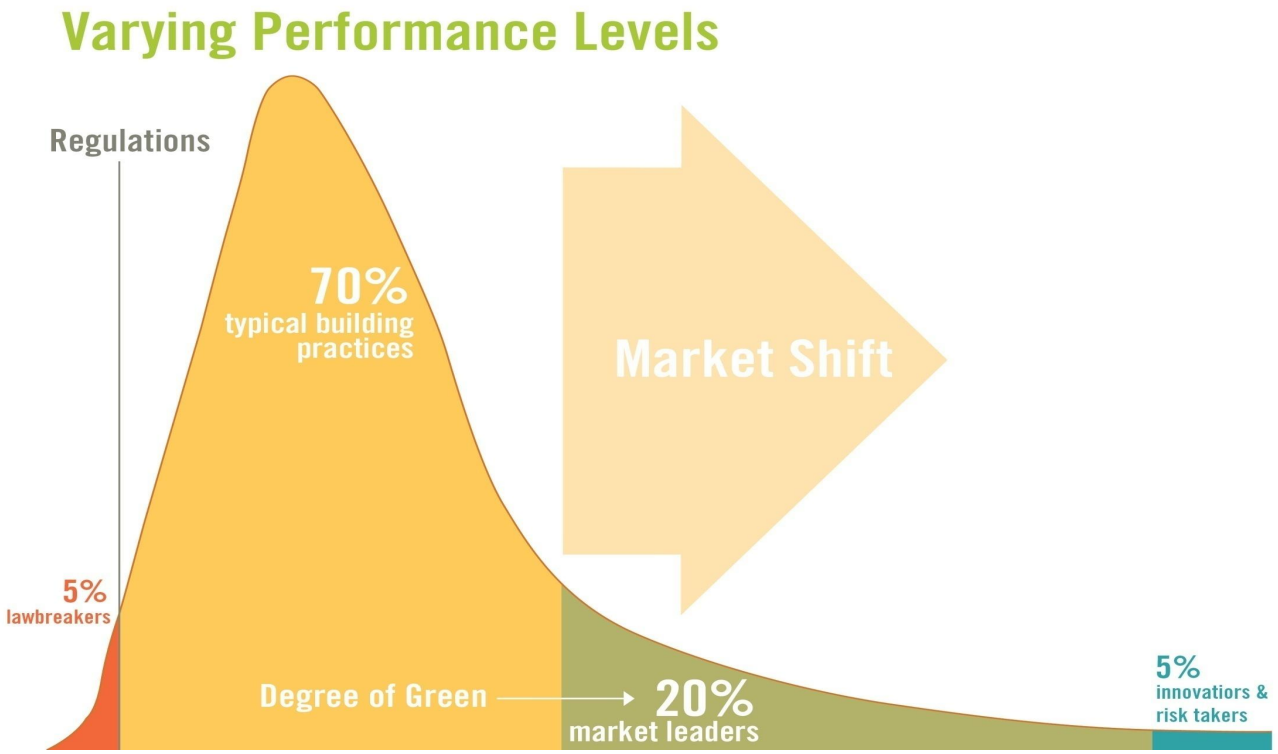
SUBJECT MATTER EXPERTISE:

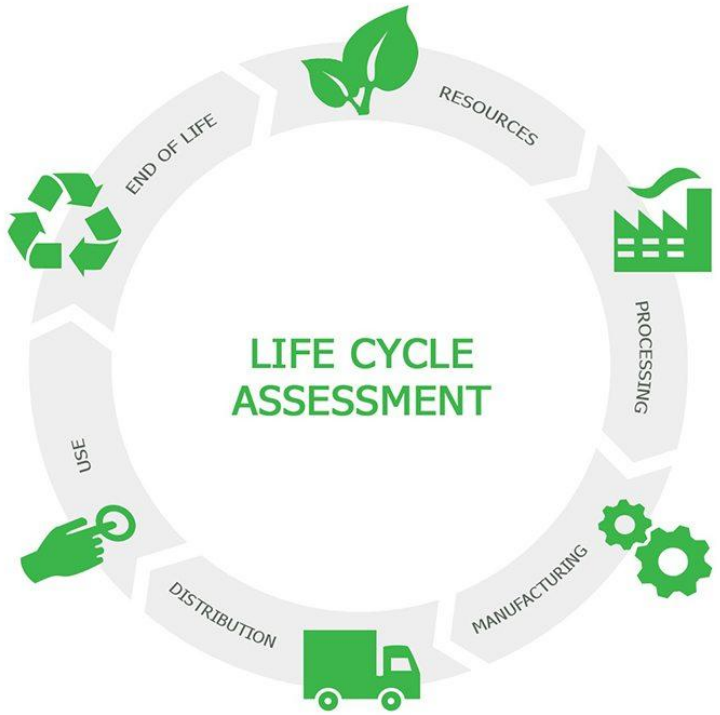
- Building Automation – DDC Technicians for major control systems
- HVAC - Air Handling / Chillers / Boilers – Factory Trained Start-up Technicians
- Electrical Systems – Master / Journeyman Licensed Electricians
- Water Systems Management
- LEED & Green Buildings – LEED Proven Provider
- Building Performance Modeling – Energy Modeling, Life Cycle Cost Analysis, CFD, Daylight
- Building Optimization Owner Training - Energy Management, Occupancy Comfort and Productivity
- Building Performance Facilitation / Visioning – Owner's Project Goal Setting
- Alternative and Renewable Energy Systems – Analysis, Engineering, Procurement, Contracting

AGENDA

- LEED v4
- LEED v4.1
- ARC

LEED v4: **THE BIG PICTURE**





HIGHLIGHTS OF LEED v4

- Closing the operations gap: access to Arc platform, emphasis on actual performance and operations
- New market sectors: adaptations for data centers, warehouses and distribution centers, hospitality, existing schools, retail and mid-rise residential projects.
- New Impact Categories: Climate change, human health, water resources, biodiversity, green economy, community and natural resources.
- Team integration: taking integrated design a step further
- Expanding market transformation efforts

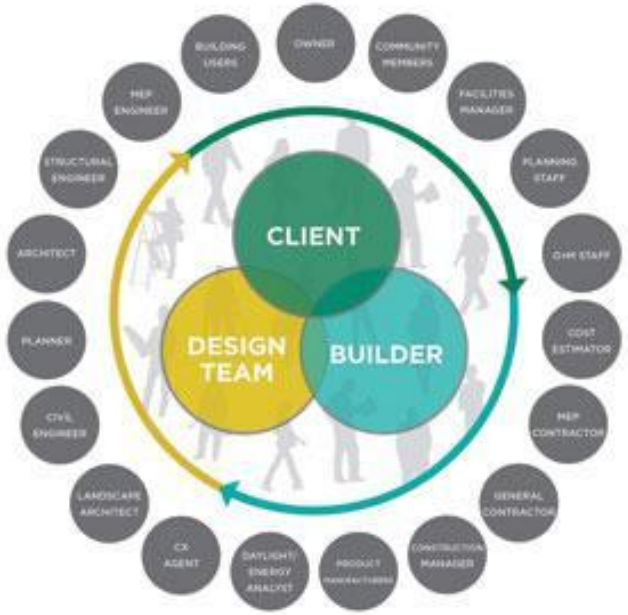
CERTIFICATION LEVELS - **UNCHANGED**

Certification Levels

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

INTEGRATIVE PROCESS

- Conduct preliminary “simple box” energy model
- Conduct preliminary water budget analysis
- Prior to end of SD



LOCATION & TRANSPORTATION

Location & Transportation: Summary of Changes						
LEED 2009	CREDITS	LEED 2009	LEED v4	CREDITS	LEED v4	
				8-16	LEED for Neighborhood Development	
	1	Site Selection (SS)		1	Sensitive Land Protection	
	1	Brownfield Redevelopment (SS)		1-2	High-Priority Site	
	5	Development Density & Community Connectivity (SS)		1-5	Surrounding Density & Diverse Uses	
	6	Alternative Transportation - Public Transportation Access (SS)		1-5	Access to Quality Transit	
	1	Alternative Transportation - Bicycle Storage & Changing Rooms (SS)		1	Bicycle Facilities	←
	2	Alternative Transportation - Parking Capacity (SS)		1	Reduced Parking Footprint	
	3	Alternative Transportation - Low-Emitting & Fuel-Efficient Vehicles (SS)		1	Green Vehicles	←

SUSTAINABLE SITES

Sustainable Sites: Summary of Changes					
LEED 2009	CREDITS	LEED 2009	LEED v4	CREDITS	LEED v4
	Prerequisite	Construction Activity Pollution Prevention		Prerequisite	Construction Activity Pollution Prevention
				1	Site Assessment ←
	1	Site Development, Protect or Restore Habitat		1-2	Site Development - Protect or Restore Habitat
	1	Site Development, Maximize Open Space		1	Open Space
	1	Stormwater Design, Quantity Control		2-3	Rainwater Management
	1	Stormwater Design, Quality Control			
	1	Heat Island Effect, Non-Roof		1-2	Heat Island Reduction
	1	Heat Island Effect, Roof			
	1	Light Pollution Reduction		1	Light Pollution Reduction

WATER EFFICIENCY

Water Efficiency: Summary of Changes						
LEED 2009	CREDITS	LEED 2009	LEED v4	CREDITS	LEED v4	
				Prerequisite	Outdoor Water Use Reduction	
	Prerequisite	Indoor Water Use Reduction		Prerequisite	Indoor Water Use Reduction	
				Prerequisite	Building-Level Water Metering	←
	2-4	Water Efficient Landscaping		1-2	Outdoor Water Use Reduction	
	2-4	Indoor Water Use Reduction		1-2	Indoor Water Use Reduction	
				1-2	Cooling Tower Water Use	
				1	Water Metering	←

ENERGY & ATMOSPHERE

Energy & Atmosphere: Summary of Changes					
LEED 2009	CREDITS	LEED 2009	LEED v4	CREDITS	LEED v4
	Prerequisite	Fundamental Cx of the Building Energy Systems		Prerequisite	Fundamental Cx & Verification
	Prerequisite	Fundamental Refrigerant Management		Prerequisite	Fundamental Refrigerant Management
	2	Enhanced Cx		2-6	Enhanced Cx
	Prerequisite	Minimum Energy Performance		Prerequisite	Minimum Energy Performance
	1-19	Optimize Energy Performance		1-18	Optimize Energy Performance
				Prerequisite	Building-Level Energy Metering
				1	Advanced Energy Metering
				1-2	Demand Response
	1-7	On-Site Renewable Energy		1-3	Renewable Energy Production
	2	Enhanced Refrigerant Management		1	Enhanced Refrigerant Management
	3	Measurement & Verification			
	4	Green Power		1-2	Green Power & Carbon Offsets

←

MATERIALS & RESOUCES

Materials & Resources: Summary of Changes						
LEED 2009	CREDITS	LEED 2009	LEED v4	CREDITS	LEED v4	
	Prerequisite	Storage and Collection of Recyclables		Prerequisite	Storage and Collecion of Recyclables	
				Prerequisite	Construction & Demolition Waste Management Planning	
	1-3	Building Reuse - Maintain Existing Walls, Floors, & Roof		2-5	Building Life-Cycle Impact Reduction	
	1	Building Reuse - Maintain Int. Non-Structural Elements				
	1-2	Materials Reuse				
				1-2	BPDO: Environmental Product Declarations	←
	1-2	Recycled Content		1-2	BPDO: Sourcing of Raw Materials	←
	1	Rapidly Renewable Materials				
	1	Certified Wood				
				1-2	BPDO: Material Ingredients	←
	1-2	Construction Waste Management		1-2	Construction & Demolition Waste Management	
	1-2	Regional Materials		200% "bonus"	BPDO Credit Suite	

INDOOR ENVIRONMENTAL QUALITY

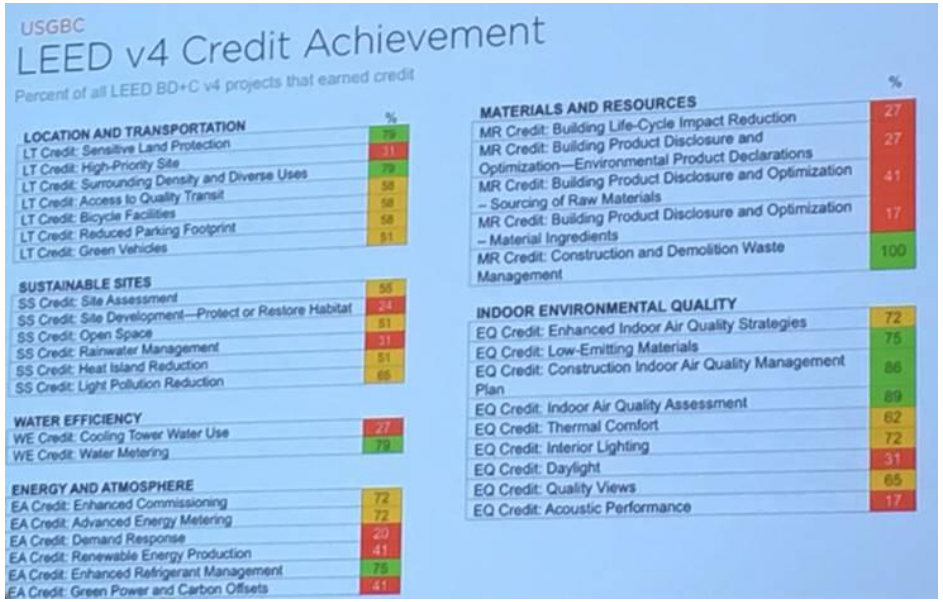
Indoor Environmental Quality: Summary of Changes					
LEED 2009	CREDITS	LEED 2009	LEED v4	CREDITS	LEED v4
	Prerequisite	Minimum IAQ Performance		Prerequisite	Minimum IAQ Performance
	Prerequisite	Environmental Tobacco Smoke Control		Prerequisite	Environmental Tobacco Smoke Control
	1	Outdoor Air Delivery Monitoring		1-2	Enhanced Indoor Air Quality Strategies
	1	Increased Ventilation			
	1	Indoor Chemical & Pollutant Source Control			
	1	Low-Emitting: Adhesives & Sealants		1-3	Low-Emitting Materials ←
	1	Low-Emitting: Paints & Coatings			
	1	Low-Emitting: Flooring Systems			
	1	Low-Emitting: Composite Wood & Agrifiber Products			
	1	Construction IAQ Management Plan During Construction		1	Construction Indoor Air Quality Management Plan
	1	Construction IAQ Management Plan Before Occupancy		1-2	Indoor Air Quality Assessment
	1	Controllability of Systems - Thermal Comfort		1	Thermal Comfort
	1	Thermal Comfort: Design			
	1	Controllability of Systems - Lighting Control		1-2	Interior Lighting
	1	Daylight & Views - Daylight		1-3	Daylight
	1	Daylight & Views - Views		1	Quality Views
		Schools & Healthcare Only		1	Acoustic Performance

LEED v4.1: Why?

- Incorporate performance reporting – valuable data for building owners
- New opportunities for every project type
- Address market barriers/lessons learned from LEED v4
- Improve performance throughout the life of buildings

"This is not a full version change, but rather an incremental update to the LEED rating systems."

-Mahesh Ramanujam, President & CEO (USGBC, GBCI)



https://www.usgbc.org/articles/whats-new-leed-leed-v41

LEED v4.1 O+M

- O+M, Residential, BD+C
- Streamlining prerequisites
- International Standards where applicable
- Including language for Interiors spaces
- Integrating performance: ARC

https://www.usgbc.org/articles/whats-new-leed-leed-v41

Performance Score

Heapy Engineering Headquarters, 1400 West Dorothy Lane, Ohio, United States

ARC: Minimum Data Requirements

Energy

Water

Waste

Transportation

Human Experience

- 12 months of measured energy & water use
- 1 waste stream analysis: generated, diverted
- 1 survey: transportation, occupant satisfaction
- 1 sampling: Interior CO_2, VOC levels

https://www.usgbc.org/resources/data-management

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LEED v4.1 | THANK YOU