

**WATER INFRASTRUCTURE**  
Conference



Atlanta, Georgia

# Going Green in the Water and Wastewater Industry- How Design-Build Facilitates Certainty



**HASKELL**  
America's **Green** Design-Build Leader®

# Topics of Discussion and Expected Outcomes

- **Going Green**
  - Historic Perspective and Current State of Practice for Sustainable Design and Construction
- **Water and Wastewater Industry Challenges**
  - Impact of LEED<sup>®</sup> Rating System being Designed for Buildings
- **Project Delivery Method Discussion**
  - How Design-Build Delivery Facilitates Sustainable Design and Construction and Acquisition of LEED<sup>®</sup> Certification
- **Case Study**
  - Illustration of Principles and Practices through NAVFAC Sewage Treatment Plant Upgrades Project

# U.S. Green Building Council (USGBC)



- A National Nonprofit Organization Founded in 1993
- Coalition of Building Industry Leaders
- Developer and administrator of the Leadership in Energy & Environmental Design (LEED®) Green Building Rating System

# Leadership in Energy & Environmental Design (LEED®)

- A rating system developed by the USGBC in 1995 to evaluate and certify environmentally responsible and healthy building projects.
- First pilot projects were certified in 2000.
- Buildings may receive a rating of “certified”, “silver”, “gold” or “platinum”.

Choose which LEED rating system best suits your project.



Building Design  
and Construction



Interior Design  
and Construction



Building Operations  
and Maintenance



Neighborhood  
Development



Homes



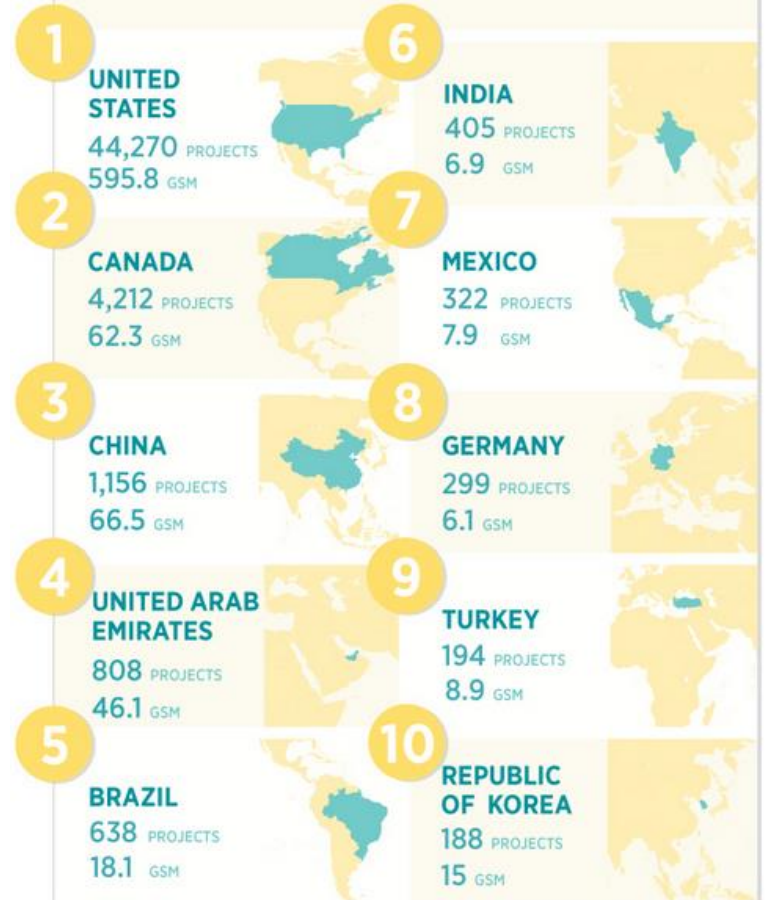
# LEED IN THE WORLD

## NUMBER OF LEED PROJECTS REGISTERED & CERTIFIED IN TOP REGIONS BY GSM



\*Gross square meters (GSM) are reported in millions.  
 \*Includes projects registered through the USGBC, GBCL, Canada GBC, and Indian GBC (partial data).

## TOP 10 COUNTRIES WITH REGISTERED & CERTIFIED PROJECTS

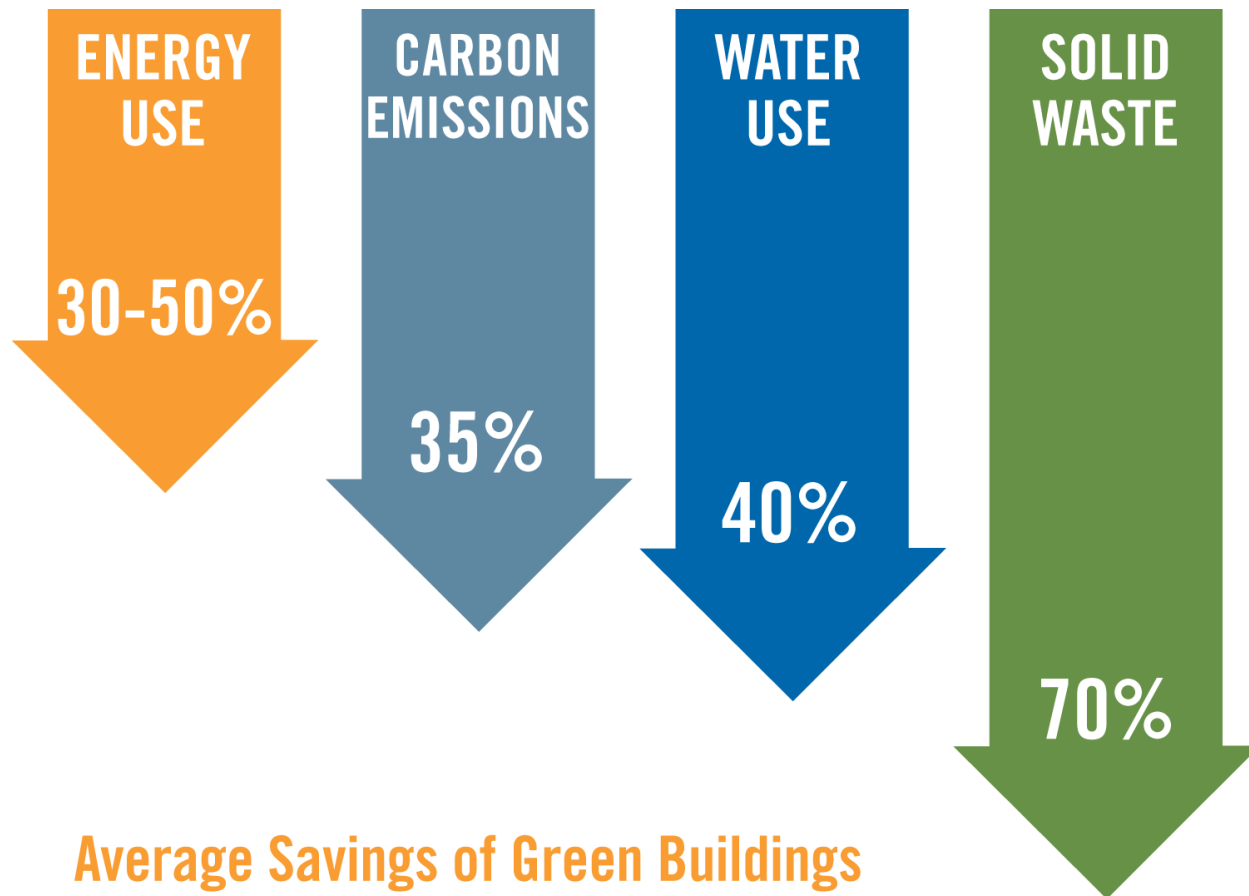


# Drivers for Green Design and Construction - U.S. Building Resource Usage



# Drivers for Green Design and Construction

Owner's Need to Lower Operating Cost



Average Savings of Green Buildings



# Water and Wastewater Industry Challenges

- LEED® Green Building practices focus primarily on commercial, industrial and residential inhabited buildings
- Site selection criteria may differ from LEED® requirements
- Site locations may not conducive to alternative vehicular and transportation services
- Site size may limit dedication of preserved open space
- Heavy vehicular loading may limit paving options alternative green paving options





# Water and Wastewater Industry Challenges

- Energy Efficiencies Prerequisites
- Owner commitment to measurement and verification plans
- Contractor commitment to storage, reuse and waste management practices
- Many of the green building requirements may be in conflicts with owner design and construction standards



# Is There a Project Delivery Method that Best Achieves LEED®?



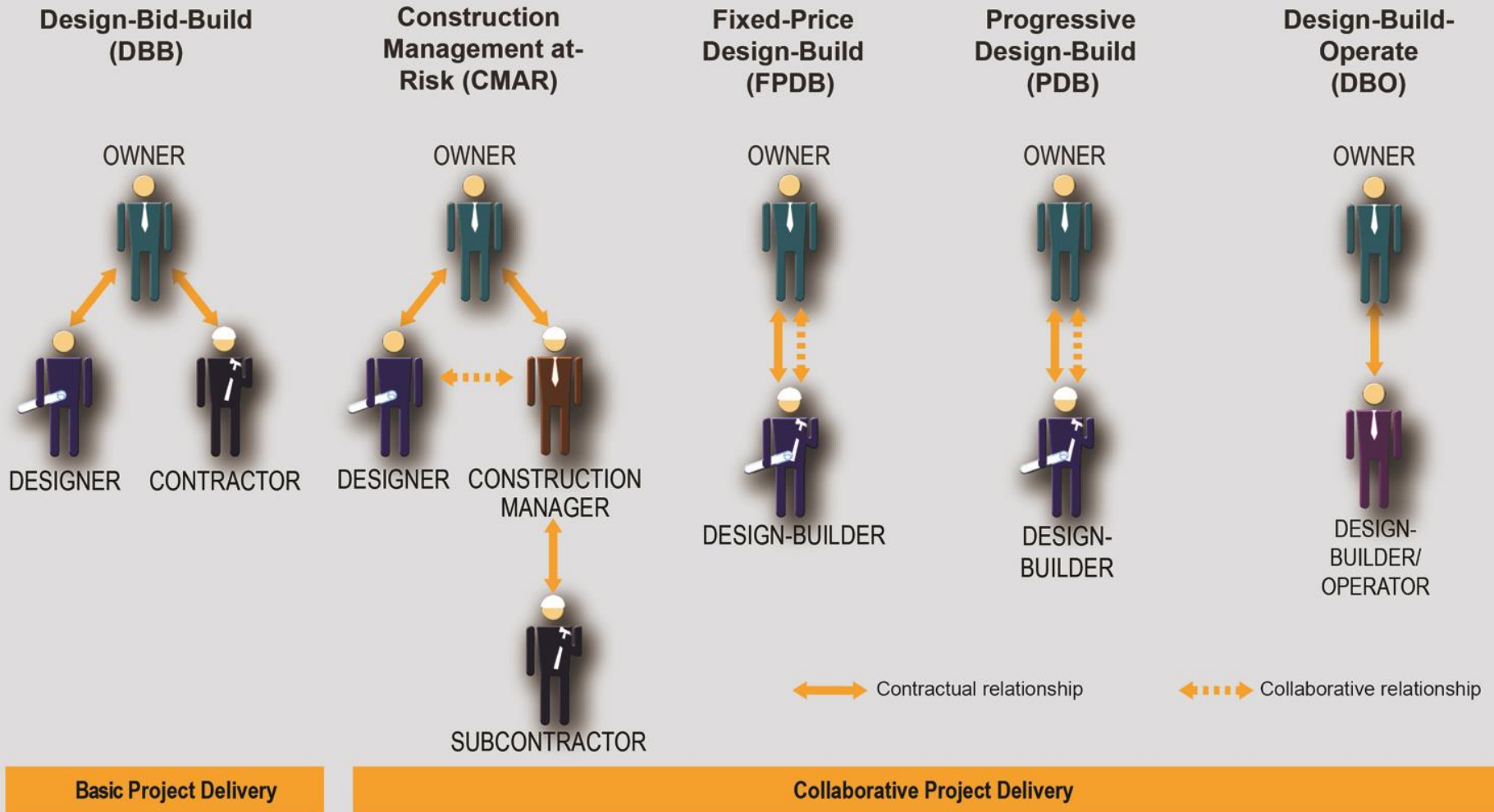
# Is There a Project Delivery Method that Best Achieves LEED®?

- University research indicates that project delivery methods with the following characteristics have the highest probability of achieving the desired LEED® rating...
  - Integration of Design and Construction
  - Early Contractor Involvement
  - Advanced Owner, Engineering and Construction Planning
  - Team Cooperation and Collaboration
  - GMP Type Contract

Yes - Progressive  
Design-Build



# Procurement Processes



# Pros and Cons of Delivery Methods

	Design-Bid- Build	CMAR	Design-Build
Schedule Savings	-	X	X
Early Life-Cycle knowledge	-	-	X
Early knowledge of Construction Costs	-	X	X
Early Contractor Involvement	-	X	X
Accountability for Results	-	-	X

# Summary

- Design-Build offers the greatest ability to account for life-cycle costs across a spectrum of factors including:
  - Initial Capital Cost
  - Equipment /Vendor selection
  - Power / Chemical usage
  - Operation and Maintenance Costs
    - Continuity considerations
  - Replacement Costs



# NAVFAC Sewage Treatment Plant Upgrades Project

- Client – US Navy
- Location – Indian Head, MD
- Delivery Method – Design-Build
- Scope – 0.5 MGD WWTP Upgrade with LEED® Silver Certification
- Value – \$13.5M



# Design-Build Team Identifies Strategies to Meet LEED® Certification



LEED-NC

LEED - NC Version 2.2 Registered Project Checklist  
SEWAGE TREATMENT PLANT UPGRADE - CONTROL BUILDING  
NSF INDIAN HEAD, MARYLAND

Yes	No	Sustainable Sites		14 Points
10	4			
Responsible Party: <b>DC</b>				
Y		C Prereq 1	Construction Activity Pollution Prevention	Required
		D Credit 1	Site Selection	1
	1	D Credit 2	Development Density & Community Connectivity	1
	1	D Credit 3	Brownfield Redevelopment	1
	1	D Credit 4.1	Alternative Transportation, Public Transportation Access	1
	1	D Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
	1	D Credit 4.3	Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles	1
	1	D Credit 4.4	Alternative Transportation, Parking Capacity	1
	1	C Credit 5.1	Site Development, Protect or Restore Habitat	1
	1	D Credit 5.2	Site Development, Maximize Open Space	1
	1	D Credit 6.1	Stormwater Design, Quantity Control	1
	1	D Credit 6.2	Stormwater Design, Quality Control	1
	1	C Credit 7.1	Heat Island Effect, Non-Roof	1
	1	D Credit 7.2	Heat Island Effect, Roof	1
	1	D Credit 8	Light Pollution Reduction	1
Yes T No				
4 1 Water Efficiency 5 Points				
		D Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1
		D Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1
	1	D Credit 2	Innovative Wastewater Technologies	1
	1	D Credit 3.1	Water Use Reduction, 20% Reduction	1
	1	D Credit 3.2	Water Use Reduction, 30% Reduction	1
Yes T No				
7 10 Energy & Atmosphere 17 Points				
Y		C Prereq 1	Fundamental Commissioning of the Building Energy Systems	Required
Y		D Prereq 2	Minimum Energy Performance	Required
Y		D Prereq 3	Fundamental Refrigerant Management	Required
		D Credit 1	Optimize Energy Performance	1 to 10
	5	D Credit 2	On-Site Renewable Energy	1 to 3
	3	C Credit 3	Enhanced Commissioning	1
	1	D Credit 4	Enhanced Refrigerant Management	1
	1	C Credit 5	Measurement & Verification	1
	1	C Credit 6	Green Power	1

continued...

Yes	No	Materials & Resources		13 Points
1	6			
		D Prereq 1	Storage & Collection of Recyclables	Required
	1	C Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors & Roof	1
	1	C Credit 1.2	Building Reuse, Maintain 100% of Existing Walls, Floors & Roof	1
	1	C Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1
	1	C Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1
	1	C Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1
	1	C Credit 3.1	Materials Reuse, 5%	1
	1	C Credit 3.2	Materials Reuse, 10%	1
	1	C Credit 4.1	Recycled Content, 10% (post-consumer + 1/2 pre-consumer)	1
	1	C Credit 4.2	Recycled Content, 20% (post-consumer + 1/2 pre-consumer)	1
	1	C Credit 5.1	Regional Materials, 10% Extracted, Processed & Manufactured Regionally	1
	1	C Credit 5.2	Regional Materials, 20% Extracted, Processed & Manufactured Regionally	1
	1	C Credit 6	Rapidly Renewable Materials	1
	1	C Credit 7	Certified Wood	1
Yes T No				
1 3 Indoor Environmental Quality 15 Points				
		D Prereq 1	Minimum IAQ Performance	Required
		D Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
		D Credit 1	Outdoor Air Delivery Monitoring	1
		D Credit 2	Increased Ventilation	1
		C Credit 3.1	Construction IAQ Management Plan, During Construction	1
		C Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1
		C Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1
		C Credit 4.2	Low-Emitting Materials, Paints & Coatings	1
		C Credit 4.3	Low-Emitting Materials, Carpet Systems	1
		C Credit 4.4	Low-Emitting Materials, Composite Wood & Agrifiber Products	1
		D Credit 5	Indoor Chemical & Pollutant Source Control	1
		D Credit 6.1	Controllability of Systems, Lighting	1
		D Credit 6.2	Controllability of Systems, Thermal Comfort	1
		D Credit 7.1	Thermal Comfort, Design	1
		D Credit 7.2	Thermal Comfort, Verification	1
		D Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1
		D Credit 8.2	Daylight & Views, Views for 90% of Spaces	1
Yes T No				
1 1 Innovation & Design Process 5 Points				
		D Credit 1.1	Innovation in Design: NOT USED	1
		D Credit 1.2	Innovation in Design: Maximize Open Space	1
		D Credit 1.3	Innovation in Design: Exemplary Perf.: 40% Water Reduction	1
		D Credit 1.4	Innovation in Design: Green Building Education	1
		C Credit 2	LEED® Accredited Professional	1
Yes T No				
3 25 Project Totals (pre-certification estimates) 69 Points				

Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points





**Sustainable Design  
Principles**

**LEED Certification**



## Sustainable Sites

- Site Selection
- Alternative Transportation
- Stormwater
- Heat Island Effect
- Light Pollution

## Water Efficiency

- Water Efficient Landscaping
- Water Use Reduction

## Energy & Atmosphere

- Optimizing Energy Performance
- Enhanced Refrigerant Management
- Measurement & Verification



## Innovation & Design

- Maximizing Open Space
- Water Reduction
- LEED Accredited Professional

## Materials & Resources

- Construction Waste Management
- Recycled Content
- Regional Materials
- Certified Woods

# City of Annapolis WTP

- **Innovative DB Process**  
**Allowed LEED® Silver**  
**Certification of Entire Facility**
- **Efficiency Modeling**
- **Credit Interpretation Ruling**





# Conclusion and Confirmation of Expected Outcomes

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