Beyond Pilot Projects: Mainstreaming Sustainable Building at The City of New York Department of Design and Construction

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DESIGN + CONSTRUCTION
EXCELLENCE 101

NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION
Introduction:

NYC Department of Design and Construction is responsible for managing much of the city’s capital construction, which includes both infrastructures and structures.

- About 1200 agency staff total
- About $500M spent on buildings and $500M spent on infrastructure each year
- About 400 projects active at DDC at any one time
- 60-80 new projects each year
- 6 years average time from start to finish of a project
- DDC serves as the contracting agency for 15-20 other city agencies at any one time.
In 1997 the Department of Design and Construction established an Office of Sustainable Design (OSD) to identify and implement cost-effective ways to improve DDC’s practice from the standpoint of its impact on the environment. Starting with the development of the DDC *High Performance Building Guidelines* in partnership with the Design Trust for Public Space, and a handful of pilot projects, the office now has 5 full time staff that contribute to many building projects at DDC.
Reasons for City to build green:

Municipal government, which owns about 4,000 buildings, stands to directly benefit from energy efficiency upgrades. City buildings are generally around and owned by the City for 50-100 years, some much longer, so investments pay off longer than on many private buildings, which change ownership more often.

With population density comes pollution density. Despite NYC having relatively good sustainability rating per capita, it also has high asthma rates, and faces other ever increasing environmental challenges relating to solid waste, air, water, and its built environment.
Policy:

For NYC government, sustainable building to be implemented through Local Law 86/2005 signed into law by the Mayor on October 3, 2005

Sustainability cited in Mayor’s Design Excellence Initiative

Mayor’s Energy Policy cites City government’s role as Leading By Example, and cites sustainable buildings as part of the strategies to be implemented. Since City-funded construction accounts for nearly 10% of NYC construction total, energy policy hopes to educate and challenge regional industry beyond the City’s capital plan. Other Cities, both nationally and world-wide look to NYC for policy ideas.

Mayor’s Task Force on Sustainability is facilitating cross-agency cooperation by bringing agencies together to share successes and resources and to challenge assumptions with charge to develop a practical and integrated City-wide plan.
Common questions about sustainable design:

Q: Isn’t the project too big?
A: No, if risk is perceived as too great, you have the wrong design team.

Q: Isn’t the project too small?
A: No, it is critical to send message that sustainable design is priority, that selections for small projects such as carpet or window replacement count. Also presents chance to introduce ideas to less experienced design teams when stakes are lower.

Q: Isn’t it early to think about sustainable design?
A: No, there can be implications as early as site selection, budgeting, and development of a space program.

Q: Isn’t it too late to think about sustainable design?
A: It is better to be too early, but excluding green operations issues, project w/o sustainable contract requirements presents opportunity to become familiar with implications for later phase decisions regarding materials selection, commissioning, lighting design and control.
Common questions about sustainable design continued…

Q: Doesn’t a LEED design process take longer?
A: The extra work involved runs concurrent with design efforts, so the schedule need not be extended.

Q: Isn’t there more maintenance involved?
A: To ensure long term success, the user group must be informed and on board with the maintenance requirements before anything is implemented. Maintenance requirements are sometimes different, but not necessarily more time intensive.

Q: Aren’t all green buildings self sufficient?
A: Whether buildings are connected to a grid of infrastructure is irrelevant to their environmental impact. In fact, some solutions may be more cost-effective if implemented at a neighborhood or city scale rather than at a building scale.

Q: Aren’t green buildings less attractive?
A: Since sustainable design is part of the building program and since the successful integration of program elements is always a function of the designer’s skill, sustainable designs may or may not be less attractive.
Common questions continued…

Q: Don’t we control the toxins that we put into our buildings through good building management?
A: Not realistic. Day to day demolition of buildings and waste removal, accidental fires, hurricanes, even war release irrecoverable long-lived pollutants into our food, air and water supply.

Q: Isn’t the environmental movement just about the forest and wildlife?
A: Only if you count yourself as wildlife. Since our bodies replace 70% of their mass every two years and this mass comes from the air and water around us and from the food that grows on land nearby, it is about us too.
Primary challenge of the sustainable program at DDC:

Ensure that the **right information** gets to the **right place at the right time** and is **communicated effectively**, so ideas most appropriate to a specific project will be implemented.
Finding the right information:

**Experience:**
- DDC pilot projects and Government/Private Projects
- Non-Profits
  - Non-profit environmental groups such as INFORM, Natural Resources Defense Council, Design Trust for Public Space, Rainforest Alliance, and others
  - Academic research/incubators at CUNY, Columbia, Rutgers, NYU, others

**Government agencies:**
- New York Power Authority Research Group
- Mayoral Task Force on Sustainability
- NYC Department of Buildings
- NYSERDA programs

**Websites**
- [www.buildinggreen.com](http://www.buildinggreen.com) – Environmental Building News publication website
- [www.usgbc.org](http://www.usgbc.org) – NYC is a member – contact greeninfo@ddc.nyc.gov for instructions on joining.
- Healthybuildings.net regarding toxic materials in buildings
Finding the right information continued…

**DDC Research Manuals Completed:**

- High Performance Building and Infrastructure Guidelines
- Quality Energy Efficient Lighting Manual:
- Local Law #77 Manual: using ultra-low-sulfur diesel fuel for off-road vehicles
- Geothermal Heat Pump Manual
- Construction and Demolition Waste Manual

**DDC Research in Progress:**

- High albedo roofing design manual and specifications
- Sustainable landscaping manual
- Energy monitoring and evaluation of completed pilot project
- Evaluation of costs/benefits related to using LEED on three DDC projects
- Monitoring and evaluation of two open-loop groundwater heat pump installations

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**Electricity Rates (New York Power Authority)**

**Natural Gas Rates**
Getting information to the **right place:**

**Write sustainable program into Architect’s contract:**

Include experience requirements for:
- quality energy efficient lighting
- sustainable landscaping techniques for urban areas
- energy modeling and analysis
- LEED methodology and tracking from early design through construction

Include process requirements:
For LEED projects:
- LEED workshop and dedicated milestone meetings with user group, operators, and subconsultants at end of schematic, design development and finals to review key submittals and LEED workplan/action items

For all projects:
- dedicated meeting to review requirements and identify other opportunities
Getting information to the **right place** continued…

**Architect’s contract continued…**

**Include performance requirements**
For additions, all new and gut-rehab projects over $2M except housing and industrial, LEED Law requires:
- USGBC LEED Silver (or LEED certified for schools and hospitals) – using appropriate LEED system
- plus 20% energy savings above Code on projects over $12M
- plus 25% energy savings above Code on projects over $30M

For boiler replacement project over $2M and lighting replacement over $1M, LEED law requires:
- 10% energy savings above Code

For HVAC control replacements over $2M, LEED law requires:
- 5% energy savings above Code

For plumbing system replacements over $.5M:
- 30% water savings above LEED baseline
Getting information to the right place continued…

Architect’s contract continued…

Include prescriptive requirements
For all projects:
• recycled content/ low toxic materials, energy code compliance analysis, walk-off matts, cool roofs, low-E glass, bike parking, consultant services related to commissioning

Include submittal requirements
For Local Law 86 projects:
• LEED plan and action items (updated at each phase)
• DDC capital projects receive LEED rating from the USGBC
• Local Law 86 reporting
For all projects:
• Environmental programming matrix, C&D waste plan
• Energy analysis showing minimum Code compliance
Getting information to the right place continued…

Develop the commissioning scope of work and write into contract/task order for commissioning services

- Reference ASHRAE 2005 Guide for commissioning
- Meet LEED prerequisite and LEED commissioning point requirements
- Fee is percentage of estimated construction cost of systems being commissioned

- DDC administers four requirements contracts for commissioning and assigns project task orders as they arise
- Commissioning agent work begins at the end of design development
- Define systems to be commissioned specific to project and client need
Bringing information at the right time: introduce information related to decisions when they are made during the design process

- Develop **timeline** of procurement activities, meetings, submittals and commissioning activities - and add to the project schedule
- Implement and enforce through submittal review and other contract management procedures
And communicate effectively:

DDC sustainable website - www.nyc.gov/ddc/ddcgreen

- Samples of submittals expected from consultants: LEED workplan, energy analysis, C&D waste plan, LL 77 reporting forms
- Materials specifications (required and recommended) for common material types
- Research manuals and guidelines

Other

- Directory of Waste Processors in NYC area
- Directory of Manufacturers of Low Toxic/ Recycled Content/ Renewable Materials
- Consultant contact for further technical information and questions: greeninfo@ddc.nyc.gov
communicate effectively continued…

DDC Internal Sustainable Training on nine topics.

Powerpoints posted on DDC website.

DVD’s available to DDC Design Teams on request.

- Commissioning
- Environmentally Preferable Materials
- Energy Efficiency and Analysis
- Construction and Demolition Waste
- Daylighting
- Quality Energy Efficient Lighting
- Local Law 77
- LEED
Pilot projects: program involved in about 40 projects worth about $1B over 8 year period

20 projects together worth over $300M total are targeting LEED (10 in pre-design):

In construction:
- Queens Botanical Garden Administration Building – (Platinum)
- Brooklyn Children’s Museum Renovation and Expansion – (Gold)
- Bronx Zoo Lion House Renovation – (Gold)
- Office of Emergency Management Headquarters, Brooklyn – (Silver)

In design:
- Weeksville Historical Society Education Building, Brooklyn (Gold)
- DOT Sunrise Yard Shop and Warehouse, Queens (Silver)
- DEP Remsen Avenue Yard, Brooklyn (Silver)
- BPL Kensington Branch Library, Brooklyn (Certified)
- Queens Public Library Discovery Center (Silver)
- Glen Oaks Library, Queens (Silver)
Strategies implemented almost always:

- Enhanced daylighting
- Low toxic materials
- Recycled content materials
- Cool roofs
- Low-e glass
- Enhanced insulation
- Walk-off mats
- Bike racks
- Increased EER rating on AC
- Efficient lighting
- Occupancy sensors
- CO2 sensors
- Hi efficiency motors
- Variable frequency drives
- Commissioning
Strategies implemented sometimes:

- Greywater recycling systems
- Drywells/ bioswales
- Biotopes/constructed wetland/green roof
- Rainwater for truck washing
- Pervious surfaces

- Fuel cells – 2-200kW (with grants)
- Photovoltaic panels (with grants)

- Renewable materials (bamboo, linoleum)
- Alternative and certified wood products (tectum, wheatboard)

- Geothermal systems (600 tons total)
- Stratified ventilation
- Radiant floor heating
- Glycol loop heat recovery
- Waterless urinals
- Daylight dimming controls
Next Steps:

Website Update

- Post LEED specification language
- Post LEED timeline of activities
- Expand and update material specifications and list of manufacturers
- Post training powerpoints
- Post High Performance Infrastructures Guidelines
- Post Hi-Albedo Roofing Manual
- Update C&D Waste Plan and Specification
- Post sample submittals for LEED work/action plan, and energy analysis

Other

- Develop detailed project descriptions of completed pilot projects for posting on website
- Develop Local Law project reporting forms and protocols for all agencies
- Consider sustainable category in performance evaluations of consultants and managers