



# The Opportunities and Challenges of Municipal Green Building

City and County of Denver

Scott Morrissey, Mayor's Office

Christian Williss, General Services

Paul Sobiech, Public Works

April 22, 2010

## Overview

- City's 2010 building utilities budget = \$17M
  - Rising costs are a significant budget concern
- 2006 Greenprint Denver Action Agenda
  - Goal to reduce City energy use 5% by 2011
- Executive Order 123 formalized green building and operations policy

# Challenges and Opportunities

**Challenge: Shrinking and volatile budgets**

**Opportunity: Identify and create new funding sources**

- **EECBG and agency sustainability funds**

Challenge: Communicating responsibilities to agencies

Opportunity: Solicit commitment from top levels

- Mayor's advocacy, Environmental Management System, quarterly utility reports

Challenge: Conflicts between capital/operating budgets

Opportunity: Promote Life Cycle Cost Analyses

- Funding energy audits, hiring Energy Manager position



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# Greening City Buildings

## Greenprint Goal

- Implement all appropriate LEED EB best practices into City facility operations and maintenance by 2011

## Challenges

- Over 180 major facilities
  - Multiple facility managers, City agencies
- Limited capital improvement funding
- Shrinking workforce
- Expanding portfolio



# Environmentally Preferable Purchasing

## Greenprint Goal

- Increase the number of environmentally preferable goods and services by 10% annually

## Challenges

- Lack of awareness
- Rapid evolution of green market
- Decentralized decision making
- Declining operating budgets
- Shrinking Purchasing staff



# Citywide Energy Efficiency

## Greenprint Goal

- Reduce City facility energy use by 5% per square foot by 2011

## Challenges

- Over 180 major facilities with multiple Facility Managers
- City facilities house dozens of different agencies
- Limited capital improvement funding
- Shrinking facilities workforce



# New Buildings

## Greenprint Goal

- All applicable new City building construction and major renovations will be built and certified at least LEED NC Silver.

## Challenges

- Public Works manages all capital construction
- Tenant agencies often have competing interests
- Building design may not reflect City's environmental priorities



# Environmental Management System

- Greenprint Environmental Management System
  - Establishes framework for managing environmental performance
  - Citywide approach
  - Formalizes responsibilities
  - Supports communication
  - Sets annual objectives and targets
  - Value of 3<sup>rd</sup> party certification





# The Opportunities and Challenges of Municipal Green Building

## *Greening New and Existing Buildings*

Christian Williss, General Services

City and County of Denver

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# Department of General Services

- Facilities Management
- Utilities
- Purchasing
- Central Services

# Existing Buildings

- Strategies
  - LEED EB Pilot Project
  - LEED EB Facility Assessment
  - Green renovation and repair projects
  - Citywide Energy Efficiency Program
  - Environmentally Preferable Purchasing
  - Greenprint Environmental Management System

# Operations and Maintenance

- LEED EB Pilot Project
  - Webb Municipal Building
    - Modify or create new policies and procedures
      - Recycling, low impact construction, purchasing, energy
    - Ensure third party certification
    - Evaluate impact of O&M changes
    - Implement in other City facilities



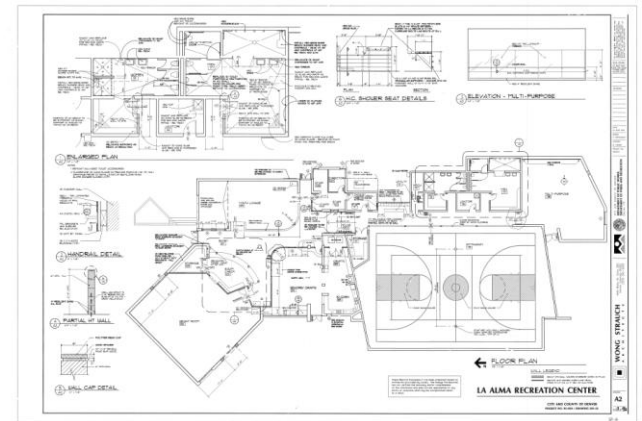
# Operations and Maintenance

- LEED EB Facility Assessment
  - Conduct assessment of 6 City facilities
  - Prioritize efforts
    - Identify easy/low cost improvements for quick implementation across portfolio
    - Identify medium and high effort/cost for future implementation
  - Include in capital planning process



# Operations and Maintenance

- Green renovation and repair projects
  - LEED AP for project managers
  - Greenprint Guidelines for Small Projects
  - Track successes/challenges
  - Include sustainability/energy efficiency in capital planning process
  - Ensure adequate funding



# Environmentally Preferable Purchasing

## ■ Strategies

- Include Greenprint Denver, EMS, and LEED EB language in all RFPs and purchase orders
- Conduct environmental assessments for all RFPs
- Inquire about product or service environmental performance
- Include sustainability in weighted criteria
  - Office equipment
- Include sustainability in product or service specs
  - Janitorial products and services
  - Paint
  - Carpet and floor coverings
  - Office paper



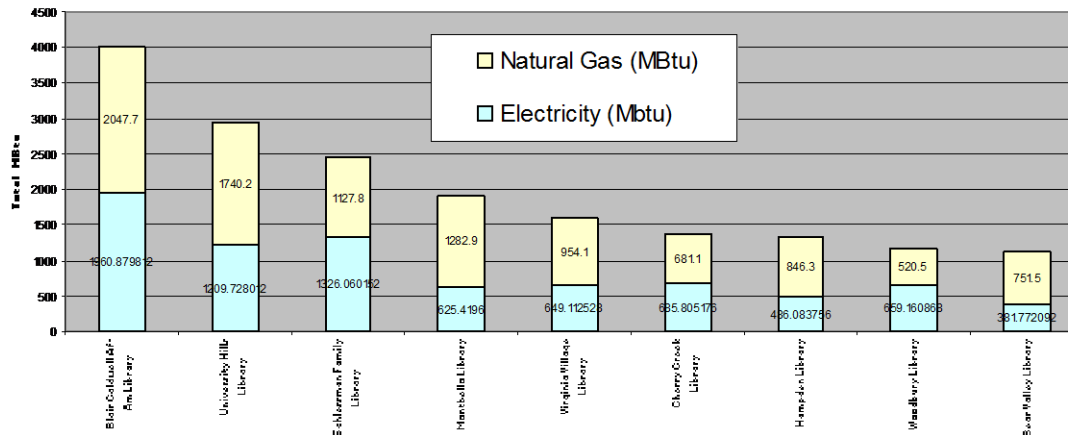
# Energy Efficiency

- Dedicated annual funding
  - Agency sustainability/energy conservation fund
    - General Services
    - Parks and Recreation
  - Annual CIP/Mill Levy
- Third Party Resources
  - Xcel Demand Side Management rebates
  - Energy Efficiency and Conservation Block Grants
    - Energy audits, recommissioning, projects
  - Denver Water



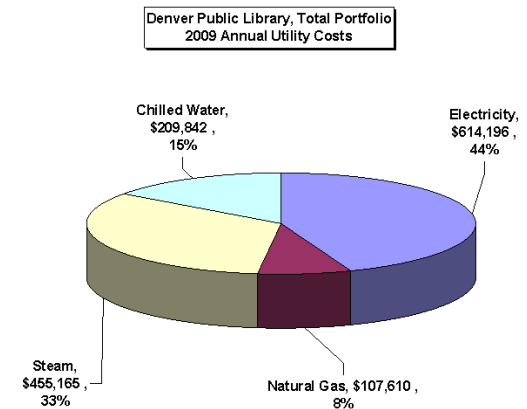
# Energy Efficiency

- Project Planning and Implementation
  - Capital improvement planning process
  - CIP/Mill Levy design and construction
  - Maintenance and repair
  - New Construction



# Energy Efficiency

- Citywide Energy Program
  - Energy Manager
  - Quality data and reporting
    - Monthly and quarterly reports
  - Focus on operations and maintenance
  - Design guidelines and front end specs
    - Metering energy intensive equipment
    - Equipment systems manual
    - Recommended preventive maintenance
    - Work closely with commissioning agent



Total 2009 Cost for the Denver Public Library - \$1,386,813

# Environmental Management System

- Greenprint Environmental Management System
  - Shared best practices
  - Environmental Guidelines
  - Work Instructions
  - Annual objectives and targets
  - Internal and external audits



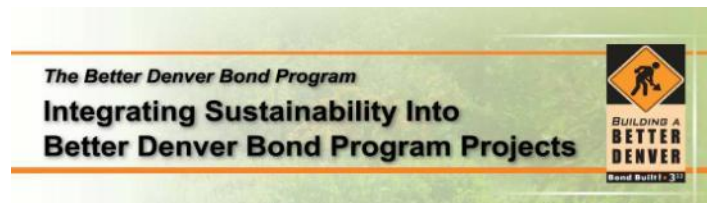
# Environmental Management System

- Greenprint EMS - Energy
  - Shared best practices
    - Agency Energy Plan
    - Better communication
  - Environmental Guidelines
    - Energy policy
      - Executive support
      - Recommended set points, Energy Star Purchasing
  - Annual objectives and targets
    - 5% energy reduction goal
  - Internal and external audits
    - Semi-annual surveillance, annual internal



# New Buildings

- **Better Denver Sustainability Committee**
  - Develops and updates project sustainability requirements and project forms for Better Denver projects
  - Reviews and approves all Better Denver projects for compliance with Better Denver sustainability requirements
  - Facilitates training and technical assistance as needed
  - Communicates Better Denver sustainability achievements
  - Bridges gap between capital and operating costs



# New Buildings

- **Better Denver Sustainability Requirements**
  - **Site Selection**
    - Bicycle Storage and Changing Rooms
    - Stormwater Design
    - Heat Island Effect
    - Light Pollution Reduction
  - **Water Efficiency**
    - Water Efficient Landscaping
    - Water Use Reduction



# New Buildings

- **Better Denver Sustainability Requirements**
  - **Energy and Atmosphere**
    - Optimize Energy Performance
      - Energy Star equipment and appliances
    - Enhanced Commissioning
  - **Materials and Resources**
    - Construction Waste Recycling
    - Recycled content materials
      - Flyash concrete
    - Regional Materials



# New Buildings

- Better Denver Sustainability Requirements
  - Indoor Environment Quality
    - Construction IAQ Management
    - Low-Emitting Materials



# New Buildings

## Municipal Animal Shelter

- Interior/exterior water efficiency
- Efficient mechanical systems – 30% savings over ASHRAE
- Enhanced commissioning
- PV ready
- Daylighting
- Low impact materials



Animal Arts Design



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THE MILE HIGH CITY

# New Buildings

## Central Platte Campus

- Interior/exterior water efficiency
- Efficient mechanical and lighting
- Enhanced commissioning
- Solar PV
- Low impact materials



RNL Design

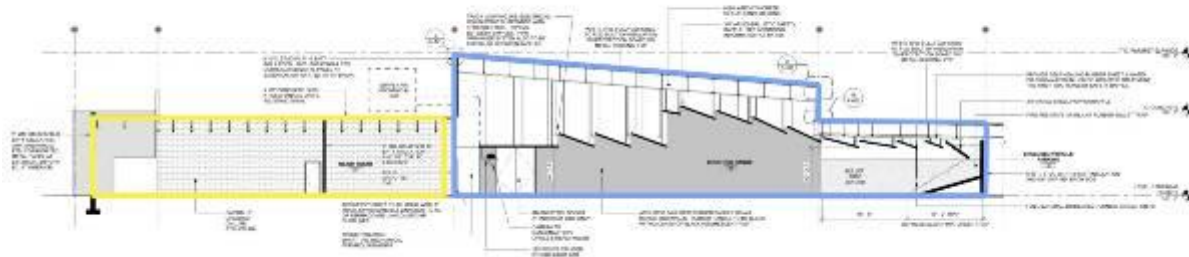
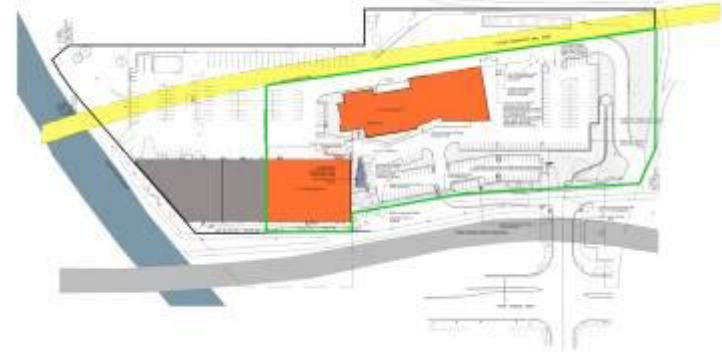
greenprint denver

building a sustainable city together, today

# New Buildings

## Police Traffic Operations/Firing Range

- Water efficiency – 50% exterior, 40% interior
- Efficient mechanical and lighting – 30% energy savings
- Enhanced commissioning
- Urban infill, community connectivity
- Incorporates existing building
- Solar PV



Humphries Poli Architects



# The Opportunities and Challenges of Municipal Green Building

*Improving Building Design, Construction, and Management*

Paul Sobiech, Public Works

City and County of Denver

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# Overview

- Environmental Housekeeping is a Challenge
- A Number of Drivers - Requirements
- Many Opportunities - Technologies & Strategies

## “Green for Life”

- To implement and continuously improve day-to-day Best Management Practices (BMPs) to reduce or eliminate:
  - Chemical Use
  - Energy waste
  - Water Waste
  - Air Pollution
  - Solid Waste



# Drivers - Requirements

- Citywide Environmental Policy
- Executive Order 123
- *Greenprint Denver* Environmental Management System (EMS)
- ISO 14001 Certification
- LEED
- Regulations and Permits
- Design Standards

# Stormwater BMPs



# Stormwater BMPs



# Material Storage & Handling



# Vehicle Washing





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# Control Systems





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# Written Procedures



# Other Considerations

- Management Commitment
- Staff Roles and Responsibilities
- EMS

