# LEED AP O+M TRAINING

June 23, 2009

Session 4 of 5

Presented by: CTG Energetics
Lisa Stanley & Celia Hammond


Always…

© CTG Energetics 2009, all rights reserved

## Materials and Resources

PURCHASING

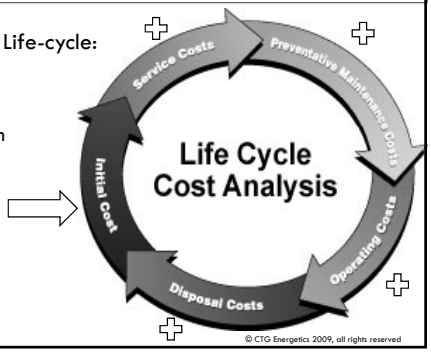
© CTG Energetics 2009, all rights reserved

## Materials Entering Project Boundary

- Environmental consequences/impacts:
  - Polluting water
  - Polluting air
  - Destroying native habitats
  - Depleting natural resources

## Materials Entering Project Boundary

- Looking at the Life-cycle:
  - Extraction
  - Processing
  - Transportation
  - Use
  - Disposal




© CTG Energetics 2009, all rights reserved

## Life Cycle Example: Carpet Tile vs Roll Floor Covering

rights reserved

## Life Cycle Example: Maintenance/Replacement Expense

- Replace stained or worn tiles as needed

- Replace entire carpet when stained and worn

rights reserved

## Life Cycle Example: Linoleum vs. Vinyl Composition Tile

## Linoleum

- Materials include: cork, wood, linseed oil, and jute
- First cost ~ $3.50sf
- Maintenance: dry dust wiping ~ $.50sf annually
- 30-40 year life

## VCT

- Materials include: PVC, calcium carbonate and pigments
- First Cost ~ $1.50sf
- Maintenance: stripping and refinishing ~ $1.45sf annually (also utilizing more chemical)
- 20 year life

rved

## Linoleum vs VCT

Linoleum materials are natural and abundant. Does not produce a toxic emission when disposed.

Vinyl is made from polyvinyl chloride (PVC) – a carcinogen and mostly land-filled.

**LCA 1,000sf VCT: 40 years (install 2x) $61,000**

**LCA 1,000sf of Linoleum: 40 years $23,500**

*(Includes initial cost and annual maintenance)*

Reference: Environmental Building News

## Purchasing Categories

| MRc1 Ongoing Consum-ables | MRc2.1 Durable Goods: Electric | MRc2.2 Durable Goods: Furniture | MRc3 Alterations & Additions | MRc4 Reduced Mercury in Lamps | MRc5 Sustainable Food |
|---|---|---|---|---|---|
|  |  |  |  |  |  |

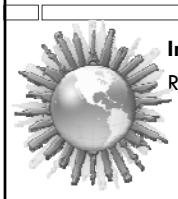
© CTG Energetics 2009, all rights reserved

## MRp1

Sustainable Purchasing Policy

© CTG Energetics 2009, all rights reserved

## MRp1 – Sustainable Purchasing Policy



**Intent**

Reduce the environmental impacts of materials acquired for use in the operations, maintenance, and upgrade of buildings

© CTG Energetics 2009, all rights reserved

## MRp1 – Sustainable Purchasing Policy

**Requirements**

- Have a Environmentally Preferable Purchasing (EPP) policy which must address the materials of:
  - MRc1 – Ongoing Consumables

    and one of these:
  - MRc2 – Durable Goods (Electric and Furniture)
  - MRc3 – Facility Alterations and Additions
  - MRc4 – Reduced Mercury in Lamps
- Requires only policies, not ongoing sustainable performance

© CTG Energetics 2009, all rights reserved

## MRp1 – Sustainable Purchasing Policy

- Create & implement a sustainable purchasing **policy**
- Address **environmental and social** factors
- State the **purpose** of the policy, give relevant **definitions**, include any related policies, and describe **best practices**
- Cover product purchases within the building and site **management's control**
- Scope can be **expanded**
- Consider using **LCC** (Life Cycle Costing Method)

© CTG Energetics 2009, all rights reserved

## MRp1 – Sustainable Purchasing Policy

- Documentation Guidance:
  - Identify **materials** to be included in the policy
  - Track **dates** of any changes
  - Document any **changes** made to the policy during implementation
  - **If there are any portions of the building not governed by the EPP policy, note the reasons for exclusion**

© CTG Energetics 2009, all rights reserved

## MRc1

Sustainable Purchasing – Ongoing Consumables

© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

- **Intent:** Reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of buildings

Ongoing Consumables (at minimum) = :

- Paper (printer, notebooks, envelopes etc)
- Binders, Desk Accessories
- Toner Cartridges

*If uncertain – select one category.*

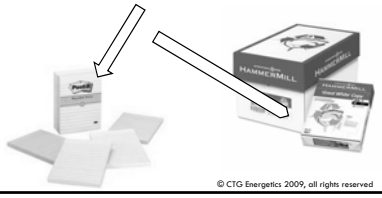
*No double dipping across credits*

© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

**Requirements:** one <u>or more</u> of these criteria are met

Purchases contain at least **10% postconsumer** or **20% Preconsumer/Postindustrial** material. As defined by ISO 14021 – review definitions on page 257




© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

Purchases contain at least **50% rapidly renewable** materials

© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

Purchases contain at least **50%** materials harvested and processed or extracted and processed within **500 miles** of the project

## MRc1 Sustainable Purchasing: Ongoing Consumables

The purchases consist of at least **50% Forest Stewardship Council (FSC)** certified paper products


© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

- Commit to purchasing **rechargeable batteries**


© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

Approach: Work with **suppliers** to find more sustainable products

Points for **60%** of Purchases: 1

- Exemplary performance for 95%

© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

- **Calculations:**
  - **Track** the cost of all ongoing consumable materials purchases
  - Compare the cost of ongoing consumable materials that meet one of the criteria with the total cost of all materials purchased
  - **Weight** purchases if they meet more than one criterion

© CTG Energetics 2009, all rights reserved

## MRc1 Sustainable Purchasing: Ongoing Consumables

- Even multi-tenant facilities must count all purchases unless 10% of sq ft is under different management.
- Use a calculation if tenant does not provide info – using **worst case scenario** of nothing sustainable.

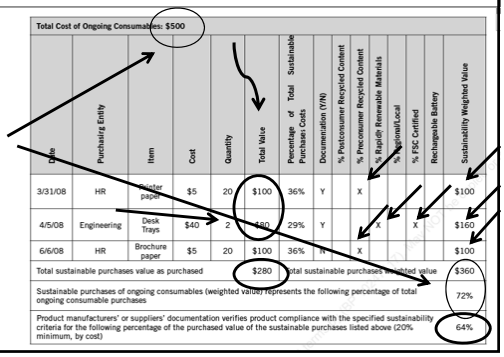
© CTG Energetics 2009, all rights reserved

## Sample Calculation

- Total Purchases ($500) for facility
- Purchased:
  - Printer Paper
  - Desk Trays
  - #10 envelopes
  - Brochure Paper
  - Legal Pads

© CTG Energetics 2009, all rights reserved

## Sample Calc – pg 255



Total Cost of Ongoing Consumables: $500

| Date | Purchasing Entity | Item | Cost | Quantity | Total Value | Percentage of Total Sustainable Purchases Costs | Documentation (Y/N) | % Postconsumer Recycled Content | % Preconsumer Recycled Content | % Rapidly Renewable Materials | % Regional/Local | % FSC Certified | Rechargeable Battery | Sustainability Weighted Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/31/08 | HR | Printer paper | $5 | 20 | $100 | 36% | Y | | X | | | | | $100 |
| 4/5/08 | Engineering | Desk Trays | $40 | 2 | $80 | 29% | Y | | | X | | X | | $160 |
| 6/6/08 | HR | Brochure paper | $5 | 20 | $100 | 36% | N | | X | | | | | $100 |
| Total sustainable purchases value as purchased | | | | | $280 | Total sustainable purchases weighted value | | | | | | | | $360 |
| Sustainable purchases of ongoing consumables (weighted value) represents the following percentage of total ongoing consumable purchases | | | | | | | | | | | | | | 72% |
| Product manufacturers' or suppliers' documentation verifies product compliance with the specified sustainability criteria for the following percentage of the purchased value of the sustainable purchases listed above (20% minimum, by cost) | | | | | | | | | | | | | | 64% |

## MRc1 Sustainable Purchasing: Ongoing Consumables


- **Summary of Referenced Standard:** Forest Steward Council (FSC)- Certified Paper Products

© CTG Energetics 2009, all rights reserved

## MRc2

Sustainable Purchasing – Durable Goods,

© CTG Energetics 2009, all rights reserved

## MRc2 Sustainable Purchasing: Durable Goods

- **Intent:** reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of buildings
- **Requirements:** Maintain a sustainable purchasing program covering Durable Goods
  - Option 1: Electric-powered equipment- 1 point
  - Option 2: Furniture- 1 point
  - Option 3: Combination- 2 points achieve requirements of both Options 1 & 2

© CTG Energetics 2009, all rights reserved

## MRc2 Sustainable Purchasing: Durable Goods – Electric Powered

- **Laptops, Breakroom Appliances, Computers, Monitors**
- **Referenced Standards:**
  - ENERGY STAR Qualified Products
  - Electronic Product Environmental Assessment Tools (EPEAT)
  - 1 point if 40% meet criteria –
    - Exemplary if 80%

© CTG Energetics 2009, all rights reserved

## MRc2 Sustainable Purchasing: Durable Goods - Furniture

- Criteria - furniture contains at least 1 or more:
  - **10%** **postconsumer** and/or **20%** **postindustrial**
  - **70%** salvaged from off-site
  - **70%** salvaged on-site, internal program
  - **50%** rapidly renewable
  - **50%** Forest Stewardship Council (FSC) certified wood
  - **50%** harvested and processed or extracted and processed within **500 miles**

1 point if 40% meet criteria –

- Exemplary if 80%

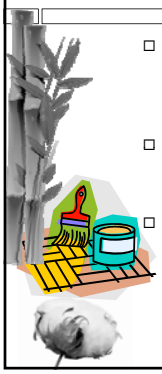
© CTG Energetics 2009, all rights reserved

# MRc3

Sustainable Purchasing – Facility Alterations & Additions

© CTG Energetics 2009, all rights reserved

## MRc3 Sustainable Purchasing: Facility Alterations and Additions



- **Intent:** reduce the environmental and air quality impacts of the materials acquired for use in the upgrade of buildings
- **Points:** 1 – for 50%
  - Exemplary performance for 95%
- **Calculations:** cost of materials used in alterations and additions that meet at least one sustainability criteria compared with total overall cost of materials used in alterations and additions

© CTG Energetics 2009, all rights reserved

## MRc3 Sustainable Purchasing: Facility Alterations and Additions

- Purchases meet one or more of these criterion:
  - At least **10%** postconsumer or **20%** postindustrial material
  - At least **70%** material salvaged from off site
  - At least **70%** material salvaged on-site
  - At least **50%** rapidly renewable material
  - At least **50%** FSC certified wood
  - At least **50%** locally sourced materials

© CTG Energetics 2009, all rights reserved

## MRc3 Sustainable Purchasing: Facility Alterations and Additions

- **Requirement criterion, continued:**
  - Adhesive and sealant emissions don't exceed SCAQMD #1168 **or** meet Bay Area Air Quality Management District Regulation 8, Rule 51

© CTG Energetics 2009, all rights reserved

## MRc3 Sustainable Purchasing: Facility Alterations and Additions

- Paints and coatings emissions do not exceed the limits of Green Seal's Standard GS-11

© CTG Energetics 2009, all rights reserved

## MRc3 Sustainable Purchasing: Facility Alterations and Additions

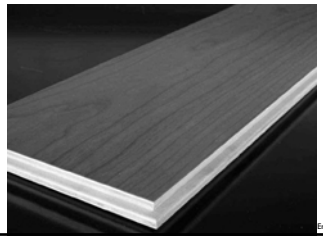
**Requirement criterion, continued:**

- 25% of non carpet flooring is FloorScore-certified
- Carpet meets CRI (Carpet and Rug Institute) Green Label Plus Carpet
- Carpet cushion meets CRI Green Label

© CTG Energetics 2009, all rights reserved

## MRc3 Sustainable Purchasing: Facility Alterations and Additions

- **Requirement criterion, continued:**
  - Composite panels and agrifiber products contain no added urea-formaldehyde resins



© CTG Energetics 2009, all rights reserved

## MRc3 Sustainable Purchasing: Facility Alterations and Additions

**Referenced Standards:**

- FloorScore
- Forest Stewardship Council-Certified Wood
- Green Label Plus & Green Label Testing Programs
- Green Seal GS-11 Environmental Requirements for Paints
- Regulation 8, Organic Compounds, Rule 51, Adhesive and Sealant Products
- South Coast Air Quality Management District (SCAQMD) Rule 1168: Adhesive and Sealant Applications

© CTG Energetics 2009, all rights reserved

## MRc4

Sustainable Purchasing – Reduced Mercury in Lamps

© CTG Energetics 2009, all rights reserved

## MRc4 – Sustainable Purchasing: Reduced Mercury in Lamps

- **Intent:** establish and maintain a toxic material source reduction program to reduce the amount of mercury brought onto the building site through purchases of lamps
- **Referenced Standard:** NEMA Voluntary Commitment on Mercury in Compact Fluorescent Lights

© CTG Energetics 2009, all rights reserved

## MRc4 – Sustainable Purchasing: Reduced Mercury in Lamps

- **Requirements:** develop a lighting purchasing plan specifying maximum levels of permissible mercury
  - Specify a target for the overall average of mercury content
  - Include lamps for indoor, outdoor, and portable fixtures
  - 90% of lamps purchased must comply
  - Addresses only the lamps purchased during the performance period, not all lamps installed in the building
- **Exception**: screw-based CFLs may be excluded **if** they comply with the NEMA Voluntary guidelines
- Mercury-free lamps (i.e. LEDs) may be included only IF they are as efficient or more energy efficient than equivalent mercury-containing lamps.

© CTG Energetics 2009, all rights reserved

## MRc4 – Sustainable Purchasing: Reduced Mercury in Lamps

- Calculations based on:
  - Picograms of mercury
  - Manufacturer-rated lamp life hours
  - Design light output per lamp in lumens

Points: 1 – 90 picograms or less ,
Exemplary Performance Eligible 70 picograms

© CTG Energetics 2009, all rights reserved

## MRc5

Sustainable Purchasing - Food

© CTG Energetics 2009, all rights reserved

## MRc5 Sustainable Purchasing: Food

- **Intent:** Reduce the environmental and transportation impacts associated with food production and distribution
- **Requirements:**
  - Achieve sustainable purchases of at least 25% of food and beverages
- **Points:** 1 for 25%
  - Exemplary Performance for 50%

© CTG Energetics 2009, all rights reserved

## MRc5 Sustainable Purchasing: Food

- Sustainable purchases must meet one or both of these criterion:
  - Purchases produced within a ***100 mile*** radius
  - Labeled USDA Certified Organic,
  - Food Alliance Certified,
  - Rainforest Alliance Certified,

© CTG Energetics 2009, all rights reserved

## MRc5 Sustainable Purchasing: Food

- Sustainable purchases criterion – cont'd:
  - Protected Harvest Certified,
  - Fair Trade, or
  - Marine Stewardship Council's Blue Eco-Label

© CTG Energetics 2009, all rights reserved

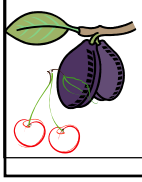
## MRc5 Sustainable Purchasing: Food

- Referenced Standards:
  - Fairtrade
  - Food Alliance Certification
  - Marine Stewardship Council (MSC) Blue Eco-Label
  - Protected Harvest Certification
  - Rainforest Alliance Certification
  - USDA Organic Certification

© CTG Energetics 2009, all rights reserved

## DID YOU KNOW?

- Protected Harvest certification currently certifies **potatoes**, but is in the process of developing a program for dairy, almonds, tomatoes, plums, peaches, nectarines, and other fresh produce



© CTG Energetics 2009, all rights reserved

Questions?

© CTG Energetics 2009, all rights reserved

WASTE MANAGEMENT


© CTG Energetics 2009, all rights reserved

## INTRODUCTION

- In 2006, U.S. produced > 251 million tons of solid waste
- That's 4.6 lbs per person, PER DAY
- Increased waste generation incurs costs for buildings:
  - Unnecessary packaging materials increase the cost of goods
  - Fees for landfill/incineration increase

© CTG Energetics 2009, all rights reserved

## INTRODUCTION

- Recycling certain materials (like batteries) prevents toxins from polluting air and water
- Diverting items from the waste stream provides re-used materials and avoids use of "virgin" materials
- Benefits of Recycling?
- Standard fluorescent lamps light 96% of commercial floor space

© CTG Energetics 2009, all rights reserved

## INTRODUCTION

- Buildings generate large amounts of waste in daily operations
- MR credits reduce waste and improve the building environment
- MR credits focus on:
  - Environmental impact of EACH material brought into the building project
  - Minimization of landfill and incinerator disposal for EACH material taken out of the building project

© CTG Energetics 2009, all rights reserved

## INTRODUCTION

- MR credits highlight these measures:
  - Select sustainable materials
  - Practice waste reduction strategies
  - Reduce source waste
  - Reuse and recycle
  - Reduce Mercury pollution

© CTG Energetics 2009, all rights reserved

## Quick Quiz:

- In 1960, 6.4% of U.S. waste was recycled
- In 2006, that amount was:

**A. 25.6%**
**B. 32.5%**
**C. 44.5%**
**D. 51.9%**

© CTG Energetics 2009, all rights reserved

## MRp2

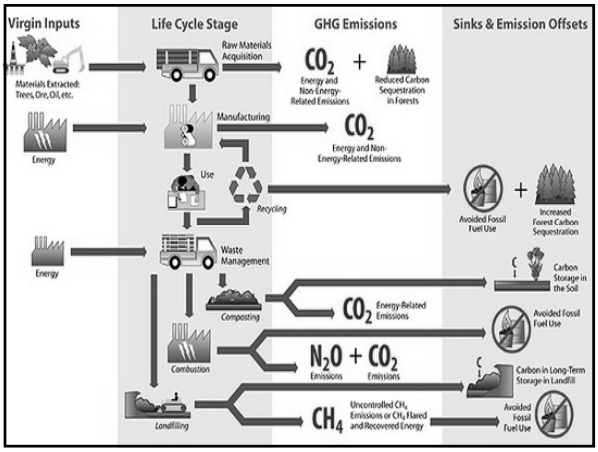
Solid Waste Management Policy

© CTG Energetics 2009, all rights reserved

## MRp2 – Solid Waste Management Policy

- **Intent:** Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills or incineration facilities

© CTG Energetics 2009, all rights reserved




## MRp2 – Solid Waste Management Policy

- **Requirements**
  - Have in place a Solid Waste Mngt policy
  - Policy must address the materials of at least:
    - MRc7 – Ongoing Consumables
    - MRc8 – Durable Goods
    - MRc9 – Facility Alterations and Additions
    - Mercury containing lamps
  - Requires only policies, not ongoing sustainable performance

© CTG Energetics 2009, all rights reserved

## MRp2 – Solid Waste Management Policy

- Approach and Implementation considerations:
  - Diverting waste from landfills and incinerators
  - Commitment to source **reduction, reuse,** and **recycling**
  - Who will be responsible for implementation
  - What actions will be implemented (Reuse? Recycling?) in the policy
  - How it will be monitored
  - Where waste will be collected and sorted

© CTG Energetics 2009, all rights reserved

## MRp2 – Solid Waste Management Policy

Approach and Implementation considerations for Mercury-containing lamps:

- Reduce the volume of lamps
- Educate staff
- State and federal requirements
- Manufacturer take-back programs
- Transporting lamps
- Tracking employee adherence

© CTG Energetics 2009, all rights reserved

## MRc6

Solid Waste Management–Waste Stream Audit

© CTG Energetics 2009, all rights reserved

## MRc6: Solid Waste Management– Waste Stream Audit

- **Intent:** facilitate the reduction of ongoing waste and toxins generated by building occupants and building operations that are hauled to and disposed of in landfills or incineration facilities


© CTG Energetics 2009, all rights reserved

getics 2009, all rights reserved

## MRc6: Solid Waste Management–Waste Stream Audit

- **Calculations:**
  - Step 1: determine the appropriate unit (volume or weight)
  - Step 2: determine the appropriate waste categories
  - Step 3: set a time interval for the audit
  - Step 4: determine the volumes or weights of the waste that is disposed of in landfills/incinerators, and the waste that is recycled, reused, or otherwise diverted
  - Step 5: for each category of waste, sort the major types and determine their volumes or weights
  - Step 6: for each waste category, add the conventionally disposed of waste to the alternative waste to get the total

© CTG Energetics 2009, all rights reserved

## MRc7

Solid Waste Management–Ongoing Consumables

© CTG Energetics 2009, all rights reserved

## MRc7 Solid Waste Management–Ongoing Consumables

- **Intent:** facilitate the reduction of waste and toxins generated from the use of ongoing consumable products by building occupants and building operations that are hauled to and disposed of in landfills or incineration fac

© CTG Energetics 2009, all rights reserved

## MRc7 Solid Waste Management–Ongoing Consumables

- **Requirements:**
  - Maintain a waste reduction and recycling program that addresses ongoing consumables
  - Reuse, recycle, or compost **50%** of the ongoing consumables waste stream (by weight or volume)
  - Have a battery recycling program in place

- 1 point for 50% – Exemplary performance 95%

© CTG Energetics 2009, all rights reserved

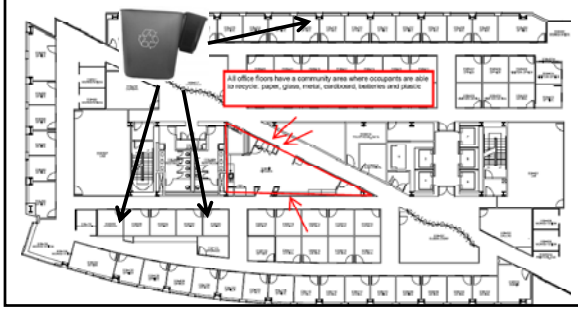
## MRc7 Solid Waste Management–Ongoing Consumables

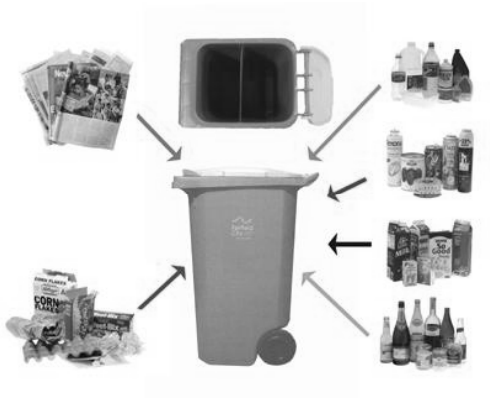
- **Approach and Implementation:**
  - Develop or improve a waste reduction and diversion program
  - Consider using a waste audit as in MRc6
  - Make it convenient for occupants to reduce, reuse, recycle
  - Aim to achieve 80% diversion of batteries

© CTG Energetics 2009, all rights reserved

## MRc7 Solid Waste Management– Ongoing Consumables

- Make it user friendly -



© CTG Energetics 2009, all rights reserved

## Sample Calculations

- Total waste leaving the property – recycled and landfill
- Total amount diverted
- Take %
  - 1,000 pounds total
    - 300 pounds – trash, food waste
    - 400 pounds paper
      - 50 plastic and aluminum
    - 150 glass
    - 100 cardboard
- 70% diverted

© CTG Energetics 2009, all rights reserved

## MRc8

MRc8 Solid Waste Management: Durable Goods

© CTG Energetics 2009, all rights reserved

## MRc8 Solid Waste Management: Durable Goods

- Intent: facilitate the reduction of waste and toxins generated from the use of durable goods by building occupants and building operations that are hauled to and disposed of in landfills or incineration facilities
- 1 point for 75% - no exemplary

© CTG Energetics 2009, all rights reserved

## MRc8 Solid Waste Management: Durable Goods

- Requirements: maintain a waste reduction, reuse, and recycling program that addresses durable goods
  - Reuse or recycle 75% of the durable goods waste stream

© CTG Energetics 2009, all rights reserved

## MRc8 Solid Waste Management: Durable Goods

- Leased durable goods returned to their owner at the end of their useful lives for normal business operations qualify
- Goods that remain useful and functional and are moved to another floor/building do not qualify

© CTG Energetics 2009, all rights reserved

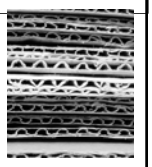
## MRc9

Solid Waste Management: Facility Alterations and Additions

© CTG Energetics 2009, all rights reserved

## MRc9– Solid Waste Management: Facility Alterations and Additions

- **Intent:** divert construction and demolition waste from disposal to landfills and incineration facilities. Redirect recyclable recovered resources to the manufacturing process
- **Requirements:** divert at least **70%** of waste (by volume) generated by facility alterations and additions from conventional disposal
- **Points – 1, Exemplary Performance 95%**



© CTG Energetics 2009, all rights reserved

## MRc9– Solid Waste Management: Facility Alterations and Additions

- Develop and adopt a waste management strategy for construction occurring on site
- Address the reuse/recycling of corrugated cardboard, metals, concrete brick, asphalt, demolition and land clearing debris, clean dimensional wood, plastic, glass, gypsum board, and carpet

© CTG Energetics 2009, all rights reserved

## MRc9– Solid Waste Management: Facility Alterations and Additions

- Evaluate the feasibility of recycling rigid insulation, engineered wood products, other materials
- Design projects with standard size materials
- Identify and institute reuse and salvaging practices for waste volumes
- Designate a recycling area on the remodel site

© CTG Energetics 2009, all rights reserved

## Questions?

© CTG Energetics 2009, all rights reserved

## Break

© CTG Energetics 2009, all rights reserved

## INDOOR ENVIRONMENTAL QUALITY

LEED Existing Buildings Operations and Maintenance
LEED Accredited Professional training

## Introduction

- Americans spend 90% of time indoors
- EPA designated indoor air pollution as a top environmental risk to public health
  - Liability concerns for building owners
  - Increased resale value
  - Increased productivity

© CTG Energetics 2009, all rights reserved

# EQp2

ETS – Environmental Tobacco Smoke Control

© CTG Energetics 2009, all rights reserved

## EQp2- Environmental Tobacco Smoke (ETS) Control

- **Intent:** prevent or minimize exposure of building occupants, indoor surfaces, and systems to environmental tobacco smoke (ETS)
- **Referenced Standards:**
  - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization (ATSM Standard E 779-03)
  - California Residential Alternative Calculation Method Approval Manual from California Energy Commission Chapter 7, Home Energy Rating Systems (HERS) Required

© CTG Energetics 2009, all rights reserved

## EQp2- Environmental Tobacco Smoke (ETS) Control

- **Requirements:**
  - Case 1 Non-residential projects
    - Option 1: prohibit smoking; prohibit on-property smoking within 25 feet of
      - building entries,
      - outdoor air intakes, and
      - operable windows
    - Option 2: prohibit smoking in building except in designated areas; Smoking rooms may vent directly outside or must have negative pressure

*Note: 10% CANNOT be exempted for multi-tenant buildings*

© CTG Energetics 2009, all rights reserved

## EQp2- Environmental Tobacco Smoke (ETS) Control

**Requirements (cont'd):**

- Case 2 Residential and Hospitality Projects
  - Reduce air leakage between smoking and nonsmoking areas; prohibit smoking in common areas; prohibit smoking within 25 feet of air intakes; minimize ETS transfer; weather strip all doors in residential units
  - Negative pressure differential at least an average of 5 Pa (Pascals) and a minimum of 1 Pa when doors are closed

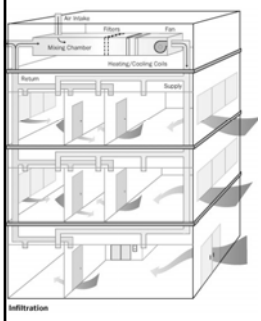
© CTG Energetics 2009, all rights reserved

## EQp1

Minimum Indoor Air Quality Performance

© CTG Energetics 2009, all rights reserved

## EQp1– Minimum Indoor Air Quality Performance



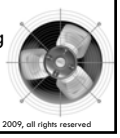

**Intent:** establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the health and well-being of the occupants

**Referenced Standard:** ASHRAE 62.1-2007: Ventilation for Acceptable Indoor Air Quality

© CTG Energetics 2009, all rights reserved

## EQp1– Minimum Indoor Air Quality Performance

- **Requirements:**
  - Case 1: Modify or maintain ventilation systems to provide outside air amounts that meet **ASHRAE 62.1-2007**
  - Case 2: Modify or maintain ventilation systems to supply at least **10 cubic feet per minute (cfm) of outdoor air per person** under all normal operating conditions AND
- Implement and maintain an HVAC system maintenance program
- Test and maintain the operation of ***all*** building exhaust systems, including bathroom, shower, kitchen, and parking exhaust systems



© CTG Energetics 2009, all rights reserved

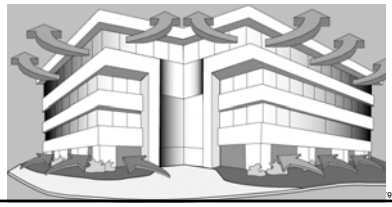
## EQc1.3

Best Management Practices– Increased Ventilation

© CTG Energetics 2009, all rights reserved

## EQc1.3 Best Management Practices– Increased Ventilation

- **Intent:** provide additional outdoor air ventilation to improve indoor air quality (IAQ) for improved occupant comfort, well-being and productivity
- **Points: 1** – No Exemplary (why not?)



getics 2009, all rights reserved

## EQc1.3 Best Management Practices– Increased Ventilation

**Case 1 Requirements**

- Mechanically Ventilated Spaces- increase outdoor air ventilation rates at least **30% above ASHRAE** minimum

**Calculations**

- Mechanically Ventilated Spaces: use calculations provided in the ASHRAE User Manual and the EQp1 Calculators

© CTG Energetics 2009, all rights reserved

## EQc1.3 Best Management Practices– Increased Ventilation

**Case 2** Naturally Ventilated Spaces- design ventilation systems to meet Carbon Trust "Good Practice Guide"

**AND**

- **Option 1-** use diagrams and calculations to show effectiveness to meet CIBSE standards

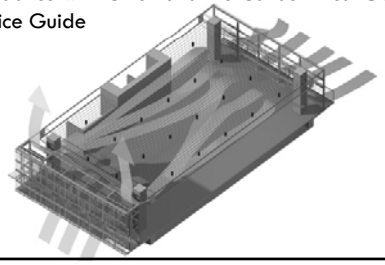
**OR**

- **Option 2-** use a macroscopic, multizone, analytic model to predict room-by-room airflows to meet ASHRAE standards

© CTG Energetics 2009, all rights reserved

## EQc1.3 Best Management Practices– Increased Ventilation

- Naturally Ventilated Spaces: determine the opening sizes for operable windows, trickle vents, and louvers in accordance with CIBSE and the Carbon Trust Good Practice Guide



ghts reserved

## EQc1.3 Best Management Practices– Increased Ventilation

**Referenced Standards:**

- American National Standards Institute (ANSI)/ASHRAE Standard 62.1 2007: Ventilation for Acceptable Indoor Air Quality
- Chartered Institution of Building Services Engineers (CIBSE) Applications Manual 10: Natural Ventilation in Non-Domestic Buildings (2005)
- The Carbon Trust Good Practice Guide 237: Natural Ventilation in Non-Domestic Buildings- A Guide for Designers, Developers, and Owners (1998)

© CTG Energetics 2009, all rights reserved

## EQc1.1

IAQ Best Management Practices – IAQ Management Program

© CTG Energetics 2009, all rights reserved

## EQc1.1 IAQ Best Management Practices – IAQ Management Program

**Intent:** enhance indoor air quality (IAQ) by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting indoor air quality problems when they occur and maintaining the well-being of the occupants

**Referenced Standard:** (EPA's) I-BEAM

IAQ Building Education and Assessment Model

1 point – no exemplary

ergetics 2009, all rights reserved

## EQc1.1 IAQ Best Management Practices – IAQ Management Program

**Credit Synergies**

- **The IBEAM includes addressing:**
  - Environmental Tobacco Smoke (EQ)
  - Remodeling and Renovation (Facility Alterations and Additions)
  - Painting (MR and SS)
  - Integrated Pest Management (SS and EQ)
  - Shipping and Receiving

© CTG Energetics 2009, all rights reserved

## EQc1.1 IAQ Best Management Practices – IAQ Management Program

**Requirements and Implementation:**


1. Use EPA's I-BEAM to develop an IAQ management program
2. During Performance Period, conduct an IAQ audit
3. Identify and fix problems associated with poor IAQ
4. Perform periodic inspections to identify any new IAQ problems and monitor previous issues
5. Establish protocols to manage all significant pollutant sources, especially moisture and mold
6. Establish a procedure for receiving and responding to occupants' complaints

© CTG Energetics 2009, all rights reserved

## EQc1.2

Best Management Practices– Outdoor Air Delivery Monitoring

© CTG Energetics 2009, all rights reserved

## EQc1.2 Best Management Practices– Outdoor Air Delivery Monitoring

- **Intent:** provide **capacity for ventilation system monitoring** to help sustain occupants' comfort and well-being

**CASE 1 -Mechanically Ventilated**

- Airflow measurements for at least 80% of intakes at system level
- Must be monitored to trend no longer than 15 minute intervals at no less than 6 months
- Alarm at 15% differential
- All devices calibrated

**Points: 1 – no exemplary**

© CTG Energetics 2009, all rights reserved

## EQc1.2 Best Management Practices– Outdoor Air Delivery Monitoring

- **CASE 2** Mechanically Ventilated for Densely Occupied Spaces (25 people per 1,000 sq ft or 40 sq ft or less)

- CO2 Sensors compared with outside air
- Must be placed between 3 and 6 feet
- Calibrated once every 5 years at minimum
- Alarm at 15 % differential
- Intervals no longer than 30 minutes

© CTG Energetics 2009, all rights reserved

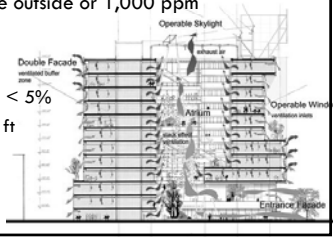
## EQc1.2 Best Management Practices– Outdoor Air Delivery Monitoring

CASE 3 – Naturally Ventilated

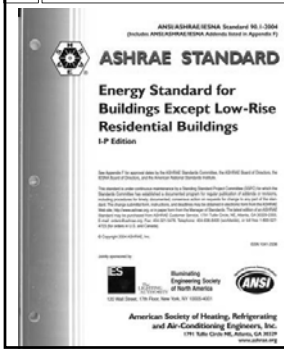
- CO2 Sensors in every densely occupied space and every naturally ventilated zone
- Alarm at 530 ppm above outside or 1,000 ppm

Exceptions:

- Sq ft naturally ventilated is < 5%
- Rooms smaller than 150 sq ft



## EQc1.2 Best Management Practices– Outdoor Air Delivery Monitoring




- **Referenced Standard:** American National Standards Institute (ANSI)/ASHRAE Standard 62.1-2007

© CTG Energetics 2009, all rights reserved

## EQc1.4

Best Management Practices– Reduce Particulates in Air Distribution

© CTG Energetics 2009, all rights reserved

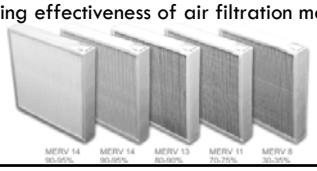
## EQc1.4 Best Management Practices– Reduce Particulates in Air Distribution

- **Intent:** reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants, which adversely affect air quality, human health, building systems, and the environment
- **Requirements:** have in place filtration media with a minimum efficiency reporting value **(MERV) of 13 or greater for all outside air intakes and inside air recirculation returns** during the performance period

© CTG Energetics 2009, all rights reserved

## EQc1.4 Best Management Practices– Reduce Particulates in Air Distribution

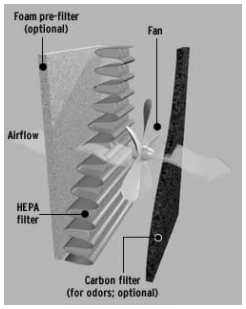
- **Referenced Standard:**
  - American National Standards Institute (ANSI)/ASHRAE Standard 52.2-1999: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by particle Size
  - Minimum Efficiency Reporting Value (MERV)- 1 to 16 scale measuring effectiveness of air filtration materials




: Energetics 2009, all rights reserved

## EQc1.4 Best Management Practices– Reduce Particulates in Air Distribution

- **Points- 1**
- **Credit Synergies?**
  - **Energy Efficiency**
  - **Thermal Comfort Survey**




© CTG Energetics 2009, all rights reserved

## EQc1.5

Best Management Practices– IAQ Management for Additions and Alterations

© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

- **Intent:** prevent indoor air quality (IAQ) problems resulting from any construction or renovation projects to help sustain the comfort and well-being of construction workers and building occupants
- **1 point – No Exemplary**

© CTG Energetics 2009, all rights reserved

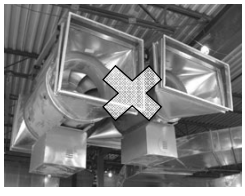
## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

- **Requirements-** IAQ management plan which addresses:
  - During construction, meet the recommended control measures of the SMACNA (Sheet Metal and Air Conditioning National Contractors Association) IAQ Guidelines for Occupied Buildings Under Construction

© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

- SMACNA Guidelines
  - HVAC Protection



© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

SMACNA Guidelines

- Source Control
  - Select low or no toxicity material


© CTG Energetics 2009, all rights reserved

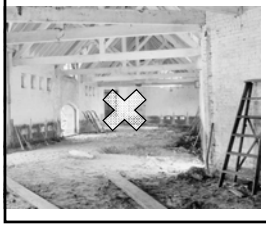
## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

- SMACNA Guidelines
- Pathway Interruption

© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

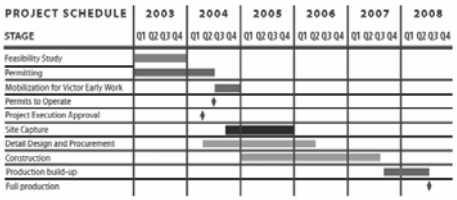
- SMACNA Guidelines
- Housekeeping



© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

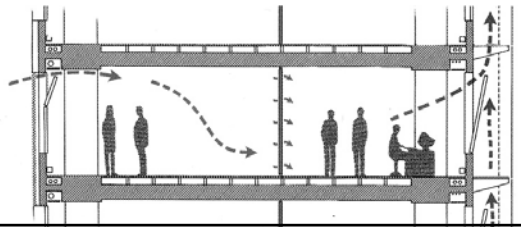
- SMACNA Guidelines
- Scheduling




© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

**Requirements:** Develop and implement an IAQ management plan for the preoccupancy phases and perform a detailed flush-out procedure



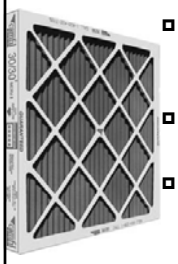
## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

FLUSH-OUT PROCEDURE:

- After construction, finish installation, punch-list & cleanup install new filter media
- Before occupancy
- Total air through area:**14,000** cubic feet per sq ft (60 Degrees + and Humidity no more than 60%)
- Occupy after 3,500 cu ft of outside air has ventilated at .30 cfm at least 3 hrs prior to occupancy (Phase One)
- May continue through occupancy (Phase Two get to the 14,000 cubic feet full flushout)

© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations



- **Requirements-**
  - Protect stored on-site or installed absorptive materials from moisture damage
  - MERV 8 filters must be in place
  - Upon completion, HVAC and lighting procedures must return to designed sequence of operations

© CTG Energetics 2009, all rights reserved

## EQc1.5 Best Management Practices– IAQ Management for Additions and Alterations

- **Referenced Standards:**
  - SMACNA Indoor Air Quality Guidelines for Occupied Buildings Under Construction, second edition, November 2007, Chapter 3
  - ANSI/ASHRAE 52.2-1999 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

© CTG Energetics 2009, all rights reserved

## Definition

**<u>ACCEPTABLE</u> INDOOR AIR QUALITY:**

Is air in which there are no known contaminants at harmful concentrations and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction (ANSI/ASHRAE 62.1-2007)

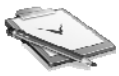
© CTG Energetics 2009, all rights reserved

# EQc2.1

Occupant Comfort– Occupant Survey

© CTG Energetics 2009, all rights reserved

## EQc2.1 Occupant Comfort– Occupant Survey



- **Intent:** Provide for the assessment of building occupants' comfort as it relates to thermal comfort, acoustics, indoor air quality (IAQ), lighting levels, building cleanliness, and any other comfort issues
- **Points:** 1 point – no exemplary
- **Referenced Standard:** ANSI/ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy

© CTG Energetics 2009, all rights reserved

## EQc2.1 Occupant Comfort– Occupant Survey

- **Requirements:**
  - Implement an occupant comfort survey and complaint response system
  - Collect a representative sample, making up at least **30%** of total occupants
  - Occupant = full time (at least 10 hrs per week)
  - Document survey results
  - Conduct at least 1 occupant survey during the performance period

© CTG Energetics 2009, all rights reserved

## EQc2.1 Occupant Comfort– Occupant Survey

- **Implementation:**
  - Create questions on a 7 point scale
  - Ensure anonymity, but specify zone
  - Corrective action required if more than 20% of respondents are dissatisfied on any issu


Incentivize for response!

© CTG Energetics 2009, all rights reserved

## EQc2.1 Occupant Comfort– Occupant Survey

- Question occupants regarding
  - thermal environment,
  - acoustics,
  - IAQ,
  - lighting levels,
  - building cleanliness, and
  - any other issues related to the workplace
- Follow-up questions required if dissatisfied

© CTG Energetics 2009, all rights reserved

## Sample Web-Based Survey

Please answer the following questions based on your experience right now:

How would you rate the current temperature in your workspace?

- Much too warm
- Too warm
- Comfortably warm
- Comfortable (and neither cool nor warm)
- Comfortably cool
- Too cool
- Much too cool

Does the current temperature in your workspace enhance or interfere with your ability to get your job done?

Enhances ... Interferes

Any additional comments or recommendations about the current temperature?

s 2009, all rights reserved

# EQc2.2

Controllability of Systems– Lighting

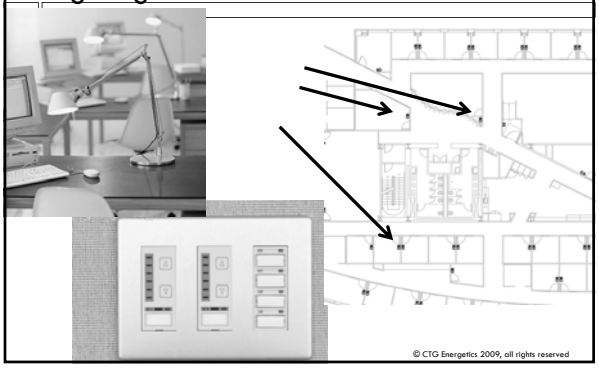
© CTG Energetics 2009, all rights reserved

## EQc2.2 Controllability of Systems– Lighting


- **Intent:** Provide lighting system control by individual occupants or groups in multi-occupant spaces to promote the productivity, comfort, and well being of occupants
- **Requirements:**
  - Provide occupant-adjustable light for at least 50% of individual workstations and multi-occupant spaces
- **Points:1 point**, Exemplary Performance **– 95%**

© CTG Energetics 2009, all rights reserved

## EQc2.2 Controllability of Systems– Lighting



© CTG Energetics 2009, all rights reserved

# EQc2.3

Occupant Comfort– Thermal Comfort Monitoring

© CTG Energetics 2009, all rights reserved

## EQc2.3 Occupant Comfort– Thermal Comfort Monitoring

- **Intent:** Support the appropriate operations and maintenance of buildings and building systems so that they continue to meet target building performance goals over the long term and provide a comfortable thermal environment that supports the productivity and well-being of building occupants

© CTG Energetics 2009, all rights reserved

## EQc2.3 Occupant Comfort– Thermal Comfort Monitoring

- **Requirements:**
  - Have in place continuous tracking and optimization of at minimum, air temperature and humidity (as per ASHRAE 55 – Thermal Comfort)
  - Establish periodic testing of air speed and radiant temperature in occupied spaces
  - Have in place alarms for conditions that require adjustment or repair
  - Establish procedures that deliver prompt adjustments or repairs in response to identified problems

© CTG Energetics 2009, all rights reserved

## EQc2.3 Occupant Comfort– Thermal Comfort Monitoring

- **Referenced Standard:** ANSI/ASHRAE Standard 55-2004: Thermal Environmental Conditions for Human Occupancy
- **Points: 1 – no exemplary**

© CTG Energetics 2009, all rights reserved

## EQc2.3 Occupant Comfort– Thermal Comfort Monitoring

- **Implementation:** in all occupied zones, install and maintain a permanent air temperature humidity monitoring system taking measurements at minimum 15 minute intervals
- Temperature/Humidity Sensors on wall between 4 to 72 inches
- **Documentation Guidance**
  - Track &record air temperature, humidity, and air speed
  - Maintain records of sensors & actuator calibration

© CTG Energetics 2009, all rights reserved

## EQc2.4

Daylight and Views

© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight OR Views

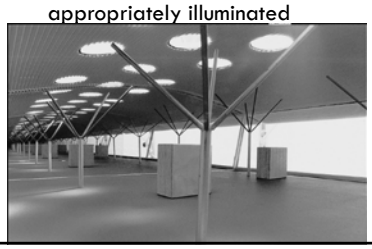
- **Intent:** provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building
- **Points: 1, Exemplary Performance**

© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight – Option 1

**Requirements:**

- Path 1. Simulation- demonstrate via computer simulations that 50% or more of occupied spaces are appropriately illuminated



© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight – Option 1

**Requirements, cont'd:**

- Path 2. Prescriptive- use a combination of side-lighting and/or top-lighting to achieve a total daylighting zone that is at least 50% of the regularly occupied spaces

Note for Side lighting:

- Window daylight area (30 – 90 inches above floor)
- Window area
- Room area
- Tviz – Visible Transmittance

© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight – Option 1

- Note for Top-Lighting:
  - Area of skylights
  - Roof area
  - Distance between sky lights
  - Measured haze value of skylight diffuser

  **Calculate:**
    - Window area to floor area (WFR)
    - Visible light transmittence to WFR
    - Between .15 and .18 is acceptable

© CTG Energetics 2009, all rights reserved

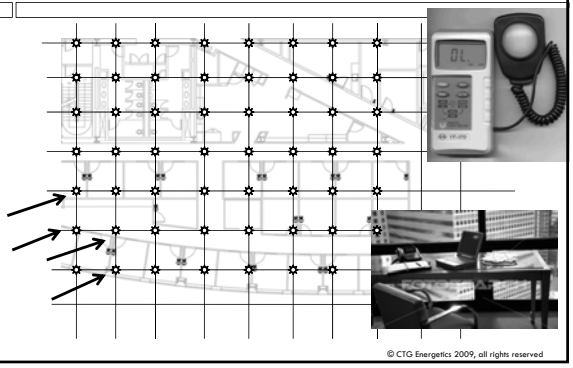
## EQc2.4 Daylight – Option 1

**Requirements, cont'd:**

- Path 3. Measurement- demonstrate through records of indoor light measurements that a minimum daylight illumination level of 25 footcandles has been achieved in at least 50% of all regularly occupied areas

© CTG Energetics 2009, all rights reserved

## Measurement



© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight – Option 1

**Requirements, cont'd:**

- Path 4. Combination- use any combination of methods to document the minimum daylight illumination in at least 50% of regularly occupied spaces

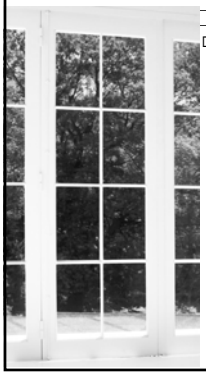
© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight

- **Referenced Standard- ASTM** D1003-07E1, Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
- **1 point** – Exemplary performance = 75%

© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight and Views



- **Implementation:** give occupants either daylight or outdoor view to decrease energy use and increase employee satisfaction
  - Increase daylight with atriums, skylights, adjustable blinds…
  - Control for glare with blinds, light shelves, "fritted" windows
  - Use interior walls and furnishing arrangement to maximize access to outdoor view from occupants workspaces

© CTG Energetics 2009, all rights reserved

## EQc2.4 Daylight and Views

- **Calculations**
  - Determine whether 45% of the regularly occupied area has the potential for view-based on vision glazing between 30 in and 90 in above the floor

© CTG Energetics 2009, all rights reserved

## EQc2.4 Views

Achieve a direct line of sight to the outdoors via vision glazing between 30 in and 90 in above the finished floor for building occupants in 45% of all regularly occupied areas

- In plan view, the area is within sight lines drawn from perimeter vision glazing
- In section view, a direct sight line can be drawn from the area to perimeter vision glazing

- 1 point - Exemplary Performance = 90%

© CTG Energetics 2009, all rights reserved

## INDOOR ENVIRONMENTAL QUALITY

GREEN CLEANING

## Introduction

- Americans spend 90% of time indoors
- EPA designated indoor air pollution as a top environmental risk to public health
  - Liability concerns for building owners
  - Increased resale value
  - Increased productivity

© CTG Energetics 2009, all rights reserved

## EQp3

Green Cleaning Policy

© CTG Energetics 2009, all rights reserved

## EQp3 Green Cleaning Policy

- **Intent:** reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment

© CTG Energetics 2009, all rights reserved

## EQp3 Green Cleaning Policy

Requirements:

Have in place a green cleaning policy for the building and site, addressing:

- Sustainable cleaning and floor care products meeting EQc3.3 criteria
- Cleaning equipment such as in EQc3.4
- Establishment of standard operating procedures addressing effective cleaning

© CTG Energetics 2009, all rights reserved

## EQp3 Green Cleaning Policy

Requirements – cont'd:

- Have in place a green cleaning policy for the building and site, addressing:
  - Development of strategies for promoting and improving hand hygiene
  - Development of guidelines addressing the safe handling and storage of cleaning chemicals

© CTG Energetics 2009, all rights reserved

## EQp3 Green Cleaning Policy

Requirements – cont'd:

- Have in place a green cleaning policy for the building and site, addressing:
  - Development of requirements for staffing and training of maintenance personnel appropriate to the needs of the building
  - Provision for collecting occupant feedback and continuous improvement

© CTG Energetics 2009, all rights reserved

# EQc3.1

## Green Cleaning– High-Performance Cleaning Program

© CTG Energetics 2009, all rights reserved

## EQc3.1 Green Cleaning– High-Performance Cleaning Program

- **Intent:** reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment.
- Difference - Actions and documentation

© CTG Energetics 2009, all rights reserved

## EQc3.1 Green Cleaning– High-Performance Cleaning Program

- Requirements:
  - Appropriate staffing plan
  - Train personnel in hazards in use and disposal of cleaning chemicals, dispensing and packaging

© CTG Energetics 2009, all rights reserved

## EQc3.1 Green Cleaning– High-Performance Cleaning Program

- Requirements:
  - Use concentrates with dilution system
  - Use sustainable materials including paper products, microfiber wipes, janitorial equipment and trash bags


:: 2009, all rights reserved

## EQc3.1 Green Cleaning– High-Performance Cleaning Program

- Requirements:
  - Use cleaning and hard care floor products from EQc3.3
  - Use cleaning equipment from EQc3.4

© CTG Energetics 2009, all rights reserved

## EQc3.1 Green Cleaning– High-Performance Cleaning Program

- Additionally consider:
  - Paper dispenser with limiting the paper
  - Toilet tissue holders for 2 rolls
  - Coreless rolls – les packaging
  - Hands free dispensers
  - Equipment that needs only water to clean
  - Floor buffer pads that minimize chemical use

© CTG Energetics 2009, all rights reserved

## EQc3.1 Green Cleaning– High-Performance Cleaning Program

**Documentation:**

- Policy – with procedures listed
- Maintain a log of cleaning equipment and maintenance
- Maintain a schedule and sign in for the training
- Establish the purchasing and tracking of all cleaning related materials

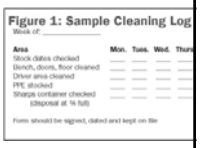


Figure 1: Sample Cleaning Log

Week of: _____

| Area | Mon. | Tues. | Wed. | Thurs |
|---|---|---|---|---|
| Stock dates checked | | | | |
| Bench, doors, floor cleaned | | | | |
| Driver area cleaned | | | | |
| PPE stocked | | | | |
| Sharps container checked (Disposal at ¾ full) | | | | |

Form should be signed, dated and kept on file

© CTG Energetics 2009, all rights reserved

## EQc3.2

Green Cleaning– Custodial Effectiveness Assessment

© CTG Energetics 2009, all rights reserved

## EQc3.2 Green Cleaning– Custodial Effectiveness Assessment

- **Intent:** reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment by implementing , managing and auditing cleaning procedures and processes

© CTG Energetics 2009, all rights reserved

## EQc3.2 Green Cleaning– Custodial Effectiveness Assessment


Conduct an audit in accordance with the APPA Custodial Staffing Guidelines

Score a 3 or less

1 point – exemplary performance is 2 or less

© CTG Energetics 2009, all rights reserved

## EQc3.2 Green Cleaning– Custodial Effectiveness Assessment

- Independent 3rd party with custodial knowledge
- 2 individuals not on cleaning staff – part of project

- *Level 1 - Orderly Spotlessness*
- *Level 2 - Ordinary Tidiness*
- *Level 3 - Casual Inattention*
- *Level 4 - Moderate Dinginess*
- *Level 5 - Unkempt Neglect*

© CTG Energetics 2009, all rights reserved

## Level 3 - Casual Inattention

This is the minimum level that should be maintained

- Floors are swept clean, but upon close observation dust, dirt and stains, as well as a buildup of dirt, dust and/or floor finish in the corners and along walls, can be seen
- All vertical and horizontal surfaces have obvious dust, dirt, marks, smudges, and fingerprints
- Lamps all work and all fixtures are clean
- Washroom and shower tile and fixtures gleam and are odor free

© CTG Energetics 2009, all rights reserved

## EQc3.2 Green Cleaning– Custodial Effectiveness Assessment

- Count up the square footage and space types within facility
- Randomly select rooms equivalent to at least 10% of each space type AND 10% of each floor
- If 10% is less than 5 rooms – do all rooms
- Weighting heavy on floors – visible areas

© CTG Energetics 2009, all rights reserved

### Audit Form for Office Space

| Rooms Required to Audit | 23 | Rooms Audited | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Provide the room number/name of each room audited in the cells to the right. | | Governors Office | Treasurer Office | House Spkr Office | Majority Office | 100 | 102 | 103 | 104A | 104 | 105 | |
| Provide the square footage for each room audited in the cells to the right. | | 700 | 400 | 600 | 400 | 427 | 427 | 427 | 427 | 427 | 427 | |
| Appearance Items | Weighting Factor | Indicate the Appearance Level for Each Room* For each room audited, provide the appearance level achieved for each ap 1 = Orderly Spotlessness, 2 = Ordinary Tidiness, 3 = Casual Inattention, 4 = Moderate D | | | | | | | | | | |
| Floors | 55 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Horizontal surfaces | 12 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| Lighting and light fixtures | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| Trash containers | 23 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Vertical surfaces | 7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Total Raw Score (Weighting Factor x Appearance Level) | | 115 | 103 | 103 | 115 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| Level Achieved (Raw Score/100) | | 1.15 | 1.03 | 1.03 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| Audit Average for Space Type | | 1.1 | Total Square Footage Audited | | | | | | | ### | | |

### Audit Form for Restrooms

| Rooms Required to Audit | 5 | Rooms Audited | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Provide the room number/name of each room audited in the cells to the right. | | 020A | 021A | 068A | 129 | 098A | | | | | | | |
| Provide the square footage for each room audited in the cells to the right. | | 300 | 300 | 168 | 180 | 168 | | | | | | | |
| Appearance Items | Weighting Factor | Indicate the Appearance Level for Each Room* For each room audited, provide the appearance level achieved for each appe 1 = Orderly Spotlessness, 2 = Ordinary Tidiness, 3 = Casual Inattention, 4 = Moderate Ding | | | | | | | | | | | |
| Floors | 13 | 2 | 2 | 1 | 1 | 1 | | | | | | | |
| Lighting and light fixtures | 1 | 2 | 2 | 2 | 2 | 2 | | | | | | | |
| Mirrors, dividers, washrooms, soap dispensers, and drying | 67 | 1 | 1 | 1 | 1 | 1 | | | | | | | |
| Trash containers | 3 | 1 | 1 | 1 | 1 | 1 | | | | | | | |
| Vertical surfaces | 16 | 2 | 2 | 2 | 2 | 2 | | | | | | | |
| Total Raw Score (Weighting Factor x Appearance Level) | | 130 | 130 | 117 | 117 | 117 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Level Achieved (Raw Score/100) | | 1.3 | 1.3 | 1.17 | 1.17 | 1.17 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Audit Average for Space Type | | 1.2 | Total Square Footage Audited | | | | | | | ### | | | |

## EQc3.2 Green Cleaning– Custodial Effectiveness Assessment

**Audit Form for Storage Rooms**

| Rooms Required to Audit | 5 | Rooms Audited | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Provide the room number/name of each room audited in the cells to the right. | | Custodian Mtr | Wrestler S. Shed | Storage | | | | | | | | | | |
| Provide the square footage for each room audited in the cells to the right. | | 864 | 300 | | | | | | | | | | | |
| Appearance Items | Weighting Factor | Indicate the Appearance Level for Each Room* For each room audited, provide the appearance level achieved for each appearance item 1 = Orderly Spotlessness, 2 = Ordinary Tidiness, 3 = Casual Inattention, 4 = Moderate Dinginess, 5 = Unk | | | | | | | | | | | | |
| Floors | 89 | 2 | 2 | | | | | | | | | | | |
| Lighting and light fixtures | 6 | 2 | 2 | | | | | | | | | | | |
| Vertical surfaces | 5 | 2 | 2 | | | | | | | | | | | |
| Total Raw Score | | 200 | 200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (Weighting Factor x Appearance Level Achieved) / (Raw Score/100) | | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Audit Average for Space Type | | 2 | Total Square Footage Audited | | | | | | | ### | | | | |

*Refer to the "Appearance Levels" tab for definitions.

## EQc3.2 Green Cleaning– Custodial Effectiveness Assessment

- Sample 1 of 2 person audit – Roll-up

| Classification by Space Type | Total sq. ft. | No. of Rooms by Type | Number of Rooms to Audit (10% or min of 5) | Square Footage for Audit | Audit Average for Space Type |
|---|---|---|---|---|---|
| Office | 177,510 | 224 | 23 | 10,213 | 1.1 |
| Restroom | 3,792 | 25 | 5 | 1,116 | 1.2 |
| Conference/Classroom | 66,067 | 11 | 5 | 3,098 | 1.1 |
| Entry & Lobby | 1,500 | 6 | 5 | 1,500 | 1.2 |
| Locker | NA | NA | #VALUE! | 0 | 0.0 |
| Public Space | 74,944 | 2 | 5 | 34,472 | 1.0 |
| Storage | 300 | 2 | 5 | 1,164 | 2.0 |
| Lab w/ Haz Mat | NA | NA | #VALUE! | 0 | 0.0 |
| Lab w/o Haz Mat | NA | NA | #VALUE! | 0 | 0.0 |
| Totals | 324,113 | 270 | #VALUE! | 51,563 | 1.7 |
| | | | | Overall Appearance Level | 1.3 |

## EQc3.3

Green Cleaning– Purchase of Sustainable Cleaning Products and Materials

© CTG Energetics 2009, all rights reserved

## EQc3.3 Green Cleaning– Purchase of Sustainable Cleaning Products and Materials

- Intent: To reduce the environmental impacts of cleaning products, disposable janitorial paper products and trash bags.

© CTG Energetics 2009, all rights reserved

## EQc3.3 Green Cleaning– Purchase of Sustainable Cleaning Products and Materials

- General cleaners, disinfectants, glass cleaners, floor finishes
  - Green Seal or Environmental Choice CCD
- Janitorial Paper products and trash bags
  - EPA Comprehensive Procurement Guidelines
  - Green Seal
  - Environmental Choice

all rights reserved

## EQc3.3 Green Cleaning– Purchase of Sustainable Cleaning Products and Materials

- Hand soaps
  - No antimicrobial agents – except where required
  - Green Seal
  - Environmental Choice
- 1 point for 30% - exemplary for 60%

© CTG Energetics 2009, all rights reserved

## EQc3.3 Green Cleaning– Purchase of Sustainable Cleaning Products and Materials

**Table 11.** Sample Sustainable Cleaning Product Purchases

| Total cost of cleaning materials and products, disposable janitorial paper products and trash bags | | | | | | | | | $1,000 |
|---|---|---|---|---|---|---|---|---|---|
| Date of Purchase | Item Purchased | Purchasing Entity | Product Category | Sustainability Criteria Met | Cost per Item | Quantity Purchased | Product Documentation | Percentage of Total Purchase Value | Value |
| 2/24/2004 | Brand X bathroom cleanser | Jones Property Mgmt | Cleaning product | GS-37 | $10 | 25 | Yes | 25% | $250 |
| 2/24/2004 | Brand Y toilet tissue | Initech | Janitorial paper, trash bags | EC CCD-082 | $2 | 150 | No | 30% | $300 |
| Total sustainable purchases | | | | | | | | | $550 |
| Sustainable purchases as percentage of total purchases | | | | | | | | | 55% |
| The project team has provided documentation from project manufacturers or suppliers that verifies product compliance with the specified sustainability criteria for the following percentage of the purchased value of the sustainable purchases listed above (must be 20% minimum, by cost, to demonstrate compliance) | | | | | | | | | 45% |

© CTG Energetics 2009, all rights reserved

## EQc3.4

Green Cleaning– Purchase of Sustainable Cleaning Equipment

© CTG Energetics 2009, all rights reserved

## EQc3.4 Green Cleaning– Sustainable Cleaning Equipment

- **Intent:** reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment from powered cleaning equipment

© CTG Energetics 2009, all rights reserved

## EQc3.4 Green Cleaning– Sustainable Cleaning Equipment

- Vacuums – Green Label with decibels 70 or less
- Carpet Extractor certified by CRI "Seal of Approval"
- Floor equipment has bumpers, guards, captures fine particulates and less than 70 dBA

© CTG Energetics 2009, all rights reserved

## EQc3.4 Green Cleaning– Sustainable Cleaning Equipment

- Propane equipment meets California Air Resources Board (CARB) 90dBA or less
- Automatic scrubbers with variable speeds
- Battery Powered – gel batteries
- Ergonomic design power equipment


CTG Energetics 2009, all rights reserved

## EQc3.4 Green Cleaning– Sustainable Cleaning Equipment

- Count all equipment used in facility
- 20% must meet a sustainable criteria for the project to get the point
- Any purchased during performance period on must meet criteria
- Keep a log for purchases and maintenance

© CTG Energetics 2009, all rights reserved

## EQc3.4 Green Cleaning– Sustainable Cleaning Equipment

**Table 12.** Sample Maintenance Log

| Equipment Type | Daily Maintenance | Weekly Maintenance | Bi-Weekly Maintenance | Monthly Maintenance | Quarterly Maintenance |
|---|---|---|---|---|---|
| Vacuum cleaner | Replace bag before start of cleaning shift | Clean filter | Replace bag | Clean interior | NA |
| Backpack vacuum | Check and replace bag every 3 hours | 1. Clean cloth bag 2. Clean filter 3. Clean exterior | Inspect electrical elements | Replace electrical outlet cord | NA |
| Floor buffer | Clean machine and electrical outlet cord after each use | NA | NA | NA | General inspectio |
| Carpet extractor machine | Clean machine and electrical outlet cord after each use | NA | NA | NA | General Inspectio |

© CTG Energetics 2009, all rights reserved

## EQc3.5

Green Cleaning– Indoor Chemical and Pollutant Source Control

© CTG Energetics 2009, all rights reserved

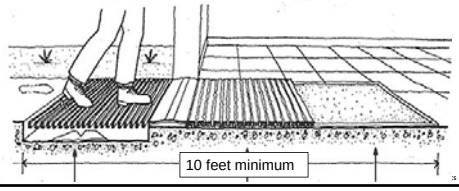
## EQc3.5 Green Cleaning– Indoor Chemical and Pollutant Source Control

- Intent: reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment

© CTG Energetics 2009, all rights reserved

## EQc3.5 Green Cleaning– Indoor Chemical and Pollutant Source Control

- Must have in place 10 feet of entry systems – grates, grills, carpets from entrance to interior
- All entrances – not emergency




© 2009, all rights reserved

## EQc3.5 Green Cleaning– Indoor Chemical and Pollutant Source Control

- Grates and grills best
- High volume carpet
- Cleaning programs in place

1 point – no exemplary

© CTG Energetics 2009, all rights reserved

## EQc3.6

Green Cleaning–
Indoor Integrated Pest Management

© CTG Energetics 2009, all rights reserved

## EQc3.6 Green Cleaning– Indoor Integrated Pest Management

- Intent: reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment

- 1 point - No exemplary

© CTG Energetics 2009, all rights reserved

## EQc3.6 Green Cleaning– Indoor Integrated Pest Management

- Development and implement an IPM program:
  - Integrated methods, site inspections controlling pest through non or least toxic methods possible – start with prevention
  - Specify situations that are considered emergency application
  - Have a communication strategy to notify occupants of use: **72** in advance of normal application, within **24** hours after emergency application

© CTG Energetics 2009, all rights reserved

## EQc3.6 Green Cleaning– Indoor Integrated Pest Management

**Standards of Performance**

**1. INTEGRATED PEST MANAGEMENT**

Orkin Commercial Services strongly advocates the use of Integrated Pest Management (IPM). IPM is an environmentally responsible approach to pest management that relies on a combination of practices. IPM programs use current, comprehensive information on pest biology and their interactions with the environment. This information, in combination with the best available pest management methods, is used to manage pests by the most economical means, with minimal hazard to people, property and the environment. IPM programs take advantage of *all* pest management options possible, starting with non-chemical techniques, and if necessary, judiciously employing other pest control materials, always considering the least-toxic formulations first.

Understanding pests' needs is essential to implementing IPM. Pests seek habitats that provide basic needs such as food, water and shelter. Pest populations can be

© CTG Energetics 2009, all rights reserved

## EQc3.6 Green Cleaning– Indoor Integrated Pest Management


© CTG Energetics 2009, all rights reserved

## Questions?

© CTG Energetics 2009, all rights reserved