

Smart, Green + Productive Workplace

Example of an simpler approach to green building
assessment and certification

Simone Skopek



Organisers:



International Co-owners:

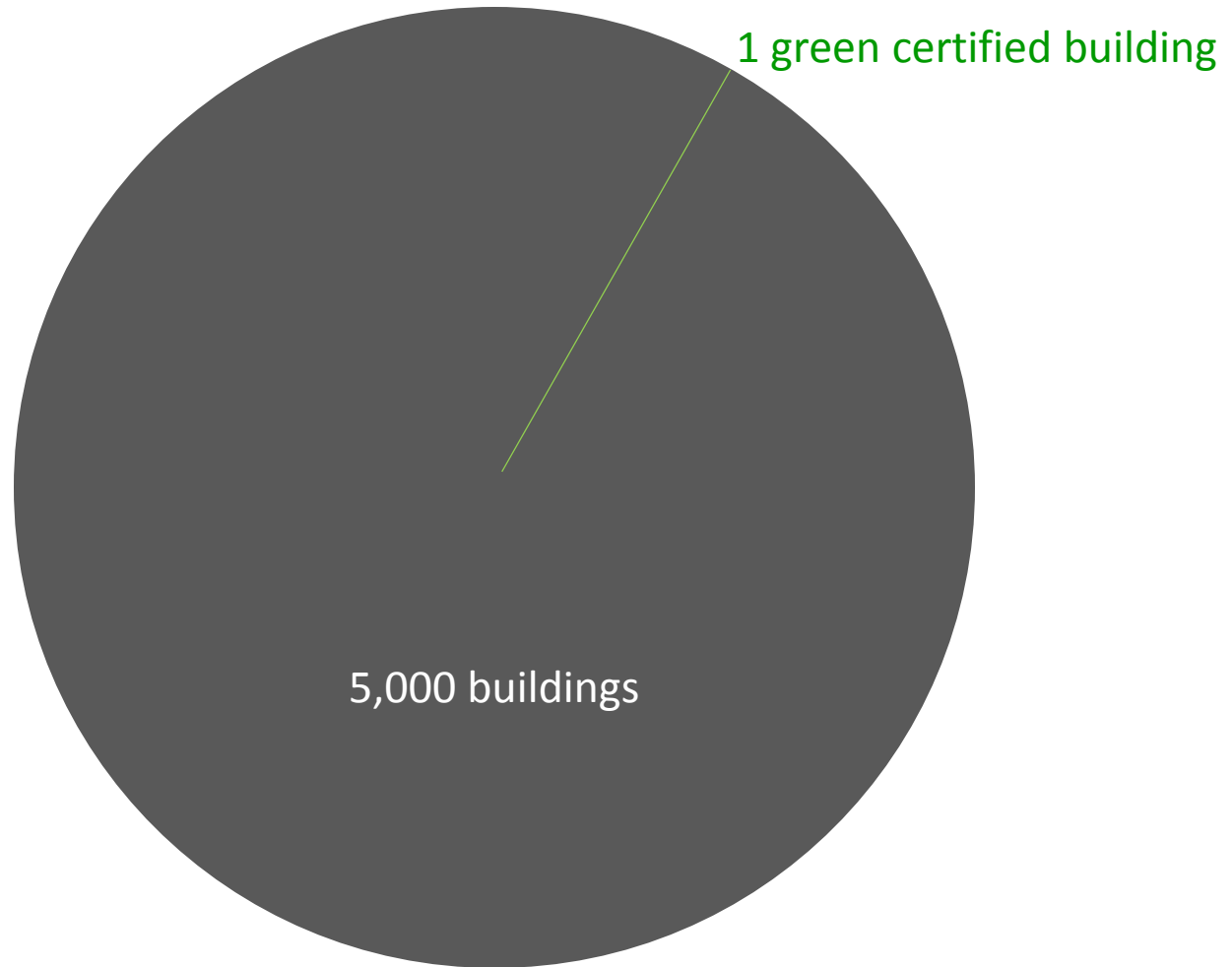


Certifications:

- Lay out the parameters for sustainable design and implementation
- Recognize high performance

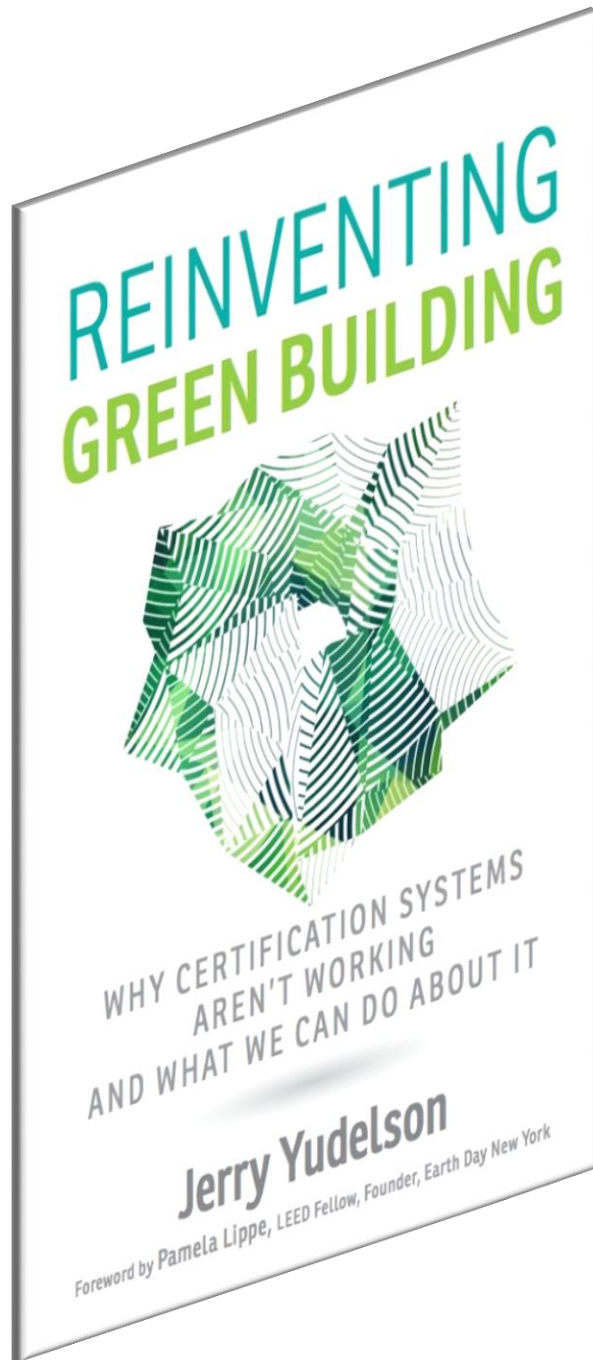


“Leaders” represent <1% of building stock



Challenges:

- Cost
- Point chasing
- Prescriptive requirements and pre-requisites – “interpretation rulings”
- Complex certification and onerous submission requirements



Recommended Approach

- More affordable
- Simpler
- Apply rigor where it matters:
 - Report carbon, energy, water, waste
 - Management & operations
- Continuous improvement
- Bottom line

Green + Productive Workplace

The screenshot shows the Environmental Leader website. The header includes the logo "environmental LEADER Environmental & Energy Management News" and navigation links for Columns, News, Videos, Jobs, Research, Webinars, and Conference 2016. A search bar is located on the right. Below the header is a navigation bar with "POPULAR TOPICS" and categories: ENERGY EFFICIENCY, EMISSIONS, CARBON FINANCE, FACILITIES, SUPPLY CHAIN, SUSTAINABILITY, WATER, and SMART GRID. The main content area features the article title "JLL Green + Productive Workplace | JLL" and a quote from an EL Product & Project Awards judge. To the right of the article is a large award badge that reads "environmental LEADER PRODUCT & PROJECT AWARDS TOP PRODUCT OF THE YEAR 2015".

environmental
LEADER
Environmental & Energy Management News

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LEADER
PRODUCT & PROJECT
AWARDS

POPULAR TOPICS ENERGY EFFICIENCY EMISSIONS CARBON FINANCE FACILITIES SUPPLY CHAIN SUSTAINABILITY WATER SMART GRID

Environmental Leader Product & Project Awards Hall of Fame » JLL Green + Productive Workplace

JLL Green + Productive Workplace | JLL

“The tool benchmarks key aspects of worker comfort including acoustic quality, workspace layout, thermal comfort and indoor air quality and aligns the ‘human’ side of sustainability with bottom line cost savings. This product should be utilized in future LEED versions of the Existing Building: Operations and Maintenance system as it allow survey data to be easily captured and analyzed.”

--EL Product & Project Awards judge

environmental
LEADER
PRODUCT & PROJECT
AWARDS
TOP PRODUCT
OF THE YEAR
2015

“In our view, G+P is a solid program – comprehensive and user-friendly, that could easily replace LEED for Commercial Interiors (ID+C) and LEED-EBOM for tenants, and which delivers more directly relevant information, much faster and at a considerably lower cost than the BIU system from the UK’s BRE.

We believe it hits the mark where other assessments have failed.”

*Jerry Yudelson
Author, speaker
former president of the Green Building Initiative
Former Chair of the GreenBuild Steering Ctee*

Green + Productive Workplace

Building occupants:

- Impact the performance of buildings
- Challenging to motivate behavior changes
- Few metrics
- More interested in improving brand and productivity

New Realities Impacting the Workplace



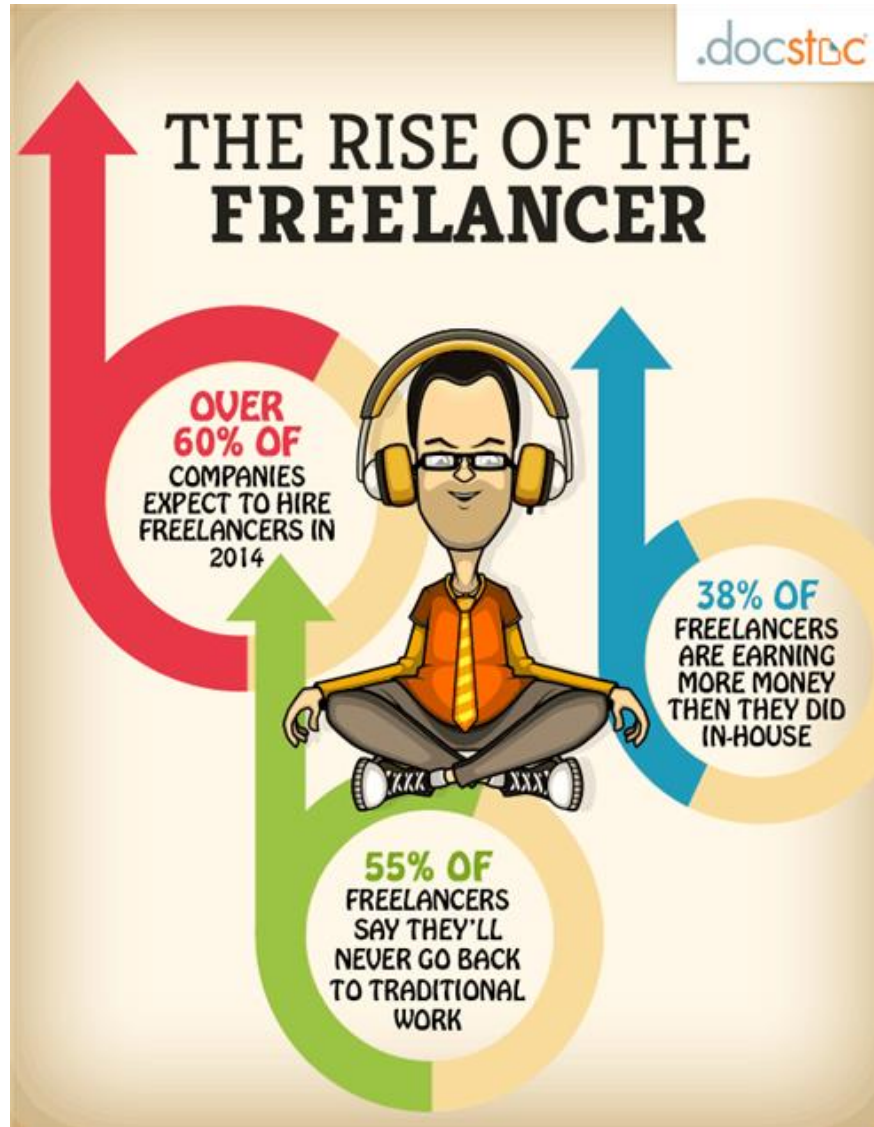
New Realities Impacting the Workplace



New Realities Impacting the Workplace



New Realities Impacting the Workplace



New Realities Impacting the Workplace



New Realities Impacting the Workplace

5 Workplace Models

Most organizations sit here

| | | | | |
|--|---|---|--|--|
| Everyone has their own office or cubicle | Everyone has their own desk in an open office | Everyone has their own desk + some common space | Some assigned, some unassigned workstations + common space | ALL <u>unassigned</u> + common support space |
|--|---|---|--|--|

Space per employee is decreasing



Increasing Choice, Efficiency, Flexibility and Cultural Integration

But the biggest shift is here



New Realities Impacting the Workplace



New Realities Impacting the Workplace



- 67% of employers say “employees’ poor health habits” is challenging affordable health coverage.
- 50% of employers offer wellness promotion initiatives.
- Need layout and features that promote exercise / good ergonomics; and dining facilities

As a result, **73%** of corporate real estate executives expect to make changes in the workplace to improve productivity



CORPORATE SOCIAL RESPONSIBILITY

G4-EN3

Energy consumption within the organization

- a. Report total fuel consumption from non-renewable sources in joules or multiples, including fuel types used.
- b. Report total fuel consumption from renewable fuel sources in joules or multiples, including fuel types used.
- c. Report in joules, watt-hours or multiples, the total:
 - o Electricity consumption
 - o Heating consumption
 - o Cooling consumption
 - o Steam consumption
- d. Report in joules, watt-hours or multiples, the total:
 - o Electricity sold
 - o Heating sold
 - o Cooling sold
 - o Steam sold
- e. Report total energy consumption in joules or multiples.
- f. Report standards, methodologies, and assumptions used.
- g. Report the source of the conversion factors used.



A green office is not necessarily comfortable or productive



A productive office is not necessarily green



‘In your opinion, what is *the best thing* about this office?’

1. Natural light
2. Open plan
3. View

‘In your opinion, what is *the best thing* about this office?’

1. Natural light
2. Open plan
3. View

‘Please describe *your biggest complaint* about your office’

1. Air temperature
2. Noise
3. Lack of privacy



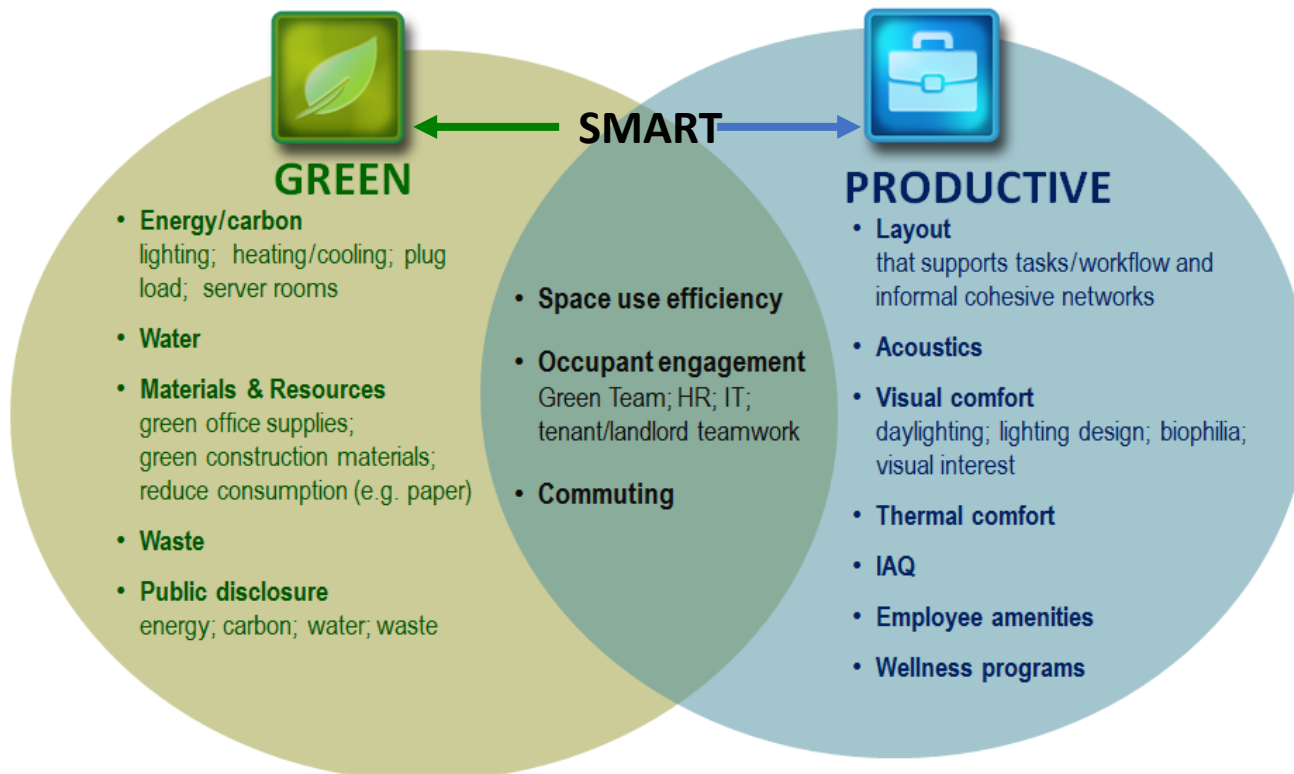




Fix problems Improve productivity

| | Productivity |
|---|--------------------------------|
| Improved acoustics | + 6 - 300% |
| Improved lighting, day lighting and views | + 5 - 18% |
| Improved thermal comfort and ventilation | + 5% |
| Reduced stress from commuting | + 11.5 working days/FTE |
| Improved ergonomics and privacy | + 6% |
| Layout, comfort, social cohesion | + 30% |

Green + Productive Workplace



Green + Productive Workplace

Low energy
intensity

Energy intensity

High performance
building

High % of occupants who find
the environment acceptable

Occupant acceptability



Organisers:



International Co-owners:



Sustainable Buildings
and Climate Initiative
Promoting Policies and Practices for Sustainability



Portfolio Approach



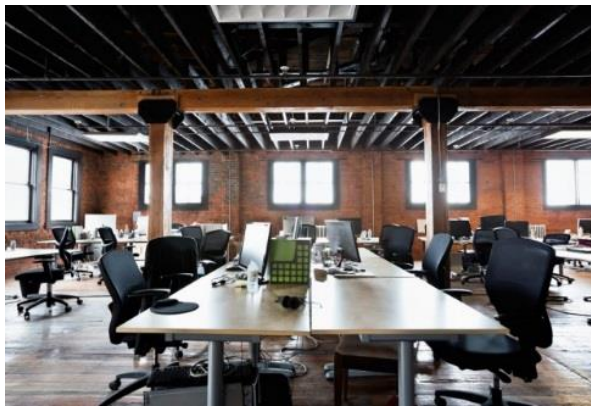
East HQ (fit-out 2016)
22,230 SF / 94 employees



Slade (renovated in 2013)
Sales & Marketing
17,760 SF / 83 employees



Burl St.
Finance, Accounting/HR
13,763 SF / 71 employees



Danby Rd. (fit-out 2016)
Research Division
31,332 SF / 122 employees



Rae St.
Client accounts
32,200 SF / 145 employees



Elm Ave.
Client Accounts
12,300 / 73 employees



International Co-owners:





MetroPlus



Corporate Leadership Assessment

Policies and directives that set a company-wide direction to be carried out by facility managers, business unit managers, Green Teams, HR, IT and employees

[Continue](#)

| Facility Name | Date entered | Score | Progress |
|-------------------|---------------|-------|----------|
| BRM Headquarters | Dec. 18, 2015 | 0% | 0% |
| Rutherford Center | Dec. 12, 2015 | 64% | 45% |
| Leo Productions | Dec. 22, 2015 | 0% | 0% |
| NEM S.E. Branch | Dec. 22, 2015 | 78% | 60% |



Corporate Leadership



98%
Progress



73%
Score

METEROPLUS PORTFOLIO / CORPORATE LEADERSHIP ASSESSMENT



POLICIES



Policies

DISCLOSURE

Does the firm have a published Environmental Policy or annual CSR report that addresses its real estate (including leased assets) with respect to energy, GHG emissions and waste management?

- Yes
- No
- NA (single small location)

DIRECTIVES

Managers of Business Units

Tenant Facility Managers

Green Teams

Human Resources

Employees

Build-out

Does the firm communicate directives re. sustainability and wellness to the appropriate personnel in terms of:

- 1) TARGETS;
- 2) STRATEGIES and RESOURCES; and
- 3) KEY PERFORMANCE INDICATORS (KPIs)

to reduce energy, waste (and water where applicable) in offices?

- Yes – all three (Targets, Strategies and KPIs)
- 2 out of 3
- Yes in a general way
- No
- NA (single small location)

Are all sites in the portfolio larger than 10,000 SF actively monitored and benchmarked for energy and sustainability?

- Yes
- No
- NA (small locations)

Do new or renewed leases contain specific "green clauses" that set out mutually agreed performance targets and actions that landlord and tenant will take to achieve those shared goals?

- Yes
- No

Is there a requirement for separate electricity metering at the time of a new (or renewed lease or build-out)?

- Yes
- No



MetroPlus



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BRM Headquarters



78%
Progress



49%
Score



Green Assessment



99%
Progress



59%
Score

Sustainability in the workplace including energy water, waste, materials, commuting and Green Teams

[Continue Assessment](#)



Comfort & Productivity Assessment



62%
Progress



37%
Score

Workplace attributes that affect productivity and wellness including layout, acoustics, visual comfort, thermal comfort, IAQ, amenities and wellness programs

[Continue Assessment](#)



Green Assessment



99%
Progress



59%
Score

METROPLUS PORTFOLIO / BRM HEADQUARTERS / GREEN ASSESSMENT



ENERGY

Energy Management

Lighting

Heating & Cooling

Plug Load

Server Room



WATER



WASTE



MATERIALS



COMMUTING



GREEN TEAM



High Efficiency Lighting & Moderate Lighting Levels

Is ambient lighting high efficiency (T8s, T5s or LED lighting)?

- 90-100% high efficiency
- 80-89%
- 50-79%
- <50% high efficiency

Are LED lamps being used for general lighting?

- >50% of the area
- >25% of the area
- >10% of the area
- <10%

Do task lights or display lighting use energy efficient bulbs?

- Yes – primarily LED bulbs
- No – primarily CFL bulbs
- T8s or T5s
- No
- NA (no task lighting)

Do (electric) ambient lighting levels meet (and not exceed) the values recommended by IESNA in most of the following areas:

- for screen tasks, 200 - 300 lux (28 FC) of ambient lighting?
 - Yes
 - No
 - NA (minimal computer work is done)
 - Not sure
- for service areas e.g. hallways, print rooms, kitchens and tenant-installed washrooms, 100-200 lux (10 FC)?
 - 75-100% of service areas
 - 50-74%
 - Less than 50%
 - NA (no service areas)
 - Not sure

Does the office consume 0.9 watts/SE or less

- Yes



Green Assessment



99%
Progress



59%
Score

METROPLUS PORTFOLIO / BRM HEADQUARTERS / GREEN ASSESSMENT



ENERGY

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Server Room



WATER



WASTE



MATERIALS



COMMUTING



GREEN TEAM



Lighting Controls

Is (most of) the lighting linked to a building automation system (BAS) and/or to occupancy sensor controls?

- Yes
- Yes – and also integrated with HVAC
- No
- Not sure

Do enclosed spaces (such as offices, meeting rooms, storage rooms) have their own lighting controls or occupancy sensors?

- 75-100% of enclosed areas
- 50-74%
- <50% of enclosed area
- NA (no enclosed spaces)

Are there zoned lighting controls for different areas within large open offices or retail (more than 3,000 SF?)

- Yes (75% of office area)
- Partial (>50%)
- No
- NA

Can lights be dimmed in most of the office?

- Yes - most areas (>70%)
- Some areas (>50%)
- No

Are there lighting occupancy sensors (motion detectors) in the following areas:

- Open office areas?
 - Yes
 - Some
 - No
 - NA
- Occupant-installed washrooms?
 - Yes
 - Some
 - No
 - NA



Green Assessment



99%
Progress



59%
Score

METROPLUS PORTFOLIO / BRM HEADQUARTERS / GREEN ASSESSMENT



ENERGY

Energy Management

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Plug Load

Server Room



WATER



WASTE



MATERIALS



COMMUTING



GREEN TEAM



Reduce Hours of Lighting

Is there prominent signage that lights should be turned off when space is unoccupied OR are there occupancy sensors or automatic controls to turn off the lights at the end of the day?

- Yes - signage or occupancy sensors
- No signage but employees habitually switch lights off when a room is unoccupied
- No
- NA (occupants do not control lighting)
- NA (build-out)

Are lights switched off at night, weekends etc.? (i.e. Is there a system or protocol to ensure this?) OR are there occupancy sensor or automatic controls to switch off lights at the end of the day?

- Yes - automated
- Yes – manually switched off consistently as per a rigorous protocol
- No
- NA (facility runs 24 hrs.)
- NA (build-out)

Where lighting is controlled manually, are midnight audits conducted to monitor whether lights are being switched off?

- Yes
- No
- NA (automated shut-off)

Is cleaning done during the day?

- Yes - automated
- No
- NA (facility runs 24 hrs. or not feasible)
- NA (build-out)

Where lighting is controlled centrally after hours, are there additional zone switches with occupancy sensors or timers in the occupant space to control after-hours lighting?

- Yes
- No
- NA

BRM Headquarters



78%
Progress



49%
Score



Green Assessment



99%
Progress



59%
Score

Sustainability in the workplace including energy water, waste, materials, commuting and Green Teams

[Continue Assessment](#)



Comfort & Productivity Assessment



62%
Progress



37%
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Workplace attributes that affect productivity and wellness including layout, acoustics, visual comfort, thermal comfort, IAQ, amenities and wellness programs

[Continue Assessment](#)

LAYOUT AND ACOUSTICS

6-300% improved productivity



| | Improvement |
|------------------------------------|-------------|
| Accuracy | 67% |
| Call worker satisfaction | 300% |
| Sales productivity | 20% |
| Ability to focus | 48% |
| Memory tasks | 10% |
| Stress (blood pressure heart rate) | 27% |

LAYOUT AND ACOUSTICS
6-300% improved productivity



LAYOUT AND ACOUSTICS
6-300% improved productivity



Welcome to the Quiet Zone



- . Turn cell phone ringers to silent
- . Take phone conversations out of library
- . Music with headphones allowed (make sure you're not disturbing others with volume)

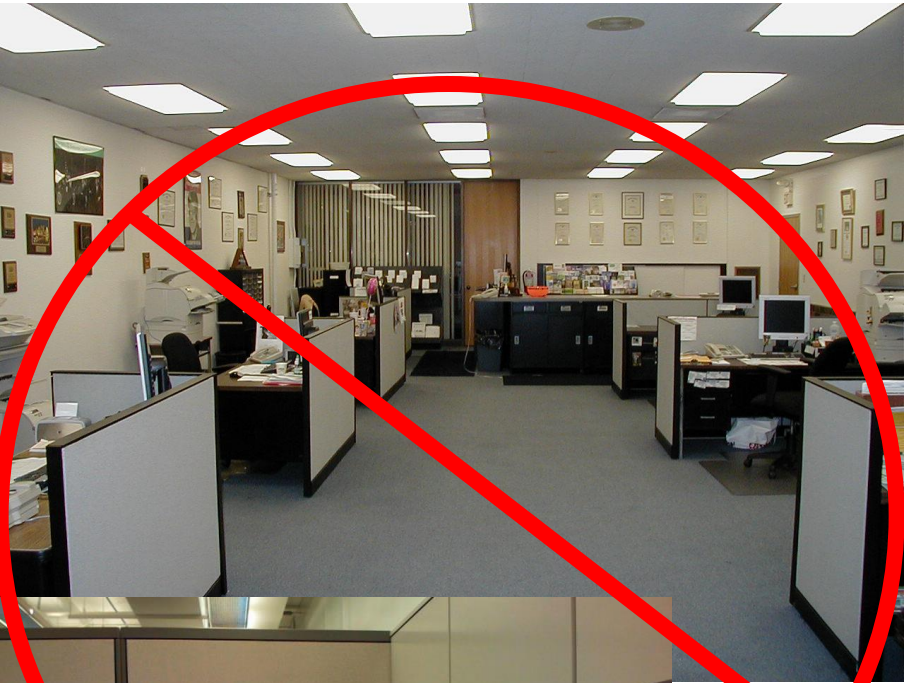
Talk out there, think in here.



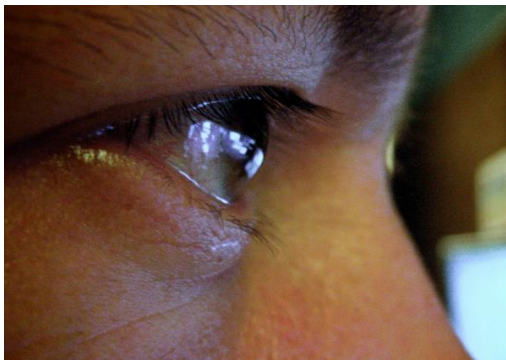
DAYLIGHT & VIEW
7-18% improved productivity



DAYLIGHT & VIEW
7-18% improved productivity



LIGHTING DESIGN
5% improved productivity



THERMAL COMFORT
5% improved productivity



IAQ
10-100% improved
productivity



ERGONOMIC
WORKSTATIONS
& TRAINING



AMENITIES WELLNESS PROGRAMS





Health & Productivity Assessment



62% Progress



37% Score

METROPLUS PORTFOLIO / BRM HEADQUARTERS / HEALTH & PRODUCTIVITY ASSESSMENT



ACOUSTICS



Acoustic conditions



INDOOR AIR QUALITY



THERMAL COMFORT



VISUAL COMFORT



LAYOUT



AMENITIES



WELLNESS PROGRAMS

Does an employee survey indicate that the majority are satisfied with the acoustic environment?

- High level of satisfaction overall
- Mixed responses
- Largely dissatisfied
- NA (no occupant survey done)
- NA (build-out)

Are there any observed or reported acoustic problems associated with:

• Sources outside the building?

- No problems
- Some problems

• Neighboring tenancies?

- No problems
- Some problems

• HVAC (Typically a rumbling, vibration or rushing noise)?

- No problems
- Some problems

• Lighting fixtures (typically a humming or buzzing noise)?

- No problems
- Some problems

• Plumbing (typically creaking, squeaking or rattling)?

- No problems
- Some problems

Are there dedicated "Quiet Zones" OR acoustically separated areas for focused concentrated work?

- Yes - sufficient to meet demand
- Not sufficient to meet demand
- NA (e.g. call center, retail)

Are there sufficient small enclosed meeting rooms to take conference calls on speaker phones or

- Yes - sufficient to meet demand
- Not sufficient to meet demand



Health & Productivity Assessment



62% Progress



37% Score

METROPLUS PORTFOLIO / BRM HEADQUARTERS / HEALTH & PRODUCTIVITY ASSESSMENT



ACOUSTICS



Acoustic conditions



INDOOR AIR QUALITY



THERMAL COMFORT



VISUAL COMFORT



LAYOUT



AMENITIES



WELLNESS PROGRAMS

Does an employee survey indicate that the majority are satisfied with the acoustic environment?

- Generally satisfied overall
- Mixed responses
- Largely dissatisfied
- NA (no comment provided)

TIP: The survey can be a quick e-mail survey (e.g. Monkey Survey™) modelled on a survey by the Center for the Built Environment (CBE) at UC Berkeley. It asks a small number of questions of a general nature to flag areas of concern:

1. How satisfied are you with the noise level in your workspace?
2. How satisfied are you with the sound privacy in your workspace?
3. Overall, does the acoustic quality in your workspace enhance or interfere with your ability to get your job done?

There are several ways to interpret the data. One of the simplest is the % who agree with statements in the survey (e.g. "78% agree that they are satisfied with the noise level").

Where problems are found, then proceed to a more in-depth investigation.

VERIFICATION: View employee survey. Interview occupants.

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62% Progress



37% Score

METROPLUS PORTFOLIO / BRM HEADQUARTERS / HEALTH & PRODUCTIVITY ASSESSMENT



ACOUSTICS



Build-out



INDOOR AIR QUALITY



THERMAL COMFORT



VISUAL COMFORT



LAYOUT



AMENITIES



WELLNESS PROGRAMS

Do walls, ceilings and partitions absorb sound as follows:

- Ceilings with an NRC of at least 0.75 OR acoustical ceiling clouds or canopies of at least NRC 0.90?
 - Yes
 - No
 - Not sure
 - NA (not a build-out)

- Walls with an NRC of 0.80 or more?
 - Yes
 - No
 - Not sure
 - NA (not a build-out)

- Partitions with an NRC of 0.70 or more?
 - Yes
 - No
 - Not sure
 - NA (not a build-out)

- Carpeted floors with a NRC of 0.15?
 - Yes
 - No
 - Not sure
 - NA (not a build-out)

Do wall assemblies avoid sound travelling between rooms through the walls by having the following minimum Sound Transmission Class (STC) ratings:

- STC-50 to isolate video conference and training rooms?
 - Yes
 - No
 - Not sure
 - NA (no conference rooms)
 - NA (not a build-out)



Green + Productive Workplace

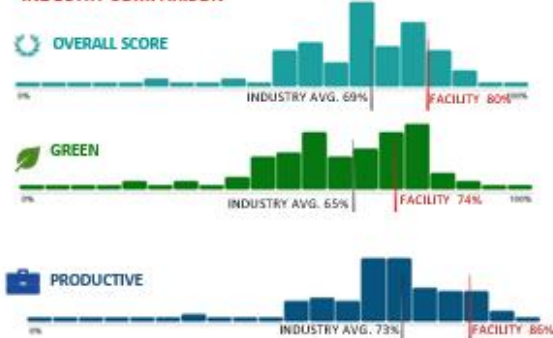
JLL Summary Report for Pittsburgh Center



YOUR SCORES



INDUSTRY COMPARISON



SUB-SECTION SCORES

| GREEN | | HEALTH & PRODUCTIVITY | |
|------------|------|-----------------------|------|
| Energy | 66% | Acoustic Comfort | 78% |
| Water | 55% | IAQ | 55% |
| Waste | 100% | Thermal comfort | 100% |
| Materials | 76% | Visual comfort | 90% |
| Commuting | 91% | Layout | 95% |
| Green Team | 51% | Amenities | 76% |
| | | Wellness | 84% |

RATING



Pittsburgh Center
21,827 SF
1,700 employees
Lease ends: 2030



RED FLAG SUMMARY

(areas that should be further investigated for corrective action)

| GREEN | PRODUCTIVE |
|--|--|
| *Check for potential lighting energy savings *There may be ways to reduce water consumption | Check acoustics (measurements and occupant survey) |

FINANCIAL IMPACTS

(Conservative orders of magnitude of the potential energy savings and productivity gains based on the 3-30-300 model)

| GREEN 721,827 square feet | |
|------------------------------|------------------|
| Lighting | Plug load |
| \$103,940 | No major savings |

| PRODUCTIVITY 1,700 employees | | | | |
|---------------------------------|------------|-----------------|----------------|------------|
| Acoustics | IAQ | Thermal comfort | Visual comfort | Layout |
| \$224,400 | No savings | No savings | No savings | No savings |

AREAS FOR FURTHER INVESTIGATION

- Occupancy sensors for lighting in all conference rooms
- Midnight audit for lighting
- Automatic lights shut-off at night
- Energy expert do a walk-through of the server room to review the air distribution
- Meter water consumption in the commercial kitchen
- Find out the ratings of the air filters
- Acoustic measurements and occupant survey

Report for MetroPlus Portfolio

METROPLUS PORTFOLIO / PORTFOLIO REPORT

EXECUTIVE SUMMARY

Overview

Scores & Ratings

Financial Impacts

Red Flag Summary

CORPORATE LEADERSHIP

Policies

Disclosure

Directives

GREEN WORKPLACE

Energy

Water

Waste

Materials

Commuting

Green Team

HEALTH & PRODUCTIVITY

Acoustic Comfort

Indoor Air Quality

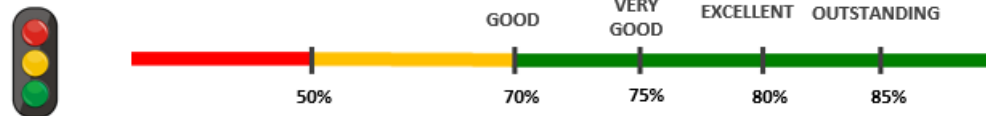
Thermal Comfort

Visual Comfort

Layout

BENCHMARKING SCALE

| Benchmark | Overall | Green | Productive |
|-------------|----------|---------|------------|
| Good | 70 - 74% | 70-100% | 70-100% |
| Very Good | 75 - 79% | 70-100% | 70-100% |
| Excellent | 80- 84% | 70-100% | 70-100% |
| Outstanding | 85 -100% | 70-100% | 70-100% |



G+P Workplace uses a simple traffic light scoring scheme:

<50% Potential risk
 50 – 70% Opportunity
 > 70% Above average

YOUR BENCHMARKS

| | Overall | Green | Productive | Benchmark |
|--------------------|---------|-------|------------|-----------|
| Horsham | ● 81% | ● 78% | ● 83% | EXCELLENT |
| San Diego | ● 76% | ● 72% | ● 79% | VERY GOOD |
| Lowell | ● 60% | ● 53% | ● 65% | - |
| Santa Clara (116) | ● 62% | ● 60% | ● 63% | - |
| Santa Clara (116A) | ● 71% | ● 70% | ● 72% | GOOD |
| Lawrence | ● 69% | ● 66% | ● 72% | - |

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Waste

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Green Team

HEALTH & PRODUCTIVITY

Acoustic Comfort

Indoor Air Quality

Thermal Comfort

Visual Comfort

Layout

Amenities

GREEN

| | Green | Energy | Water | Waste | Materials | Commuting | Green Team |
|-----------------------|---------|---------|---------|---------|-----------|-----------|------------|
| Portfolio | 65% | 62% | 52% | 69% | 66% | 85% | 55% |
| Bay St. Operations | 73% | 69% | 74% | 74% | 78% | 83% | 95% |
| BRM HQ | 89% | 93% | 88% | 87% | 97% | 82% | 69% |
| Mitchell & Associates | 62% | 57% | 62% | 67% | 66% | 81% | 46% |
| Rutherford Center | 39% | 30% | 8% | 49% | 22% | 92% | 49% |



HEALTH & PRODUCTIVITY

| | Productive | Acoustics | IAQ | Thermal | Visual | Layout | Amenities | Wellness |
|-----------------------|------------|-----------|---------|---------|---------|---------|-----------|----------|
| Portfolio | 59% | 46% | 69% | 40% | 74% | 54% | 81% | 51% |
| Bay St. Operations | 74% | 95% | 65% | 59% | 80% | 81% | 74% | 64% |
| BRM HQ | 59% | 35% | 81% | 32% | 92% | 47% | 85% | 42% |
| Mitchell & Associates | 54% | 35% | 83% | 11% | 71% | 45% | 82% | 53% |

Report for MetroPlus Portfolio

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Green Team

HEALTH & PRODUCTIVITY

Acoustic Comfort

Indoor Air Quality

Thermal Comfort

Visual Comfort

Layout



RED FLAG SUMMARY

The following is an overview of red flags that warrant concern or call for further investigation.

Bay Street Ops Center ● 73% 13,763 SF 56 employees Lease ends 2019



Green



Productive

No red flags

- There may be ways to improve the layout to better correspond to actual work processes and support informal cohesive networks
- Check for opportunities to improve health and wellness in the workplace

Rutherford Center ● 46% 102,300 SF 40 employees Lease ends 2016



Green



Productive

- Check for potential lighting energy savings
- There may be an opportunity to save energy for heating and/or cooling and perhaps also improve comfort
- Check for potential for plug load reduction opportunities
- There may be ways to reduce water consumption
- Review waste management and/or how toxic waste is being disposed
- Acoustic conditions may be impacting wellbeing and productivity
- Thermal comfort issues could be affecting wellbeing and productivity
- There may be ways to improve the layout to better correspond to actual work processes and support informal cohesive networks
- Check for opportunities to improve health and wellness in the workplace

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- Red Flag Summary

CORPORATE LEADERSHIP

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ENERGY - LIGHTING

High efficiency & Moderate levels



Lighting is high efficiency; Light levels comply with IESNA recommendations

Controls



Lighting linked to BAS; Zoned controls; Dimmable lighting; Occupancy sensors; Daylight harvesting

Reduce hours of lighting



Where lights are manually controlled, prominent "lights-off" signage; midnight audits for manual controls; Lights off at night; Daytime cleaning

| | | | |
|-----------------------|------|------|------|
| Bay Street | ●74% | ●95% | ●65% |
| BRM | ●59% | ●35% | ●81% |
| Mitchell & Associates | ●54% | ●35% | ●83% |
| Rutherford | ●51% | ●30% | ●50% |

ENERGY - PLUG LOAD

Office & Kitchen Appliances



Workstation devices ensure that desktop equipment is switched off when not in use; Where there are no switch-off devices, there is signage reminding employees to switch off desktop equipment, AND midnight audits to verify. There are no redundant appliances; the office uses laptops rather than desktops; The office/kitchen uses ENERGY STAR office equipment and appliances

| | |
|-----------------------|------|
| Bay Street Operations | ●89% |
| BRM Headquarters | ●86% |
| Mitchell & Associates | ●22% |

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LAYOUT

Activity-based Layout



Activity-based allocation of space for collaboration, concentration, conversation and confidentiality; Balanced use of space; Ease with which to find people, book space

Social Cohesiveness



Features that promote informal social cohesion; Ease with which to find people, book meeting rooms

Flexibility



Flexible space, furniture, power and communications connectivity; Flexible work arrangements

| | Activity-based Layout | Social Cohesiveness | Flexibility |
|-----------------------|-----------------------|---------------------|-------------|
| Bay Street Operations | ●48% | ●77% | ●61% |
| BRM Headquarters | ●86% | ●100% | ●31% |
| Mitchell & Associates | ●22% | ●80% | ●73% |
| Rutherford Center | ●36% | ●32% | ●81% |

AMENITIES

Local Amenities



Walkable neighborhood with shops, banking, a variety of restaurants; green spaces; Where public transportation is lacking, there is minimal gridlock and ready access to main arteries, airport etc.

Office Amenities



Employee amenities: lunch room, exercise facilities, quiet room, facility for nursing mothers; water stations

| | Local Amenities | Office Amenities |
|-----------------------|-----------------|------------------|
| Bay Street Operations | ●48% | ●77% |
| BRM Headquarters | ●86% | ●100% |

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FINANCIAL IMPACTS

The following values represent the order of magnitude of wasted energy and lost productivity due to current deficiencies. The estimates show the potential savings from taking corrective action. Values are purposely estimated on the low side to provide a credible case for action. Conservative estimates for “energy inefficiency” are a maximum of 5% for a worst case of inefficient lighting, plug load and server room lighting and plug load. Conservative estimates for “lost productivity” are a maximum of 6% , which represent the reduced quantity and/or quality of work output per employee (as gauged in minutes lost) in a worst case scenario of acoustic, thermal and visual discomfort, bad air, poor layout of space and lack of wellness features and amenities.

Green

| | Square Feet | Lighting | Plug Load |
|------------------------------|-------------|------------|------------|
| Bay Street Operations Center | 13,763 SF | \$660 | No Savings |
| BRM Headquarters | 32,200 SF | No Savings | No Savings |
| Mitchell & Associates | 50,000 SF | No Savings | \$3,000 |
| Rutherford Center | 102,300 SF | \$7,370 | \$6,140 |

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FINANCIAL IMPACTS

The following values represent the order of magnitude of wasted energy and lost productivity due to current deficiencies. The estimates show the potential savings from taking corrective action. Values are purposely estimated on the low side to provide a credible case for action. Conservative estimates for “energy inefficiency” are a maximum of 5% for a worst case of inefficient lighting, plug load and server room lighting and plug load. Conservative estimates for “lost productivity” are a maximum of 6% , which represent the reduced quantity and/or quality of work output per employee (as gauged in minutes lost) in a worst case scenario of acoustic, thermal and visual discomfort, bad air, poor layout of space and lack of wellness features and amenities.



Health & Productivity

| | # of employees | Acoustics | IAQ | Thermal comfort | Visual comfort | Layout |
|-----------------------|----------------|------------|------------|-----------------|----------------|------------|
| Bay Street Operations | 56 | No Savings | \$14,780 | \$24,640 | No Savings | No Savings |
| BRM Headquarters | 122 | \$174,460 | No Savings | \$174,460 | No Savings | \$174,460 |
| Mitchell & Associates | 200 | \$211,000 | No Savings | \$187,000 | No Savings | \$132,000 |
| Rutherford Center | 40 | \$35,200 | \$10,560 | \$17,600 | \$10,560 | \$35,200 |

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Amenities

Wellness



**TO-DO's
RED FLAGS**



TO DO'S

ENERGY

| | Bay Street | BRM | Mitchell & Ass | Rutherford |
|--|------------|-----|----------------|------------|
| Consider the possibility of installing sub-metering for the project area. | ✓ | ✓ | 🚩 | 🚩 |
| Install high efficiency lighting. | ✓ | ✓ | ✓ | 🚩 |
| Consider installing LED lighting. | 🚩 | ✓ | ✓ | 🚩 |
| Measure ambient lighting levels in areas where screen tasks are done. 200-300 lux (28 FC) of ambient lighting should be sufficient for screen tasks, along with some task lighting. There may be an opportunity to "de-lamp" some areas. | 🚩 | ✓ | ✓ | 🚩 |
| Calculate the wattage per square foot for the office (wattage of all the lamps divided by floor area). Take appropriate action to achieve approximately 0.9 watts per SF. | - | - | - | - |
| Enclosed rooms (e.g. offices, meeting rooms, storage rooms) should have their own lighting controls. | ✓ | ✓ | ✓ | 🚩 |
| Large open offices should have zoned lighting controls. | ✓ | ✓ | ✓ | 🚩 |
| Consider installing dimming controls for lights. | 🚩 | ✓ | 🚩 | 🚩 |
| Provide lighting occupancy sensors (motion detectors) in conference rooms, enclosed offices, storage, supply rooms or printing rooms. | 🚩 | ✓ | ✓ | 🚩 |
| Consider installing daylight-sensors to automatically dim electric light levels. | ✓ | ✓ | ✓ | |
| Automate lights off at the end of the day, weekends etc. | | | ✓ | |

| | A | B | C | D | E |
|----|--|---------------------------------|------------------------------|------------------------------|--------------------------|
| 1 | Energy | Street Operations Center | BRM Headquarters 2014 | BRM Headquarters 2015 | Rutherford Center |
| 2 | Consider the possibility of installing sub-metering for the project area. | ✓ | !! | ✓ | ✓ |
| 3 | Install high efficiency lighting. | ✓ | ✓ | ✓ | ✓ |
| 4 | Consider installing LED lighting. | ! | ✓ | ✓ | ! |
| 5 | Measure ambient lighting levels in areas where screen tasks are done. 200-300 lux (28 FC) of ambient lighting should be sufficient for screen tasks, along with some task lighting. There may be an opportunity to "de-lamp" some areas. | !! | ✓ | ✓ | ✓ |
| 6 | Calculate the wattage per square foot for the office (wattage of all the lamps divided by floor area). Take appropriate action to achieve approximately 0.9 watts per SF. | - | - | - | - |
| 7 | Enclosed rooms (e.g. offices, meeting rooms, storage rooms) should have their own lighting controls. | ✓ | ✓ | ✓ | ✓ |
| 8 | Large open offices should have zoned lighting controls. | ✓ | ✓ | ✓ | ! |
| 9 | Consider installing dimming controls for lights. | ! | ! | ✓ | ! |
| 10 | Provide lighting occupancy sensors (motion detectors) in conference rooms, enclosed offices, storage, supply rooms or printing rooms. | ✓ | ✓ | ✓ | ✓ |
| 11 | Consider installing daylight-sensors to automatically dim electric light levels. | !! | ✓ | ! | !! |
| 12 | Automate lights off at the end of the day, weekends etc. | ! | ✓ | ✓ | ✓ |
| 13 | Where there are no occupancy sensors or BAS to shut off lights, conduct midnight audits to check whether lights are being switched off after-hours. | !! | ✓ | ✓ | ✓ |
| 14 | Consider seeking professional advice to reduce unwanted heat loss and/or solar gain through windows. | ✓ | ! | ✓ | ✓ |
| 15 | Consider adding solar control window film to reduce energy use and improve comfort in spaces that are in direct sunlight. | ✓ | !! | ✓ | ✓ |
| 16 | Install window blinds. | ✓ | ✓ | ✓ | ✓ |
| 17 | Install automated controls on the operable windows based on outdoor temperature, occupancy sensors and window (open or closed) sensors. | ✓ | ✓ | ✓ | ✓ |
| 18 | Check temperature settings i.e. 75°F (24°C) or higher in the summer, and 70°F (21 °C) or lower in winter. | ✓ | !! | ✓ | ✓ |
| 19 | Implement temperature set-back when the office is unoccupied. | ✓ | ✓ | ✓ | ✓ |
| 20 | Install devices that switch off office equipment when occupants are not present. | ! | !! | ! | !! |

Thank you



Organisers:



International Co-owners:



Sustainable Buildings and Climate Initiative
Promoting Policies and Practices for Sustainability



Global Alliance
for Buildings and
Construction