GREEN BUILDINGS
Risks and Rewards

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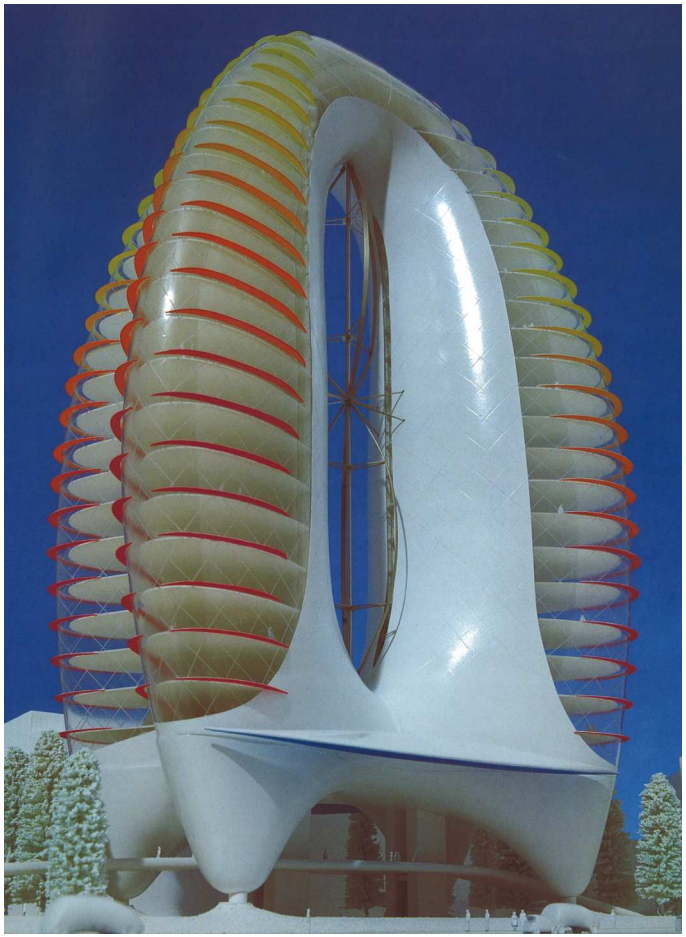
Agenda

- Green Buildings
- LEED Intro
- Risks

What is a Green Building?



Radical Design?

Natural Materials?

Technological gizmos?

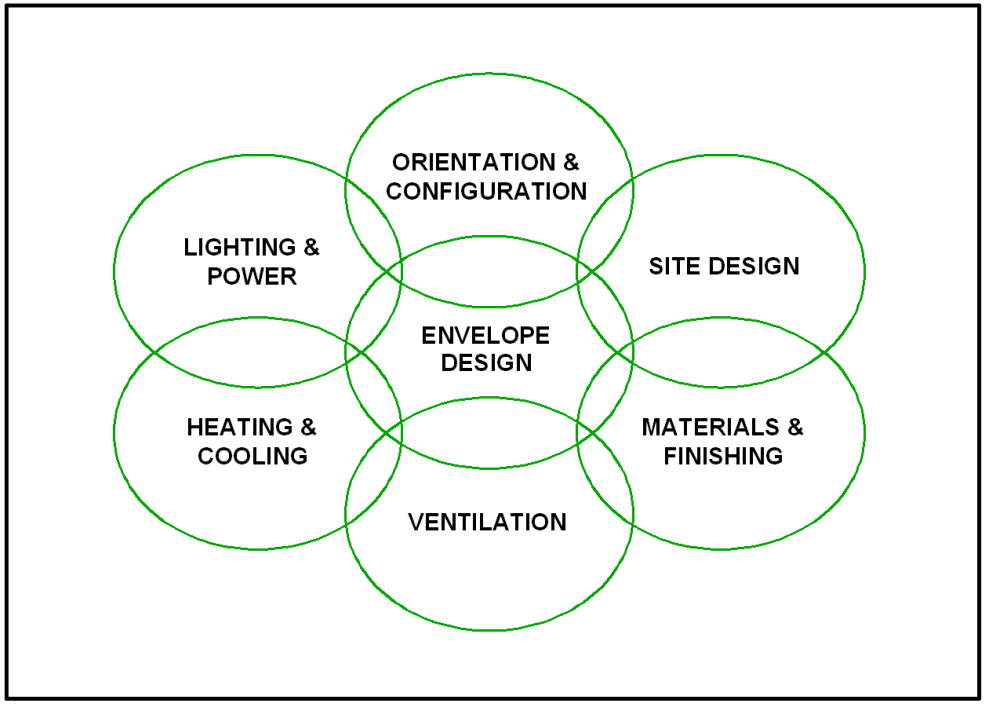
What is a Green Building?

"Green Buildings integrate social and environmental goals with financial considerations in real estate projects"

-Rocky Mountain Institute

What is a Green Building?

- Is it defined by process? Integrated design



Graphic: Teresa Coady

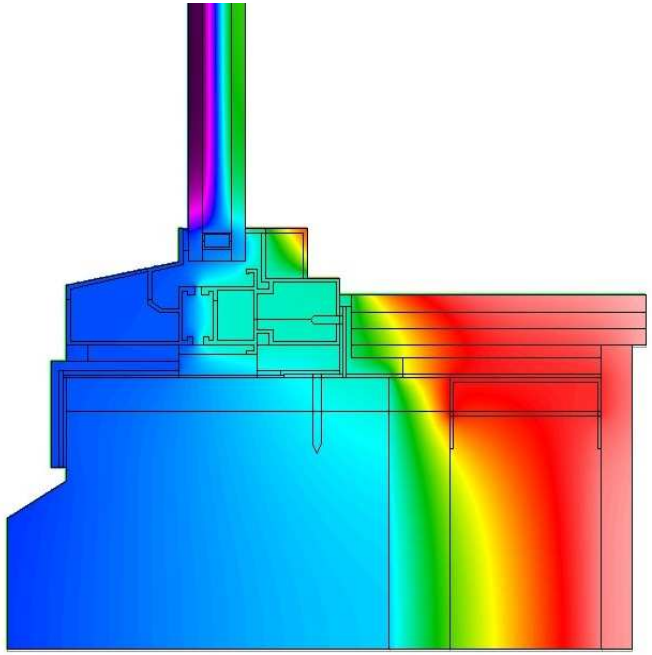
What is a Green Building?

- Process? Integrated design
- Is it defined by Elements?

Photos from CanSIA: used with permission

What is a Green Building?

- Process? Integrated design
- Elements?
- Low energy use?



Insulation

Glazing

Mechanical systems

Lighting

What is a Green Building?

- Process? Integrated design
- Elements?
- Low energy use?
- Ecological Considerations?

What is a Green Building?

TECHNOLOGY

COST

COMFORT

GREEN

Green Building Definition

- Several overlapping terms
  - Energy efficient building - Environmental building
  - Eco building - Sustainable building
  - High performance building
- Building rating systems
  - Point systems can be used to define “green”
  - BUT all points are equal

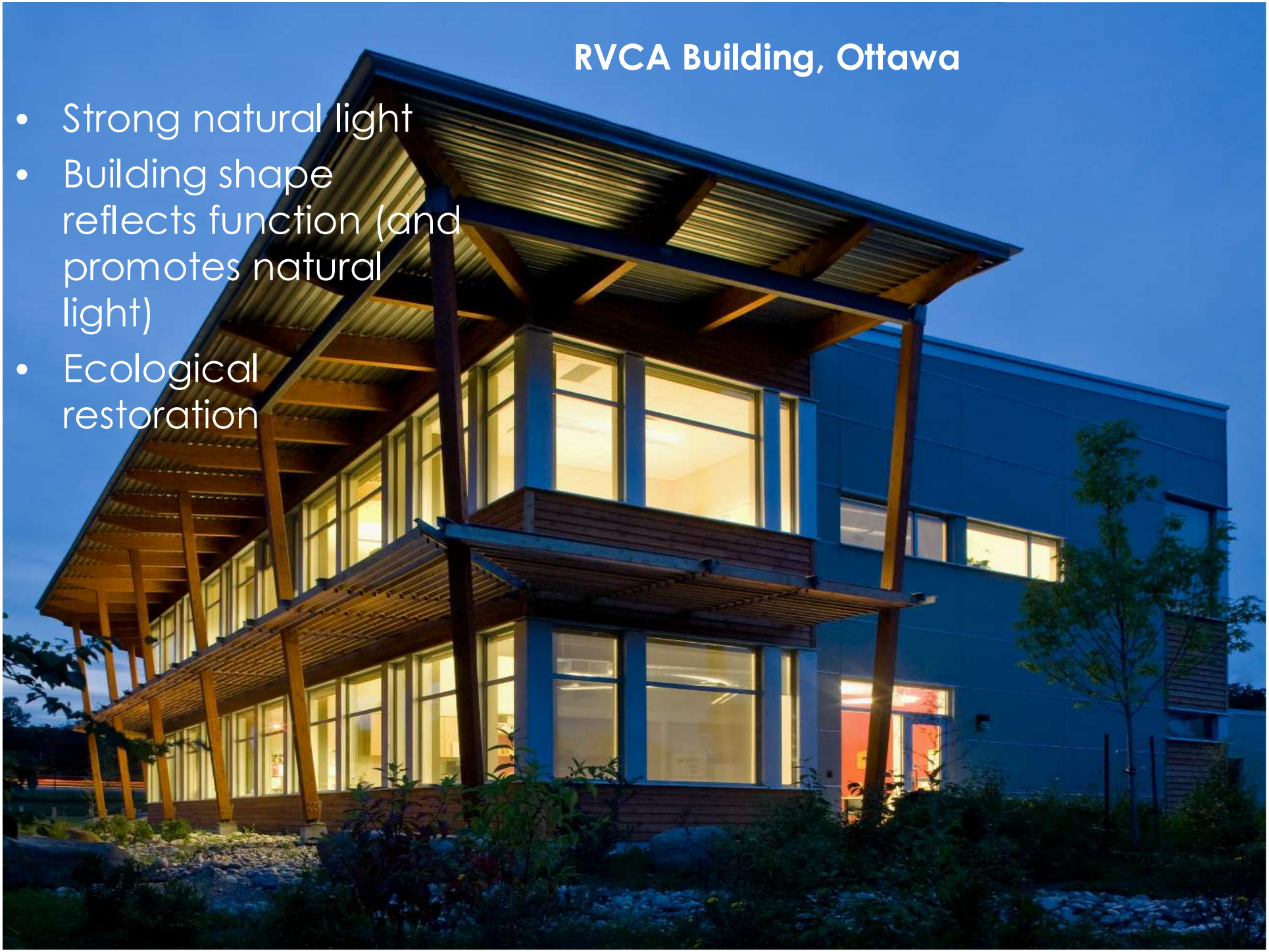
There is no clear definition!

SITE Building

- High end curtain wall
- Few finishes
- Innovative mechanical system

City of Vancouver National Works Yard

- Natural Light
- Local materials
- Reduced water

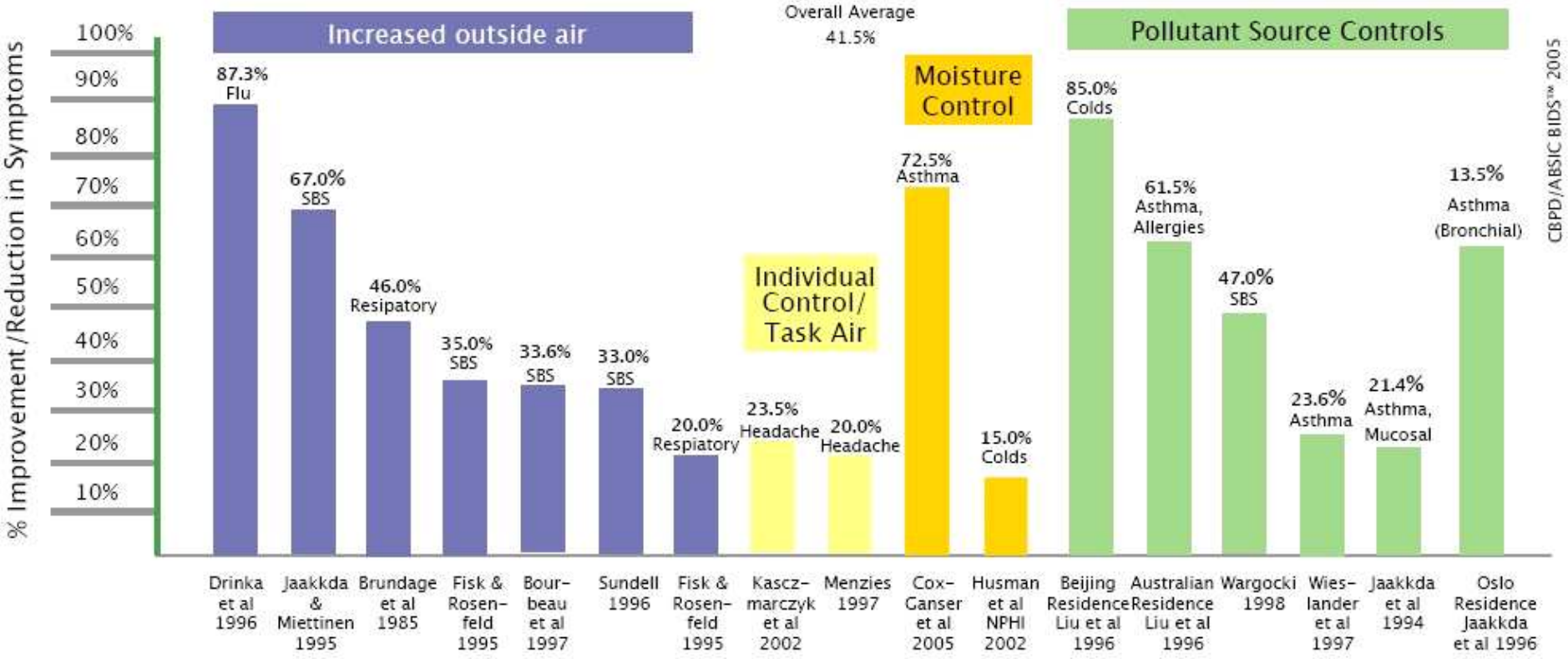

RVCA Building, Ottawa
• Strong natural light
• Building shape reflects function (and promotes natural light)
• Ecological restoration

The Business Case

- 2% more in Construction Cost
- Simple payback: 5 – 8 years
- Productivity gains: 5 to 17%
- Increased Sales: 25 - 40%
- Property values / absorption rates / long tenancies
- Community relations
- future proofing (don't be caught with a competitive disadvantage)

Productivity - Studies

Figure B: Health Gains from Improved Indoor Air Quality



Source: Carnegie Mellon University Center for Building Performance, 2005

Graphic from "Greening America's Schools" by **Capital E**

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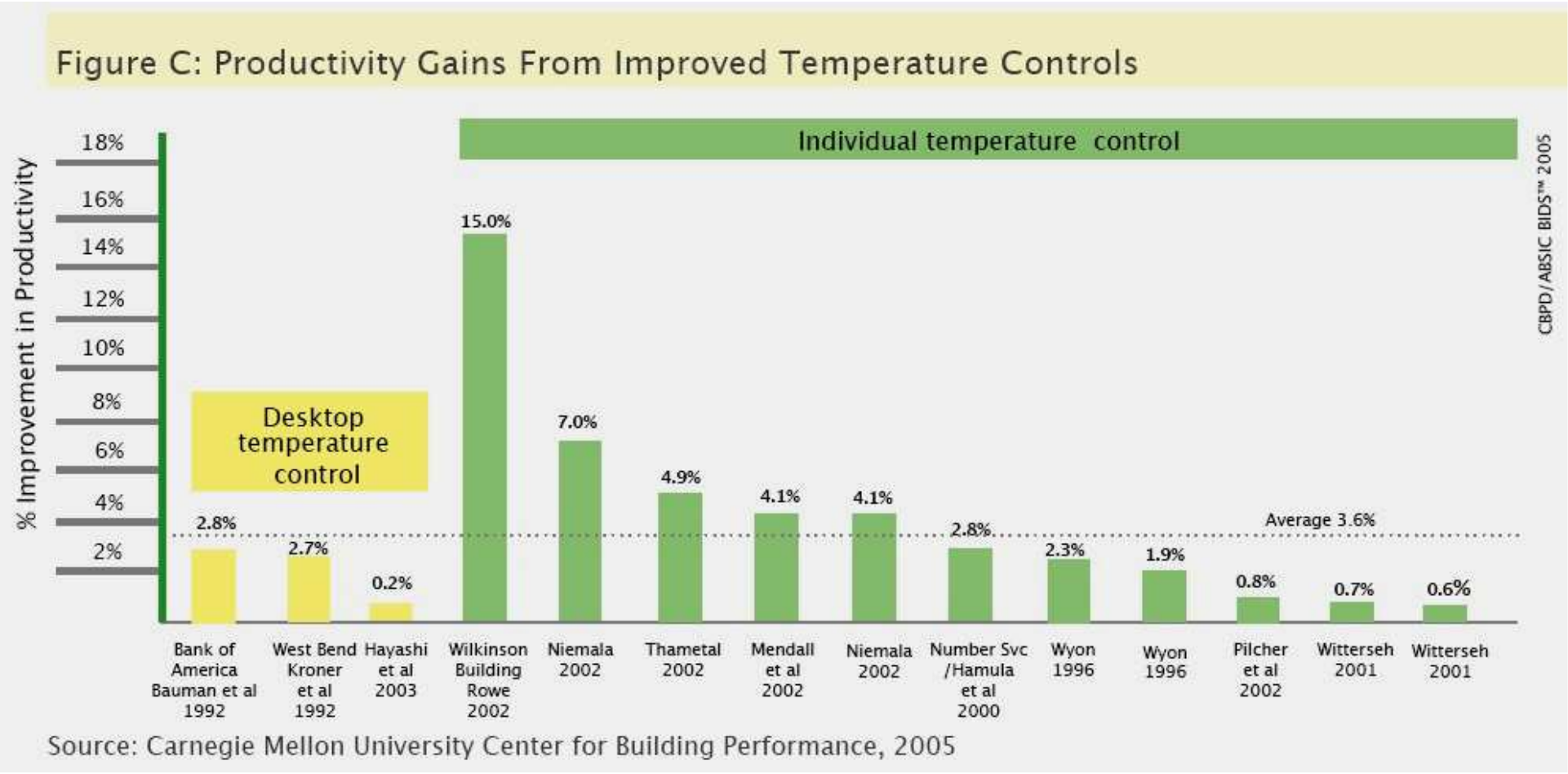
Productivity - Studies



Graphic from "Greening America's Schools" by **Capital E**

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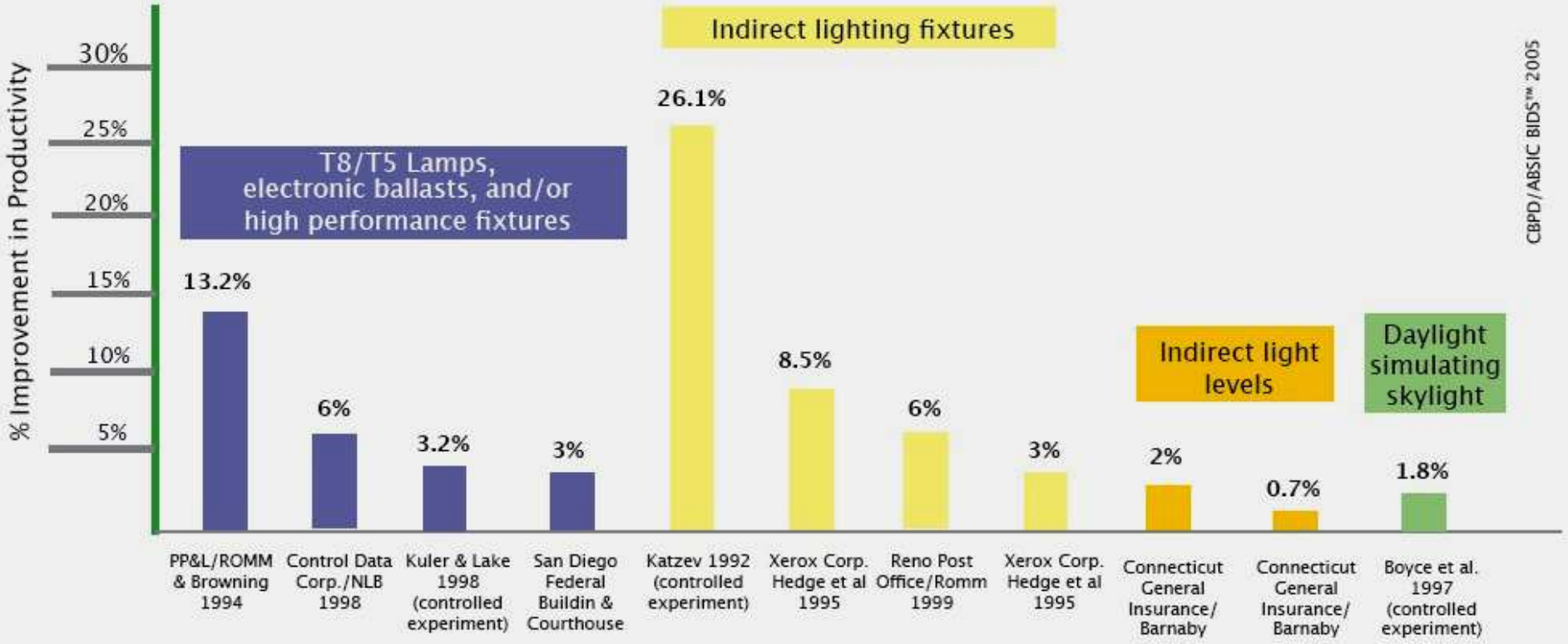
Productivity - Studies

Figure D: Productivity Gains from High Performance Lighting Systems



Source: Carnegie Mellon University Center for Building Performance, 2005

Graphic from "Greening America's Schools" by **Capital E**

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School Studies

- 1999 American Study, 21,000 students:
  - Progressed 20% faster in math and 26% better in reading (daylit to poorly lit classrooms)
- North Carolina School Study (3 schools):
  - Average test score improvement of 5% in daylit rooms
- 1992 Alberta Study:
  - Attended school 3.5 days more per year
  - Quieter libraries
  - 9x less dental decay and grew 2.1 cm more over 2 years

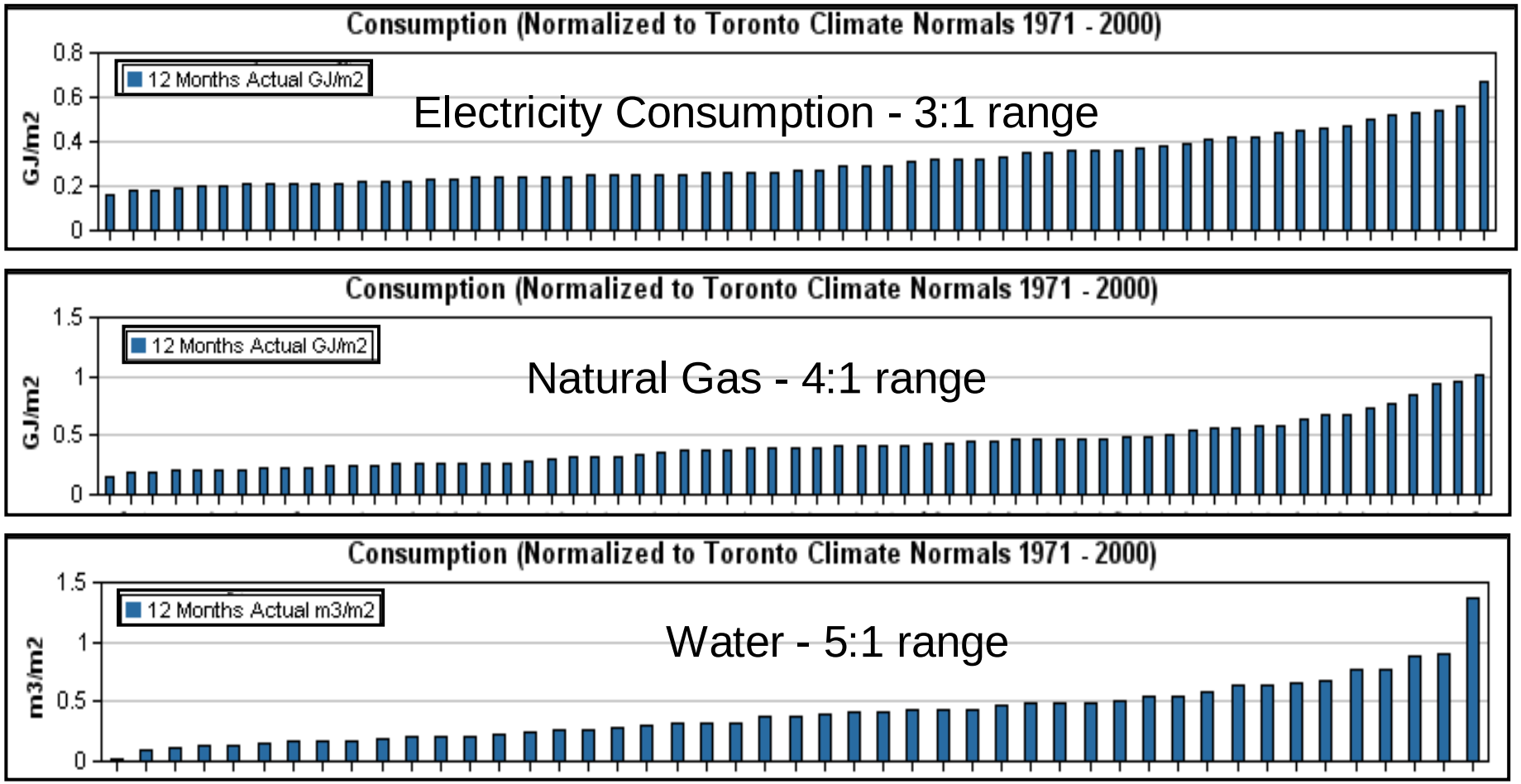
Source: **A business Case for Green Buildings in Canada**

Green Buildings

Who cares about green?

- The 2030 Challenge- developed by architects in response to the impact of buildings on global warming- *close to 50% of all emissions*- with a target of carbon neutrality for all buildings by 2030.
- 100 000 Green Buildings and 1 000 000 Green Homes- the Canada Green Building Council has set this ambitious goal for 2015.
- 90% Reduction by 2050- the US Climate Action Partnership agrees to cut greenhouse gas emissions, starting with 45% by 2020, as well as initiating a moratorium on coal.
- 20% Reduction by 2020- the Canadian government's plan to reduce greenhouse gas emissions.

Performance-Based Programming - Benchmarking New Schools



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Green Building Rating Systems

- LEED (CaGBC, USGBC)
- Green Globes (BOMA GOGreen Plus / BOMA BeST)
- Built Green (CHBA)
- ENERGY STAR for New Homes
- + 30 more

What is LEED ?

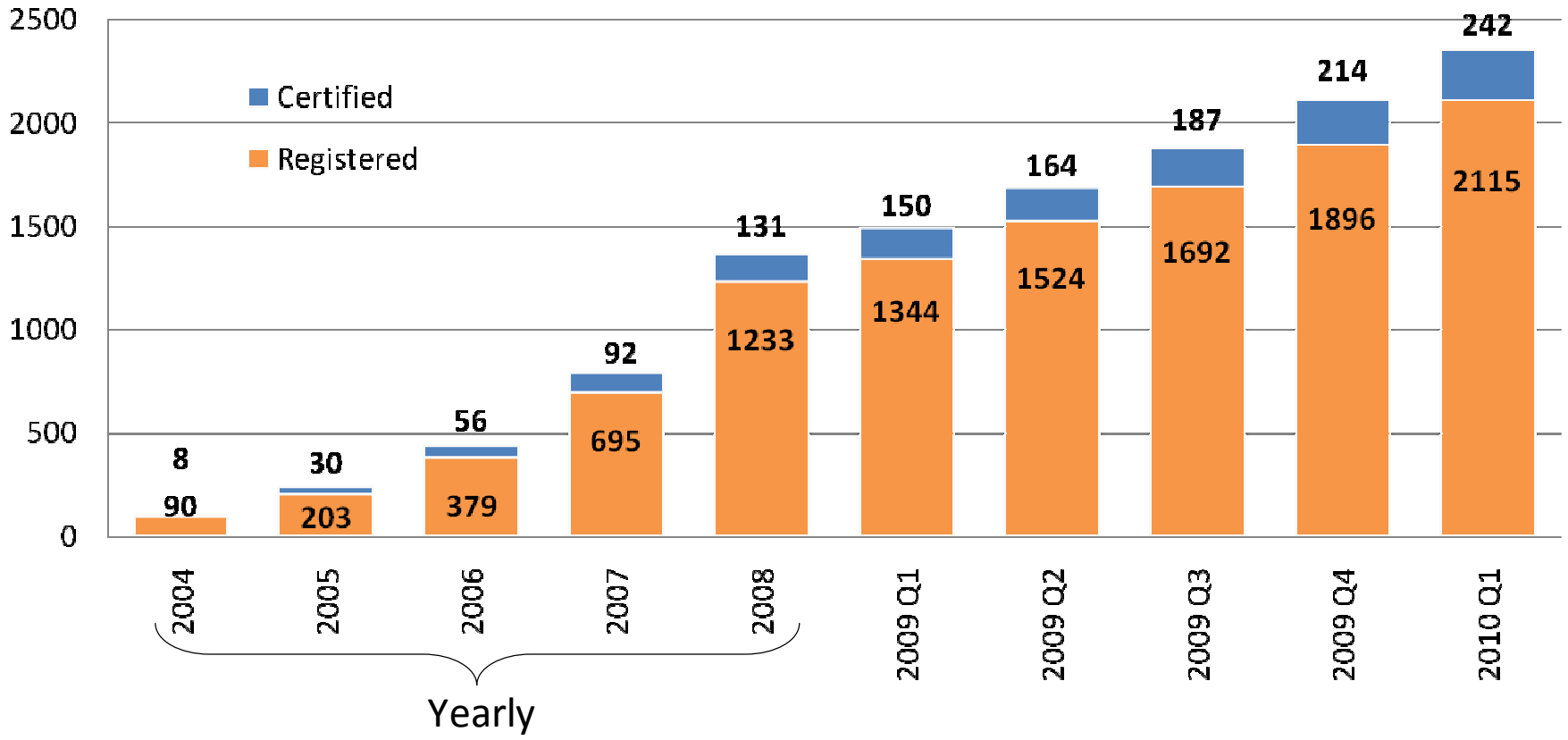
- Leadership in Energy and Environmental Design
- Green building rating system, third-party certification program developed by the US Green Building Council (USGBC)

What is LEED ?

- LEED Green Building Rating System focuses on:
  - sustainable site development
  - water efficiency
  - energy efficiency
  - materials selection
  - indoor environmental quality
- Projects must meet a number of prerequisites as well as a minimum number of points, which are awarded through specific credits.
- A minimum number of points is required for LEED certification, with additional points needed for silver, gold, or platinum status.

LEED® Projects

(End of Q1 2010 CaGBC/March 17, 2010 USGBC)



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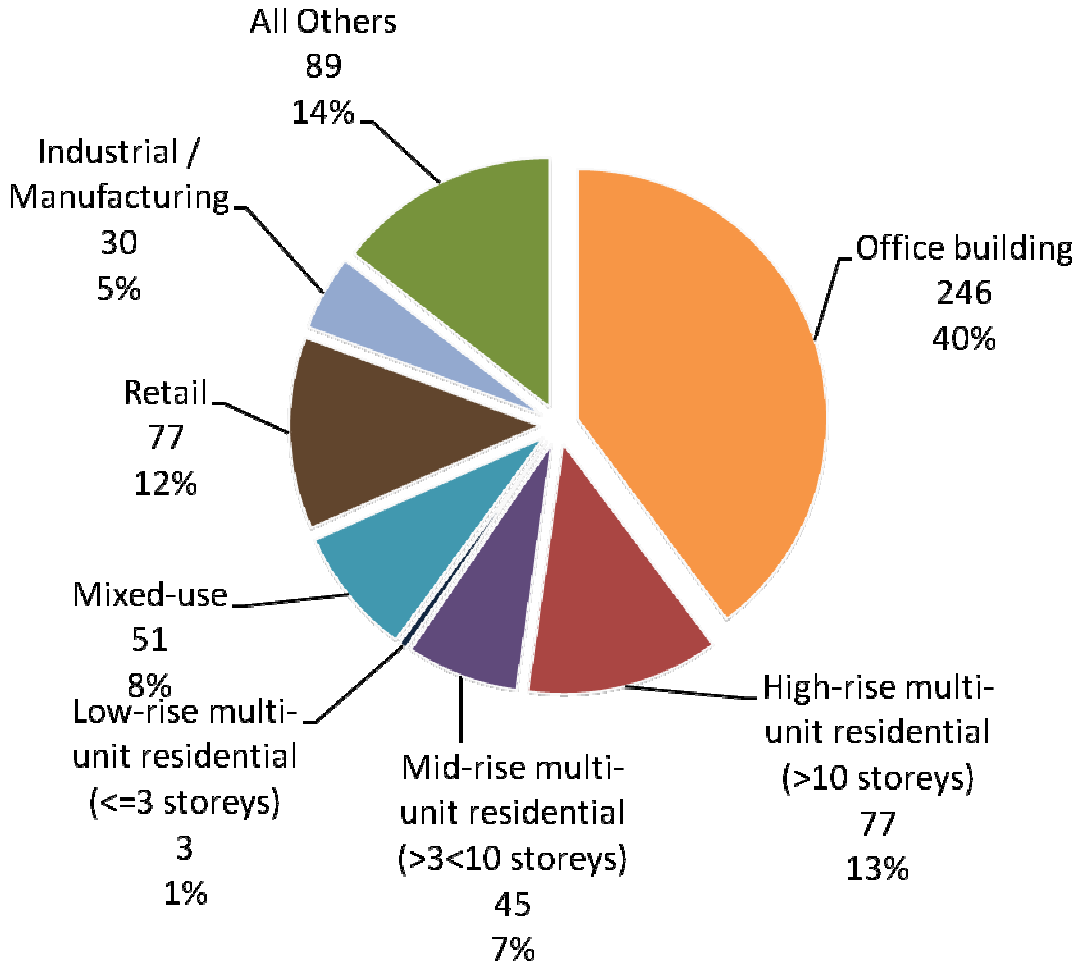
Commercial registered/certified by Building Type



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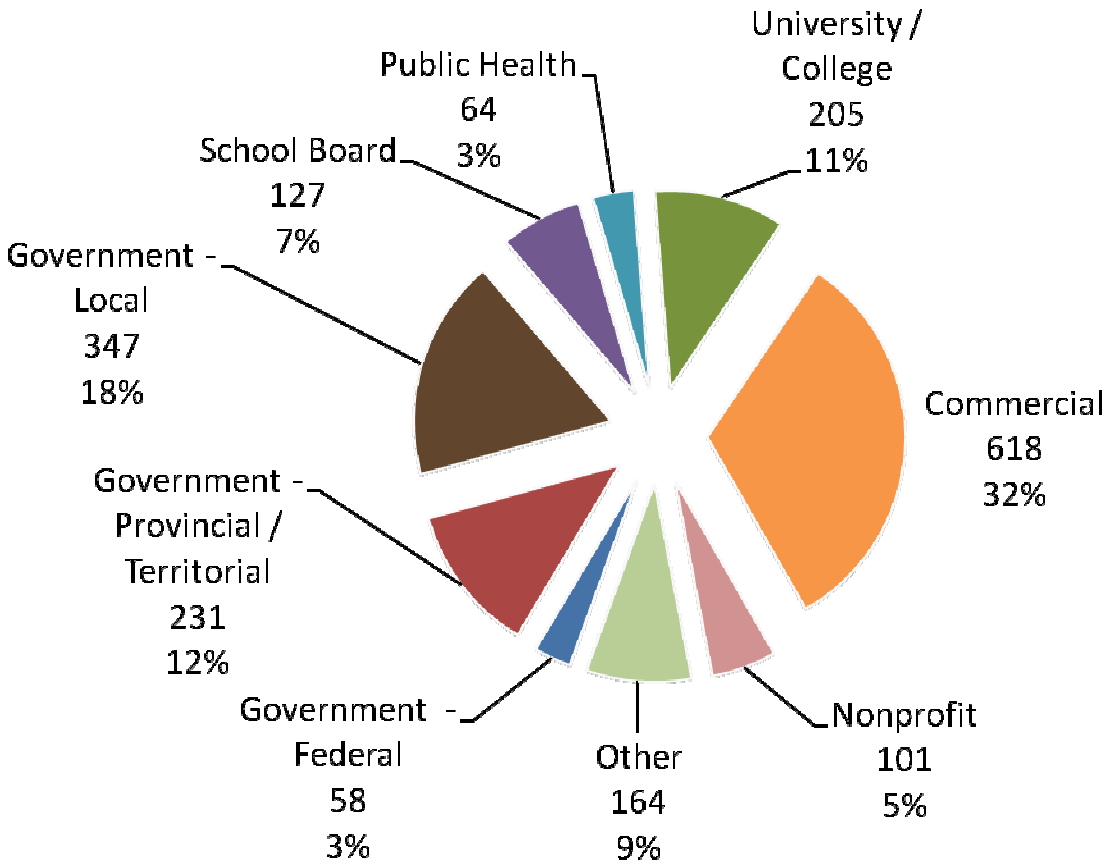
LEED® Canada Registered/Certified Projects by Owner Type



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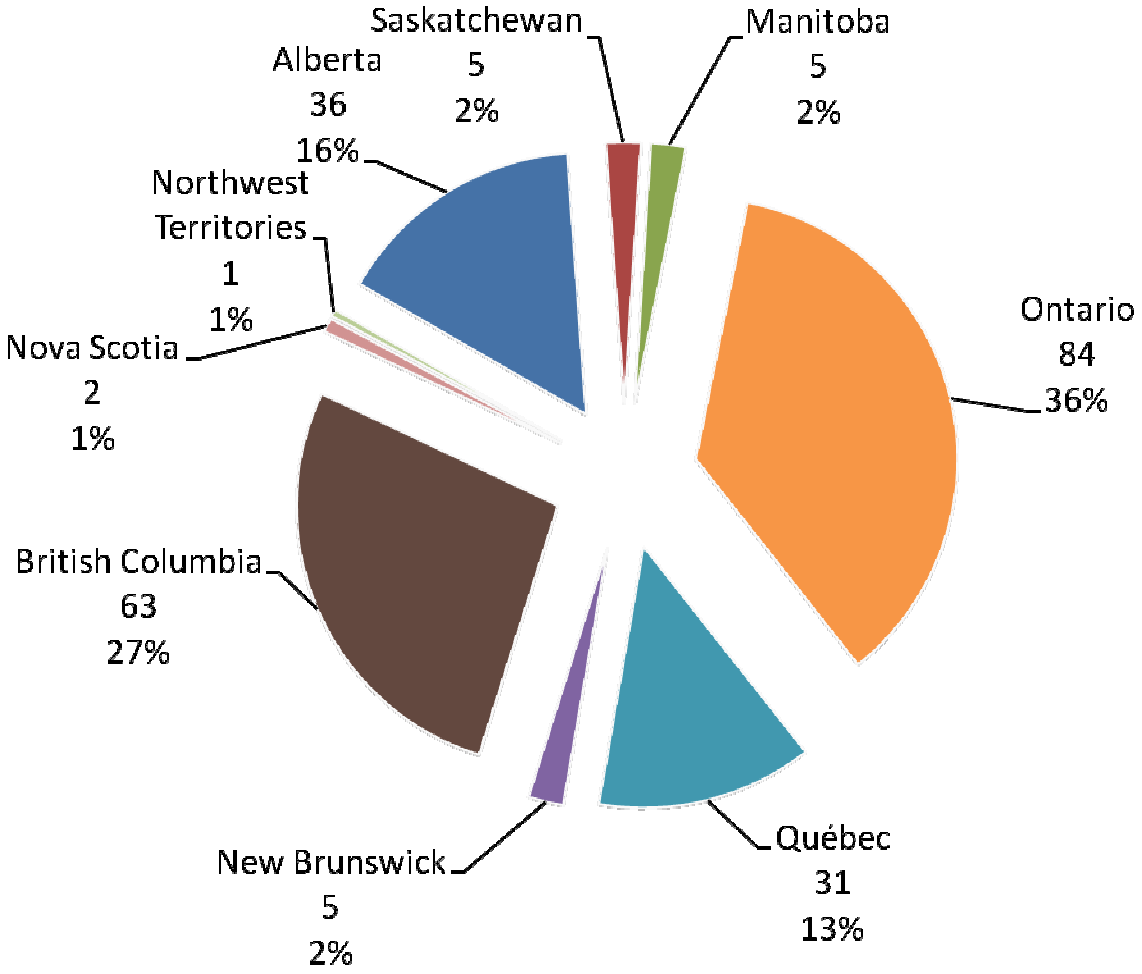
LEED® Certifications by Province

(End of Q1 2010 CaGBC/March 17, 2010 USGBC)



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LEED® rating systems

- LEED for New Construction

  Special guidance for:

  - Multi-unit residential buildings
  - Campus and multiple buildings

- LEED for Core & Shell
  - Spec office buildings
  - Similar to LEED NC

- LEED for Commercial Interiors
  - Commercial office fit-ups

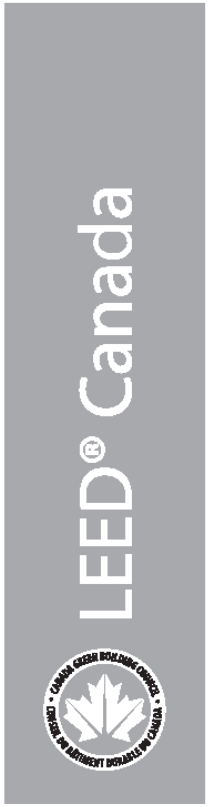
LEED® rating systems

- LEED EBOM
  - Focus on building operations and maintenance
  - Adaptation of USGBC 2009 rating system
  - Similar scoring and weighting as NC 2009

- LEED Homes
  - Very different system, for residential low rise developers
  - Released March 2009

LEED Canada NC 2009

- Summer 2009
- Adaptation of USGBC 2009 rating system
- Adjustment to scoring
  - 110 credits total (not 70)
- Adjustment to weighting
  - Redistribution of points so that a given credit's point value more accurately reflects its potential to either mitigate the negative or promote the positive environmental impacts of a building
- Process improvements
  - Implementing online tools to simplify project submissions
  - Implementing improved, ISO compliant certification process



Future: LEED Canada ND

- 2011
- Neighborhood Development
- Developed in conjunction with USGBC product
- Very different LEED system, including stronger consideration of social impacts and transportation

LEED Myths

- You need actual material receipts to document cost
  - The reality is LEED does not define how you get costs. It needs to be reasonably accurate but does not need to be a receipt.
- LEED requires a full time dedicated site person
  - Why? The contractor really does not have that much additional work.
- The LEED police will get you
  - There are no LEED police. If you follow the rules it will work out. If you make assumptions you take risks
  - "Catch people doing the right thing"
- LEED APs know everything
  - Every person in this room is 16 hours away from being a LEED AP.
  - Some LEED APs took the exam in 2002

LEED Myths

- LEED buildings cost 40% more (or 30, or 20…)
  - Why? Follow the specs and everything will be alright.
  - Many buildings cost the same as a typical one.
  - Some cost marginally more (1 – 5%)
  - What is a "typical" building
- LEED projects require a high contingency
  - Realistically, many LEED buildings do require a slightly higher contingency
  - Base your contingency the way you always do…evaluate the quality of the documents and the risks you are undertaking
- LEED never changes
  - LEED is in a constant state of change
  - CaGBC recently adopted regular cycle for change
  - CIRs (credit interpretation rulings) adjust requirements a bit

LEED Myths

- There are LEED certified materials
  - LEED doesn't certify or approve materials.
  - Material contribute to LEED
- There are LEED certified people
  - LEED accredits people, it does not certify them
- LEEDS
  - One very quick way to show everyone you know little about LEED
- LEED will go away
  - I don't think so
  - Exponential growth, even in the recession

Summary: LEED Products

- There are many of them
- Some are very different than others
- There is confusion in the industry

Green Building RISKS

Disclaimer: The risks presented are intended as an introduction only, and are not provided as an extensive or complete list of risks associated with green buildings. This section contains opinions of the presenter and should not be relied upon as complete or entirely accurate. This section is intended to spark conversation and discussion, enabling attendees to understand some of the implications green buildings might have on their business.

RISK 1: Emerging Materials

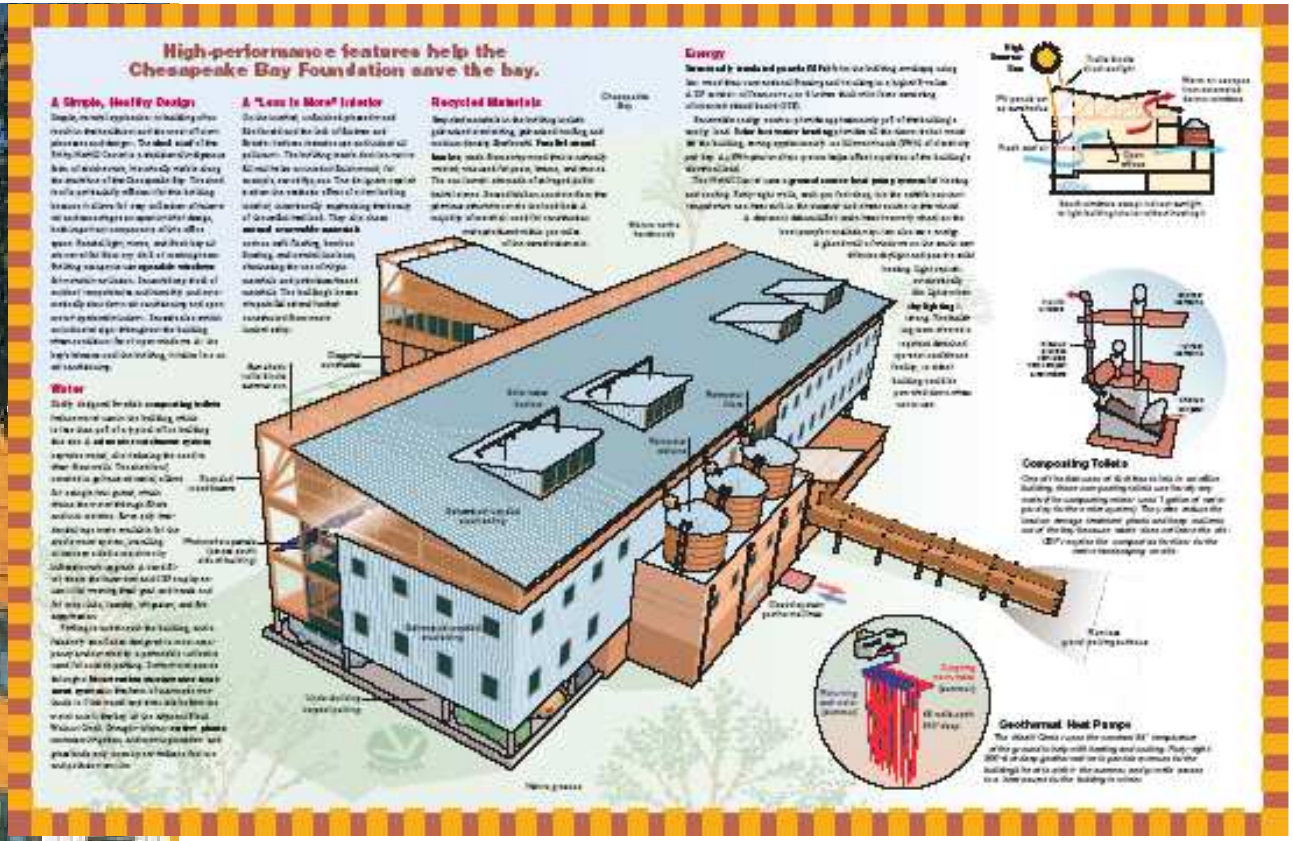
- Green Buildings often promote the use of emerging systems and materials
- New materials are inherently more likely to fail

SOLUTION

Back to Basics: Rely on standard methods to assess reliability of systems and materials. Do not get drawn into hype on new materials and systems.

Green Building Durability

The Chesapeake Bay Foundation's Philip Merrill Environmental Center



"The Importance of Building Envelope Commissioning for Sustainable Structures", Daniel Lemieux & Paul Totten.

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RISK 2: Guarantees

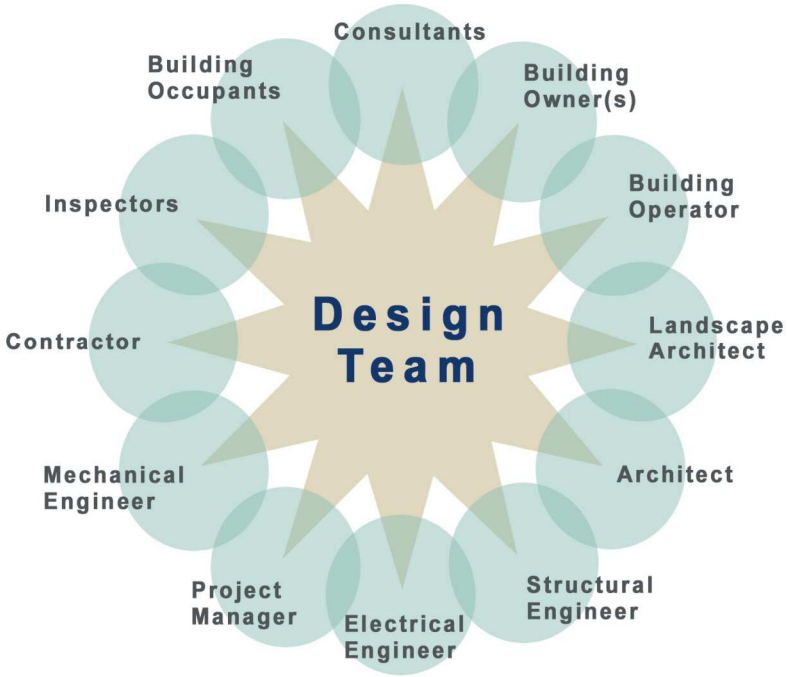
- RFPs often mandate LEED
- Designers often promise that LEED credit will be achieved
- BUT….
  - LEED is not fully in their control!
  - LEED is not a standard!

SOLUTION

1. Developers of RFPs must be educated on the proper way to tender for a green building.
2. Designers must control their risk.

RISK 3: Larger Design Teams

- Integrated Design means more people
- Prime consultant often needs to carry very small and specialized sub consultants



SOLUTION

1. Encourage bundling of services in one firm.
2. Designers must account for additional time to manage subs.

RISK 4: Security

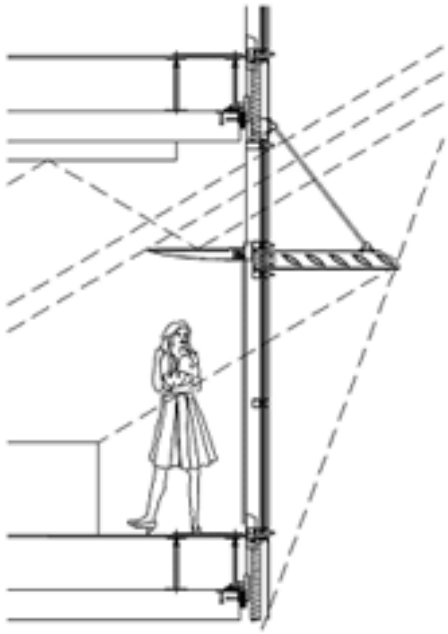
- Green Buildings often promote daylighting and views
- Windows are an obvious security risk, but so are innovative daylighting systems

SOLUTION

Back to Basics: Rely on standard methods to assess security. Understand the implications of your decisions. Do not get drawn into hype on new materials and systems.

RISK 5: Ice and Snow

- Light shelves are not uncommon
- Light shelves project from the building, offering places for ice to accumulate

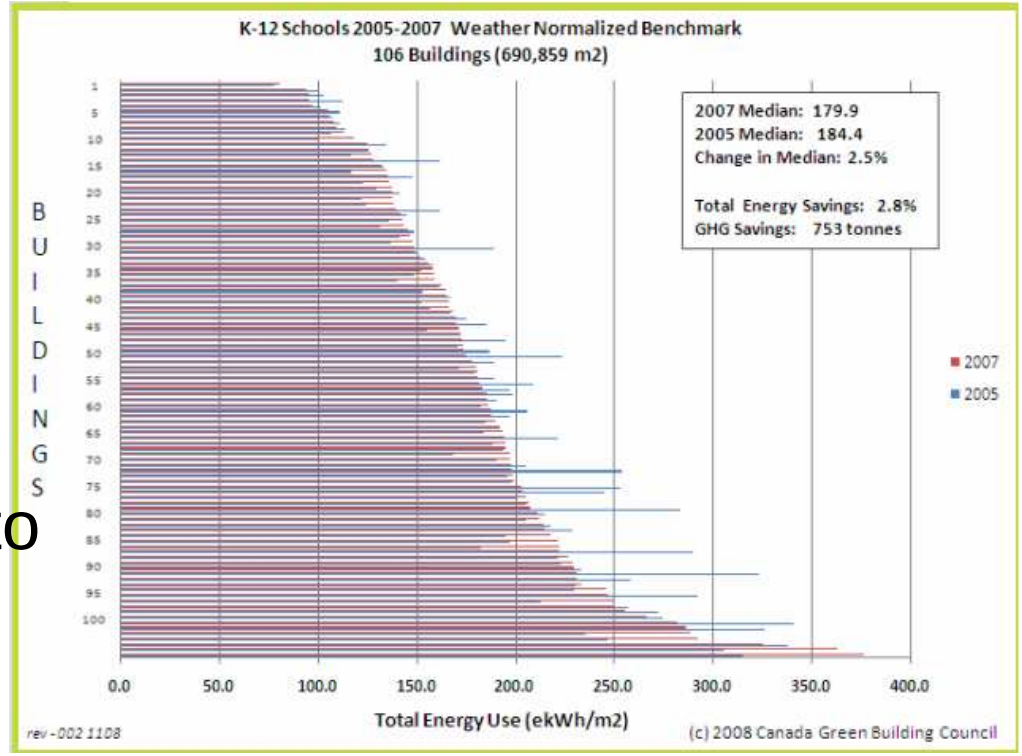


SOLUTION

Back to Basics: Rely on standard methods to assess systems. Understand the implications of your decisions. Do not get drawn into hype on new materials and systems.

RISK 6: Energy use

- Owners may have expectations for low energy use for a green buildings
- Increasingly, more and more energy use data is available, bringing risks to all projects



SOLUTION

1. Design more energy efficient buildings (stop producing crap)
2. Communicate the expected performance of the building.

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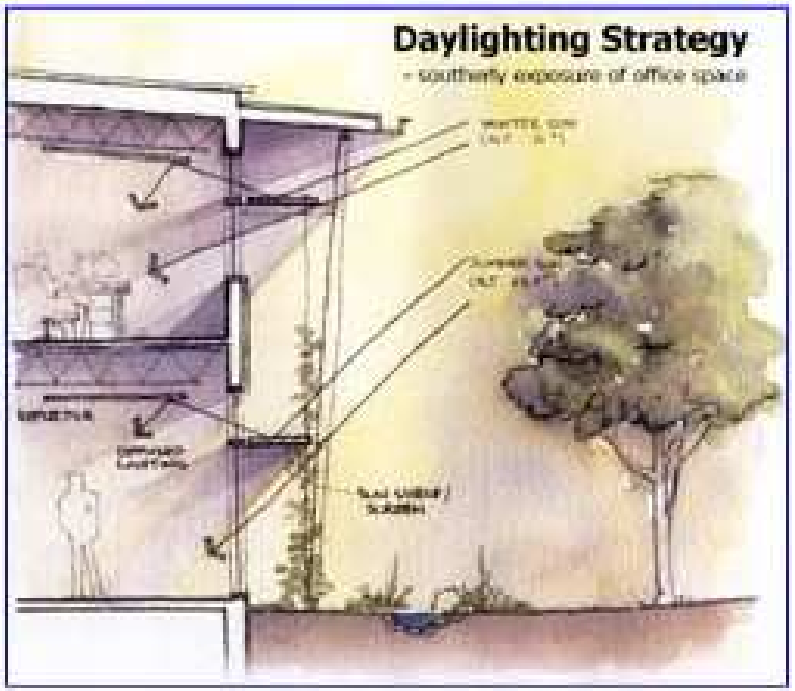
RISK 7: Communication

- Owners often communicate the benefits of their green building
- If claims provide to be false….

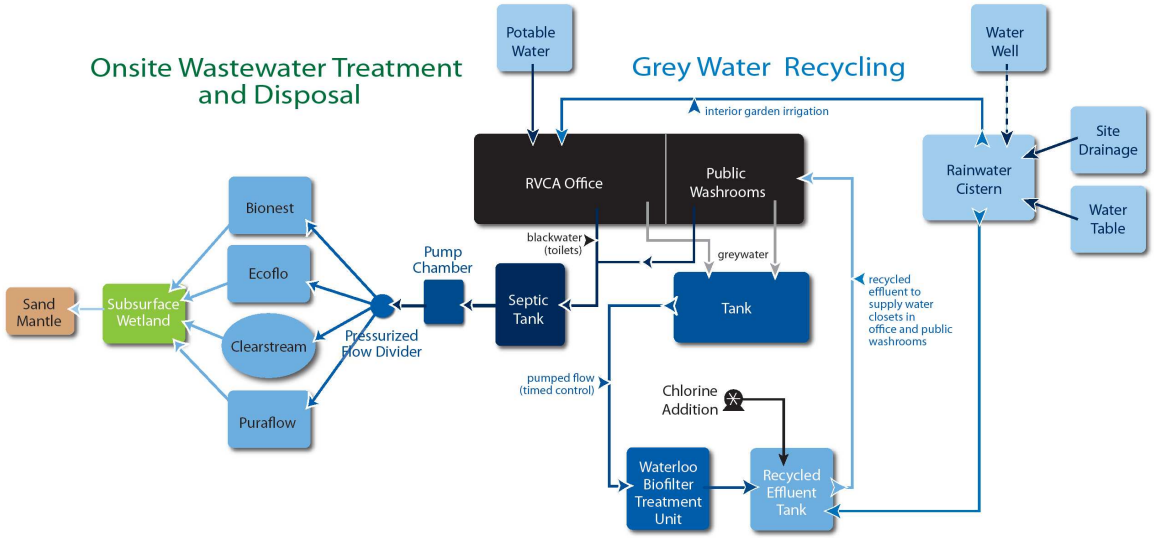


SOLUTION

?????

RISK 8: Complicated Design

- Many green buildings have complicated energy systems, envelopes, water treatment systems, etc.



SOLUTION

Back to Basics: Rely on standard methods to assess systems. Understand the implications of your decisions. Do not get drawn into hype on new materials and systems.

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Other Risks….

- Delays due to material availability
- Delays due to longer design period
- Productivity gains not realized
- Geographical and time variability in materials and services (ex. material recycling, innovative materials)
- Unilateral material substitutions
- Modeling and simulation do not prove to be accurate
- Greenwashing damages reputation

Summary

- Green Buildings and LEED are here to stay
- Green Buildings bring many benefits to society
- Green Buildings can increase risk for designers
- Much of the risk can be mitigated through reasonably conventional engineering methods and analysis
- Some external stakeholder communication is encouraged

The industry does not need barriers, it needs solutions.

Thank You

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