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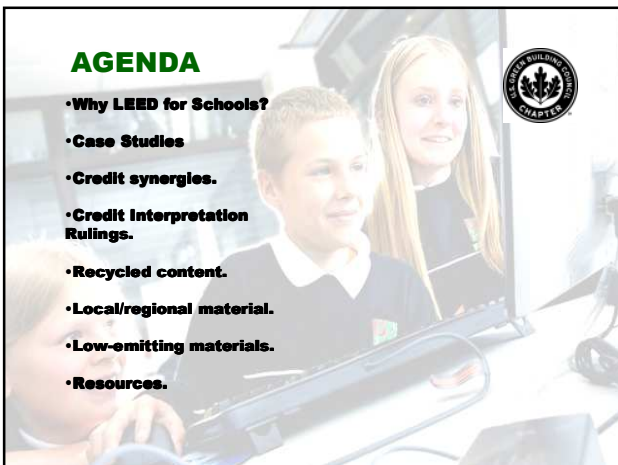
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### Why LEED for Schools?



- **Consensus-based**
- **Transparent**
- **Third-party verification**

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### Why LEED for Schools?



- **K-12 must use LEED for Schools.**
- **Higher education may use either LEED for Schools or LEED-NC.**
- **20% of America goes to school every day - 55 million children and faculty.**
- **More than one quarter of schools are considered substandard or dangerous to occupant health.**
- **Building to code is building the worst building you can legally build.**

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### Why LEED for Schools?



- School buildings:**
- **Largest construction sector in the US.**
  - **Representing \$80 billion in 2006-2008.**
  - **Responsible for 38% carbon dioxide emissions in the US.**

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### Why LEED for Schools?



- 668 schools registered nation-wide.
- 26 schools registered in NYS.
- 85 schools certified nation-wide.
- 1 school certified in NYS.



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### Why LEED for Schools?



A green building is a quality building.

**Environmental benefits:**

- Emissions reductions – Reducing CO2 by 40%.
- Water usage and rainwater run-off strategies.
- Recycling and building material sourcing.



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### Why LEED for Schools?



**Human health benefits:**

17 separate studies all found positive health impacts of 13.5% to 87% improvement.

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## Why LEED for Schools?



### **Economic benefits:**

**Additional initial costs (if any) quickly recovered.**

**Greg Kats, "Greening America's Schools: Costs and Benefits 2006":**

- On average, less than 2% or \$3.00 s.f. additional cost.
- Saves an average school \$100,000 per year.
- Direct savings to the school: \$12 s.f.

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## Why LEED for Schools?



### **Economic benefits:**

**On average, green schools:**

- Use 30% - 50% less energy.
- Save 32% - 40% water usage.
- Reduce solid waste by 74%.



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## Why LEED for Schools?



### **Economic benefits:**

**Savings may be used for:**

- Additional teaching staff
- Computers
- Text Books

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### Why LEED for Schools?

- Productivity benefits
- Lower O&M costs - \$8 s.f. over 20 years in California
- Lower risk management costs – 49 LEED points associated.



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### Why LEED for Schools?

#### Learning benefits:

- Heschong Mahone Daylighting Study – 10% - 28% higher learning rates.
- The Green school as a teaching tool.
- Acoustics.
- Less sick days – 15% drop in absenteeism at Ash Creek Intermediate School.



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### Why LEED for Schools?

#### Teacher/staff recruiting benefits:

- Lower staff turnover
- Less sick days
- A morale booster.



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## Why LEED for Schools?



**"The kids are exhibiting better behavior in this new facility than they did in the schools where they came from."**  
**Principal, Tarkington School of Excellence**  
**Chicago City Schools**

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## Tarkington School of Excellence



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## Background Info



- Chicago Public Schools, SW Chicago, K-8.
- LEED Certified – First in the District.
- Prototype for future Chicago Public Schools.
- Winner 2007 Citation of Merit for Sustainable Design from AIA Chicago.
- 134,165 sf. ft.
- \$23 Million.
- \$171 s.f.
- 1,000 students.



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### More Background Info

- Architect: Warman Olsen Warman.
- 9.82 acre site adjacent to Marquette Park.
- Regional Headquarters for Chicago Park District.
- Construction complete 2005.
- 3-story brick and dimension stone on steel structure.




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### More Background Info

- Built to relieve overcrowding in 2 other schools.
- 92% of students eligible for free lunch.
- Green construction driven by Mayor Daley.
- City-owned building.
- No community input solicited.




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### Sustainable Sites

- White roof and green roof.
- Green Roof Problems:**
  - Watering.
  - Weeding.
  - Children not allowed.
  - Shadows.
  - Frit in windows reduces the view of the green roof.




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### Sustainable Sites

- Bio Swale.
- Water runs off to lagoon in the park – not to City sewer system.
- ¼ mile to 2 bus stops.




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### Water

- 30% reduction in water usage.
- 1.6 gal flush.
- Photo sensors in toilet rooms.

#### Problem:

- 4 Power outages – no flushing or sink water.




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### Energy & Atmosphere

- Radiant Heat: Condensing Boilers – 93% efficient – located on 3<sup>rd</sup> floor.
- Demand control ventilation w/CO2 monitors in fan power box returns.

#### •6 air handlers:

- 3 on east side of bldg,
- 3 on west side of bldg.

#### •Central Air:

- Air cooled chiller w/reciprocating screw.




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## Energy & Atmosphere

### Central Control System Problems:



- Power outages fry the central controls.
- Cold on the first floor.
- Hot on the third floor.



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## Energy & Atmosphere



- Daylight dimming.
- Infrared & Acoustic Sensors.
- Centralized lighting control.
- Frit stripe in windows makes occupants sick.



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## Energy & Atmosphere

- Infrastructure for PV.
- 50% power from renewables – eGreen tags.
- No ozone-depleting refrigerants



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### Materials

- Recycled glass in terrazzo.
- 75% construction waste diverted.
- 20% sourced within 500 miles.
- 10% bldg materials have recycled content.



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### Indoor Environmental Quality

- Some operable windows.
- CO2 monitors in fan power box returns.
- Low emitting materials.



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### Acoustics

- Microphone system in all 7<sup>th</sup> & 8<sup>th</sup> Grade Classrooms.



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### Innovation

- Green curriculum incorporated into science classes.
- Green teaching committee creating documentary.
- Athletic facilities shared w/community after school hours.
- Regional Park District Headquarters located in the building.



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### Principal's Perception

“The kids are exhibiting better behavior in this new facility than they did in the schools where they came from.”



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### Bolingbrook High School



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### Background Info

- Valley View Public Schools (w. suburb).
- Design start 2001 – learning curve project.
  - Complete 2004.
- 3,500 students – growing to 4,100.
- 96 bid packages.




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### More Background Info

- \$98 million, including soft costs.
- \$152 s.f. construction cost.
  - 562,000 s.f.
- 70 acre site – flood plain w/detention area.
- 55 acres available to develop.
- Extensive athletic fields.




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### More Background Info

- 25' drop on the site.
- Former farmland.
- Architect: Wight & Company.
- Referendum required - \$23 mil grant from State.
- No State incentives for LEED.
- LEED was perceived as a “trend”.
- Submitted 36 - Achieved 32 points – not quite silver.




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### Strategies

- Architect created a booklet for the client – showing what each point meant to them.
- Use of wetlands for env. science classes.
- 90% daylighting & views.



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### Acoustics

- VAV boxes in corridors.
- Acoustic panels in classrooms & corridors.



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### Water & Site

- Condensate collected and used as make-up for cooling towers.
- Well used to irrigate athletic fields.
- Landscape not irrigated.
- Bio-swales in parking lot.
- Energy Star roof 95.56% roof area.



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### Lighting

- Dimmers and daylight harvesting.
- Tinted glazing.
- Central control for all lights in all schools in the district.




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### IAQ during Construction

- Filtration media.
- Ductwork ends closed.
- 2-month flush-out.
- Commissioned at end of each phase & at final completion.




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### Low Emitting Materials

- Adhesives.
- Sealants.
- Paints.
- Carpets.
- Composite wood.




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### Recycling & Materials

- 4,708 tons (62.8%) waste diverted from landfills.
- 75.38% recycled content in bldg materials.
- 69.28% regional materials.




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### Accomplishments

- 1<sup>st</sup> LEED Certified School in Illinois.
- 4<sup>th</sup> in N. America.
- 2004 IASB Award of Distinction.
- Many points achieved without “a lot” of add'l cost – ½% added construction cost.




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### Hind-sight

- Future project design fee increase – ½ - 1%.
- Sustainable Site Strategies: Permeable pavers v.s. long pipe runs to storm sewers – similar cost.
- District has hired energy mgmt expert.
- Energy Usage:
  - \$1.21 s.f. elec/gas new bldg
  - \$1.29 s.f. non-LEED district bldgs




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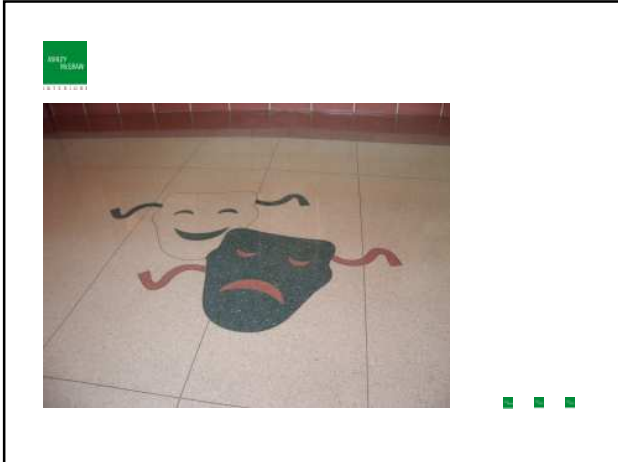
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### Credit Synergies



**Double-dipping:**

- LEED for Schools credits used for LEED-EB.
- FSC Certified Wood & Local/Regional Credits.
- Green school as a teaching tool – innovation credit.




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### Credit Synergies



**Beware!**

- Product contributing toward a credit in one category – may preclude credit in another.

**Example: Rapidly renewable bamboo and formaldehyde content.**




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**Credit Interpretation Rulings (CIRs)**



**Benefit from others questions.**




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**Recycled Content**



**Credits 4.1 (10%) & 4.2 (20%)**

- Post-consumer, plus ½ pre-consumer.
- Based on cost.
- Assembly – determined by weight.
- MEP precluded.
- Furniture – if used – must be used Consistently in MR Credits 3-7.




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**#3 Recycled Content Strategies**



- GC responsible for documentation.
- Products representing the bulk of materials on the project:
  - Steel
  - Concrete – based on mass of cementitious material only.
  - Gypsum Board
  - Acoustical Ceiling Tile




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## Regional Materials



**Credits 5.1 (10%) & 5.2 (20%)**

- Extracted, harvested or recovered and manufactured within 500 miles of project site.
- Based on cost.
- Assembly – determined by weight.
- MEP precluded.
- Furniture – if used – must be used consistently in MR Credits 3-7.



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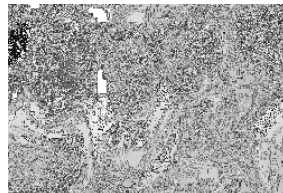
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## Regional Materials Strategies



- GC responsible for documentation.
- Products representing the bulk of materials on the project:
  - Steel
  - Concrete – based on mass of cementitious material only.
  - Gypsum Board
  - Acoustical Ceiling Tile



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## Low Emitting Materials



**4 Credits – 6 Options**

- Adhesives & Sealants
- Paints & Coatings
- Flooring Systems
- Composite Wood & Agrifiber
- Furniture & Furnishings
- Ceiling & Wall Systems



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## Low Emitting Materials Strategies



- All credits: California CHPS Product List
- SCS Indoor Advantage Gold Certified.
- Greenguard for Children & Schools Certified.
- FloorScore Certified.
- CRI Green Label Plus



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## Key Messages



Green schools give our children:

- A healthy indoor environment
- A healthy outdoor environment
- Increased academic achievement
- Increased productivity
- Savings that can be invested in teachers, equipment and books



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## Resources



[www.buildgreenschools.org](http://www.buildgreenschools.org)

[www.greenupstateny.org](http://www.greenupstateny.org)

California Collaborative for High Performance Schools  
Low-Emitting Materials Table

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**Join the Green Schools Campaign**



**The most powerful message is personal.**

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**Thank you!**



**Questions?**

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