

High Performance Schools

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High Performance School Characteristics

◆ Healthy and Productive

- Acoustic, thermal, and visual comfort
- Superior indoor environmental quality (air and natural daylight)

◆ Cost Effective to Operate

- Optimized energy performance and life-cycle cost approach
- Building commissioning

◆ Sustainable Design and Operation

- Efficient use of resources (energy, water, materials)



Benefits of a High Performance School

- ◆ Opportunity to utilize the facility as a teaching tool
- ◆ Better student performance
- ◆ Increased average daily attendance
- ◆ Increased teacher satisfaction and retention
- ◆ Reduced operating costs
- ◆ Reduced liability exposure



North Clackamas High School

“We did not set out to build an energy-efficient school, our goal was to build the best building we could afford for the students and teachers”

**- Bill Dierdorff,
Business Manager
North Clackamas School
District**



Courtesy of BOORA Architects

COST for a High Performance School

- ◆ No extra capital cost if done correctly
- ◆ Soft Costs
 - Energy modeling: \$10 - \$20K
 - Building commissioning: \$0.40 - \$1.00 per square foot
 - Design charrette
 - Design/construction team added cost
- ◆ Grants and tax credits available to help pay for some of these costs

High Performance Schools

- ◆ Newberg
- ◆ Lebanon
- ◆ Central
- ◆ Sisters

- ◆ Lake Oswego
- ◆ Bend-La Pine
- ◆ Corvallis
- ◆ Salem/Keizer
- ◆ The Dalles
- ◆ North Clackamas
- ◆ Eagle Point
- ◆ Central



Facility as a Teaching Tool



Extensive daylighting

Water habitat

Rainwater harvesting

Wind energy

Solar energy



***“This is not just a building...
this is an educational
philosophy”***

- SD staff member



Facility as a Teaching Tool



Visual access to heating equipment



On site waste water treatment

Facility as a Teaching Tool

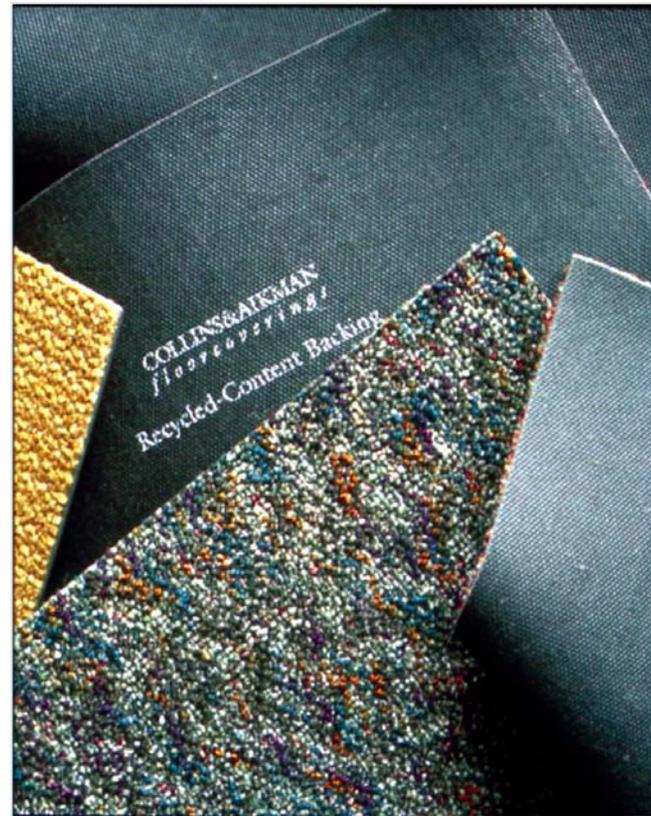
◆ Science and Math

- Solar and wind performance and impact
- Effluent treatment

◆ Material Education

- Recycled
- Local
- Low toxic

◆ Humans can have positive influence on the environment



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Improved Student Performance

- Capistrano: In the year analyzed (1998), students with the most daylight improved 20% more on math and 26% more on reading tests (99% certainty)
- Seattle : Students with the most daylight performed improved 15% more on math and 13% more on reading tests (99% certainty)
- Design counts: diffusing skylight designs showed 20% improvement; direct sun showed 21% decrease**

Daylighting in Schools - The Dalles MS



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Daylighting in Schools - N. Clackamas HS



Daylighting in Schools - The Dalles MS

Classroom
on first
floor



Hallway on
first floor

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Daylighting in Schools - The Dalles MS



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Classroom Daylighting - Ash Creek MS



View is looking from within the classroom into the hall. The daylighting from the hall provides an inviting atmosphere. Besides the daylight from the light shelves and the hallway, the light tube (circle of light above clock) in the classroom provides additional light. T5s are in the indirect light fixtures.

Increased Average Daily Attendance

◆ Durant School District (North Carolina)

- Two nearly identical schools
- One with daylighting, one traditional
- ➔ 3% increase in average daily attendance in daylight school



Increased teacher satisfaction and retention

◆ Walker Elementary School

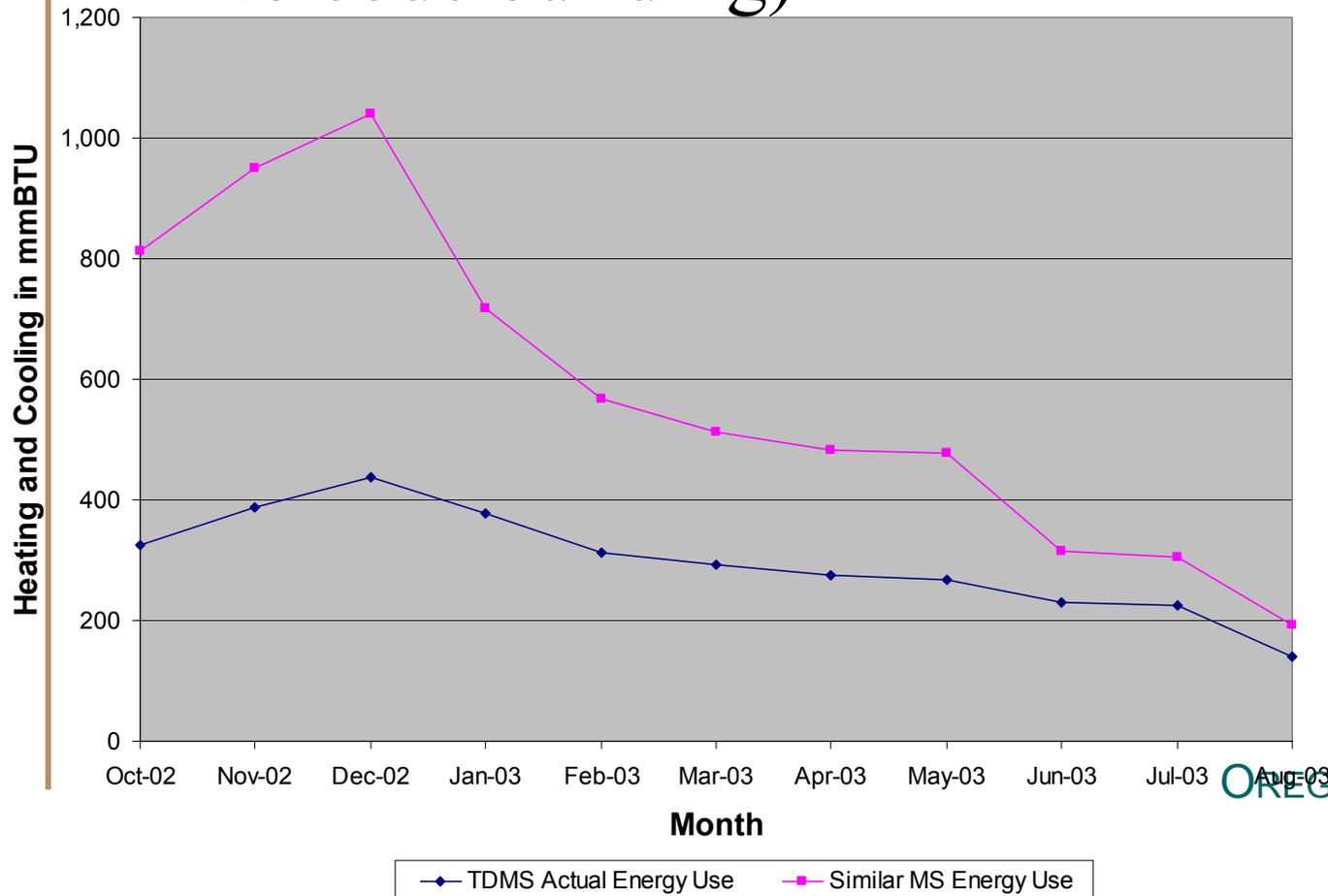
- Two nearly identical schools
- One with daylighting, one traditional
- ➔ All teachers want to be moved to daylight school



Reduced Operating Costs

◆ The Dalles

- 46% reduction in energy costs (compared to code building)



Mechanical System

Three 97 percent efficient boilers provide the heat for the entire school.



The Dalles Middle School



Ash Creek Intermediate School

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Reduced Operating Costs

◆ Reduced maintenance costs

- Reduced water usage (landscaping)
- Less equipment failure (e.g., lights last longer)
- Less cleaning (e.g. cement floors)

The ducts in TDMS gym are made from cloth. The ducts can be cleaned when the school district notices that they are dirty (unlike metal ducts). Small perforations allow for uniform distribution of air.



Reduced Liability Exposure

- ◆ School District proactive in (Indoor Air Quality) IAQ
- ◆ Potential reduction in workers' comp claims
- ◆ Reduced medical problems (e.g., asthma acquired during childhood)



How to get a High Performance School

- ◆ Designed using team approach
- ◆ Designed with a different goal than a traditional building design
- ◆ LEED certification (optional)
 - <http://www.usgbc.org>
- ◆ Push desires on architects, engineers, and all other designers and contractors



How to get a High Performance School

- ◆ Start as early as possible (before design, even before thinking of bond)
- ◆ Success depends on champion within School District
 - Superintendents or
 - Business Managers or
 - Facilities Managers
- ◆ Educate community on benefits of high performance school

