



Fall 2009

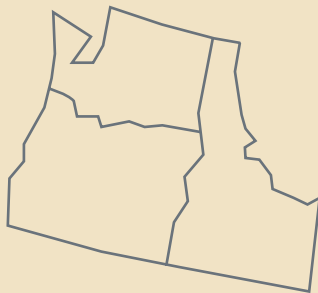
IAQ News

Indoor Air Quality in Northwest Schools



Our schools play a critical role in our society as we work toward creating a greener, more sustainable future. That's why I want our schools to do everything they can to prepare students for the challenges they will face...

Susan Castillo
Oregon Superintendent of
Public Instruction



An electronic newsletter exclusively for Northwest schools

IAQ Assistance Still Needed in Northwest

*By Rich Prill, Building Science & Indoor Air Quality Specialist
Washington State University Extension Energy Program, Spokane*

The Washington State University Extension Energy Program's "School IAQ Program" was fortunate to have earned another Region 10 Environmental Protection Agency (EPA) grant last year. The program provided workshops, the quarterly *IAQ News*, on-site walk-through assessments, and equipment loans.

One might think that after more than a decade of workshops, dozens of newsletters, and hundreds of walk-through assessments in schools across the Northwest, the need for further IAQ assistance would not be justified. And, nationally, Northwest schools have earned the reputation as leaders in IAQ, energy efficiency, and sustainability. However, findings from 44 schools during the 2008-2009 school year suggest that schools still need some IAQ help.

To be fair, school operations & maintenance (O&M) and custodial staff have been severely reduced over the years due to budget constraints. Rather than preventive maintenance and proactive attention to providing effective learning environments, school staff generally struggle to just accomplish emergency maintenance and minimal cleaning. Unfortunately, this "breakdown" maintenance approach has been shown over and over to result in false economy and contributes not only to O&M staff burn-out but also impacts student and staff performance and attendance.

The following charts (see pages 7 and 8) illustrate that further assistance and awareness are still needed here in the Northwest. Realistically most schools aren't going to be able to afford a deluxe "fortune 500" O&M and custodial program, but paying necessary and timely attention to the basics will go a long way toward preventing small issues from turning into expensive and long-term problems.

See **IAQ Assistance** on page 7



Table of Contents

Someone to Tackle Resource Conservation 2

Renovating an Occupied School 3

Infrared is HOT! 4

First “Sustainability Education Week” Observed 5

Annual Indoor Air Quality Tools for Schools (IAQ TFS) National Symposium Set 5

Someone to Tackle Resource Conservation

By Karen Janowitz, WSU Extension Energy Program

Resource conservation management is a tool that can help school districts reduce the use of gas, electricity, water, waste disposal, and transportation fuel, thereby reducing utility costs. At the same time, this program can contribute to healthy indoor air quality, a comfortable environment, and promote environmental stewardship in the school and community.

The resource conservation manager (RCM) coordinates the effort through careful tracking and analysis of resources and attention to efficient building operation. The RCM must be very organized, and emphasize communication with everyone from custodial staff and facility managers to school superintendent, faculty and students.

Most RCM programs achieve around 10 percent savings on utility bills after the first year, depending on number of buildings, level of management commitment, and conservation efforts previously introduced. Savings often cover the cost of the RCM position, contributing to cost-effectiveness.

In order to conserve resources such as energy and water, you need to first know how much is being used (or how much waste is made), where it’s being used, and how it’s being used. Just as in financial management, resources can only be managed if you know how much you have at the beginning and at regular intervals, and track usage. This is energy accounting.

What does a Resource Conservation Manager do?

The job of a RCM is multi-faceted.

At the minimum, a RCM must:

- Make a baseline accounting of current utility usage and expenditures (there is software for this)
- Survey everyone who uses or impacts the use of the resources, and document standard operation and maintenance procedures.
- Go over utility bills in detail. There might be errors due to faulty meters, abnormal use patterns, or particularly



See **RCM** on page 6

© 2009 Washington State University Extension Energy Program.

This publication contains material written and produced for public distribution. You may reprint this written material, provided you do not use it to endorse a commercial product. Please reference by title and credit the Washington State University Extension Energy Program.

WSUEEP-09-038 • December 2009

Renovating an Occupied School

By Dave Blake, Northwest Clean Air Agency

No one renovates an occupied school unless all reasonable alternatives have been exhausted. Beyond the obvious issue of construction noise and activities disturbing classes, construction-contaminated air presents a serious challenge that needs to be addressed head on – and from the start – by school district and contractor representatives.

The goal is clear and simple: let there be no air exchange or contaminant migration from the construction zone to the occupied school. Achieving that goal takes careful planning and constant vigilance by designated responsible parties. Failure to achieve that goal will lead staff and parents to an inevitable painful conclusion: the district is putting their construction schedule ahead of student/staff health and safety. So, as they said in Apollo 13, “failure is not an option.”

Don't Count on Plastic Sheeting

Major renovation work can be isolated from student-occupied zones with “hard walls” constructed of plywood, studs, plastic and sealants. A pressure barrier can be created to prevent air from venting into the occupied zone, either by creating negative pressure on the construction side, or positive pressure on the occupied side, or both. In either case, the pressure regime means air can only go from clean to dirty and then outside. Chemical smoke puffers



can be used to check air flow direction at “hard wall” locations, but differential pressure gauges or manometers with data logging can be set up to document the pressure gradient protecting the student-occupied zone.

I am making this sound easier than it is. Large construction fans and/or 2000 cfm HEPA-filtered fan units can suck air out of construction zones and blast the bad air outside... hopefully away from humans and windows open to the student-occupied zone. Similarly, fans can be used to push fresh air into occupied zones to create positive pressure, assuming ambient temperatures and outdoor air quality are forgiving.

All parties need to agree up front which entity is responsible, and which individual within that entity will keep a reliable handle 24/7 on the pressure gradient enforcement. This is much easier than dealing with the alternative...unanswerable questions about the health effects of a child's exposure to unmeasured levels of welding fumes, concrete dust, plain old accumulated dirt, and silt. You want to be able to assert that there was no exposure, period! And devote the time and energy it takes to ensure that will be the case. 🚧

Infrared is HOT!

The price of infrared thermography (IR) equipment has been steadily falling over the last few years. Once reserved for specialty applications, consultants, and large organizations -- now IR equipment is suddenly affordable for many of us. However, using IR equipment takes more than pressing the “On” button and surveying your facility. Training is essential in order to make accurate assessments and useful recommendations based on interpretation of the images.

To meet the needs of school staff, the Washington State University Extension Energy Program is sponsoring an infrared training series. The cost of these classes is significantly reduced through this sponsorship, but class size is limited to 16 students on a first-come/first-served basis. Estimated costs should be no more than \$450 for either of the 2-day courses or \$800 for all 4-days to get Level 1 Certified. Watch the WSU website (www.energy.wsu.edu) or call for final pricing.

A two-day “Residential & Weatherization” course is followed by a two-day “School & Commercial Buildings” course, and will be held in both Olympia and Spokane. Each two-day course covers the basics of thermography and equipment use. Students who successfully complete both courses (4-days) are eligible for Level 1 Certification, which is recognized by both the Building Performance Institute (BPI) and the Residential Energy Services Network (Resnet). **Important Note:** Only the “Residential & Weatherization” course provides basics; you cannot take the “School & Commercial Buildings” course without taking the “Residential” course first. The second course builds on the first course, so students can take just the first course, but not just take the second one. Completing *both* courses qualifies for Level 1 Certification.

Olympia Schedule

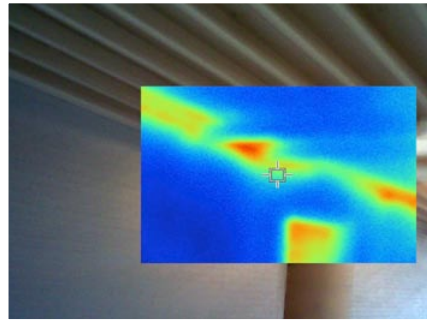
- Tuesday-Wednesday, February 9-10, 2010:
Residential & Weatherization
- Thursday-Friday, February 11-12, 2010:
Schools & Commercial Buildings

Spokane Schedule

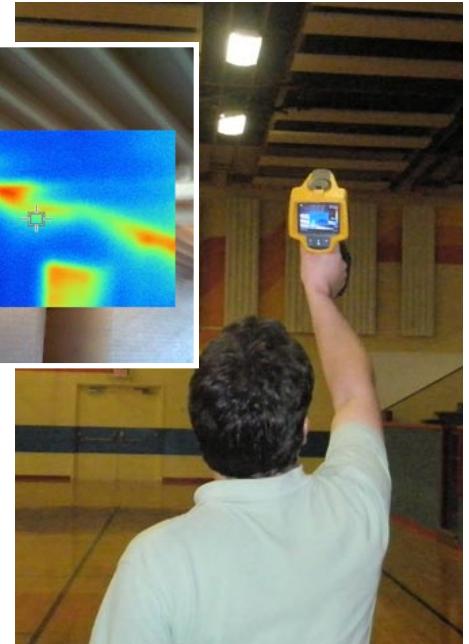
- Monday-Tuesday, February 15-16, 2010:
Residential & Weatherization
- Wednesday-Thursday, February 17-18, 2010:
Schools & Commercial Buildings

Instructors

The training is presented by The Snell Group (TSG), national leader in infrared training. TSG is not affiliated with any equipment manufacturer or supplier.



Infrared thermography equipment at work: the blue is cold and the red/yellow is warm.



Scope

The purpose of this training is to provide hands-on applications instruction in the use of thermographic imaging equipment and interpretation. This training will focus on the applications relevant to the inspection needs of the attendees, especially inspections of building systems, approaches to production and process-related problems, and a general background in solving thermal problems.

The participants, upon completion of the training, will have an understanding of heat transfer concepts, will know how to best utilize imaging equipment, and will be better able to employ the equipment to perform surveys. This will enable them to more fully incorporate this inspection method in existing programs to conduct audits, diagnose problems, make recommendations, reduce unscheduled downtime, improve system performance and reduce maintenance costs.

Format

The workshops will consist of classroom lectures, group discussions and demonstrations. Materials prepared especially for instruction in maintenance thermography will be used. Hands-on activities are emphasized so that participants use the equipment during a large portion of the training. Comprehensive training manuals, for use during and after the course, are included for each participant.

Registration

To register, or to get more details, contact Marla Hacklander at the WSU Extension Energy Program:

Phone: 509-477-6703

Email: hacklanderm@energy.wsu.edu

FAX: 509-477-6709 📠

First “Sustainability Education Week” Observed

Sustainability can mean a lot of different things to people. For some it’s simply living within one’s means on a day-to-day basis. For others it’s living in a manner that looks forward seven generations. For schools it often encompasses energy use, water use, recycling, waste management, transportation efficiency, and incorporating sustainable values into the culture of the school. Making students aware of what they can do to reduce their impact in the planet is a goal of sustainable education.

The first National Sustainability Education Week was observed November 9-13, 2009.

Washington Governor Christine Gregoire and Oregon Governor Ted Kulongoski joined several other governors in issuing a proclamation to encourage Washingtonians and Oregonians to observe the week. Susan Castillo, Oregon’s Superintendent of Public Instruction, echoed support for the Governor’s proclamation:

... Our schools play a critical role in our society as we work toward creating a greener, more sustainable future. That’s why I want our schools to do everything they can to prepare students for the challenges they will face and to nurture their commitment and creativity as they grow up to become the stewards of our planet. ...

Oregon Resource

Sustainable Oregon Schools Initiative:
www.sustainableschools.org

Washington Resource

Education for Environment and Sustainability:
www.k12.wa.us/curriculumInstruct/EnvironmentSustainability/default.aspx

A National Resource

Another resource is the U.S. Partnership for Education for Sustainable Development’s K-12 and Teacher Education Sector Team. This team encourages participation in sustainability learning opportunities throughout the school year. Explore the many resources available from their website: www.uspartnership.org/main/show_passage/33. 🚗



Annual Indoor Air Quality Tools for Schools (IAQ Tfs) National Symposium Set

Organizer: U.S. Environmental Protection Agency (EPA)

Date: January 14-16, 2010

Where: Washington, DC

The U.S. Environmental Protection Agency (EPA) hosts its annual Indoor Air Quality Tools for Schools (IAQ Tfs) National Symposium in Washington, DC, to bring together past, present, and future leaders in protecting and improving IAQ in our nation's schools. The IAQ Tfs Program is a nationwide initiative to help school officials assess, resolve, and prevent IAQ problems, and to reduce exposure to asthma triggers in school facilities. While school officials, administrators, facilities and operations personnel, teachers, parents, and students traditionally attend, the Symposium is open to anyone with an interest in IAQ in schools.

More information is at
www.iaqsymposium.com/. 🚗

RCM

Continued from page 2

- high water usage in one building which may lead to discovery of a leak. These are the easy fixes.
- Develop an action (implementation) plan. The plan may identify changes for both people (changing habits) and mechanical systems (fixing problems, improving efficiency, making capital improvements).
 - Get approval for the plan from management, building operators and others – having support from all levels of the institution is crucial.
 - Give trainings and presentations on how to achieve the action plan's goals, and why it's important. This includes everyone from facility managers, maintenance crews, and custodial staff to teachers, administration, staff and students.
 - Track changes in consumption and costs. Adjust implementation plans based on data accordingly.
 - Provide reports and presentations on the effectiveness of the program.
 - Give recognition and awards to encourage continued involvement.

Schools have the added advantage of engaging students and teachers to help develop an implementation plan. Taking ownership tends to improve carrying out

the plan, especially for changing behavior amongst students.

RCM Exchange

The Resource Conservation Program at Washington State University Extension Energy Program provides a wealth of information for those working in the RCM field, their managers and those interested in pursuing a career as a RCM. Find the RCM Exchange (RCMx) website at www.energy.wsu.edu/rcmx/

The website features steps for implementing a successful RCM program. Documents and tools on the website include:

- Fundamentals of energy resource billing
- Tips for effective communication
- Resource accounting forms
- Checklists for energy audits and facility surveys
- Sample maintenance awards

There are also profiles of people working as RCMs and sample RCM job announcements.

Who can become a RCM?

Generally, people with experience in facilities management, environmental program management, or resource accounting have a good foundation to become a RCM. Qualifications often cited in job announcements for RCMs include:

- Bachelor's degree in business, education, environmental science, facilities management, or engineering
- Two years experience managing programs, or

- facilities management
- Ability to carry out detailed data analysis
- Excellent written and verbal communication skills
- Creative problem-solving skills
- Good customer service
- Understanding of finance, accounting, or utility finance principles
- Understanding of systems such as HVAC, lighting, electrical, mechanical

Interested in becoming a RCM?

There are a few training and certificate programs to gain the type of experience useful for a RCM position. In Washington State there is Edmonds Community College (www.edcc.edu/energy), and Cascadia Community College in Bothell (www.cascadia.edu/programs/professional_technical_certificates/energy_management_specialist.aspx). In Oregon, check out Lane Community College (www.lanec.edu/collegecatalog/documents/CTEnergygmttech.pdf).

Other courses include Building Operator Certification (www.theboc.info/) and an on-line self study professional training course with the Association of Energy Engineers (www.aeecenter.org/training/).

The EnergyExperts.org database contains lists of educational programs, as well as an events calendar and employment

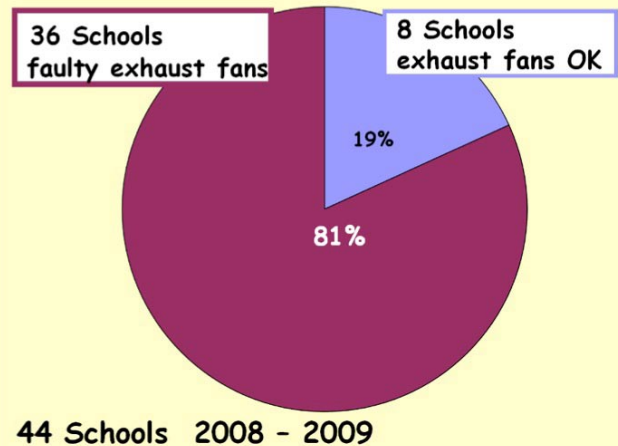
See **RCM** on page 8

IAQ Assistance

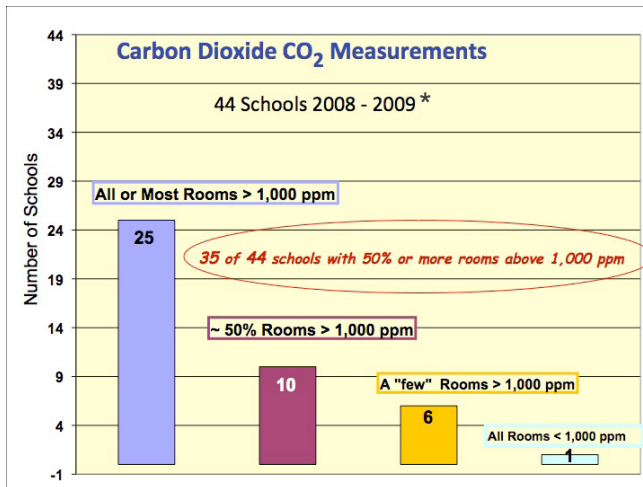
Continued from page 1

Findings during the 2008-2009 IAQ walk-through program in 44 northwest schools

- Faulty exhaust fans
- Incorrect air flow direction
- Molds & moldy/musty odors
- Inadequate fresh air ventilation
- Particles (carpets & vacuum exhaust)
- VOCs (“air fresheners”, markers, etc.)
- Combustion products
- Animals, furniture, rugs, ozone generators
- Chemicals

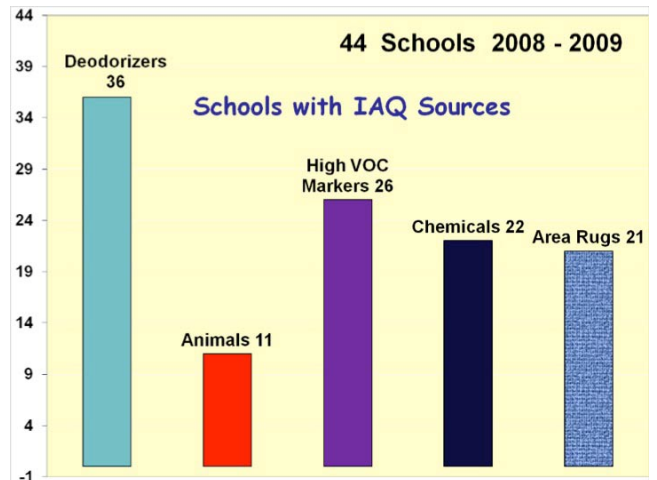


Experience has shown that exhaust fans are often either turned off, failed, over-powered by supply air delivery, or weak or undersized. Using chemical tracer smoke, exhaust fans can be easily and routinely checked to ensure they are doing the job intended. Some exhaust fans are more critical than others of course – chemical storage, zones with asbestos, science labs, etc. – these need to be monitored routinely.



Fresh air ventilation is estimated using Carbon Dioxide as an indicator. Carbon Dioxide concentrations above about a 1,000 ppm suggests less than the recommended 15 cubic feet per minute fresh air ventilation rate. Measurements in hundreds of classrooms during the 2008-2009 school year in 44 schools revealed only one school with all classrooms below the 1,000 ppm recommended air exchange rate. About 80% of schools had CO₂ levels above the 1,000 ppm threshold in over half of the classrooms tested. Clearly NW schools should be monitoring and adjusting ventilation rates on a more frequent basis. Recent research in Washington and Idaho elementary schools showed a 20% increase in student absenteeism for every 1,000 ppm increase.

*Note: Two of the 44 schools had insufficient data for CO₂ reporting.

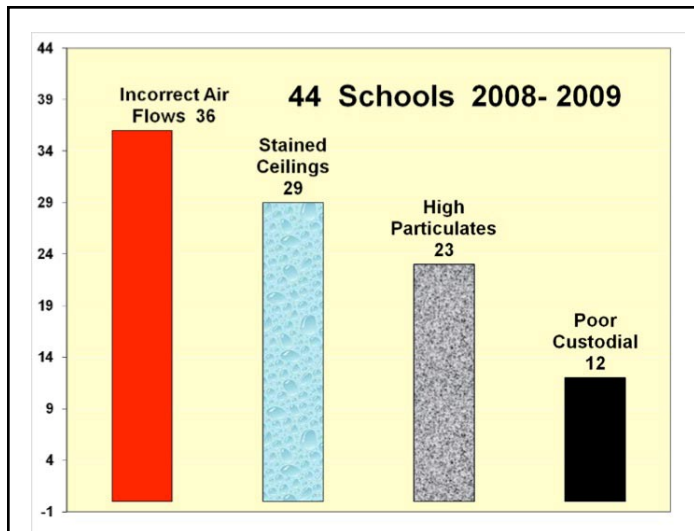


These IAQ sources are asthma and allergy triggers. So-called deodorizers may smell “nice” to the individual that brings them into the school, but these are essentially chemical emitters and simply mask other odors. Rather than add to the chemical and odor mix, use proper inspection, cleaning, and ventilation to take care of any odors or distracting fragrances. Masking odors is not a solution – it’s a piling-on of chemicals.

See **IAQ Assistance** on page 8

IAQ Assistance

Continued from page 7



These findings show that the majority of schools are not tracking air flow directions in critical locations. Incorrect air flow direction creates a potential exposure to asthma and allergy triggers, and indicates lack of attention and/or poor operations and maintenance practices. Stained ceiling tiles may pose no threat to health or productivity, but send the wrong signal that moisture and molds may be present. Poor custodial practices or deficient cleaning resources also send the wrong signal to building occupants as well as to the parents and the community.

Every school should try to focus on these five basic elements of school IAQ:

- Dry
- Clean
- Comfortable
- Pollutants controlled
- Adequate ventilation

These elements need to be addressed in practical terms based on each school's individual challenges and resources, and documented in a concise IAQ Program.

The EPA's "Tools for Schools" program contains a wealth of excellent information to help schools choose IAQ program essentials.

- Tools for Schools program: www.epa.gov/iaq/schools/
- Action Kit: www.epa.gov/iaq/schools/actionkit.html

The WSU Extension Energy Program has developed **Indoor Air Quality Implementation: 3 Easy Steps:**

www.energy.wsu.edu/documents/building/iaq/schools/3step_iaq_program.pdf

The IAQ program essentials are in a "menu" format, making it easy for schools to adopt specific IAQ elements for their own custom program. 📄



A quarterly electronic newsletter exclusively for Northwest schools.

Please circulate this subscription opportunity throughout the Northwest to those who may be interested.

There are two ways to subscribe:

- 1) To view *IAQ News*, click here: www.energy.wsu.edu/projects/building/iaq_nl.cfm
The newsletter contains a link for subscription information.
- 2) Or, send a blank email message to: subscribe-iaq@listserv.energy.wsu.edu

You will receive a confirmation message. When you reply to that message you will be subscribed and will receive all future postings. You can easily unsubscribe at any time.

This broadcast email list not only provides automatic delivery of the quarterly *IAQ News*, but includes announcements about news of interest, training events, grant opportunities, and other information useful to school districts, agencies, and stakeholders involved in school IAQ and operations and maintenance.

IAQ News is an opportunity for all interested parties to communicate, and add to the collective wisdom.

RCM

Continued from page 6

opportunities that are searchable by state or region, www.energyexperts.org/TrainingEducationandEmployment.aspx.

With a resource conservation manager working full-time or part-time at your school district, you will feel the difference in both your budget and comfort level.

Want to know more?

Contact Karen Janowitz, WSU Extension Energy Program, at janowitzk@energy.wsu.edu or 360-956-2096 for more information. 📄