

Southwest Energy Efficiency Project and the Western Cooling Efficiency Center

WORKSHOP ON MODERN EVAPORATIVE COOLING TECHNOLOGIES

July 10th, 2007, The Hotel Boulderado
Boulder, Colorado

Overview

Evaporative cooling systems are ideally suited to the hot dry climate that predominates in much of the Western U.S. When properly installed and maintained, evaporative coolers use about one-fourth (or less) the electricity of conventional central air conditioners and cost about one-third to operate.¹ Modern evaporative coolers use less energy, less water, and require less maintenance than traditional evaporative cooling systems. Because of their superior energy performance, properly installed and maintained evaporative cooling systems can play an important role in utility DSM programs aimed at reducing both regular and peak electricity demand, particularly during the hot summer months when cooling is most needed.

Evaporative coolers also offer a number of other benefits to public health and the environment. They can help improve indoor air quality by frequently exchanging air from the outside and maintaining higher humidity levels than conventional air conditioning. Evaporative cooling systems do not use refrigerants (e.g., CFCs or HCFCs), which can damage the ozone layer or lead to increased concentrations of greenhouse gases in the atmosphere if released.

Despite their significant energy cost savings and related benefits, advanced evaporative coolers have captured only a small share of the air conditioning market in the Southwest. Barriers to advanced evaporative cooling include builder and consumer preferences for conventional air conditioning systems, concerns about the capabilities of evaporative cooling to perform well under a variety of climate conditions, and lack of inclusion of evaporative cooling technology in energy efficiency programs, such as federal tax credits or utility incentives (which may only offer incentives to central A/C systems only). The workshop will explore these and other barriers, and identify specific strategies and action steps needed to overcome them.

Workshop Goals and Objectives

The goal of the workshop is to identify utility-sponsored programs, incentives, research and demonstration efforts, and cooperative activities that can help advance evaporative cooling technologies in the Western U.S. The workshop will review existing and proposed utility incentives

Modern Evaporative Cooling Technologies

Recent advances in evaporative cooling technology have improved the energy efficiency and performance of evaporative cooling systems, which are now available for residential, commercial and industrial applications.

- “Indirect” evaporative coolers take advantage of evaporative cooling effects, but cool without raising indoor humidity.
- Indirect-direct evaporative coolers (IDEC) add a second stage of evaporative cooling before the conditioned air enters the dwelling to further lower the temperature of the incoming air.
- Indirect/DX-compressor combinations are often used in larger commercial-scale applications, sometimes also coupled with a direct cooling phase.
- Evaporative cooling systems are capable of being supplied (all or in part) by on-site PV systems, making them compatible with renewable energy applications, such as zero-energy homes.

Sources:
SWEEP 2004 and New Buildings Institute, 2006

¹ SWEEP. 2004. Evaporative Cooling Policy and Program Options: Promising Peak Shaving in a Growing Southwest.

http://www.swenergy.org/pubs/Evaporative_Cooling_Policy_Options.pdf.

New Buildings Institute. 2006. Market Assessment of Evaporative Technologies. <http://www.newbuildings.org/mechanical.htm>

and programs for advanced evaporative cooling, and identify the elements of an implementation strategy for advancing the use of evaporative cooling in the Southwest.

The objectives of the workshop are to:

- Identify opportunities and strategies to advance the use of advanced evaporative cooling in new building design and construction, and retrofits (or additions to) existing evaporative cooling systems in residential and commercial/industrial buildings.
- Identify the elements of an evaporative cooling implementation strategy for the Southwest, including coordination across the building industry, utility DSM programs, and state and local policies and building codes.
- Determine potential sites for demonstration or pilot projects to showcase advanced evaporative cooling technologies.
- Identify new areas for collaboration between and among private companies, utilities, state energy offices, research institutions, and public interest groups.

Target Audiences

- Utilities serving the Southwest (Arizona, California, Colorado, New Mexico, Nevada, Utah and Wyoming)
- State energy offices, weatherization assistance programs, and public housing agencies
- Municipal utilities and local governments
- Manufacturers of advanced evaporative cooling equipment
- Builders interested in learning about the role of evaporative cooling as part of energy efficient building design approaches for hot dry climate regions
- Energy efficiency proponents

Workshop Sponsors

The workshop is sponsored by Xcel Energy and the Sacramento Municipal Utility District (SMUD).

For More Information

To learn more evaporative cooling technologies and policy options, contact SWEEP or the WCEC:

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At the workshop, participants will:

- Learn about recent advances in evaporative cooling technologies and results of recent field demonstration projects.
- Discuss barriers to advanced evaporative cooling technologies.
- Develop a 'roadmap' for advancing evaporative cooling technologies through state policies and utility programs, including: tax credits, research and demonstration, utility incentives, and educational campaigns targeted at builders, policymakers and consumers.
- Determine next steps for advancing modern evaporative cooling technologies, including opportunities for collaboration, information sharing, and new program development.