Coffee Break Training - Fire Protection Series

Building Construction: Solar Energy Systems

No. FP-2009-39 September 29, 2009

Learning Objective: *The student shall be able to identify the two main types of solar energy collection systems in general use, shall understand that there are areas of concern for first responders, and will know where to go to get additional information.*

Every single day our sun projects enough solar energy onto the surface of the earth to supply all the world's energy needs for 4 to 5 years! This enormous supply of energy remains virtually untapped by the earth's inhabitants, but is changing rapidly. In a world hungry for energy, solar energy collection is happening now at locations near you, and it is going to increase. Fire officers, firefighters, inspectors, plan reviewers, and code officials need to know about these systems and the potential hazards that they may pose.

Two types of solar energy systems are most common: water heating systems and photovoltaic (PV) systems.

Water heating systems are used to heat water for domestic use (hot tap water), heating, and recreational use (pool heating). Water heating systems typically have much smaller solar panels than those used in PV systems.

Photo courtesy California State Fire Marshals Office. This rooftop is equipped with both photovoltaic (upper) and water heating solar panels.

PV systems convert the sun's rays into electricity, and are used in a wide range of applications where electricity is needed. Some PV systems have batteries to store electricity that they generate for later use; other systems (i.e., grid-tied) feed unused electricity back into the electric grid.

The greatest danger facing emergency responders operating around solar energy collection systems is the lack of knowledge needed to operate safely around these systems. Potential hazards associated with solar energy systems are summarized below:

Potential Hazards from Solar Energy Collection Systems

Water Heating Systems	Photovoltaic Systems
• tripping hazards and/or falls for firefighters operating on the roof	• tripping hazards and/or falls for firefighters operating on the roof
• earlier roof collapse due to extra weight	• earlier roof collapse due to extra weight
• hot water scalds	• electric shock
	• battery hazards
	• inhalation exposure
	• access for ventilation

More information

Working with industry leaders, the California State Fire Marshal's Office prepared an excellent series of training materials related to PV systems, including an installation guideline that can be used to encourage installers and building officials to consider firefighter safety when designing, approving, or installing PV systems. Topics covered in the training materials and the 66-page "*Fundamentals of Photovoltaics for the Fire Service*" include how PV systems work, the components of the system, performance, applications, codes and standards, and emergency response. These materials can be downloaded from the California State Fire Marshal's photovoltaics Web page at http://www.osfm.fire.ca.gov/training/photovoltaics.php

In addition to the training materials produced by the California State Fire Marshal's Office, Matt Paiss of the San Jose, CA Fire Department has developed an in-service training program and video focused on operational issues. Matt can be contacted at mpaiss@earthlink.net