

Mandatory Monitoring For Solar Thermal?

Unlike the PV market, where increasingly sophisticated monitoring systems are common equipment for even the smallest-scale residential project, the solar thermal sector does not yet universally consider monitoring to be required. Whether even basic capabilities will be included is usually a function of system size and the individual preferences of the installer and end user.

However, in the large and frequently precedent-setting California market, regulations for the California Solar Initiative's (CSI) new solar thermal rebate program may quickly bring about more widespread use of monitoring equipment - a prospect that has been met with a mixed reception from the solar thermal sector.

Filed in late May, the CSI thermal program handbook includes guidelines for multifamily and commercial installations and revisions to the previously approved guidelines for single-family projects. Many of the guidelines were based on information gained through a pilot program conducted in San Diego Gas & Electric's service territory from 2007 to 2009.

"CSI is getting very specific in what they require in monitoring solutions," says Chris Chappell, director of sales at Richmond, Calif.-based solar thermal integrator SunWater Solar. He explains that during the program's San Diego pilot, technical issues that emerged directly prompted many of the requirements that ultimately appeared in the CSI thermal program handbook.

Under the new rules, customer performance monitoring (CPM) is encouraged for all solar thermal systems receiving the incentive, and it is required for systems that displace at least 30 kW_{th}. Systems of all sizes that are participating in the initiative's measurement and evaluation (M&E) program must also include monitoring.

"These minimum metering requirements were developed to increase knowledge of system performance, foster adequate system maintenance and thereby [ensure that] ratepayer-funded incentives result in expected levels of energy displacement," the handbook states.

For solar hot water systems greater than 30 kW_{th} (greater than 462 square feet of fluid collector area or 628 square feet of air collector area), specific minimum metering requirements for participation in the CSI thermal program include an electromagnetic flow meter with an integral electronics module, two semiconductor-based electronic temperature sensors that are bath-calibrated and matched for the temperature range of each application, a British thermal units meter, temperature thermowalls and all required mechanical installation hardware. The complete system must be built and calibrated by a single manufacturer.

The flow-meter requirement applies only to the consumption side of the solar thermal system's tank, notes Tom Dinkel, CEO of San Francisco-based monitoring systems provider SunReports. "We're pretty adamant that you also need to know what's happening on the solar side," he says, adding that he has been in discussions with CSI personnel regarding program rules.

Myriad system malfunctions can occur in the collector portion of the system, according to Dinkel. For instance, check valves can become stuck open, reverse thermal-siphoning situations can occur at night or glycol can lose pressure. To detect these and similar problems, he believes flow meters on the collector side should be mandatory.

A system-level view

Although customers with small-scale systems who are not participating in the CSI M&E program are currently ex-

empt from CPM requirements, Dinkel believes system integrators should consider monitoring to be essential - regardless of installation size. "As an installer, I would want to mitigate my risks by being able to see what's going on in the installations I've done," he points out.

In addition, Dinkel says, the increased access to detailed, verifiable information that monitoring provides could enhance solar thermal's customer appeal and stimulate market growth.

"I think if we had the ability to show people what's going on and how much impact solar thermal has on their usage, it would become a more readily adopted technology," Dinkel says. "It's important to think about solar thermal monitoring not just for large systems, but [also] for smaller systems." He points out that in PV, the public image of a backward-running meter strongly resonates; a similarly striking standard measurement image does not yet exist for solar thermal.

SunWater Solar's Chappell, however, warns that despite the benefits for both installers and customers, universal adoption of monitoring technology for solar thermal is not financially viable. He believes mandatory system monitoring may, in fact, hamper industry growth.

"We want an active solar thermal market in California," Chappell says. "We don't want a lot of regulation that will drive up the costs of the system. The more regulations there are, the more costly the monitoring system is, and the less likely the customer is to purchase the system."

"What we have found is that there are certain customers who do want monitoring systems for solar thermal," he adds. "But because the industry is not well developed and there are not a lot of installers, people are very price-conscious."

- Jessica Lillian