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A109, a heat exchanger, a 25 hp pump, 447 m of pipe running back to the solar field from the plant, and bypass valves and controls 241 viii C entral S olar Hot W ater S ys tem Des ign G uide F igure Dec ember 2011 P age 2 A128 Components of a 54,000 sg ft 5022 m solar industrial process heat plant at Frito Lay Modesto CA, including an unfired steam generator, pump, and controls 241 A129 Governor Arnold Schwarzenegger gets a closeup look at the field of parabolic solar collectors at the SunChips factory 242 A130 Peak hourly averaged efficiency for each day since midJune 2009. The Energy Independence and Security Act EISA 2007 SEC. 523 requires that "if lifecycle costeffective, as compared to other reasonably available technologies, not less than 30% of the hot water demand for each new Federal building or Federal building undergoing a major renovation be met through the installation and use of solar hot water heaters." In the United States, different types of solar water heating systems are available and primarily used for standalone buildings. Different design quidelines are available from the National Renewable Energy Laboratory NREL and American Society of Heating, Refrigerating, and AirConditioning Engineers ASHRAE for small size systems. These systems are relatively complex and application of solar based heating in the United States is often limited by economical considerations when compared to traditional heating systems and local cost of fossil fuels. In recent years, numerous innovations in solar thermal technologies have resulted in cost effective large scale systems including integrated solar supported heating networks. Examples of such systems installed in Denmark, Germany, Austria and other countries have proven that such systems are reliable and may be more economical compared to small scale systems. Such systems may be cost effective for clusters of buildings containing e.g.