

Energy Auditing

Energy auditing was used to great effect during the first of the energy crises in the US over thirty years ago. With a wider array of techniques and much improved and innovative new technologies to remedy energy deficiencies caused by deterioration or obsolescence much can be accomplished by having a comprehensive or special energy audit done as energy costs continue to increase.

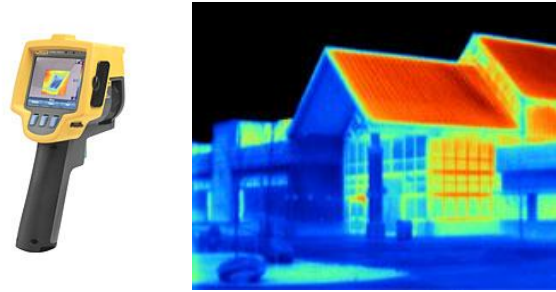
Audits are one of your best sources for determining the efficacy of updating existing structures in order to save the costs of new construction.

Facilities and residences are able to upgrade their insulation, lighting and mechanical systems to make them more efficient and less costly to operate.

The first step to becoming more efficient is to evaluate individual or overall energy concerns by performing the tests and studies needed to determine the scope of problems, and if they require action, arrive at the most economical and beneficial solutions.

Low-cost, and even no-cost, recommendations are always completed first. Repairs, replacements or upgrades with a short pay-back should be considered next. Costly up-grades should only be considered if the problem is significant (a large ticket item may be such a central issue that it supersedes less costly problems), adding in considerations as to how reasonable the pay-back will be, and funding: especially the availability of tax credits and other incentives offered to reduce the solution's cost. Energy audits are often required by government programs in order to qualify for grants or matching funds.

Thermal Imaging



SWT Energy utilizes thermal imaging as part of its standard energy audit. This tool provides a visual assessment of the insulating concerns of a building. It will detect air leakage, moisture concerns and lack of insulation. It also detects problem areas in utility junction boxes, main panels and HVAC equipment.

Lighting Surveys

SWT Energy offers lighting surveys as well. New types of lighting and lighting systems are available that can save up to 60% of electrical consumption.

SWT's analysis of your lighting generates specific recommendations that can reduce lighting costs in school classrooms, gymnasiums, parking lots, office spaces (individual office areas and cubical common spaces), up to large industrial production floors.

Types of large area lighting, use of CFL and LED lights, motion sensor technology; all are rapidly becoming a basic starting point for the reduction of electrical costs.

Alternative Energy & Energy Expertise



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PHOTOVOLTAICS

Solar cells in Photovoltaic (PV) panels convert the sun's energy into a DC electrical current, which flows into an inverter and changes the DC to AC electricity in order to supply power to household appliances – with no pollution!



Solar modules have a 50+ year life expectancy; show little degradation over time while in operation; and usually carry a 25-year manufacturer's warranty.

Worldwide, PV installations grew at an average annual rate of 25-30% during the period from 2000 to 2004. On June 19, 2007, the *USA Today* ran an article: "Vatican Building Converting to Solar Energy, reflecting Pope Benedict XVI's concern about conserving the Earth's resources".

Although there are only 4,000 electric vehicles operating in the U.S. today; installing a PV system now will provide fuel for this technology when it becomes readily available.

Mounting equipment for solar panels are rated to withstand 120 miles/hour wind speeds. Furthermore, sun-tracking pedestals are available which increase photovoltaic performance up to 45% over fixed modules.

Typically, reducing your electrical needs by 50% is the most cost-efficient approach for solar power. Accordingly, we have a complete system can be installed for less than \$7.00 per watt.

Adding Solar panels to an average home which pays \$100-130 per month for electricity would eliminate approx. 361 tons of CO₂, 1,324 lbs. of NO_x, 1,838 lbs. of SO₂, 64 lbs. of VOC, and 163 lbs. of CO. That is equivalent to taking 63 gasoline automobiles off the road, or planting 1,060 trees.

WIND

The wind in North Dakota alone could produce at least a third of America's electricity!

Wind and Solar resources often complement each other. Generally, when it is sunny, it is calm; and when it is cloudy, it is windy. However, PV energy is linear (2x Sun = 2x Solar power); whereas Wind energy is exponential (2x Wind = 8x Wind power).



Wind generators should be mounted at least 30' above anything within 300'; and the higher the turbine, the more efficient it performs. SWT Energy will not install a turbine on anything less than a self-supporting tower. Hydraulic towers are available for our horizontal axis turbines to allow for easier installation and maintenance.

Wind turbines are not maintenance free, no matter how little maintenance the manufacturer or seller says it takes, maintenance costs are one of the main factors you judge in evaluating solar versus wind use on a property.

SWT's installed prices are close to the cost of Photovoltaic in most cases. Packages can be offered to the do-it-yourselfer to reduce installation costs, but some requirements for installation can apply which affect manufacturer's warranties.

THERMAL SOLAR

Solar hot-water heating—home or industrial—is one of the most cost effect alternative energy systems.

Solar water-heater systems offer the largest potential savings: Domestic hot water is a year-round need. Home-

owners save as much as 50-70% annually on their utility costs for conventional water heating.

Industrial uses include large laundry facilities, hospitals, nursing facilities, car washes, apartment complexes, motels, correctional facilities, fire stations; any place where large volume hot-water is a cost center.

Although collection methods are simple, thermal is an exceedingly efficient use of the sun's energy. Heat energy tends to be the largest use of power in the average home or business.

Thermal solar systems gather heat from the sun, then transfer that heat energy through pipes or ductwork for either hot water applications or heated space; including radiant floor heating, pool heating, and driveway snow melting.



Thermal systems are much less costly than wind or photovoltaic systems. From a heating stand point, thermal systems can produce over six times as much energy per square foot than PV systems. Thermal systems are best used on homes and buildings that require hot water 24/7.

A thermal system can pay for itself in less than six years (electric) or less than 10 years (natural gas) for residential applications using the tax credits available.

Commercial applications are totally written off via tax credits, accelerated depreciation and/or investment credits. Energy savings is money in the BANK!!!

Thermal Solar systems DO NOT POLLUTE. When a solar water-heating system replaces an electric water heater, the electricity displaced over 20 years represents more than 50 tons of avoided CO₂ emissions alone.