Ask Jon Eakes

SOLAR ENERGY

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The sun's energy is free. It's collecting it that costs money.
There are two different ways of collecting solar energy; actively and passively.
Active solar heating systems collect the sun's heat and transport it into the house where it is used to heat water or living space. Usually there is also provision for storing that heat for periods when the sun is not reaching the house. These are complex systems, especially so in Canada where we have to keep everything from freezing up. Generally speaking, with the present state of solar technology and the cost of installing and maintaining the collection and storage system, active solar energy is not yet economical in Canada. You will get higher return on your money by investing in passive solar heating and heavy insulation. However by 2015 the costs of photovoltaic systems, cells converting sunlight directly into electricity, will be approaching the cost competitive position with many fuel source electrical generators. One new development to look at is Dow's new PowerHouse Solar shingles. These are actually roof shingles that replace most of the regular asphalt shingles but at the same time are small modular photovoltaic cells. They obtain a slight cost advantage over solar pannels by replacing regular roofing -- and can be installed by regular roofers at the time that you re-shingle your roof.
Active solar domestic hot water heating is definately cost efficient where there are no freezing conditions requiring the use of anti-freeze solutions and heat exchangers, but even in Canada there are cases of anti-freeze systems providing almost all the hot water all year long. In these cases the heated water is stored in a regular water tank, which only adds heat when necessary. Active seasonial use of the sun is very cost effective, such as with solar swimming pool systems, like the TechnoSolis system I have on my roof which gives me about a 10F boost to the pool temperature on a sunny day by simply sending the pool water to the roof and back down with the regular pool circulation pump.
There is a lot of criticism about solar panels of any kind on a shingled roof, mostly related to screws penetrating all the layers of water protection on the roof. This danger can be minimized by applying caulking or roofing sealant prior to driving a screw (pre-sealing a hole) and using attachment fixtures that create a sealed washer around the screw. An old non-functioning system should be removed from the roof and all holes patched by lifting a shingle and sealing the screw holes between two shingles.
A passive solar system starts by placing most of your windows on the south side of the house and letting the sun shine in. The heat is stored in heavy building components like extra heavy walls (heavy tile floors don't do much good in Canada as the sun rarely hits the floor during the winter above the 48th parallel) and circulated through the house with ventilation systems. Thermal shutters on the window prevent the escape of this heat at night. Combined with the high insulation levels, the sun can be an important source of heat, even in Canada.
There is an abundance of excellent literature on both active and passive solar energy, so I will not try to duplicate it here. You can contact the Solar and Sustainable Energy Society of Canada.

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