## WT - Energy and Atmosphere

Of course the most effective means of reducing a building's reliance on external grid power is to reduce energy use as a whole. In our projects we consider a variety of solutions to this point. Increasing reliance on natural lighting and passive

heating and cooling are some of the most effective ways of reducing energy consumption. Choosing efficient appliances one can save significant amounts of energy.

Ultra-efficient washers exist that use less energy and will spin up to ninety percent of the moisture out of clothes, reducing the need for even owning a dryer if room for a clothesline or rack is available. Novel technologies are available in washers, some eliminating the need for soap by using hydrogen ions to remove stains and smells, or greatly reducing the water needs by saving the water from the last rinse cycle for the wash cycle on the next load.

Much of the energy used in homes is simply wasted by leaving on lights, fans, heat, electronics, air conditioners, etc. One way of mitigating this energy loss is to create systems that automate the control of these functions and the power supplied to them. Phantom power, the power used by electronics and appliances that are not being charged or currently used, is a large cause of electricity use. In fact, in the average home, 75% of the energy used by electronics is consumed while the product is off or not in use. One solution to this problem is to install a combination of light detectors, dimmer switches and motion detectors. or a server which can control all of a houses systems. While using less energy can reduce one's reliance on grid connected energy, most people still need some energy. One of the more popular methods of generating onsite electricity is through solar power or photovoltaics. Solar is the source of all energy on our planet, is in all practicality renewable, "provides 6,000 times more energy than consumed by humans and has the highest power density of any renewable energy ("Solar Power"). When choosing solar, one must take into account economics, sustainability, and site selection. The good news is that even if solar power is not viable for a current project, it may be in the future.

Photovoltaic technology is advancing quickly with thin film solar, and plastic photovoltaics being new fronts of research. Technology is rapidly increasing the efficiency of photovoltaics and reducing their initial cost both monetarily and in embodied energy.

On site wind energy is also a field that is rapidly expanding. Companies are beginning to offer small scale wind generators that can be used even in residential situations. These small turbines, like solar, have a high initial cost but will lower electric bills and grid reliance for their lifetime. However, while wind energy compares to coal favorably on a large scale ($0.04 - 0.06/kWh), on a small scale, buying energy from the grid is often a better choice monetarily (but again wind is more sustainable and these cost estimates often do not take into account environmental costs) ("Cents Per Kilowatt-hour").