

Top 10 Technologies: Green Plant Infrastructure â€” LEEDing The Green Trend

In the mad race to compensate for a waning economy that has especially upset the manufacturing sector, plant managers are opting for more operational efficiencies, whether through equipment or a transformation in standard operating procedures. Not necessarily complementary, but in parallel, the drive toward a more sustainable, environmentally conscious business model is taking hold. When these two initiatives converge, we arrive at the trend toward greening plant infrastructure.

According to a recent Greentech Media report, of the \$1.2 billion spent in venture capital investment for green technologies—only in the second quarter of 2009—\$7.5 million was allocated to green buildings. But of what does a green building consist? Well, the contemporary buzzwords in green infrastructure that have been pinging around the industry include, but are not limited to: waste-to-energy recovery systems, solar energy, wind power and green roofs. While some of these technologies have been around a while, such as green roofs, which have been in operation for centuries, others are just gaining commercial traction.

The Leadership in Energy and Environmental Design (LEED) green building rating system is a great gauge for how to green your facility. (For more information, visit www.usgbc.org/leed.) Developed by the U.S. Green Building Council, the system highlights:

- Indoor environmental quality.
- Materials and resources.
- Energy and atmosphere.
- Water efficiency.
- Sustainable sites.
- Innovation and design process.

Spotlighting Solar Progress Solar power is just one of the technologies that is helping improve a handful of these LEED criteria. One problem plaguing solar power over the course of its history, however, was efficiency. Ascent Solar Technologies, a developer of flexible thin-film solar modules, recently announced that it has achieved its target module efficiency goal of 10 percent for its flexible copper, indium, gallium, selenide monolithically integrated modules. The DOE's National Renewable Energy Laboratory has independently verified that the modules measured as high as 10.4 percent in conversion efficiency.

Another obstacle that solar faced was its expense. Well, BioSolar CEO and Chairman

David Lee says, “Designed specifically for cost-sensitive economical photovoltaic (PV) solar modules, the BioBacksheet-C is expected to be instrumental in driving down the cost per watt of solar power.” He adds that his company’s solar panel components consist of cotton, castor beans and other biobased ingredients to help reduce petroleum dependence. BioBacksheet-C is a protective covering that can be found in the back of virtually all PV solar cells.

And according to BusinessWeek, a three-year-old solar startup called SolarCity now takes the hassle out of solar installations by not only designing, purchasing and installing them, but also by lining up building permits, financing and tax breaks.

Green Heating & Cooling According to Wes Livingston, a Power Partners mechanical design engineer, “The current trend toward sustainable, carbon-neutral heating and cooling systems is showing great environmental and economic savings. The latest systems feature solar thermal collectors, backup biomass boilers and adsorption chillers. Cost is the initial obstacle, but federal and state rebates, along with utility carbon credits, often make these systems less expensive than traditional systems. Over time, the reduced operating costs pay for the systems regardless of incentives.”

Livingston further explains, “Solar thermal collectors generate hot water during the day, even cloudy days. In the winter, this heat is used to directly heat the building and provide domestic hot water. In the summer, this hot water is used to power adsorption chillers. Solar thermal collectors are, on average, five times more efficient at capturing solar energy than PV systems, plus they are about 20 percent of the cost of PV.

“Germany is betting the future of its energy needs on this technology. And by 2050, Germans plan to provide 50 percent of its energy supply with solar thermal energy. China already has 20 million of these systems installed for hot water production. The added feature of having the biomass boiler for backup heat makes the system completely carbon-neutral and provides local jobs, as well as operating costs significantly below fuel oil. Production of equipment in the United States just began this year and is rapidly taking off.”

Although Livingston has all the answers concerning green heating and cooling, he thinks that the most promising type of green building infrastructure in the future will be “roofs that change from dark to light, depending on the temperature.” The technology is simple: UV-resistant thermal paint. Whether simple or complex, old or new, large strides are being made in green building infrastructure, and no matter what direction you choose to go, LEED can help guide you.

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