Brainstorm: Environmental Issues

Which green technology has the most commercial potential?

David Hsieh, DisplaySearch, www.displaysearch.com **[1]**

From our research, it is evident that display centric devices will have the most commercial potential. This is not only due to the “green” aspect of displays as a result of the initiatives that manufacturers are taking to make environmentally friendly displays. Many people believe that green panels cost more. While there are sometimes higher costs (such as replacement of components with greener components), there can also be savings (such as replacement of backlight lamps with cheaper optical films). Green technology in flat panel displays shows that green FPD technology is also a cost reduction technology in many respects.

Green Design Methods
This is a good way to achieve green FPD as the cost/performance is high, and it does not necessary entail higher costs. However, the biggest challenge is the design capability. First-tier panel suppliers have better engineering capabilities and more abundant resources to apply green design.

Greener Manufacturing Processes
Depending on production volumes, green manufacturing can result in lower costs. The reduction or elimination of steps or processes (such as photo masks or color filter patterning) brings the total production cost down. Despite this, if the manufacturing yields are lower with the new process, then it will have a negative impact on the cost structure.

Using Eco-Friendly Components
This is the fast way for panel makers-no matter their capabilities-to move into green. There is little impact in production yield so the cost premium is manageable. However, in many cases, eco-friendly components are higher cost, such as optical films and LED backlights. Therefore, regulations and customer attitudes are the key drivers for this method. Green component prices will drop rapidly for two reasons.
* As green panel volumes continue to grow, economies of scale will increase and lower costs for component suppliers.
* The market downturn is forcing changes in the negotiation power between panel makers and component suppliers.

Jordi Torrebadell, RECOM Power, www.recom-power.com [2]

In 1879, Thomas Edison invented the light bulb, one of the best inventions of the Nineteenth Century. More than a hundred years later, while the light bulb is coming to an end, a new technology is rising above all others, the LED.

Incandescent lights will be phased out soon (2010 in Europe, 2014 in the US), and there is an urgent need to find an alternative. Two solutions seemed the most attractive: the Compact Fluorescent Lamp (CFL) is very efficient, has a long lifetime, but includes toxic materials (Mercury); the Light Emitting Diode (LED) is as efficient, has longer lifetime, and is a much greener solution.

LED technology is taking over the industry and its entire commercial potential, including not only the LED itself but the constant-current LED drivers and the electronic components needed for its proper use; growing faster than anyone could imagine and reducing its cost while offering a wide range of unique possibilities: size, colors, resistance, lifetime, easily dimmable... the potential is unlimited.

Light is one of our most valuable possessions and LEDs are the only true green technology available that will allow us to continue enjoying this “given” treasure and make the World a better place.

Steve Bowling, Microchip Technology, www.microchip.com [3]

A green technology must significantly benefit the consumer's wallet in order to have commercial potential. I think technologies that focus on lower power consumption and operating costs have the greatest potential to succeed.

In the commercial sector, the energy consumed by server data centers is growing. According to the EPA, data centers used 60 billion kWH of electricity in 2006. The growth of these data centers is projected to double that consumption by 2011. Since data centers operate 24-7, the energy consumption of the server equipment over its operating lifetime is a very big deal to the data-center operator. Computing equipment is not always operated at full capacity. Servers that sit idle when data traffic is low still use a significant amount of power. To make matters worse, the server power supplies are less efficient at the lighter load levels, and multiple power supplies per server are operated for redundancy. A typical server power supply can provide 1000W or more of power, and typical efficiencies are 85% at full load1. Using these numbers, you can see that each power supply radiates a significant amount of power in the form of heat. This heat must be removed by cooling fans, chillers and other equipment that also increases operating costs.

Therefore, even small increases in server power-supply efficiency can have a big impact, by reducing the cooling load for the data center. Intelligent digital power supplies that operate in coordination with server equipment and software have the potential to save significant energy costs for the data center. These power supplies can communicate digitally with other equipment and change operating modes to gain efficiency during light load conditions. They can also shut down processor cores, and even entire servers, when data traffic is light.

Dr. Joe Polastre, Sentilla, www.sentilla.com [4]

New energy is really expensive. The most commercially viable option is to reduce your own energy use, which, as stated by the Obama Administration, is the cleanest fastest easiest, cheapest way to generate renewable energy. In order to reduce your energy consumption, you need to know precisely where and when you're using it.

For example, most people don't realize that when they do a Google search they are consuming energy—both directly by using the computer and indirectly because Google’s data center is processing the search—and there's a carbon footprint associated with that search. A recent report indicated that just two Google searches are equivalent to boiling water for a cup of tea.

The most commercial potential exists for energy saving rather than energy generating technology, to reduce consumption and cost. One of the technologies that will have the most impact is the “Internet of Things.” With smart, interconnected equipment, things tell you precisely and in real time how much energy they're consuming and allow you to control that equipment from anywhere in the world. An example of the energy implications of the “Internet of Things” is lowering your thermostat or turning off your computer at your home, coordinated from your hotel room halfway around the world.

By making "dumb" objects smart, fine granularity energy consumption information gives you the opportunity to take steps and reduce it—fundamentally based on the principal that you can't manage what you can't measure. Back to our data center example, data centers are expected to consume 4 percent of the total country's energy by 2011 according to the US Department of Energy. If we can shrink that to a much smaller percentage there will be less of an energy burden on our country, and our wallets.

Dave Iverson, 3M, www.mmm.com [5]

Green technologies that have the greatest commercial potential are those that enable consumers to conserve energy. There are a variety of ways that consumers can save energy—in some cases it can be as simple as having electronic appliances plugged into a power strip that can easily be turned off when in not in use or lowering the brightness of TVs in darker rooms.
One of the main areas consumers can reduce power consumption is in their TVs. As flat panel TVs become more prevalent in households and power bills rise—reducing TV power consumption has also become an increasingly important issue. Nielson reports show that consumers have their TVs on an average of 8.14 hours a day, which can be attributed to today's TV usage going beyond watching TV, and also used for gaming, movies and viewing digital photos. Moreover, with the growing number of environmental regulations for 'green' flat panel displays and TVs (such as RoHS, WEEE, EuP and Energy Star), display and TV manufacturers continue to look for new ways to reduce energy.

While LCD TVs already consume less energy than other flat panel TV technologies, there is still more that LCD panel makers and LCD TV manufacturers can do to reduce power consumption. For example, the addition of 3M's optical films can save energy by eliminating the need for extra bulbs and the extra power needed to increase CCFL brightness. The company's Vikuiti reflective polarizer for LCD TVs can reduce backlight power by 52% and TV power by 37%, while maintaining picture quality and also reducing component costs. It is estimated that by using DBEF films for LCD TVs, from 58 Billion kWh of energy could be saved 2007-2011, which equals the amount needed to power five million households or taking six million passenger cars off the road in terms of CO_2 reduction.

Market research from DisplaySearch shows that by 2014, all displays will be green. Cutting-edge technologies, such as Vikuiti DBEF optical films, will significantly contribute to the transition to greener displays and electronic devices.

Continued on next page... [6]

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