

The Next Wave in Display Innovation

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The progress in flat panel displays over the last two decades has been astonishing. In just 20 years, the LCD-TV grew up from a 2-inch curiosity, to an industry that will sell about 120 million flat panel TV's this year, with viewing area up to 4000 times larger. That success is based on continuous innovation, especially in manufacturing processes.

For the next decade to bring another doubling of the business, progress will need to continue in four major areas: Human factors, ecological impact, visual quality, and of course continued drive towards affordability. This talk will detail the technology advances that can allow this industry to meet those challenges.

Human factors. Today, we adapt our lifestyle to our technology. People organize their offices, and their homes, around displays. We pass around mobile phones to share images, rather than experiencing them as a group. Billions of newspapers continue to be sold daily. Advances in flexible displays can lead to large portable displays. "New era projection" includes the handheld Pico Projectors that are already on the market, and will ultimately appear integrated in mobile phones the same way cameras do today.

"Eco" impact. Today TV's are one of the top energy consumers in a U.S. home, and the fastest growing. Watching a large flat panel TV can cost twice as much as running a large refrigerator. With today's concern about energy consumption, regulations are starting to emerge worldwide to limit TV electrical use. Fortunately, good solutions exist in using light management films to eliminate bulbs, saving power without increasing cost. Going forward, LED backlights will drive another step downward. OLED displays might be the ultimate solution.

Visual quality. The color of an LCD-TV is still often considered inferior to a far less expensive CRT. And almost all displays suffer from representing a three-dimensional world on a two dimensional surface. The technology to improve color is available today, and will likely move from premium sets into the mainstream as costs come down. 3D is now arriving in movie theaters worldwide, and that will drive up the demand for similar realistic images in home theaters. And the technology is emerging today for 3D representation to move beyond specialized applications into everyday use, on screens large and small.

Affordability. The world takes cost-down miracles for granted in consumer electronics. Each of these other advances will be balanced with a drive for affordability, especially as the market grows in emerging countries. The other three challenges must be met without increasing cost.

Putting this all together, the next few years will emphasize "eco friendly" designs, and enhanced images such as 3D. By 2013 we will start to see serious penetration by emissive technologies (OLED, high efficiency plasma, or other), with the "ultimate display" likely not in the market for a decade. Lots of opportunities for innovation remain ahead of us.