## High Definition: over-optimistic forecasts or missed opportunities?

**Impact of wide-screen flat panels**
**Introduction of blue laser DVD**
**Commercial operators' plans and strategies**

Alexander Shulzycki
European Broadcasting Union

Geneva, December 15, 2004

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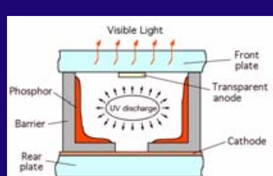
# The Technology – Plasma v. LCD

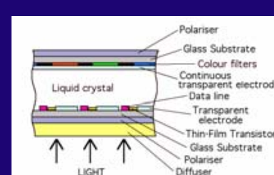
### Plasma

- **Advantages**: Wide viewing angle, large screen size, production efficiencies, higher contrast, more natural colours
- **Disadvantages**: Screen burn, lifespan (15,000 hours), high power consumption




### TFT (Thin Film Transistor) LCD

- **Advantages**: vivid colours, lifespan (30,000 hours), low power consumption
- **Disadvantages**: Slow response time of panel, lower contrast than PDP




Both technologies will improve over time.

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## Manufacturers and production - Plasma

- Plasma Display Manufacturing
  - Matsushita's Osaka plant is expected to come on line 2004 and add about one million units to its production capacity.
  - Matsushita announced in May 2004 its plans for a large-scale plant with an investment of $840 million making screens at 37 inches, 42 inches, and 50 inches. Full production in 2006 will give Matsushita annual production of 3 million units.
  - Pioneer and Fujistsu-Hitachi have factories coming on line 2004 that will add 2.6 million units to global capacity.

Incremental annual capacity of about 5 million units

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## Manufacturers and production - LCD

- LCD Display Manufacturing
  - Global investment in LCD manufacturing is expected to reach 10$ billion in 2004 with seven additional plants in 2004, and five more in 2005.
  - Combined investments of Sharp, LG-Philips, and Samsung represent half of this total.
  - The new generation plants will be capable of using larger substrate sizes (1.5 by 1.8 meters) and thus produce panels more efficiently.
  - Major plants In mid-2004 Sharp will launched its $1 billion plant capable of producing 180,000 large substrates annually. LG Philips' Seoul plant is expected to come on line in 2005 and produce 720,000 substrates per year. In late 2005 Samsung's large substrate plant will come on line.

Larger and more efficiently-produced panels

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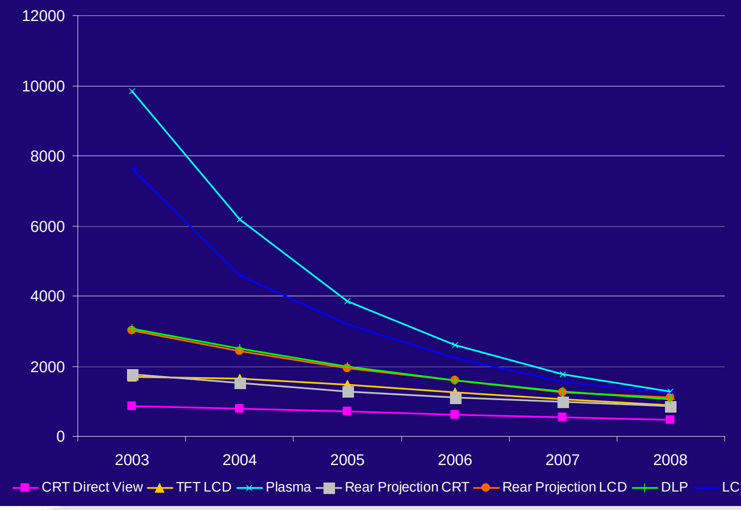
## HD Display Average Selling Prices (US$) by type




Non-CRT displays still close to $1000 by 2008

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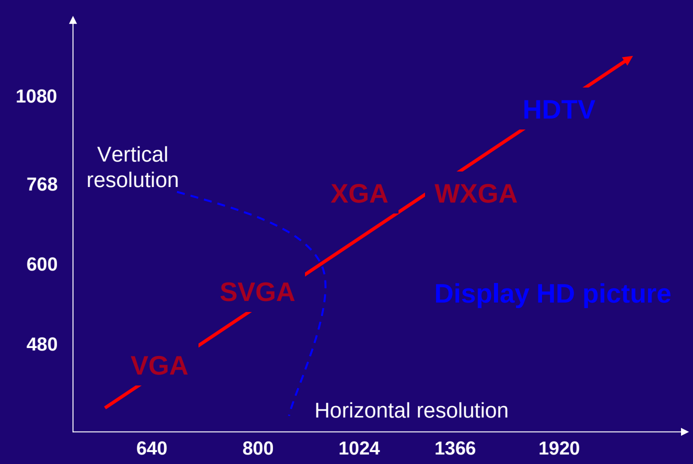
## Display Resolution Evolution




HD minimum resolution is XGA display mode1024 horizontal lines by 768 vertical lines.

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## The Global Market – current situation

| Worldwide Sales of HDTV equipment 2003 - by region (000s) | | |
|---|---|---|
| **Region** | **units** | **share** |
| Australia | 65 | 0.8% |
| Japan | 2806 | 35.4% |
| North America | 4229 | 53.4% |
| Other | 826 | 10.4% |
| | **7926** | |

| Worldwide Sales of HDTV equip ment 2003 - by size (000s) | | |
|---|---|---|
| Less than 30 inches | 3420 | 43.2% |
| Between 30 -40 | 1100 | 13.9% |
| Larger than 40 | 3400 | 42.9% |
| | **7920** | |

| Worldwide Sales of HDTV equipment 2003 - by type (000s) | | |
|---|---|---|
| CRT (direct) | 2211 | 27.9% |
| TFT LCD | 2137 | 27.0% |
| Plasma | 718 | 9.1% |
| CRT (projection) | 2536 | 32.0% |
| LCD (projection) | 172 | 2.2% |
| DLP | 142 | 1.8% |
| LCOS | 10 | 0.1% |
| | **7926** | |

*Source: IMS Research, EBU analysis*

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## The European Market – status and outlook

| | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| **HDTV's Shipments (thousands)** | Below 29 inches | 0 | 14 | 96 | 284 | 703 | 1617 |
| | 30-40 inches | 0 | 12 | 104 | 352 | 807 | 1666 |
| | Greater than 40 inches | 0 | 17 | 127 | 384 | 758 | 1375 |
| | **Total HDTV's shipments** | **0** | **44** | **326** | **1019** | **2268** | **4658** |
| | % of Total Digital | 0% | 1% | 4% | 10% | 17% | 31% |
| | CRT Direct View | 0 | 13 | 59 | 115 | 198 | 269 |
| | TFT LCD | 0 | 6 | 69 | 285 | 828 | 2220 |
| | Plasma | 0 | 19 | 170 | 562 | 1169 | 2063 |
| | **Total Direct View HDTV** | **0** | **38** | **298** | **962** | **2195** | **4553** |
| | Rear Projection CRT | 0 | 6 | 25 | 42 | 33 | 20 |
| | Rear Projection LCD | 0 | 0 | 1 | 3 | 5 | 7 |
| | DLP | 0 | 0 | 1 | 4 | 9 | 17 |
| | LCOS | 0 | 0 | 2 | 9 | 26 | 61 |
| | **Total Projection HDTV** | **0** | **6** | **28** | **58** | **73** | **106** |
| | **Total HDTV's Shipments** | **0** | **44** | **326** | **1019** | **2268** | **4658** |

Approaching five million in 2008.

## HDTV household forecast by country (000s)

| 000s | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Austria | 0.0 | 0.4 | 1.3 | 3.5 | 9.2 | 23.1 |
| Belgium | 0.0 | 1.2 | 3.9 | 0.3 | 24.6 | 54.5 |
| Denmark | 0.3 | 0.6 | 1.8 | 4.5 | 11.0 | 25.3 |
| Finland | 0.0 | 0.4 | 1.3 | 3.7 | 10.1 | 26.4 |
| France | 6.9 | 14.6 | 36.2 | 118.0 | 330.6 | 843.6 |
| Germany | 13.0 | 37.1 | 103.4 | 271.6 | 671.4 | 1566.6 |
| Italy | 6.1 | 13.0 | 32.5 | 79.2 | 182.7 | 406.0 |
| Netherlands | 3.5 | 8.5 | 20.6 | 46.1 | 97.9 | 200.2 |
| Norway | 0.0 | 0.4 | 1.4 | 4.0 | 11.0 | 28.0 |
| Portugal | 0.0 | 0.2 | 0.7 | 2.1 | 5.3 | 13.1 |
| Spain | 1.2 | 2.7 | 7.4 | 19.4 | 49.2 | 120.5 |
| Sweden | 0.8 | 1.6 | 4.3 | 12.1 | 32.4 | 81.9 |
| Switzerland | 0.2 | 0.9 | 3.2 | 9.8 | 26.3 | 65.5 |
| UK | 17.9 | 37.4 | 82.5 | 212.5 | 512.5 | 1154.6 |
| **Total** | **49.9** | **119.1** | **300.3** | **796.7** | **1974.3** | **4609.3** |

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## Other forecasts for 2008

**millions of HDTV househlods in Europe**

- Yankee Group 59
- Strategy Analytics 37
- IDATE 25
- SONY 20

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## EU Report on Wide-screen Television

The European Commission released a study early this year which was very positive about wide-screen and high-definition TV in Europe:

Wide-screen technology "can help accelerate the transition to digital television."

"the time is ripe for a revival of HDTV."

Etc.

The report included some statistics:

wide-screen TVs account for 22% of all TVs sold in the EU, and 40% by value.

wide-screen TVs will be installed in 60% of households in the EU-15 2009, driven by sales of DVDs, flat-panel displays and home cinema systems.

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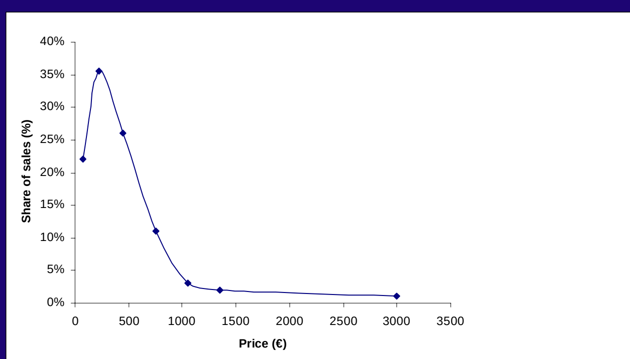
## Current TV set market

- Television sets priced over €1000 represent only 5% of sales; those under €500 are 80% of sales




Breakdown of TV sets sales based on prices

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## DVD technology specifications

| | DVD | HD-DVD | Blu-ray |
|---|---|---|---|
| Laser wavelength (nm) | 650 | 405 | 405 |
| Numerical aperture (of objective lens | 0.6 | 0.65 | 0.85 |
| Disc structure | Two 0.6 mm substrates bonded together | Two 0.6 mm substrates bonded together | Single substrate 1.1 mm thick with 0.1 mm cover layer |
| Track pitch (µm) | 0.74 | Not available | 0.32 |
| Minimum mark length (µm) | 0.4 | Not available | 0.16 |
| Disc capacity | 4.7 GB (single-layer), 8.5 GB (dual-layer) | 15 GB (single-layer), 30 GB (dual-layer), 20 GB (single-layer rewritable) | 23.3, 25, 27 GB (single-layer) 46.6, 50, 54 GB (dual-layer) |

Both are backwards compatible but not with each other

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## Blue laser DVD

- There are several competing formats, foremost are Sony's Blu-ray and the Toshiba-NEC standard. License revenues at stake.
- No significant market development expected before 2006 (global sales 3 million annually by 2008 are predicted)
- Cost curves for players and disks expected to follow previous technology.
- The key decision makers may be Hollywood majors which control premium pre-recorded content but current DVD market not exhausted.
- Content not widespread until 2006/2007 (Columbia-Tristar may lead)

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# Blue laser DVD

- ❑ Sony's Blu-ray (Matsushita, Sharp, Hewlett-Packard, Samsung, Philips)
  - ❑ Disney (non-exclusive)
  - ❑ Twentieth Century Fox: "…will support"
  - ❑ Microsoft Longhorn: undecided
- ❑ Toshiba-NEC (Sanyo, etc)
  - ❑ Twentieth Century Fox: "…will continue to work with"
  - ❑ Paramount Home Entertainment, Universal Pictures, Warner Bros. Studios and New Line Cinema (45% of current US DVD market)
  - ❑ Microsoft Longhorn: compatible

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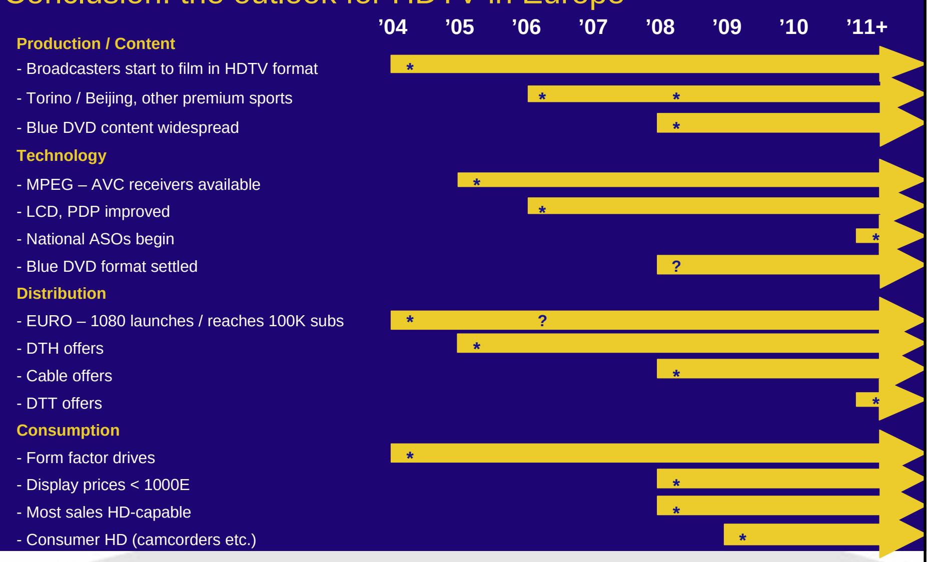
# Conclusion: the outlook for HDTV in Europe

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