

Global TV Trends in the Flat Panel TV Market



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- Five Years at Hitachi Home Electronics
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About DisplaySearch

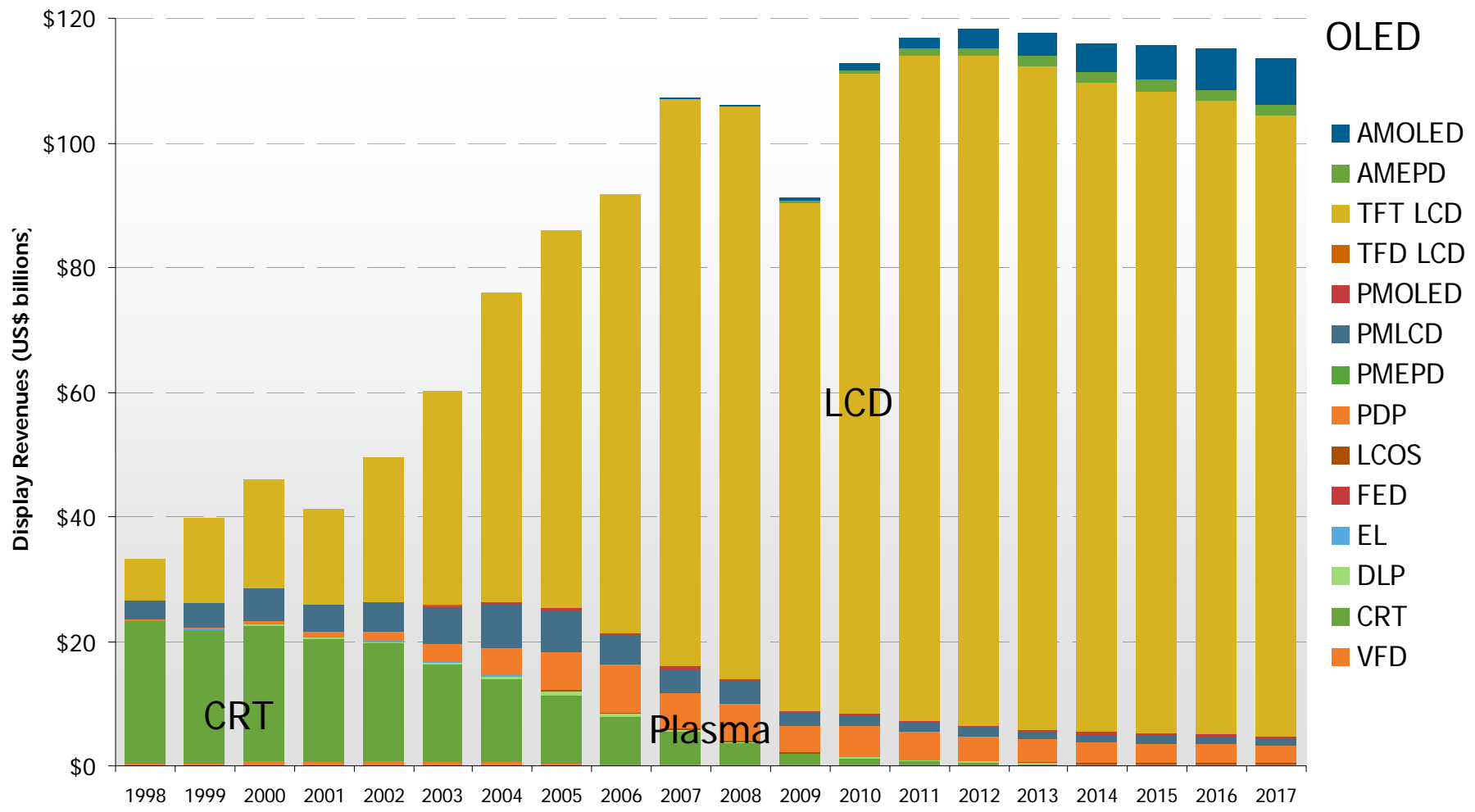


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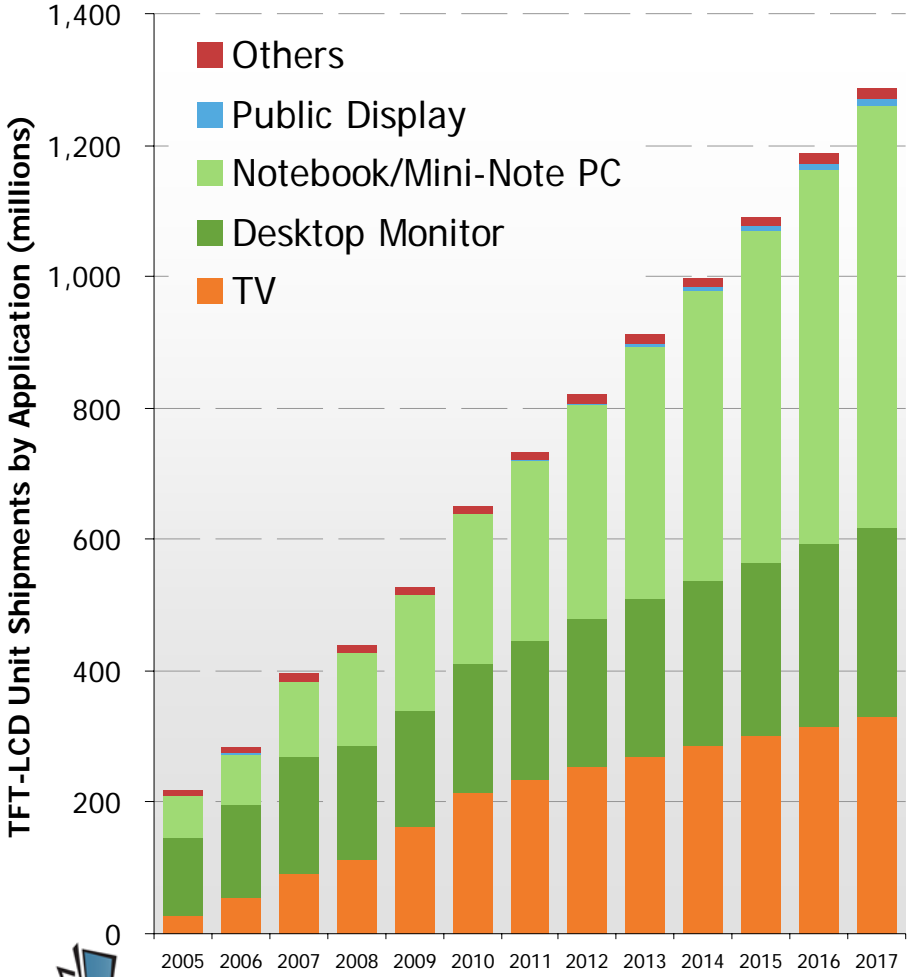
Global Display Market Recovering; Will Peak in a Few Years

- The progression is from CRT -> LCD/PDP -> OLED.
- New markets, applications, and technology revolutions should be explored.

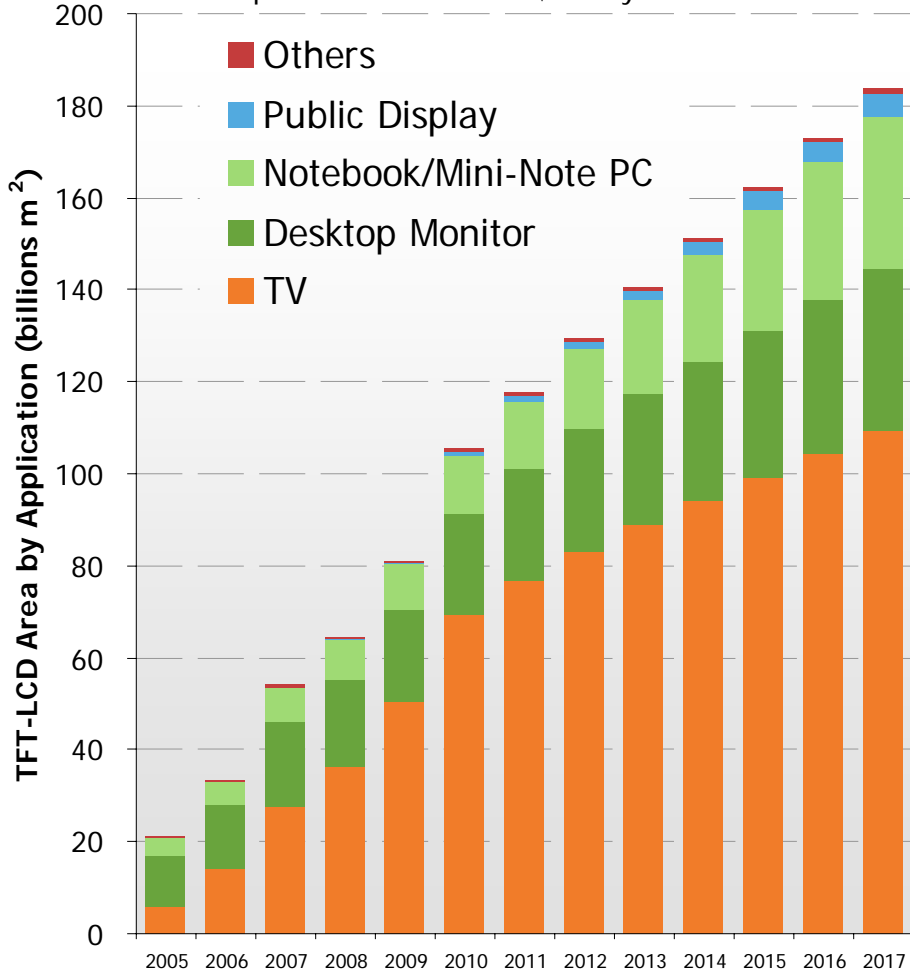


Key Large Area TFT LCD Applications

- Unit Growth (2010-2017)
 - 9% CAGR
 - Portable PCs growing at 16% (includes 9.7" tablet)
 - Half the market by 2017



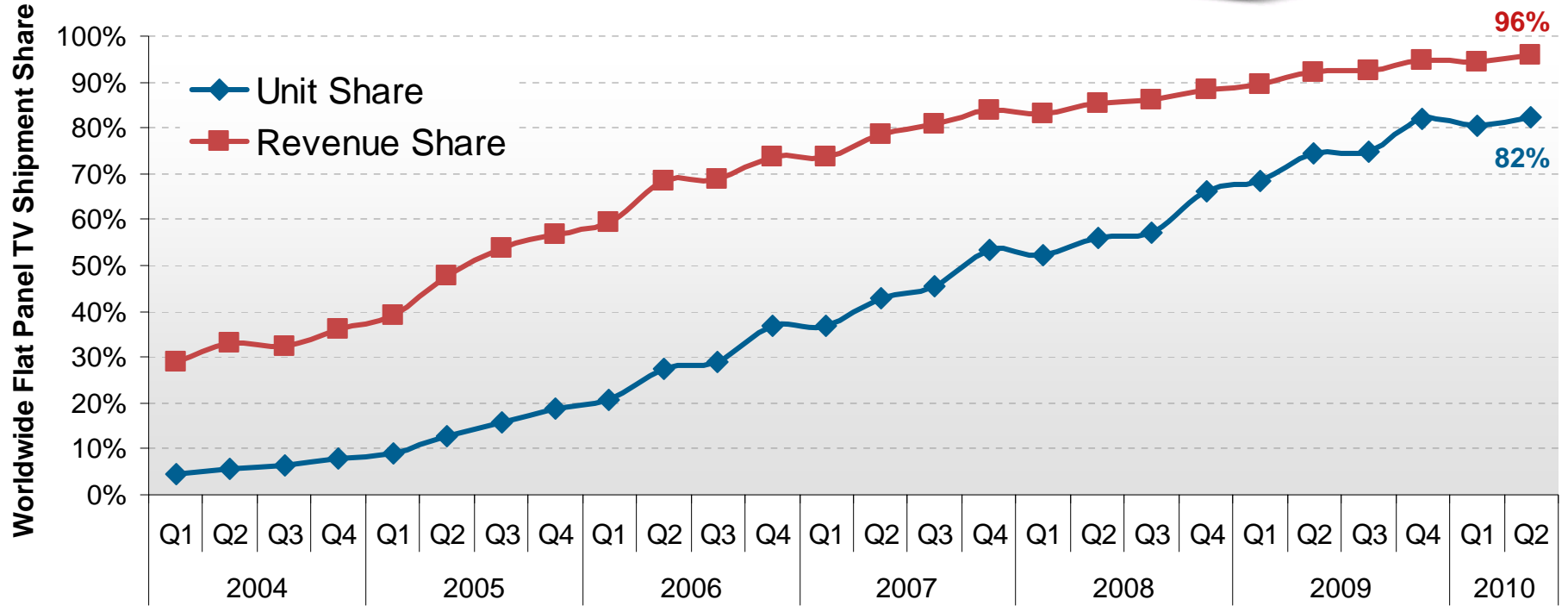
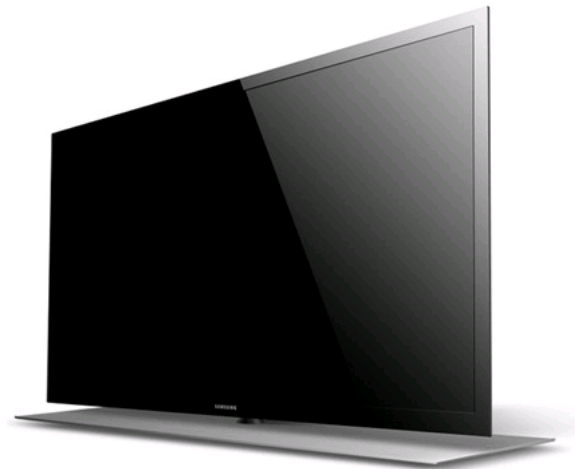
- Area Growth (2010-2017)
 - 11% CAGR
 - Public displays growing at 31%
 - TV growing at 7%
 - Share peaks at 66% in 2010; slowly declines



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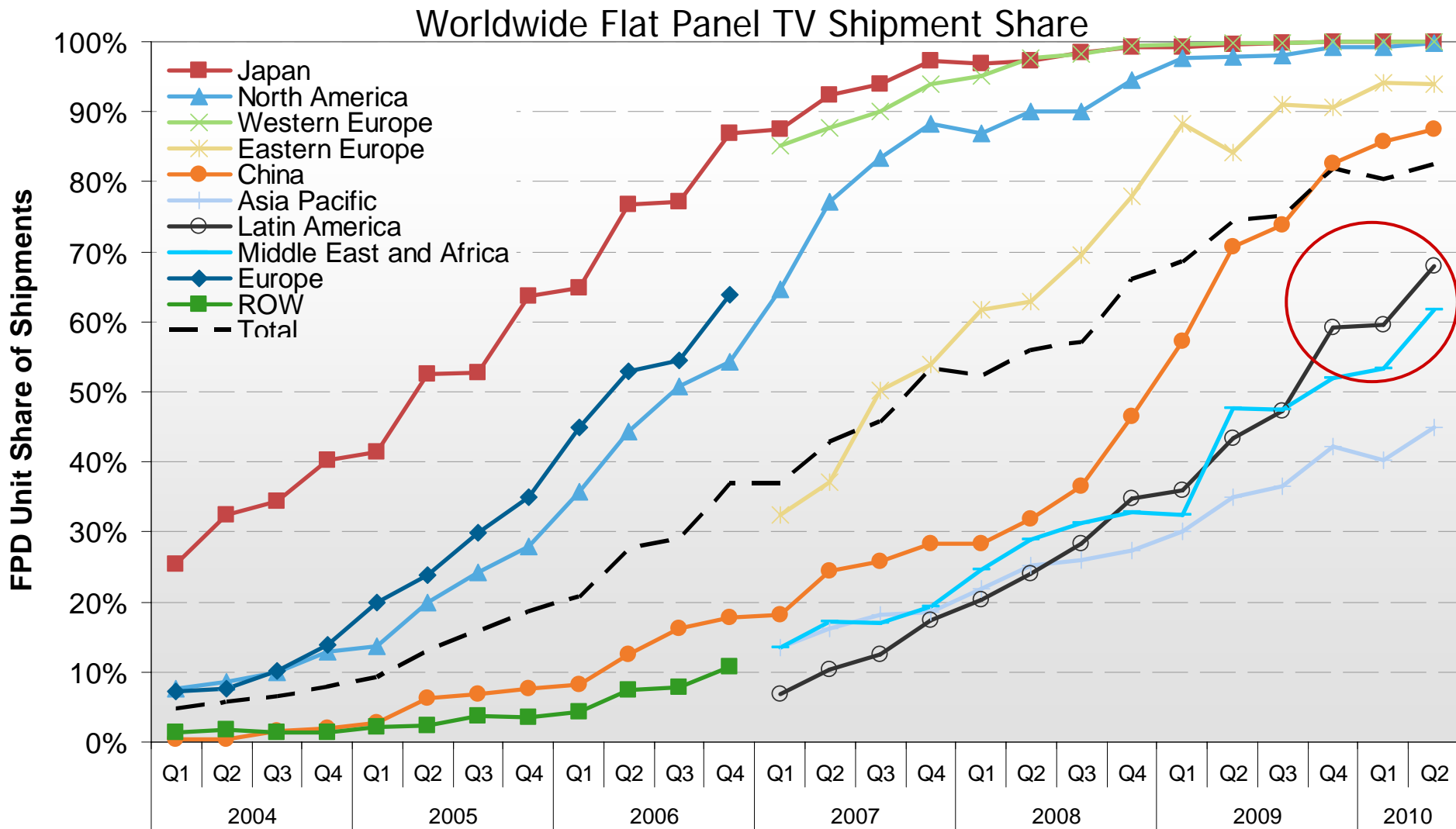
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Transition to Flat is Mostly Complete



Developed Regions Give Way to Emerging Regions

- Latin America crossed the 50% flat panel barrier in 2010.

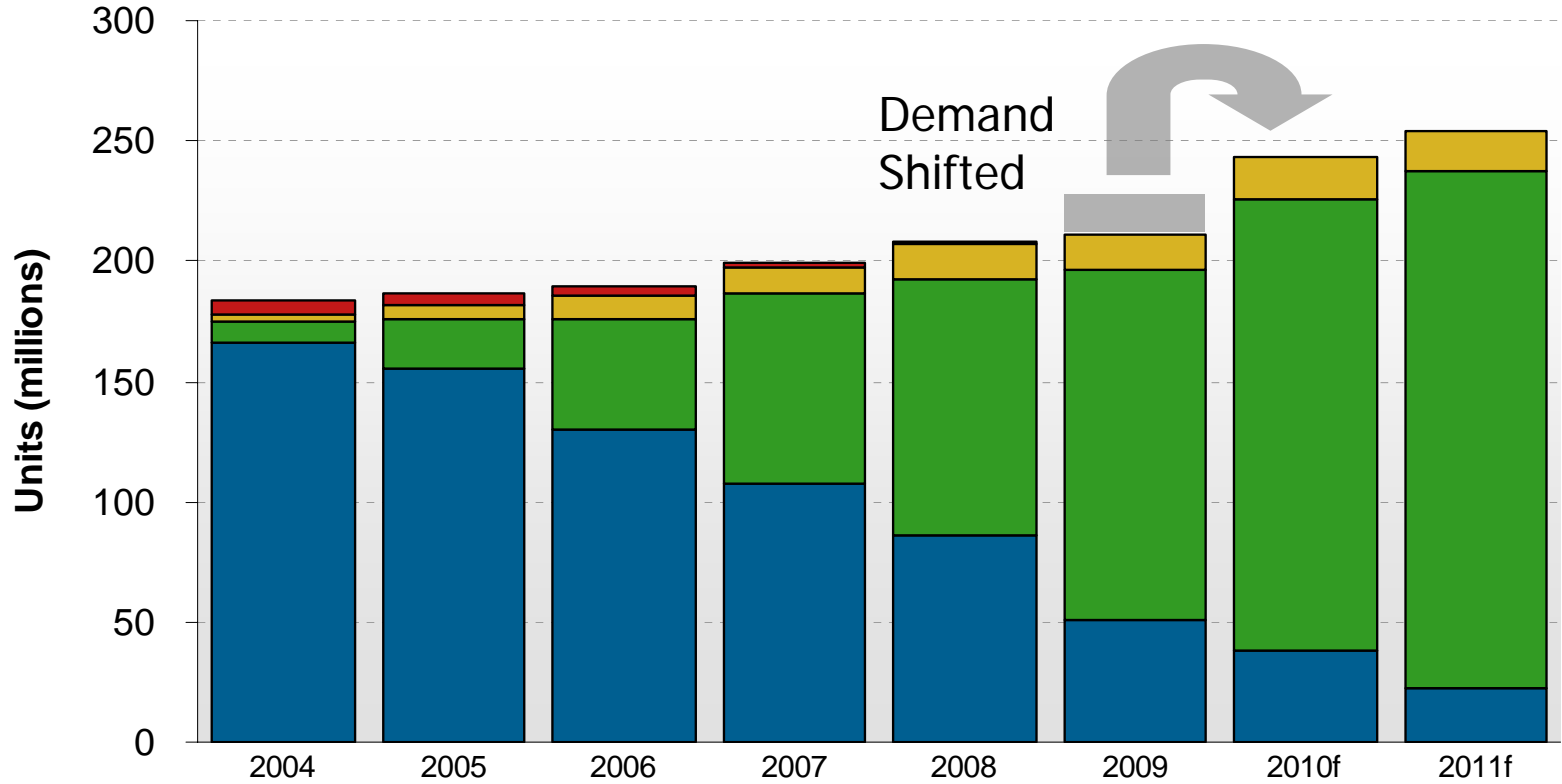


Source: DisplaySearch Quarterly Global TV Shipment and Forecast Report

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LCD Dominates TV Sales; 2009 a Tough Year

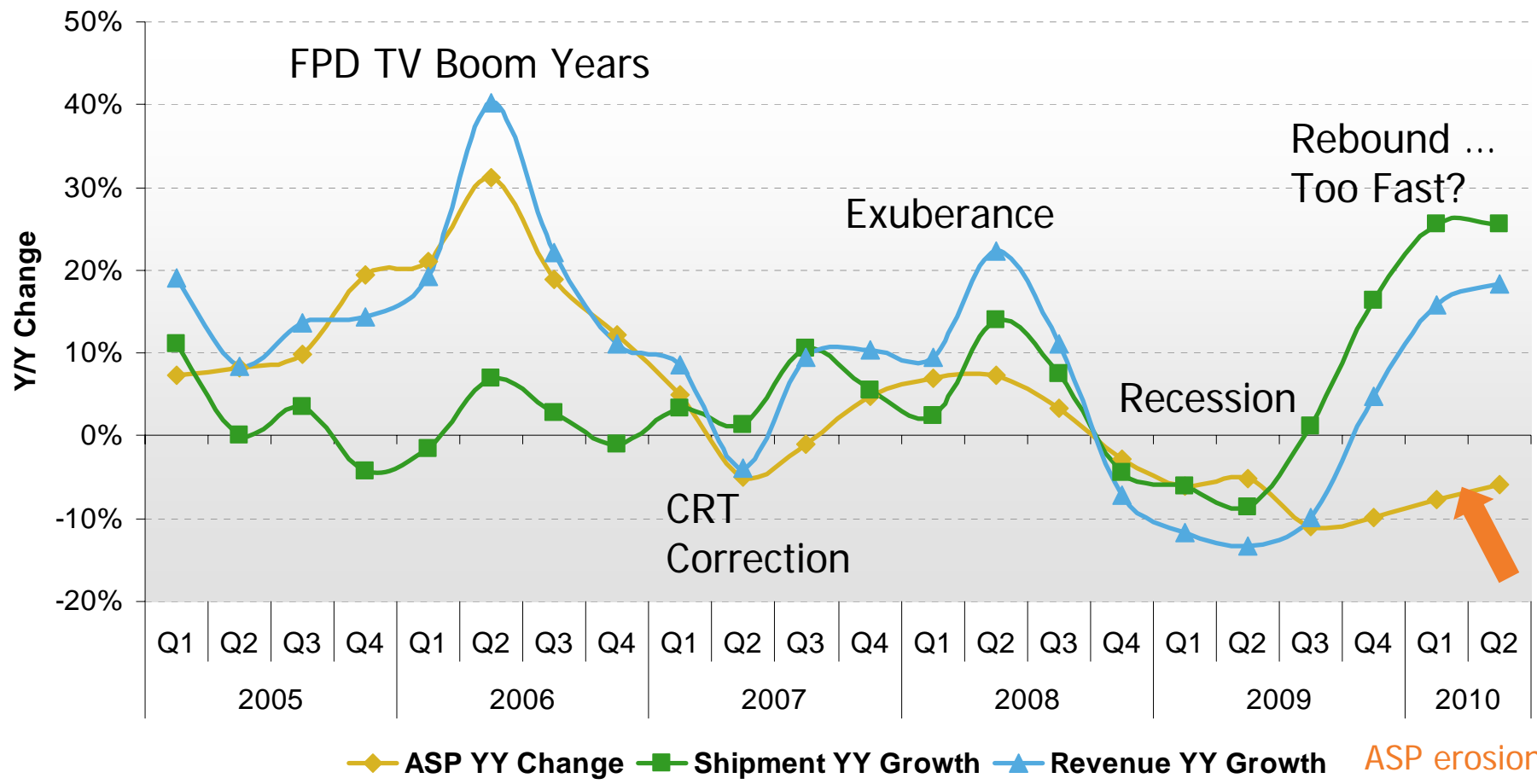
Worldwide TV Shipments



■ RPTV	5.9	4.9	4.0	1.8	0.4	0.2	0.1	0.0
■ OLED	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
■ PDP	2.8	5.9	9.2	11.3	14.4	14.2	17.7	16.9
■ LCD	8.8	21.2	46.0	79.2	106.4	145.7	188.0	214.5
■ CRT	165.9	154.9	130.3	107.2	86.4	51.2	37.7	22.7

Growth Has Been Cyclical; Mirrors LCD Crystal Cycle

Global TV Unit, Revenue, and ASP Growth

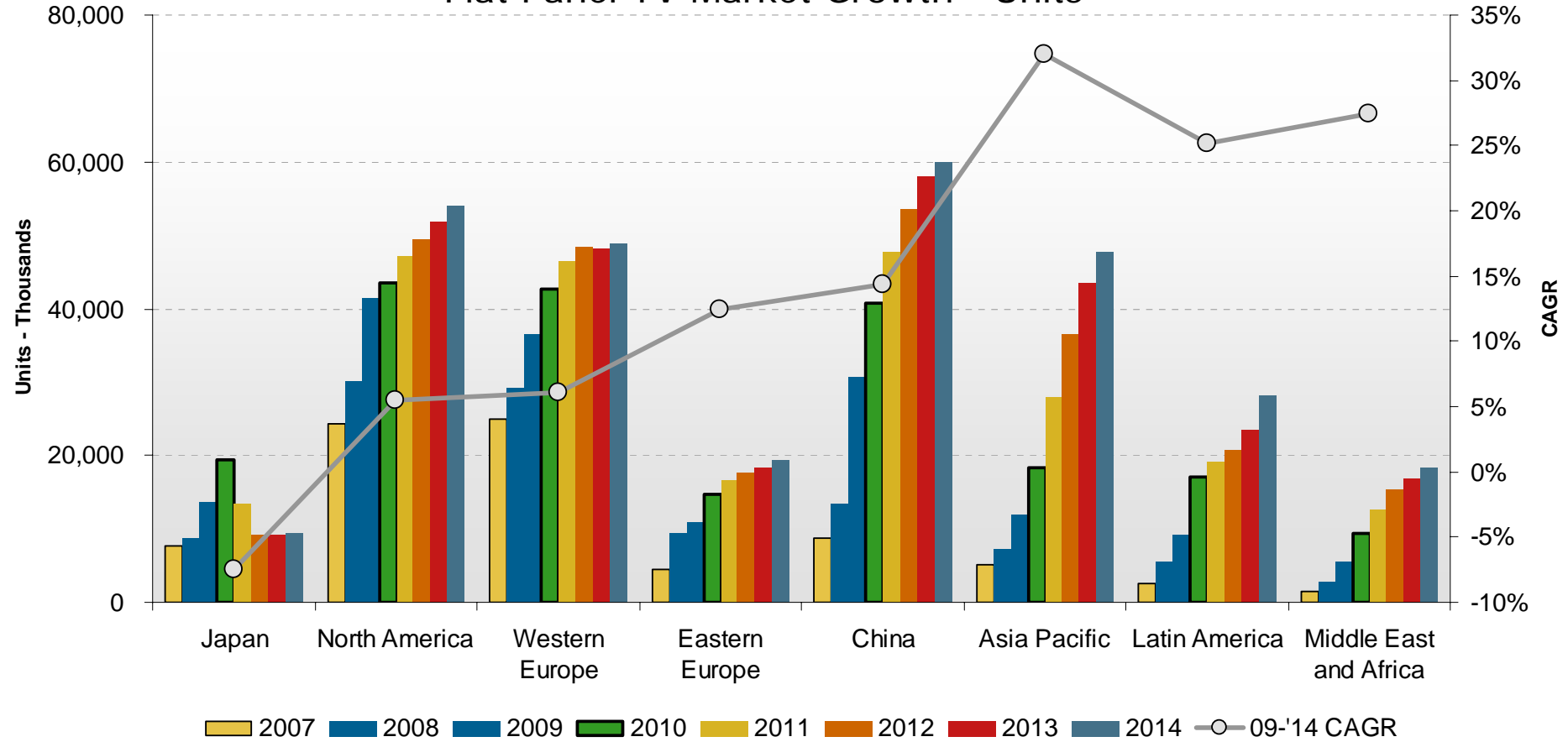


ASP erosion is closely linked to unit growth.

Developed Markets Slowing; Emerging Markets Hot

- North America flat panel market slowing from triple/double-digit to single-digit growth rates.
- Emerging markets maintain solid 20%+ growth. China is also maturing.

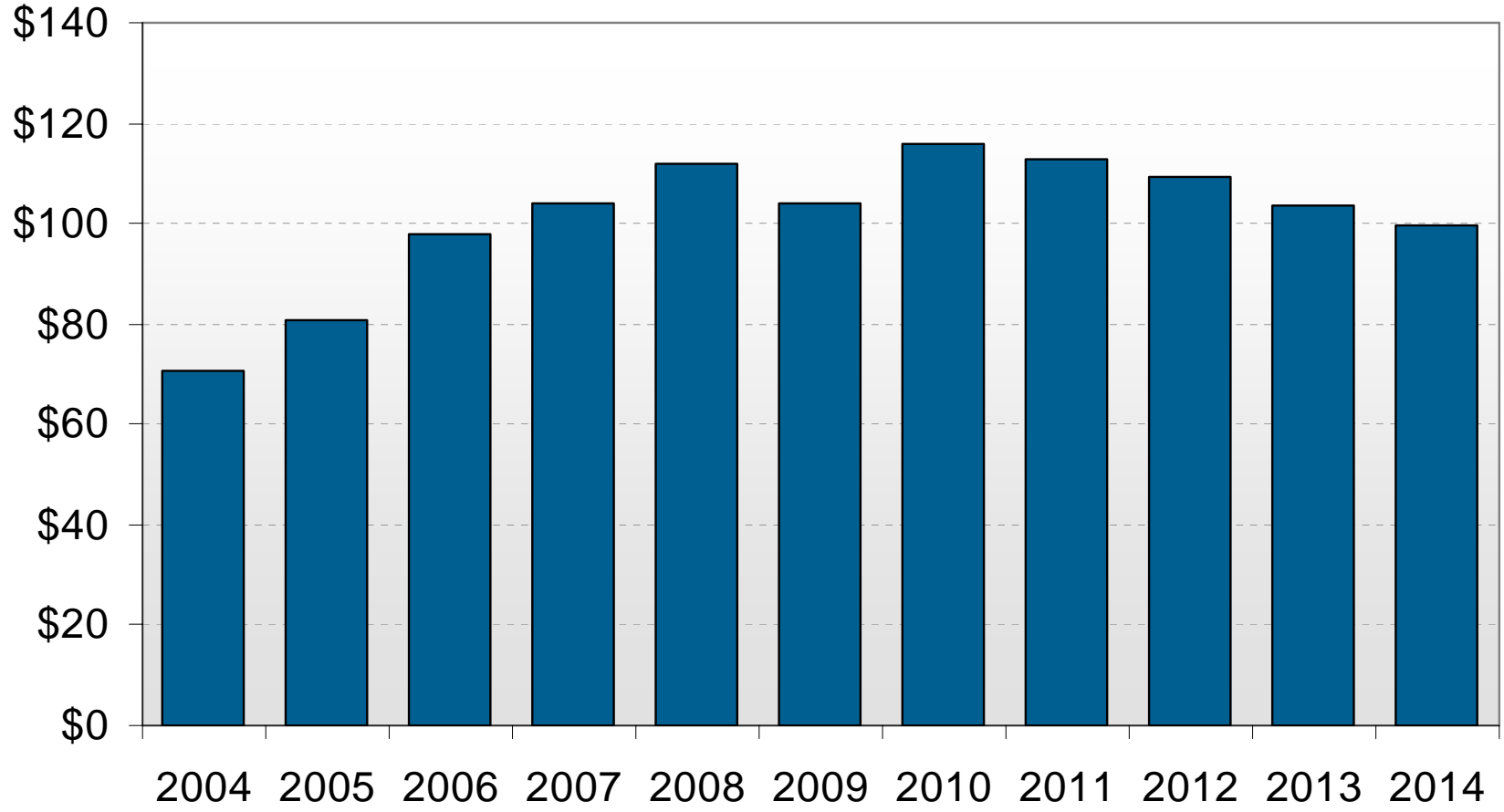
Flat Panel TV Market Growth - Units



Global TV Revenues are Peaking

- As flat panel TV penetration starts to saturate, weighted average ASPs are beginning to fall more quickly.
- Industry will either have to address this issue with new innovation or reduced competition.

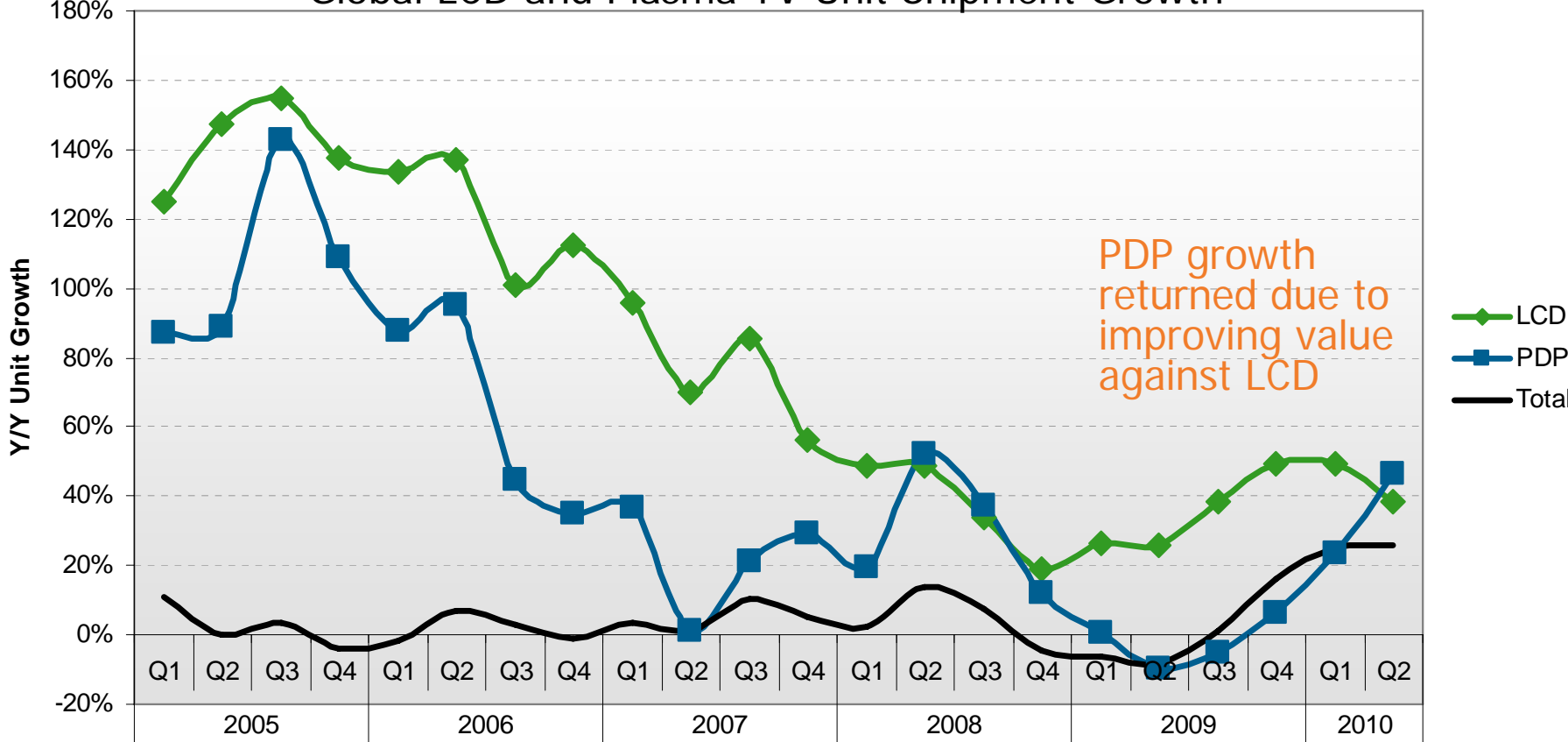
Global TV Revenues



Premium Features are Difficult to Market in a Recession

- New features have been introduced in large sizes, which are the core of the replacement market. However, many replacement customers are cautious due to the economy.
- PDP TV value fell in 2009 as LCD prices plummeted, but the situation reversed in 2010.
 - A large increase in the LED mix and stable panel prices led to softer LCD growth in Q2'10.

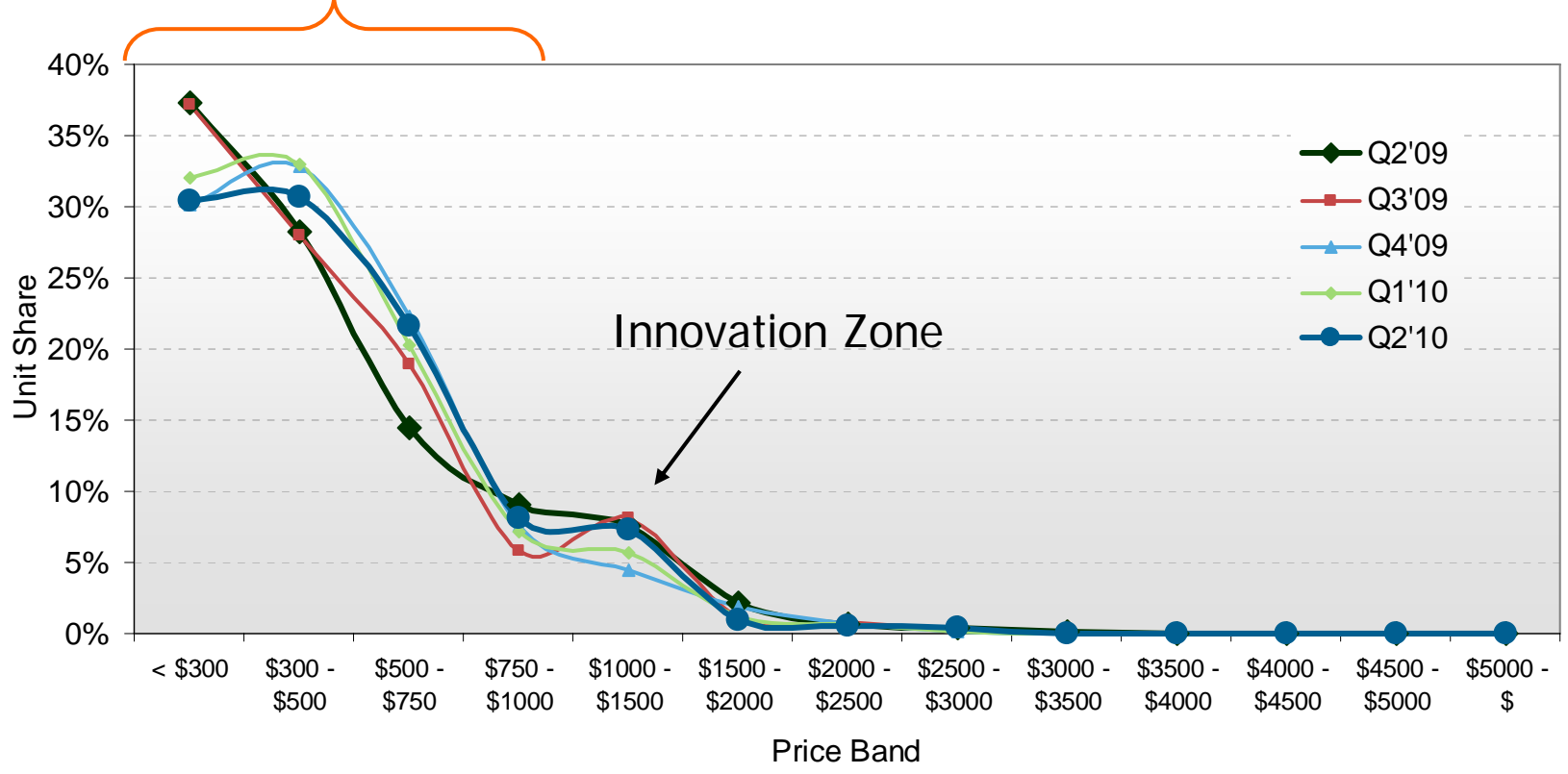
Global LCD and Plasma TV Unit Shipment Growth



TV Purchases Concentrated Below \$500

- The \$1,000 segment is more prevalent in well-matured markets like North America.
 - Large sizes (40" +) have weaker penetration in many emerging markets.
- LED, 3D, and connected TVs are most common at the \$1,000-1,500 price point.

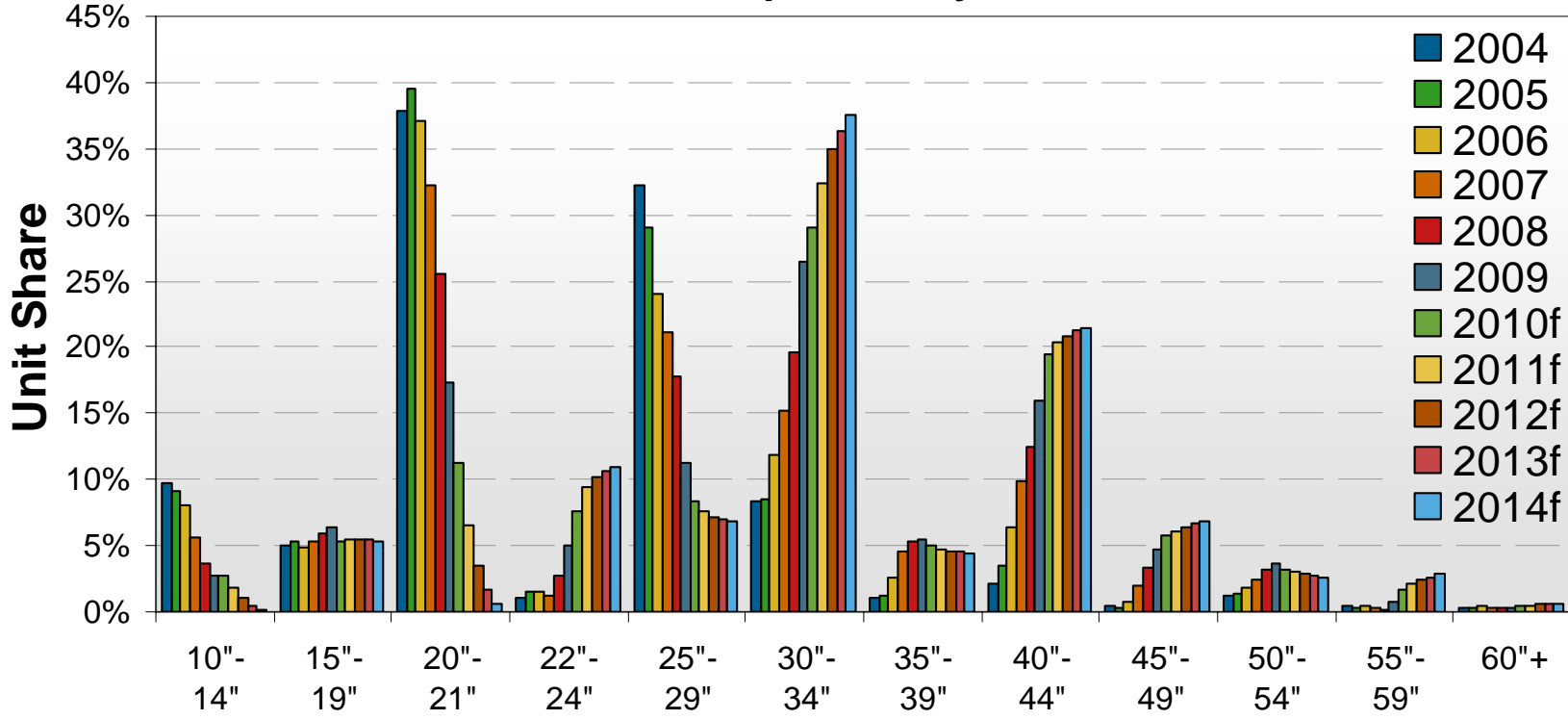
91% less than \$1,000 → 96% Latin America
 61% less than \$500 → 71%



Shift to Larger Sizes Could Offset ASP Declines

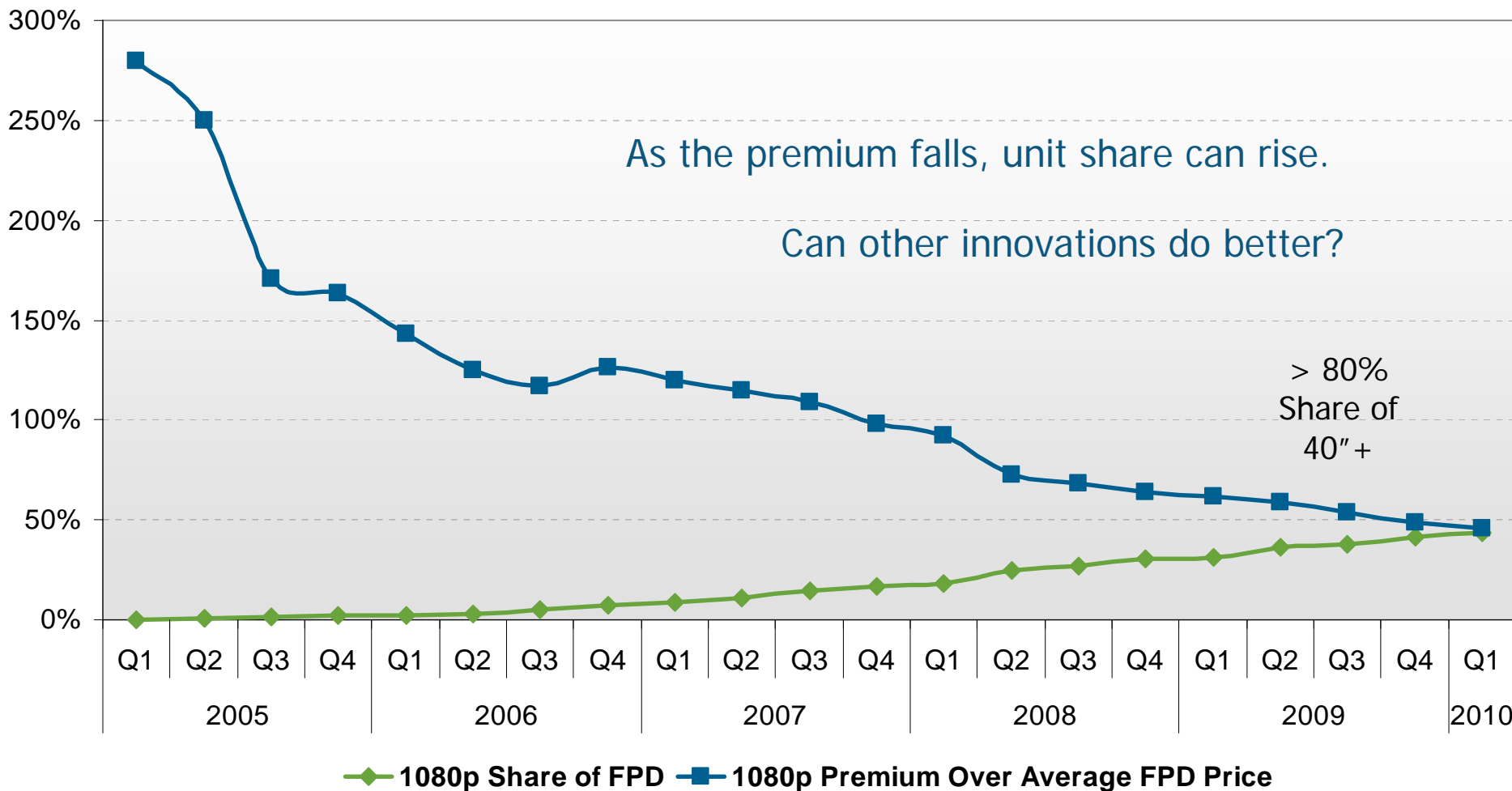
- Strong bump in 40-44" and 45-49" size categories as prices breaks or nears \$500/\$1,000.
- Small sizes losing share as prices compress and replacements move to larger sizes.
- 50"+ market is slowly expanding.

TV Unit Shipments by Size



1080p was First Major Flat Panel TV Innovation

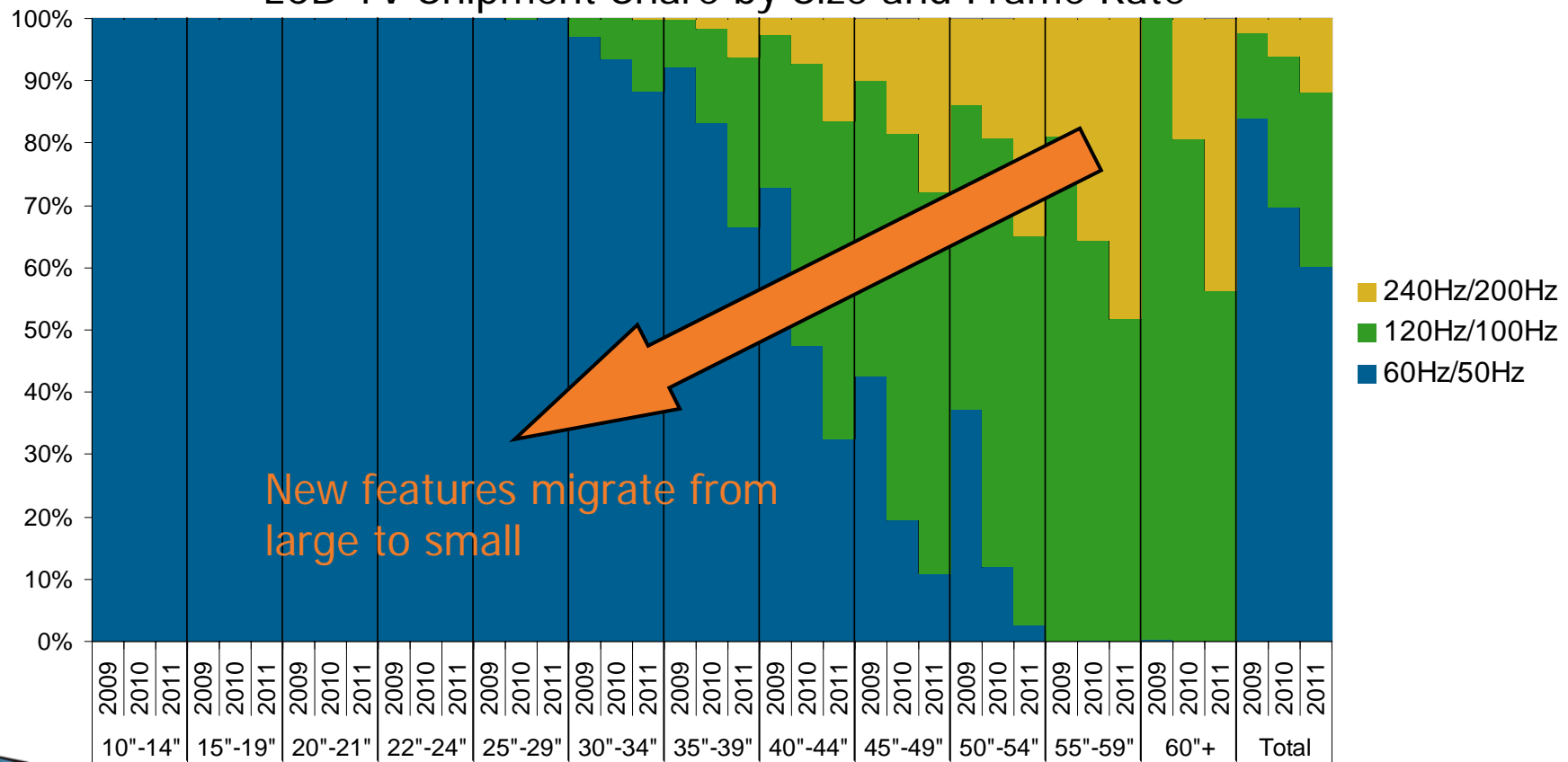
- 1080p is barely at the 50% threshold in total share of FPD.
- This reflects a strong bias towards larger sizes.



Other Performance-Oriented Features Focus on 40" +

- High frame rate models were introduced to improve picture performance of LCDs and have strong adoption in 40" + sizes.
- Overall, these account for less than 25% of all LCD TV shipments.
 - Feature-stacking drives premiums up. The average 240 Hz 40/42" LCD is 50% more expensive than 60 Hz.

LCD TV Shipment Share by Size and Frame Rate



New features migrate from large to small

Increased Pace of Innovation is a Challenge

2006



+ 1080p

2007



2008



+ 120 Hz

2009



+ 240 Hz

+ LED

+ Connected TV

2010



+ LED

+ 3D

+ Connected TV

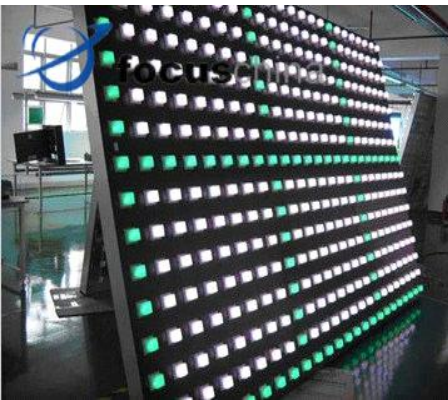
1-2 year
product life
cycle

6-12 month
product life
cycle

Pace of Innovation Shortening Development Cycles

2010's Trilogy of Significant TV Tech Innovations

LED



3D TV

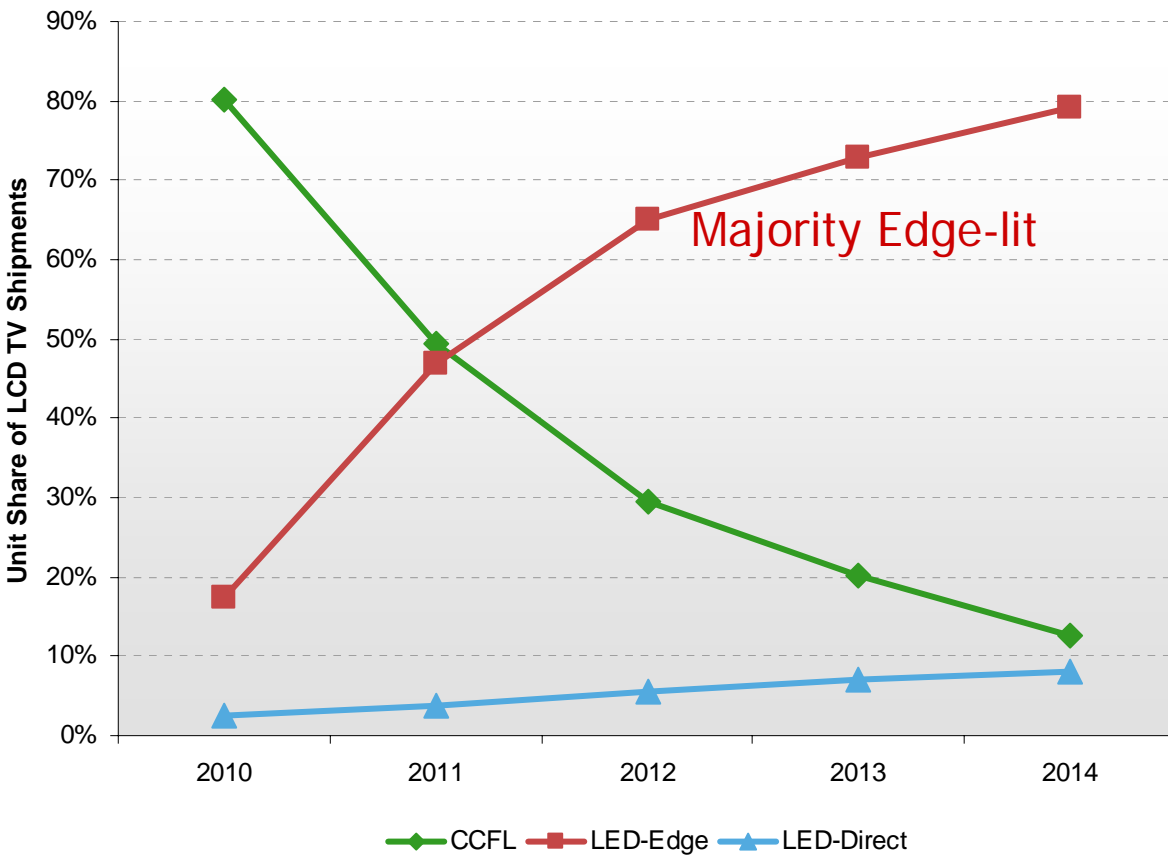


Connected TV



LED Replacing CCFL LCD as Flat Panels Replaced CRT

LCD Share by Backlight Type



Premiums to Drop Significantly from 2010 to 2011

40-50%+



<30%

- This rapid transition indicates that the feature is accepted, but only at a sharply reduced premium.

3D TV Stays High-End in 2010; Rapidly Moves Down Market



Rear Projection



LCD



Plasma

Sizes	60"+	40"-72"	50"+ (40"+ Japan)
Resolutions	1080p	1080p	720p + 1080p
Frame Rates	120Hz	240Hz+	N/A

Notes

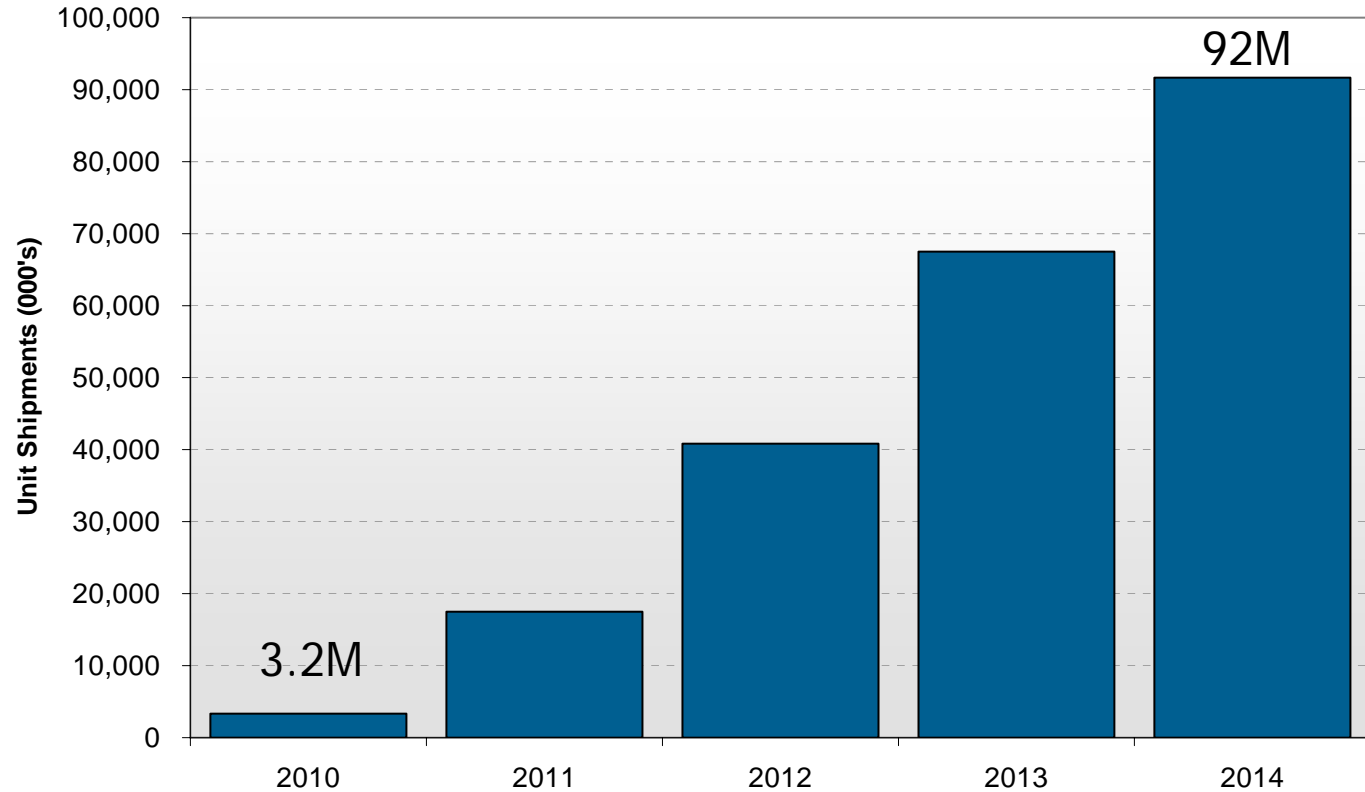
*LED + CCFL
120 Hz Possible/Likely*

Most Sizes in 2011

3D TV has Big Intro in 2010

- Balancing hype with the realities of an immature ecosystem will be a challenge.

Worldwide 3D TV Forecast



Primary Hurdles

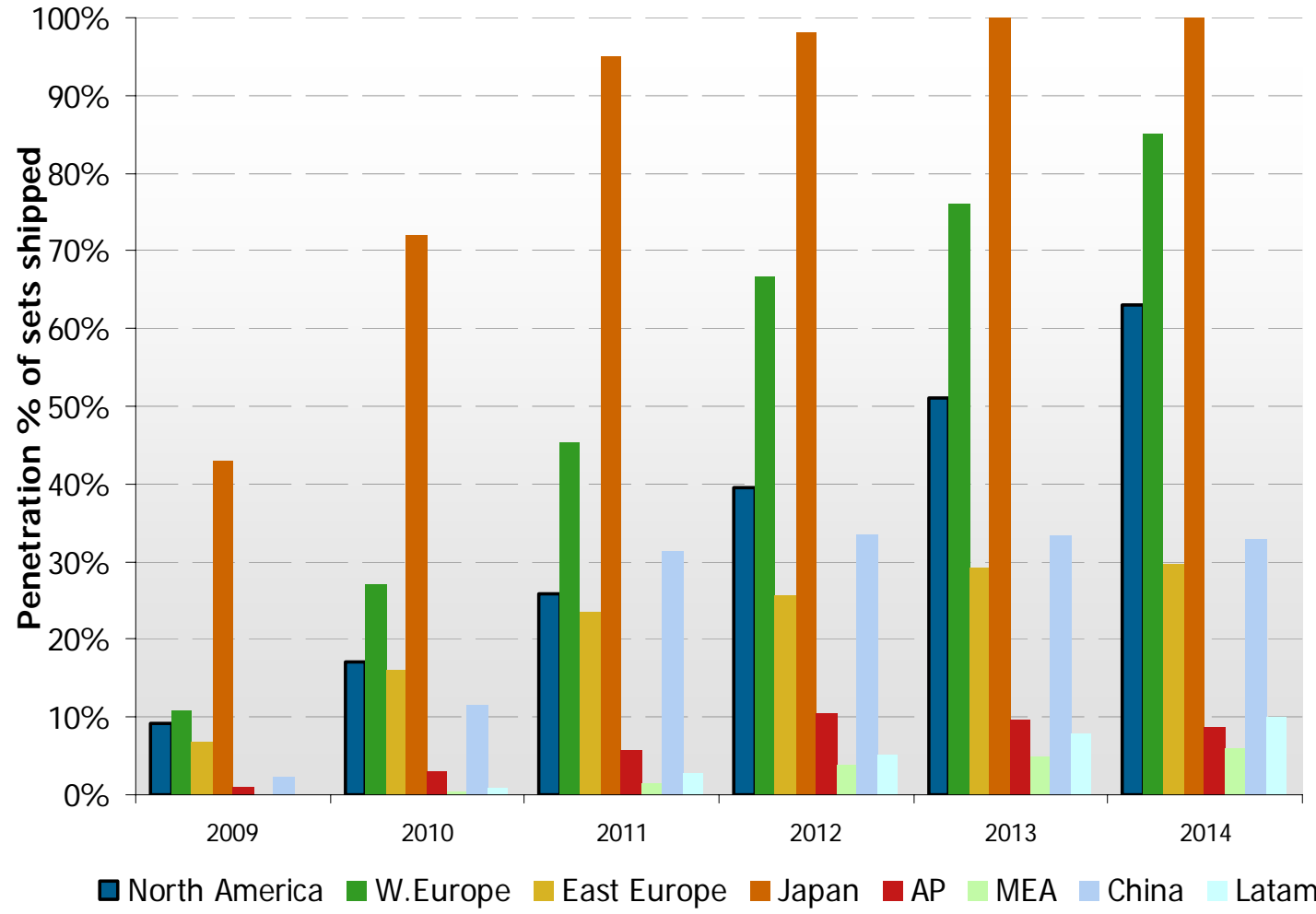
1. Content
2. Education
3. Accessory Market
4. Low Quality Experience
5. Price Premium

Rapid growth comes from vanishing premiums and SKU proliferation.
Nearly all sets 40" + with 120 Hz + frame rate (for LCD) will be 3D-ready.

Connected TV Market is Becoming an Important Battleground

- There are many different levels of connectivity that are not well-defined.
 - Smart TV concept is emerging.
- Manufacturers are looking for alternate business models for low-margin hardware.
- There is a lot of M&A activity and new entrants.
- Partnerships and alliances will be crucial.
- There is a very real possibility that connected functions will win in STBs, not TVs.

Worldwide Connected TV Forecast



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Summary

- TFT LCD will continue to dominate the global display market, although new technologies like OLED will gain some momentum in 5-10 years.
 - Plasma is still relevant.
- IT products dominate consumption of large-area TFT LCD panels on a unit basis, but TVs account for the vast majority of area consumption.
 - New capacity will start to shift from focusing on producing larger sizes to making existing sizes more efficiently, especially 32– 46”.
- Most global TV shipments are flat panels, even in emerging countries.
 - Household penetration still has a ways to go.
- LCD TV dominates the global flat panel TV market.
 - There are a wide range of sizes.
 - CCFL → LED is reducing power consumption.
 - Plasma is still a strong competitor for 40”+.
- The highly cyclical market means that it is critical to react quickly to changes.
 - External factors can bring unexpected opportunities.
 - Anticipating cyclical shifts is key to profitable operations.
- Slow growth of the flat panel TV market is due to maturity, but new technologies are aiming to drive new purchasing patterns.
 - 3D TV is slowly emerging, will probably become ubiquitous.
 - IPTV/connected TV can alter the TV usage model.
- The product development cycle has gotten shorter, but it is stabilizing.
 - It must be in sync with distribution channels and consumers.

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