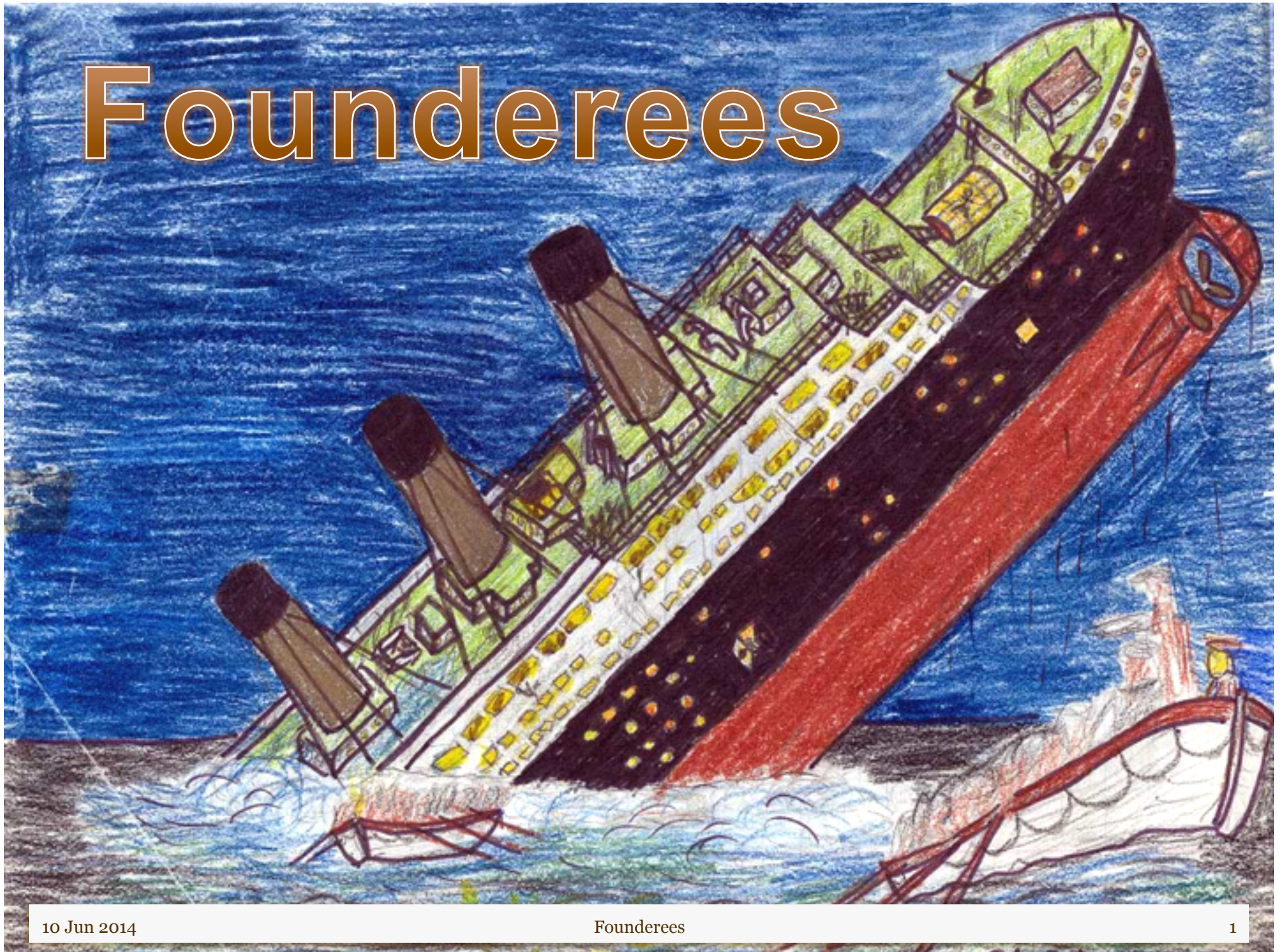


# Founderees





# This year continues the nautical theme from There Be Dragons in 2012

Panel makers were seen sailing uncharted waters seeking OLED fortunes on some coconut island.

The question was how many would arrive...

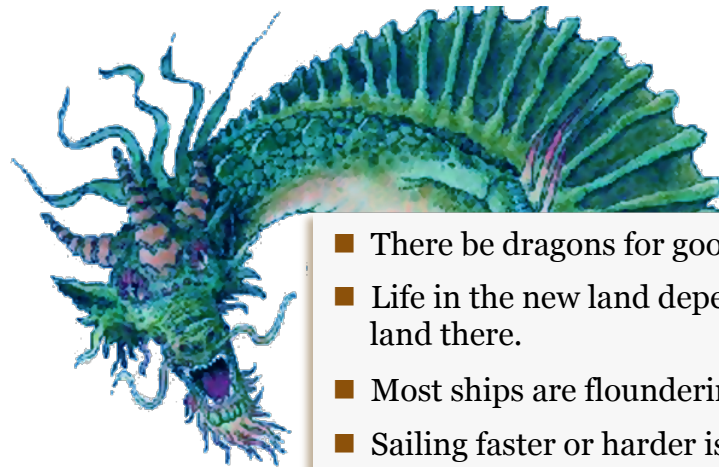
And how many coconuts were there to share around.

If one panel maker came to dominance, some stability might develop for the leader and a few minions.

If ships kept arriving, there might not be enough for all.

Two years later, we see one dominant OLED leader.

## Conclusions from 2012



- There be dragons for good or ill.
- Life in the new land depends on how many ships land there.
- Most ships are floundering in choppy seas.
- Sailing faster or harder is not helping.
- We may see one of two scenarios play out in the new game of AMOLED.
  - A dominant supplier stabilizes a new industry that becomes profitable for a few players.
  - New players keep bringing new stakes to the table and spoiling the game.

BizWitz, 2012 SID Business Conference, Session 4

# It may be a lovely bunch of coconuts but the AMOLED market remains small in area

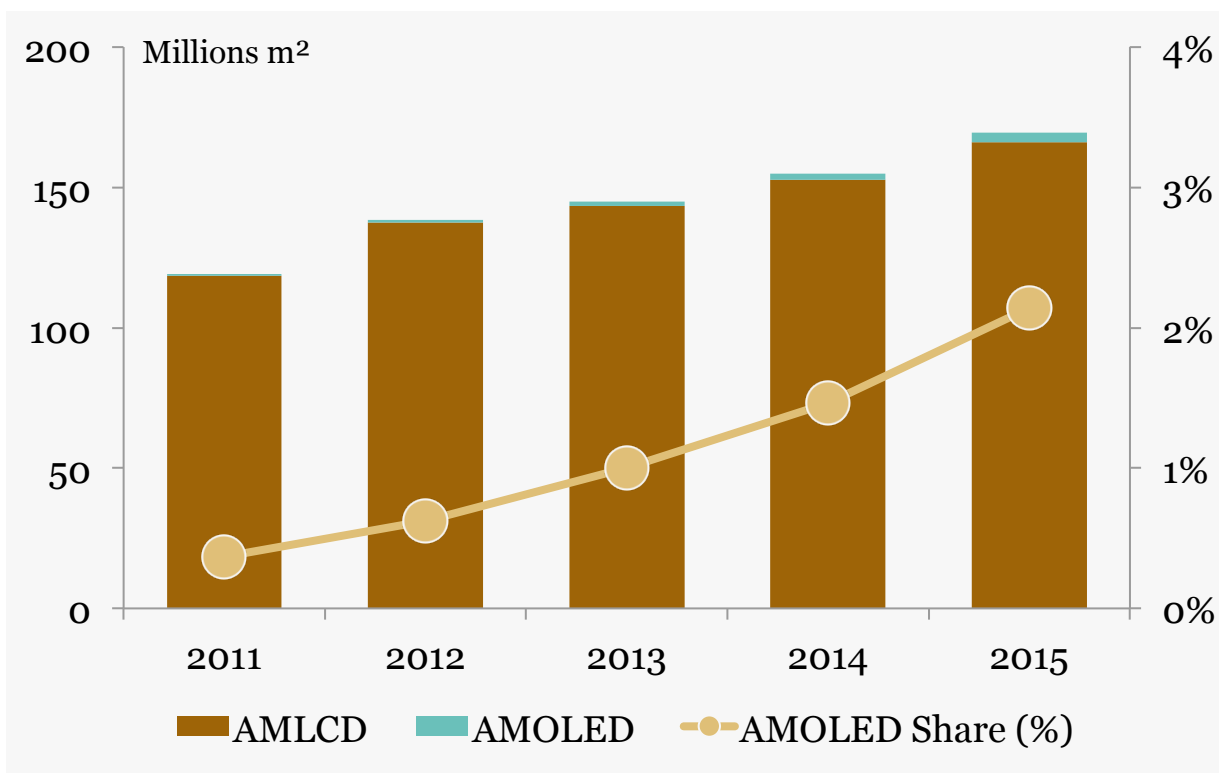
Initial growth from zero always looks exciting but AMOLED may not become important this decade, unless more producers pile into it.

In reality, the LCD vs OLED debate is an internal one... a civil war between product groups inside leading LCD makers... cannibalism on coconut island?

This means that panel makers will depend on AMLCD sales and profits for the rest of this decade, at least.

- So, how's business?
- What's the next big idea?

AMOLED Shipment Area Relative to AMLCD



Source: NPD, BizWitz analysis

# So, how's business?

## Financially, panel makers remain under water.

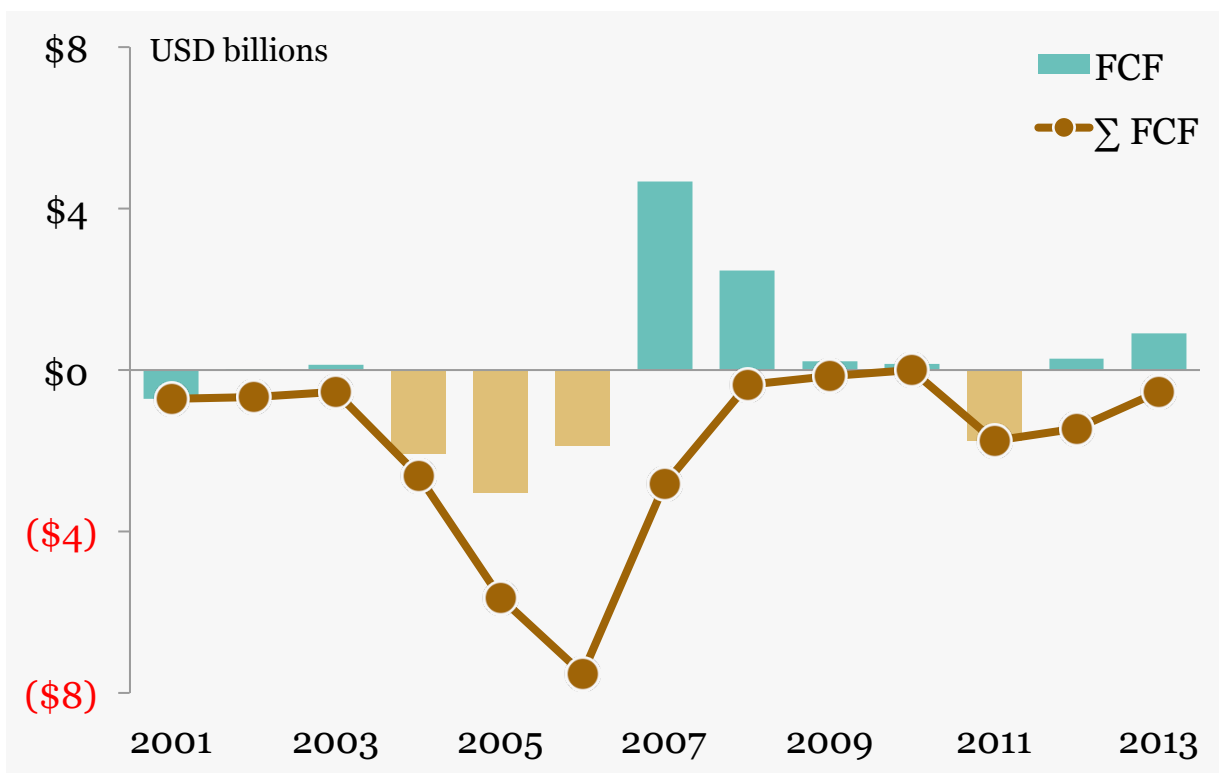
Even better run companies have not generated positive free cash flow to offset the billions of dollars they put into money pits each year.

Panel makers that run out of credit or credibility can reach breakeven as they slow their rate of reinvestment.

Those that stay in the game stay under water.

We covered this last year in “Industrial Limbo: How Low can you Go?”

Combined Free Cash Flow for AUO+LGD



Source: public disclosures, BizWitz analysis

# So, how's business?

## And a national industry has failed, practically.

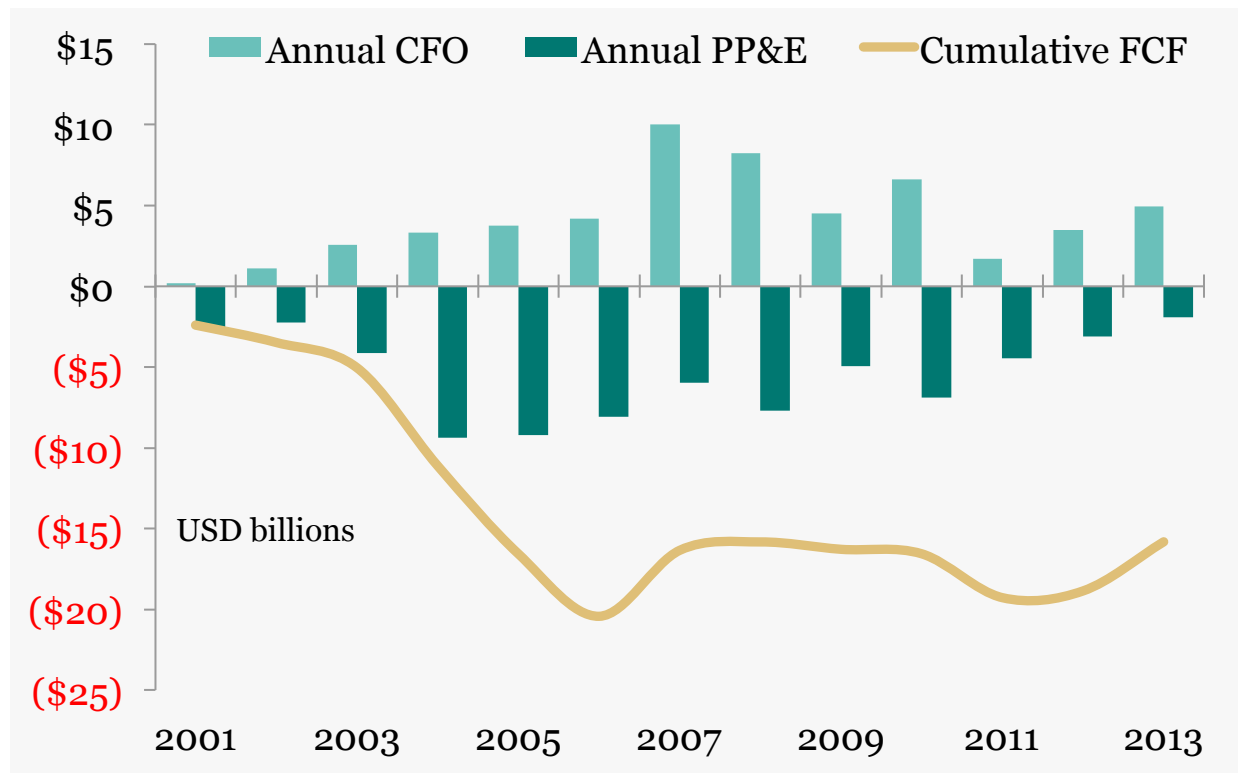
Historical results for Taiwan's AMLCD industry shows how a national effort can create social value but destroy financial value.

Panel makers put more than \$59 billion into the ground and generated less than \$59 billion in EBITDA.

Cumulative free cash flow for 13 years is *negative* \$15.8b, which represents a transfer of wealth from shareholders to employees and suppliers.

The recent IPO of Japan Display (TKO:6740) offers a model for how such deficits can be worked out.

Cumulative Results for Taiwanese AMLCD Makers



Source: public disclosures, BizWitz analysis

# So what's the next big idea?

## Founderees!

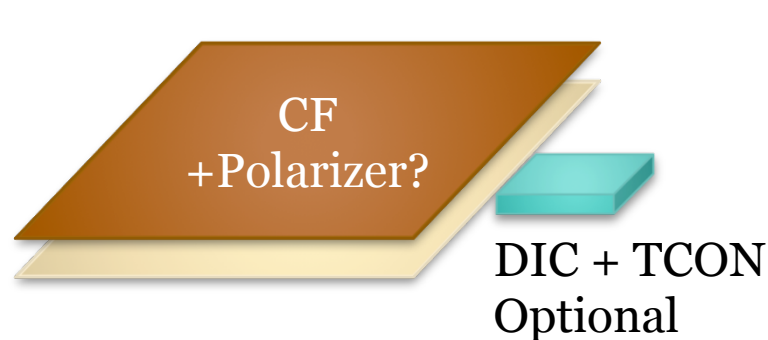
- Like semiconductor foundries, but not.
  - IC foundries offer extensive services so customers can design chips.
  - And foundries standardize processes so designs can scale.
- Unlike semiconductor foundries...
  - LCD makers are structured to design and make modules.
  - LCD makers are not offering design-it-yourself services.
  - LCD makers are surrendering value to customers.

Thesis: Founderees cannot afford competitive levels of reinvestment, so they will cede control to Chinese panel makers, as we have seen in prior national industrial cycles.



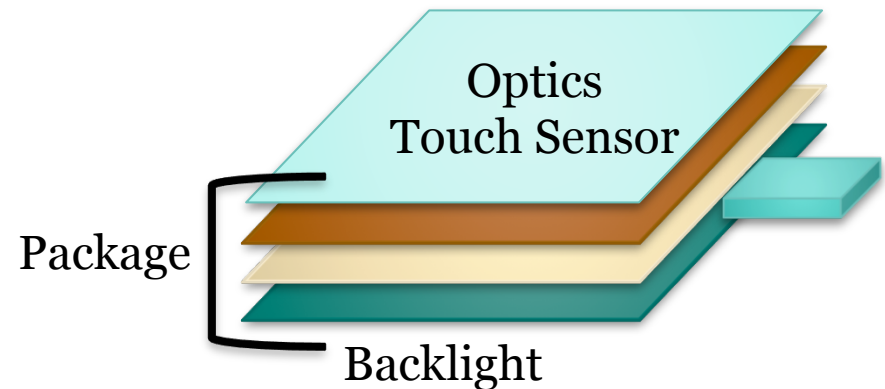
# Divide and be conquered.

## Panel makers just make panels, not displays.



### Open Cell

- Fabricate TFT and CF arrays
- Fill with LC, seal and cut
- Attach DIC or TCON (optional)
- Laminate Polarizers (optional)
- Cost 2/3 to 3/4 of total display

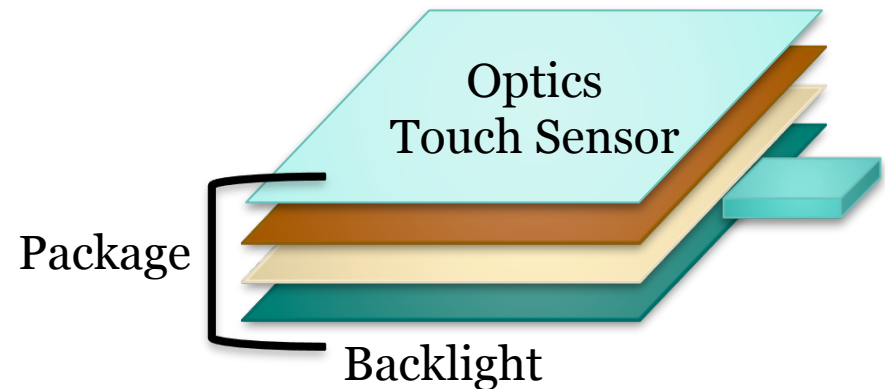
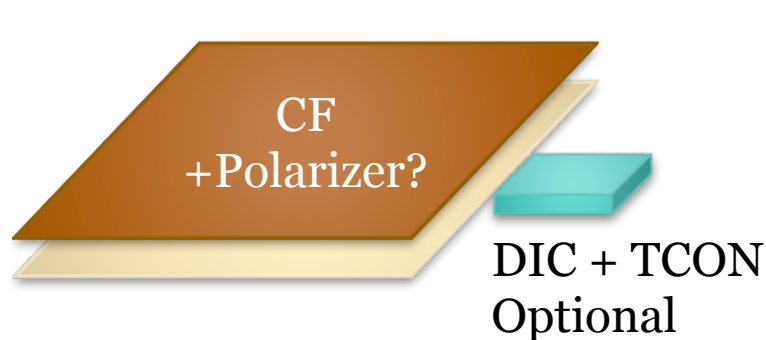


### Module or BMS\*

- Laminate polarizer films (optional)
- Assemble and attach electronics (?)
- Put cell in BLU tray with LGP and selected optical films
- Add surface films or touch sensor
- Package module (electro-mechanics)
- Adds 1/4 to 1/3 of display cost

\* Backlight Module System

# Becoming founderees makes sense, for their customers



## Fabricator Benefits

- Reduce BOM purchasing cost
- Streamline factory flow
- Shorten cash cycle
- Please customers

■ Value subtractive

## Assembler Benefits

- Standardize key components
- Capture 1/3 of display value
- Reduce production steps
- Obtain scale economies

■ Value additive



# So how much are panel makers giving up?

## Sales revenue perspective

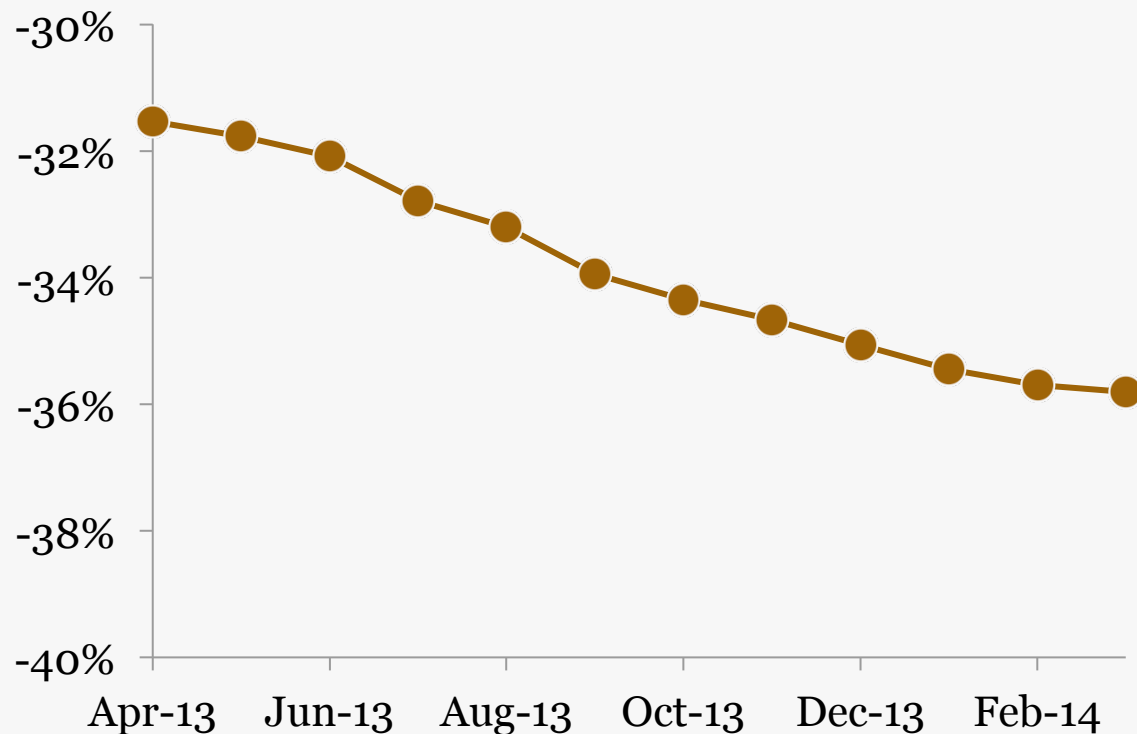
Looking at a year's worth of pricing for TV displays, it looks like open cell prices are falling faster than full module prices and that the gap is more than 1/3 down.

From this we can estimate that selling open cells cuts sales revenue by 1/3.

Based on nominal costing, open cell sales may be slightly positive or negative in terms of EBITDA margin.

But how do open-cell sales affect a producer's ability to reinvest (add capacity)?

Typical Open-cell Price Discount for TV Panels



Source: NPD, BizWitz analysis

# So how much are panel makers giving up?

## Reinvestment perspective

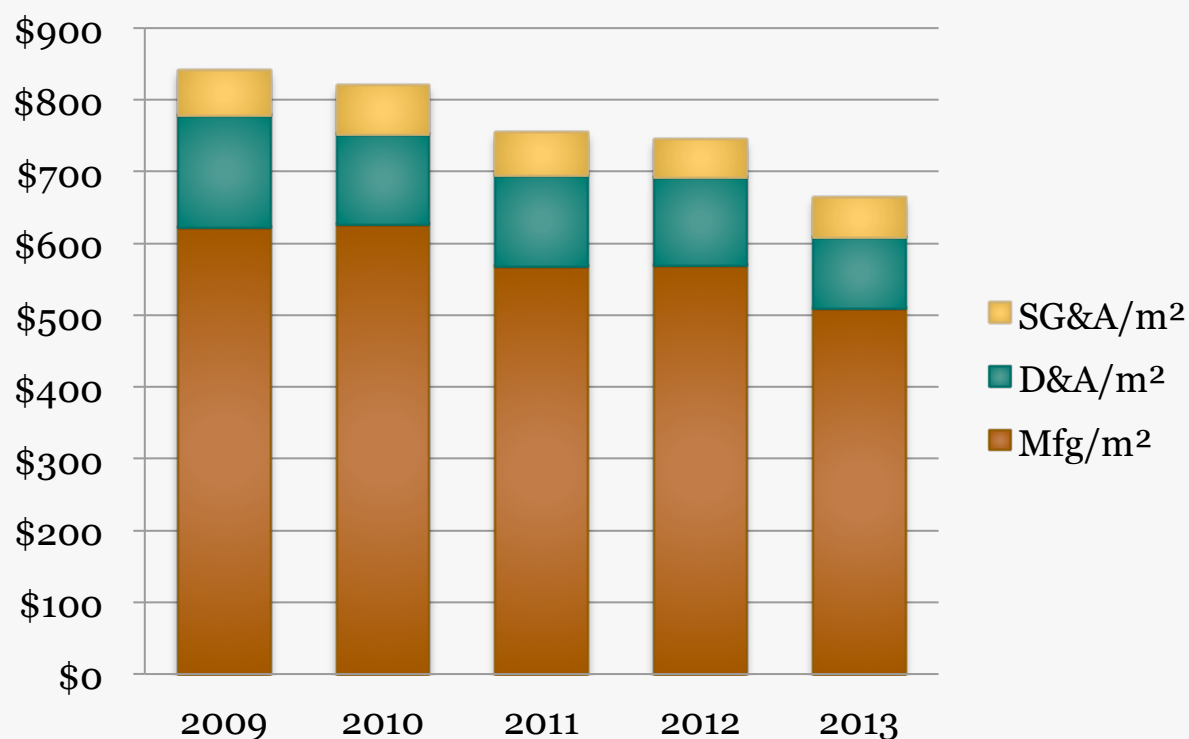
Looking at AUO and LGD, which have different strategies representing much of the LCD industry, we see depreciation continues to be 20% of their operating cost.

There may be some reduction in SG&A from converting to open cell sales primarily, but much of SG&A is a semi-fixed.

This leaves depreciation as the only item to cut in order to preserve EBIT margin...

Based on 2013, depreciation would have to be cut 40% to 50% for open cells to become margin neutral.

Cost of Product Contributions (USD/m<sup>2</sup>)



Source: AUO + LGD public disclosures, BizWitz analysis

# Cutting depreciation in half?

## Not easily or quickly, but what then?

So far, AMLCD makers have been on a capex treadmill.

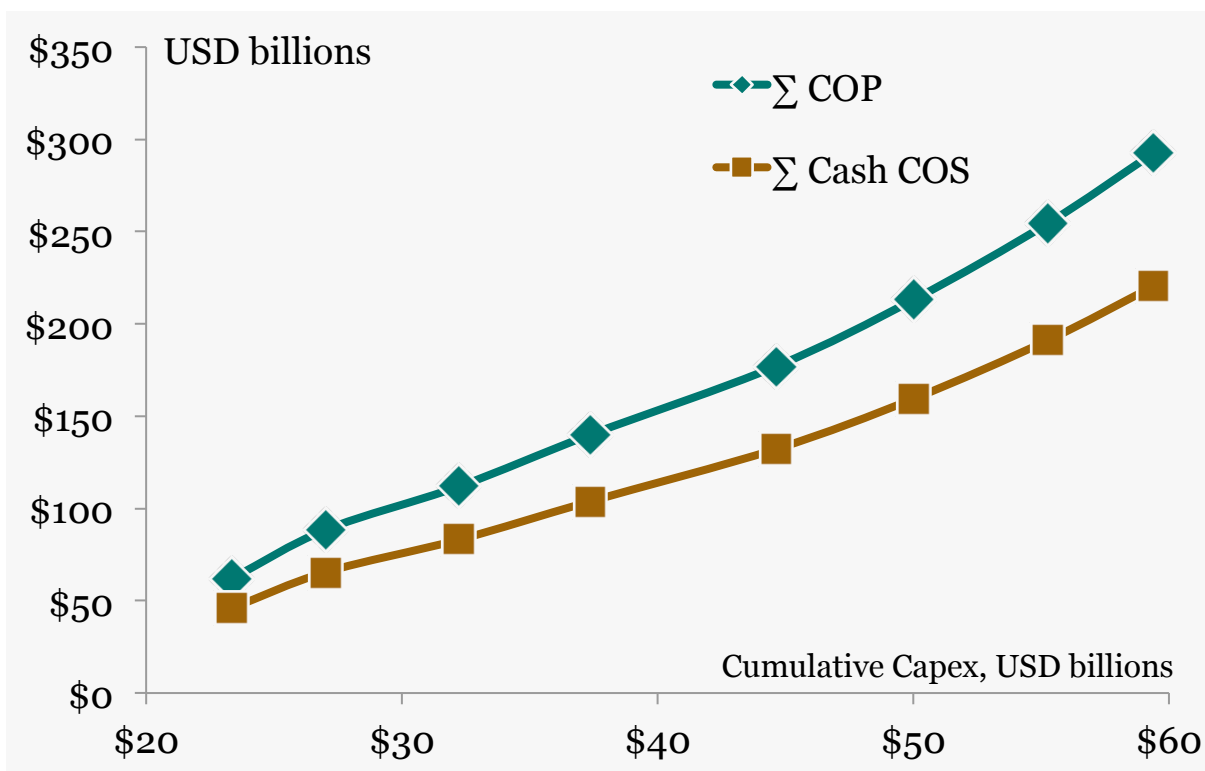
These lines curve up slightly, which implies no economies of scale. Costs should flatten out with increased investment in technology or capacity.

Straight-line depreciation schedules of 4–6 years makes it hard to reduce charges quickly without impairments.

Founderees would have to throw capex overboard, now.

What would this mean for industry growth generally and for founderees particularly?

Cumulative Costs versus Capex for AUO+LGD



Source: disclosures 2002–2013 charted for 2006–2013 by BizWitz

# If Chinese entrants dig deeper money pits, then area output may keep pace with population.

Capacity forecasts imply a 1/3 increase to 310 million m<sup>2</sup> by 2020.

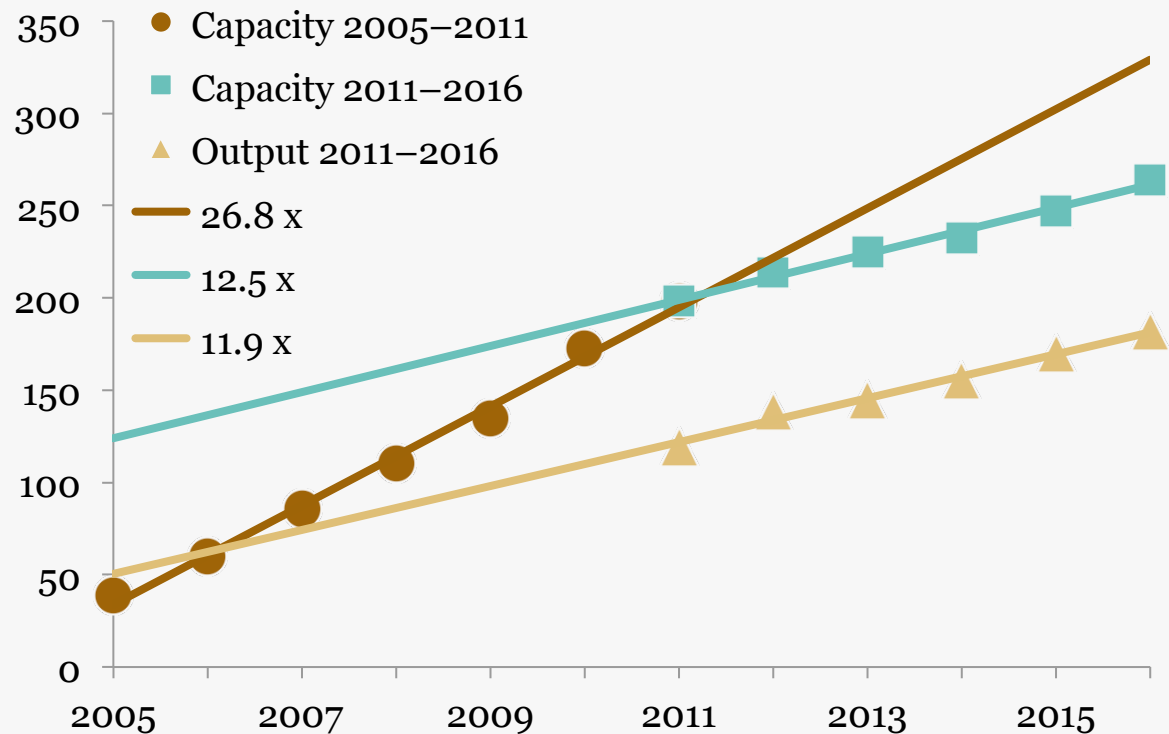
Based on historical trends, that implies cumulative capex must increase 1/4 by 2020.

Founderees must cut capex and reduce depreciation ASAP so they are unlikely to add capacity. They will become irrelevant over time.

This implies that only Chinese producers will have the policy support needed to put more money into the ground.

OECD estimates the middle class population will increase by 1/3 from 2014 to 2020. So, can panels get bigger?

TFT Input Capacity and Output Trends (m<sup>2</sup> millions)



Source: NPD, BizWitz analysis



# Choosing to be founderees would perpetuate a sad historical trend but there are alternatives.

## Founderees

- The more they streamline their fabs, the less capex they can finance.
- The less they reinvest, the less competitive they become in mass market segments.
- Even mobile displays are becoming a commodity, overall. Niches are, well niches...
- The path toward irrelevance can be long or short depending on a maker's market mix of open cell panels.
- Chinese producers may dominate a non-profit market.
- Materials and tools will follow.

## Alternative Strategies

- Stop digging money pits. A rising middle class will clamor for more and some will pay more.
- Integrate forward; add value. Merge with an EMS company or redefine group business charters.
- Differentiate, really. Ultra-high rez with on-glass electronics is one example... think IC industry.
- Enter adjacent technology markets. Who knows more about large-area electronics?
- Become wards of the state. Use social credits to work-down the debt.

# FPD is a difficult business...

## BizWitz analysts are here to help



### Growth

- Market entry
- Business structure
- Phase gates, R&D

### Performance

- Price position
- Cost reduction
- Portfolio balance

### CapEx

- Factory plans
- Tool selections
- Plant conversions

### Sourcing

- Make/buy
- Value chains
- Supplier selection

### Technologies

- Market sensing
- Market & IP value
- Consortia synergy

### Alliances

- M&A candidates
- Partnerships, JVs
- Integration plans

### Plans

- Strategic audits
- Investor insights
- Business valuation

### Materials

- Pricing policies
- Market strategies
- Licenses, royalties

[db@bizwitz.com](mailto:db@bizwitz.com)