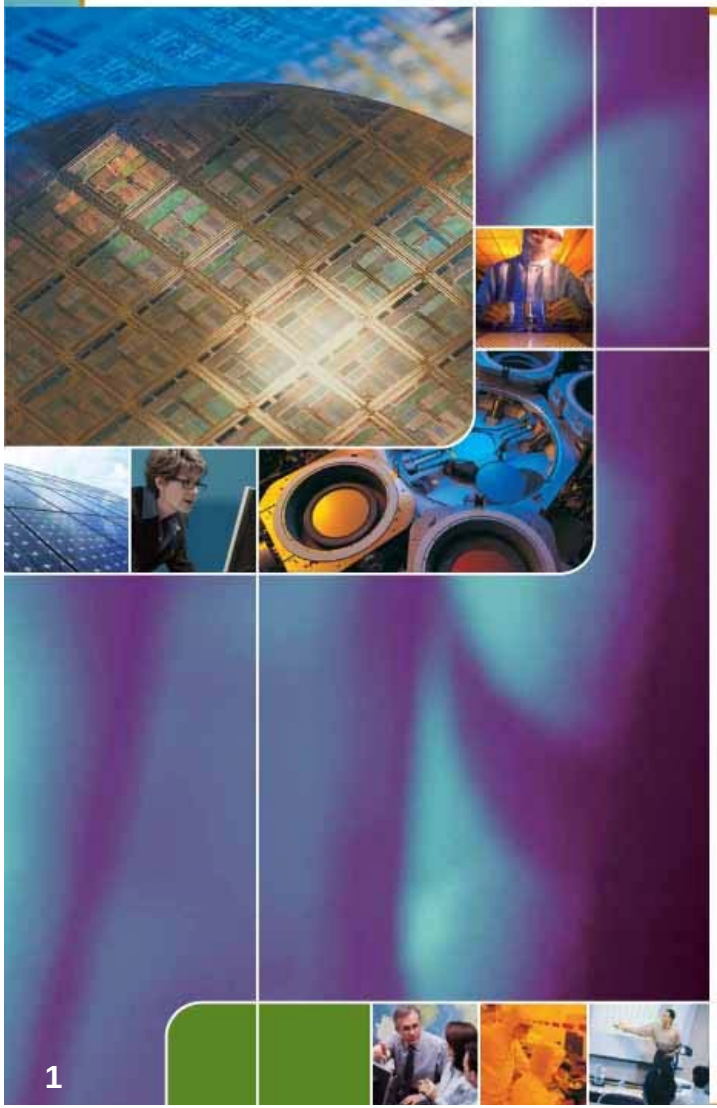
Semiconductor Equipment and Materials Outlook



SEMICON Singapore 2010

Dan Tracy
SEMI Industry Research & Statistics Group

May 19, 2010

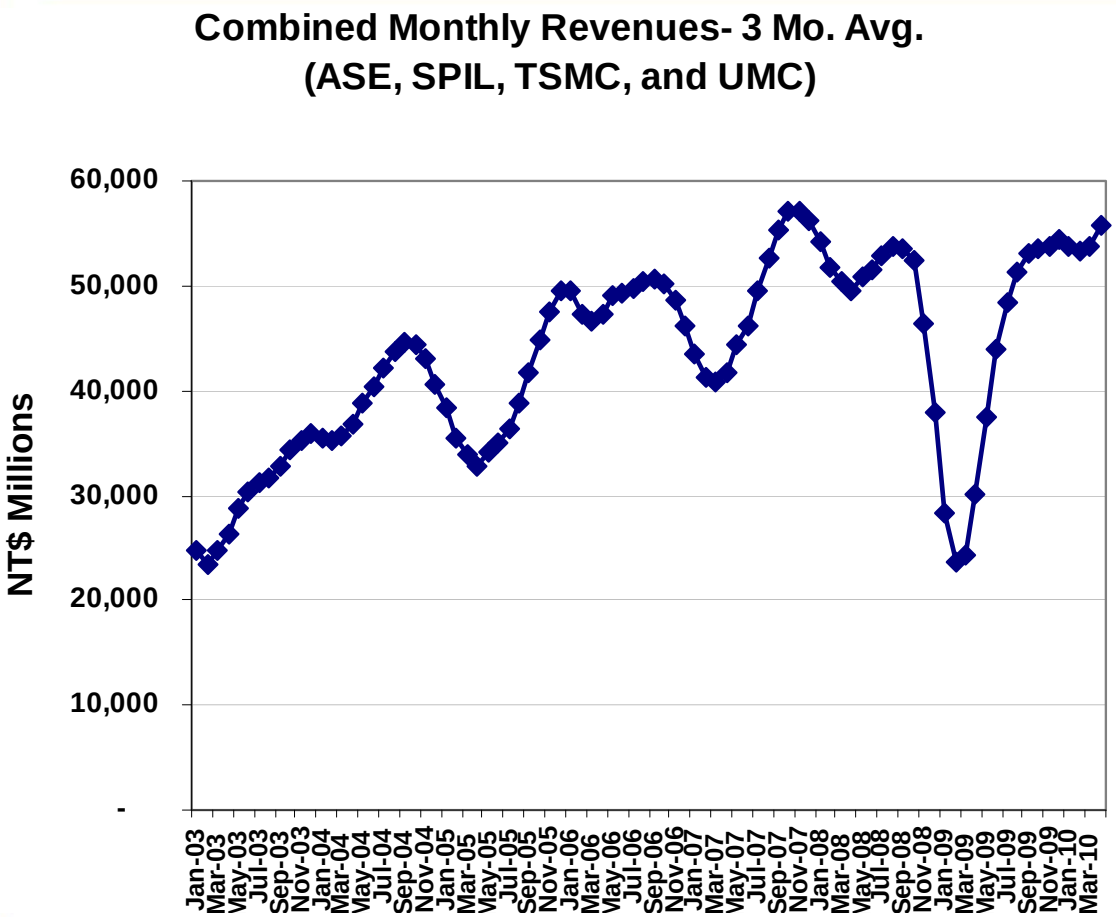
Outline

Update on current market and forecast for,

- ✓ **Industry Trends**
- ✓ **Semiconductor Equipment**
- ✓ **Semiconductor Materials**

Summary

Outsource Manufacturers Monthly Sales



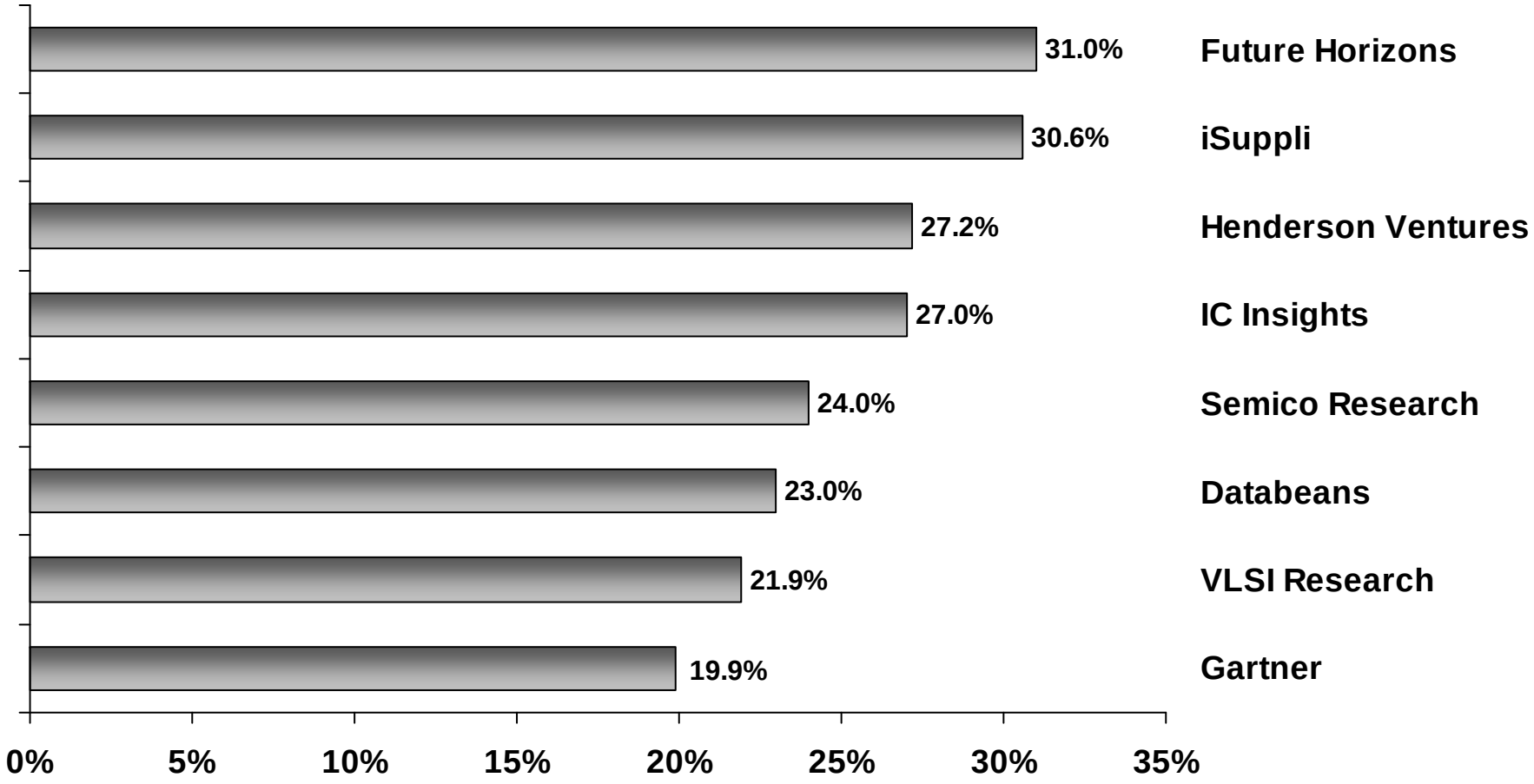
<u>1Q 2010</u>

- Flat vs. 4Q 2009

- 102% above 1Q 2009

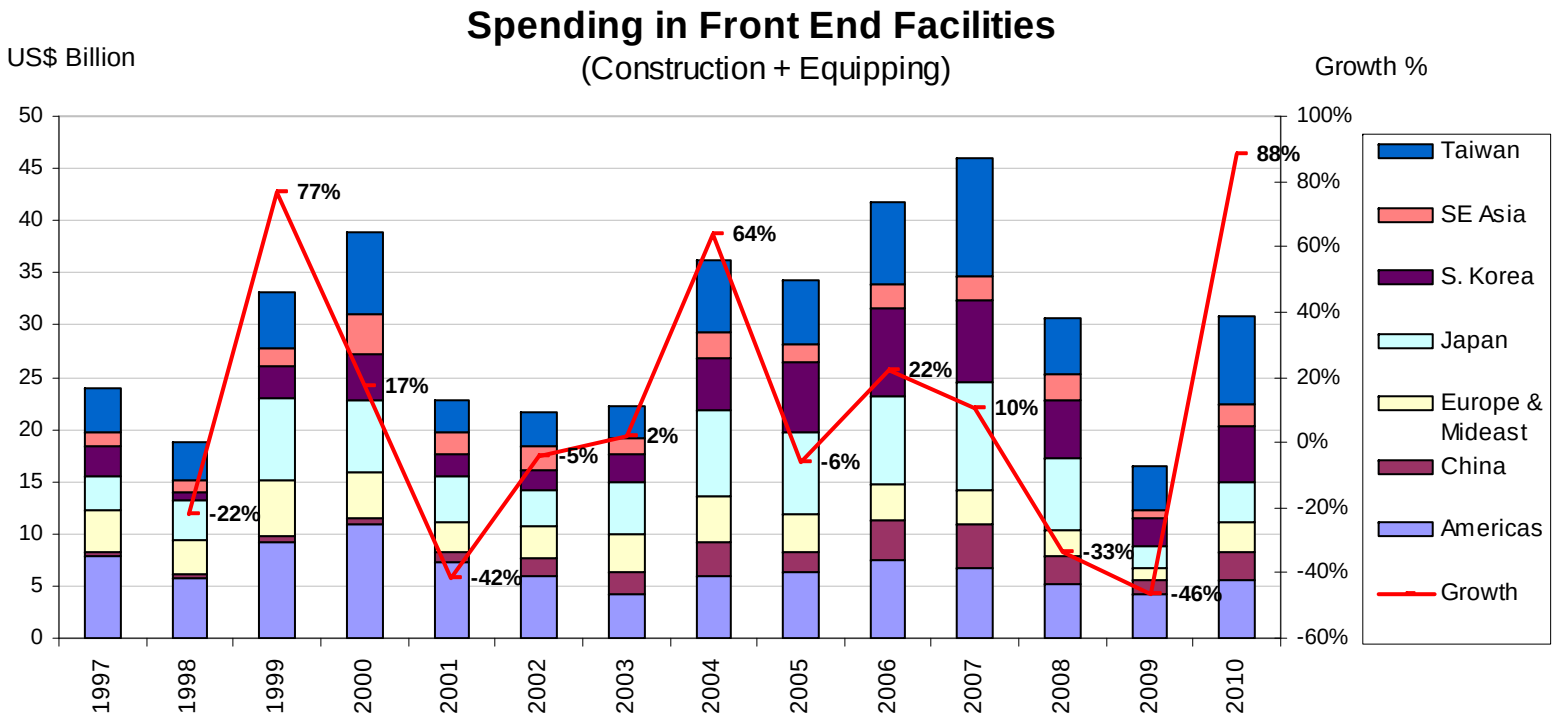
Source: Company reports

2010 Semiconductor and IC Revenue Forecasts



Source: SEMI

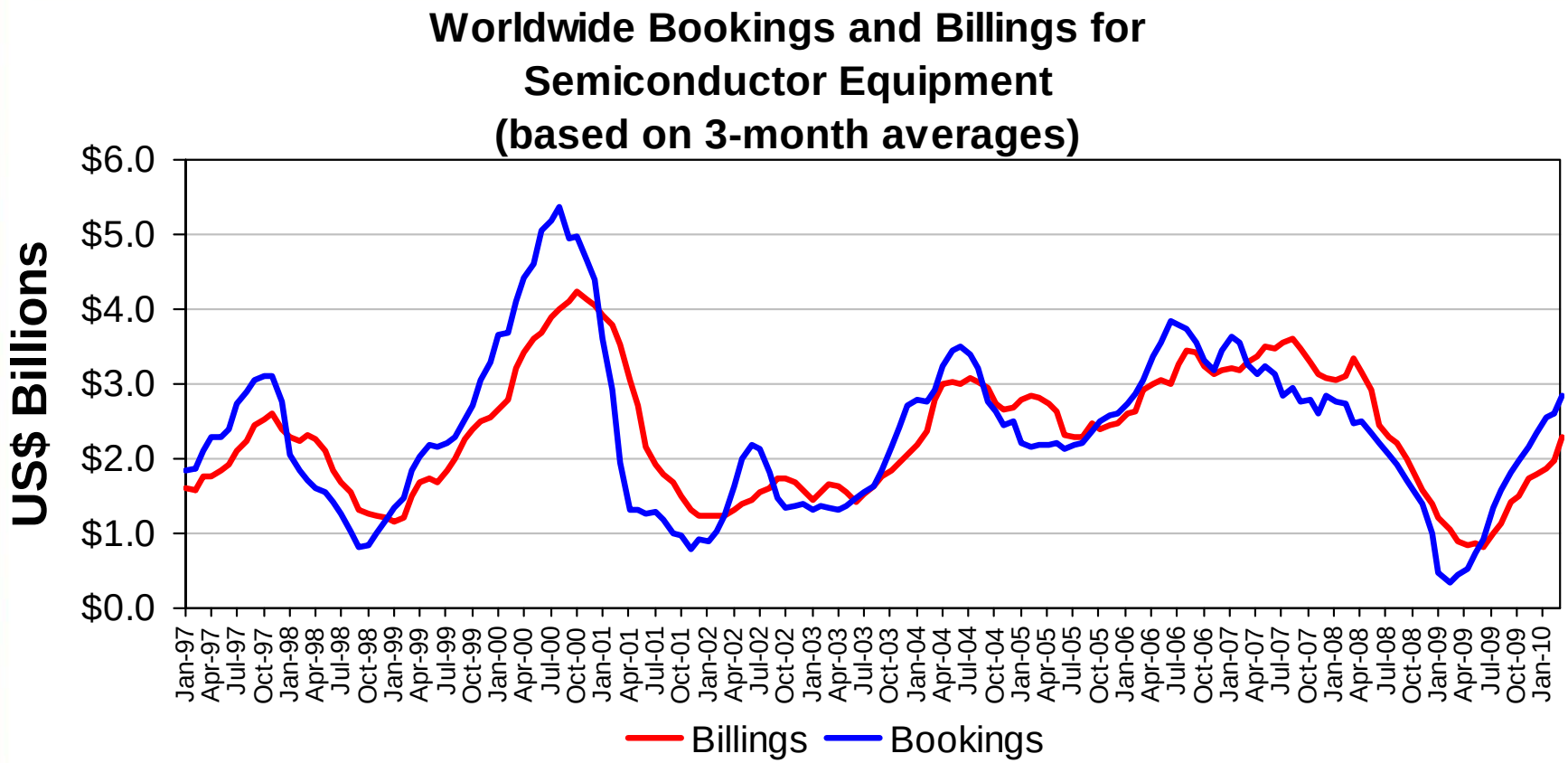
Front End Fabs Spending



Source: SEMI World Fab Forecast, February 2010

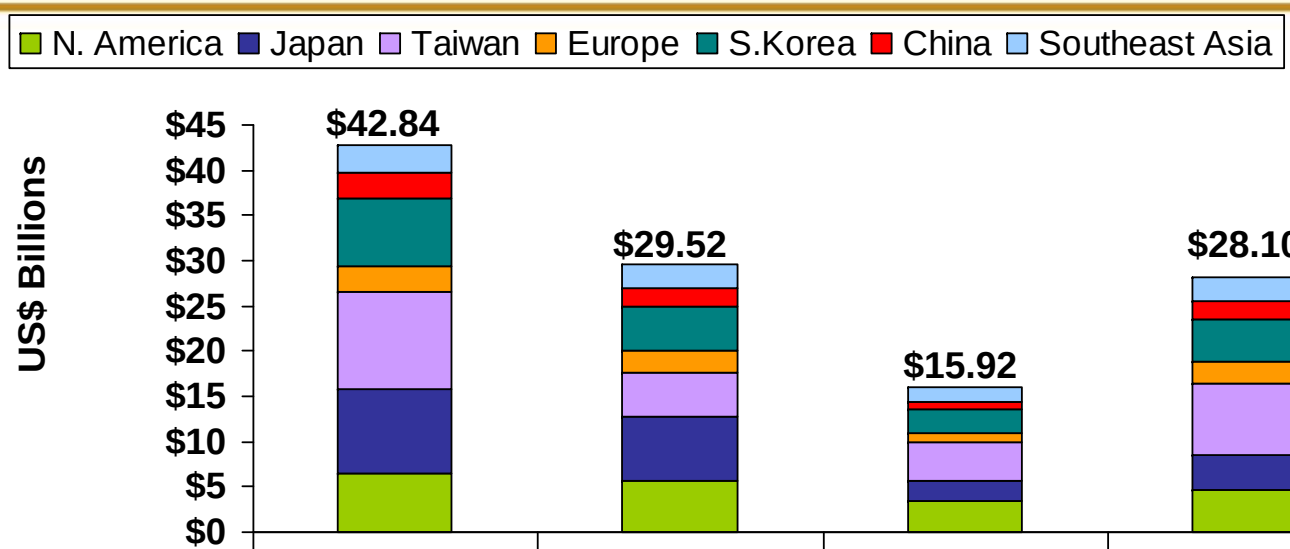
Semiconductor Equipment

Worldwide Semiconductor (Fab, Test & Assembly) Equipment Trends



Source: SEMI/SEAJ May 2010

Equipment Forecast By Market Region

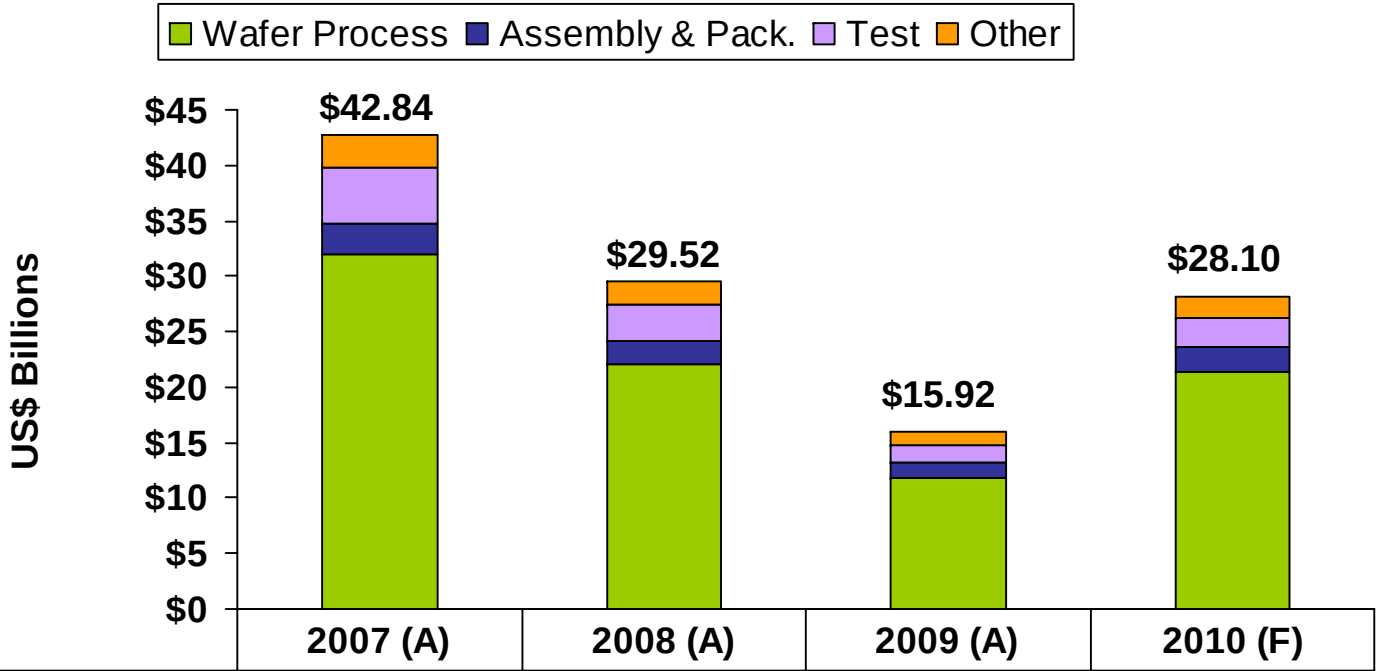


	2007 (A)	2008 (A)	2009 (A)	2010 (F)
Southeast Asia	3.05	2.61	1.44	2.60
China	2.99	1.89	0.94	1.90
S.Korea	7.35	4.89	2.60	4.70
Europe	2.94	2.45	0.97	2.40
Taiwan	10.65	5.01	4.35	7.90
Japan	9.31	7.04	2.23	3.90
N. America	6.55	5.63	3.39	4.70

-Totals may not add due to rounding
- Includes fab, test, assembly, & other equipment

Source: SEMI

Equipment Forecast by Segment

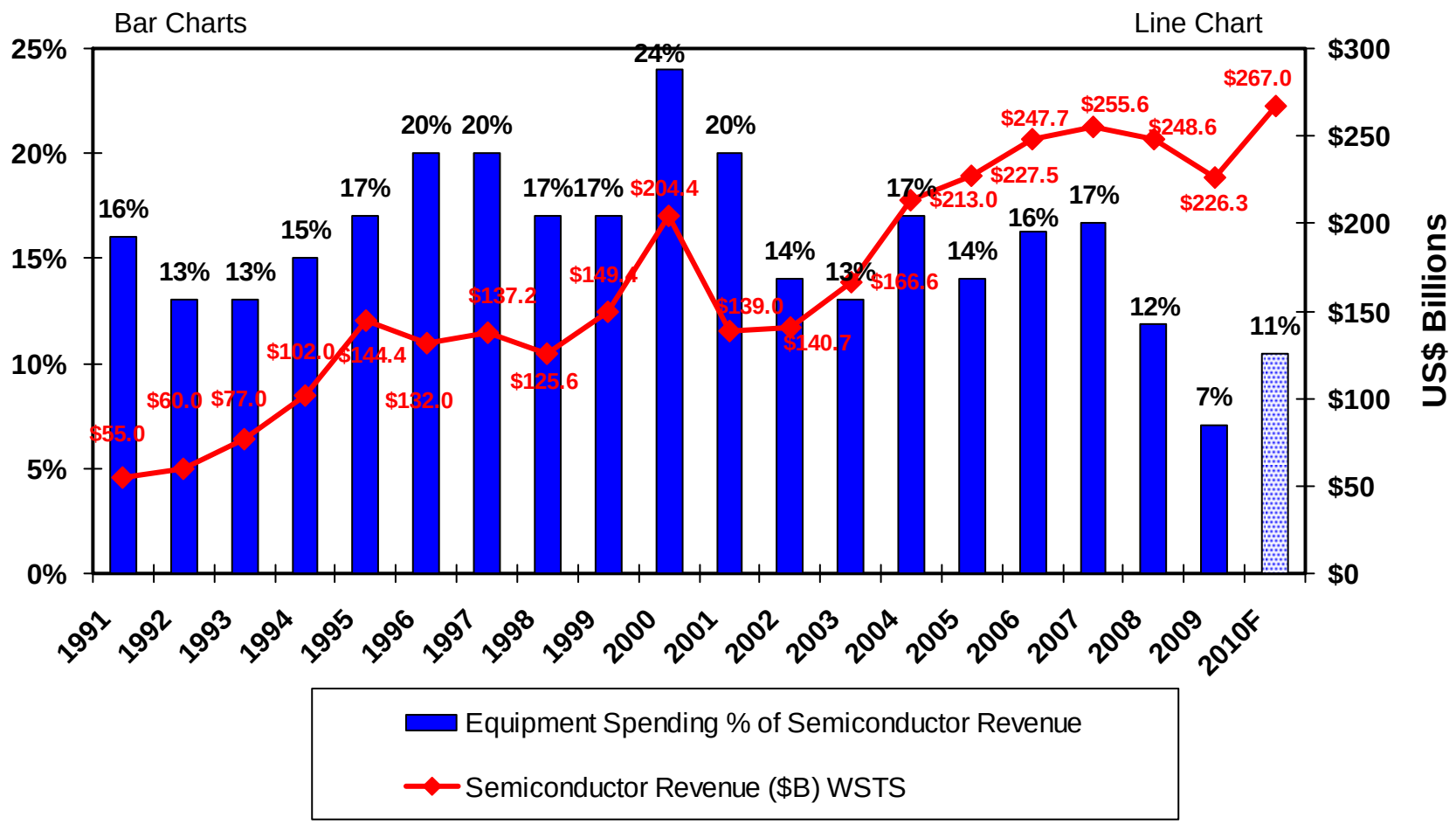


	2007 (A)	2008 (A)	2009 (A)	2010 (F)
Other	2.92	2.00	1.11	1.90
Test	5.05	3.45	1.55	2.50
Assembly & Pack.	2.84	2.04	1.41	2.30
Wafer Process	31.95	22.03	11.84	21.40

-Totals may not add due to rounding

Source: SEMI

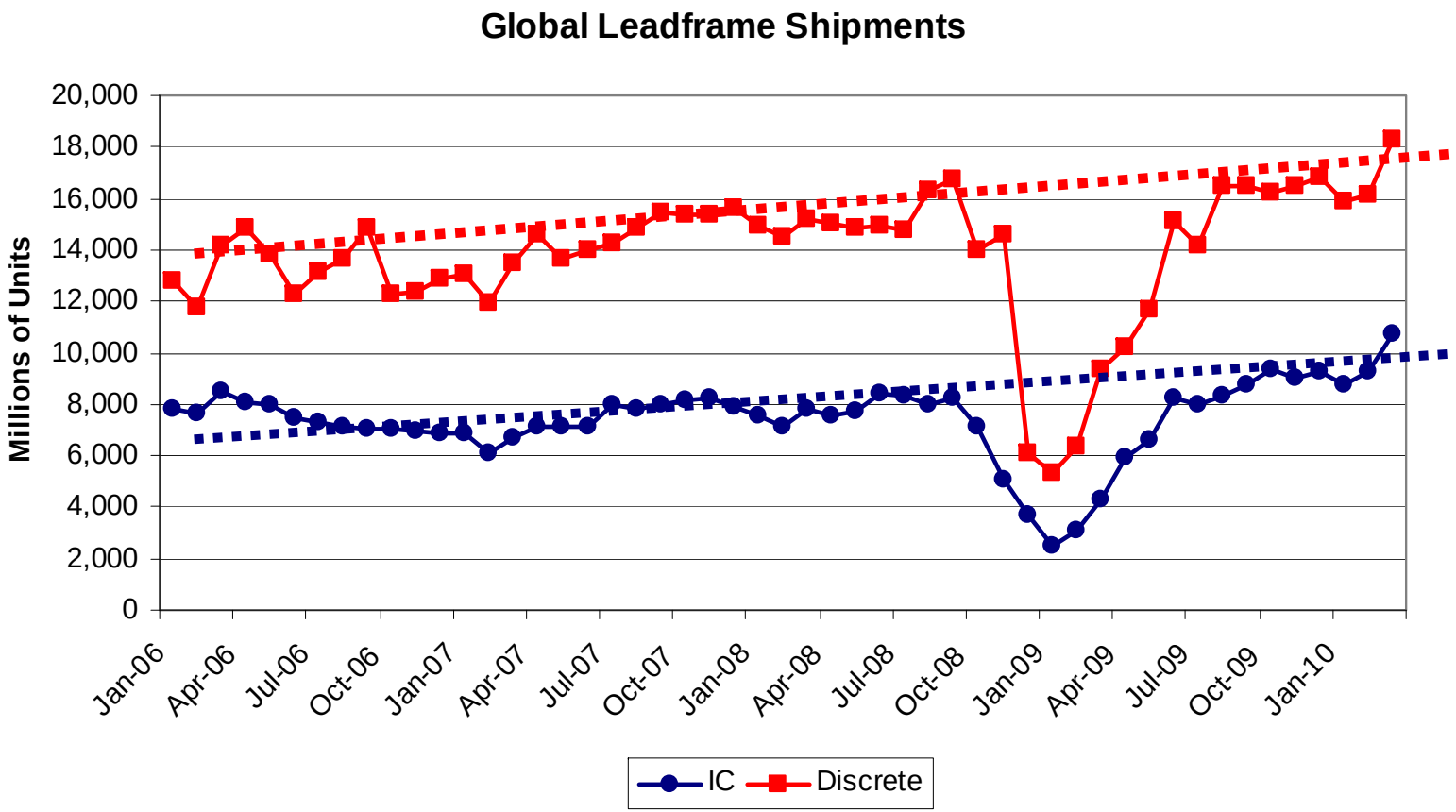
Equipment Spending Trends



Source: SEMI and SIA, SEMI Forecast Estimate

Semiconductor Materials

Leadframes-
Unit shipments have recovered



Source: SEMI Materials Market Data Subscription

Worldwide Wafer Fab Materials Forecast

US$ Millions	Actual	Actual	Forecast		
	2007	2008	2009	2010	2011
Silicon Wafers[1]	12,830	11,924	7,125	8,782	9,745
Photomasks[2]	2,975	2,948	2,732	2,926	2,994
Photoresists	1,144	1,116	920	1,092	1,184
Photoresist Ancillaries[3]	1,219	1,225	1,075	1,279	1,389
Wet Chemicals[4]	904	923	905	941	983
Gases	3,229	3,100	2,465	2,929	3,177
Sputter Targets[4]	480	508	356	391	438
CMP Slurry & Pads[5]	1,024	1,007	916	1,105	1,241
Other/New Materials[6]	1,271	1,439	1,359	1,575	1,757
Total	**$25,076**	**$24,191**	**$17,854**	**$21,020**	**$22,908**
% Growth		**-3.5%**	**-22.1%**	**17.7%**	**9.0%**

Totals may not add due to rounding

Source: SEMI Materials Market Data Subscription February 2010

Wafer Fab Materials Forecast Notes

1. Silicon wafers include merchant sales value only; includes SOI wafers; no reclaim wafers
2. Includes captive market
3. Includes resist removal chemicals, developers, anti-reflective coatings, contrast enhancers, edge bead removers, adhesion promoters, etc.
4. Source is Techcet Group LLC, includes precious metals
5. Estimates for IC applications only
6. Includes low k dielectrics, copper plating solutions, dielectric precursors, organometallic precursors, etc.
7. All forecasts in current dollars
8. Source for all data is SEMI, unless otherwise indicated

Source: SEMI February 2010

Worldwide Semiconductor Packaging Materials Forecasts

US$ Millions	Actual		Forecast		
	2007	2008	2009	2010	2011
Leadframes	$3,289	$3,013	$2,635	$2,942	$2,997
Organic Substrates[1]	6,656	7,586	6,967	7,674	8,255
Ceramic Packages	1,574	1,501	1,290	1,388	1,429
Encapsulation Resins	1,624	1,475	1,284	1,464	1,559
Bonding Wire[3]	3,592	3,968	3,838	4,359	4,446
Die Attach Materials[4]	612	588	582	650	682
Others[5]	242	193	179	207	233
Total	**$17,589**	**$18,324**	**$16,775**	**$18,684**	**$19,601**
% Growth		**4.2%**	**-8.5%**	**11.4%**	**4.9%**

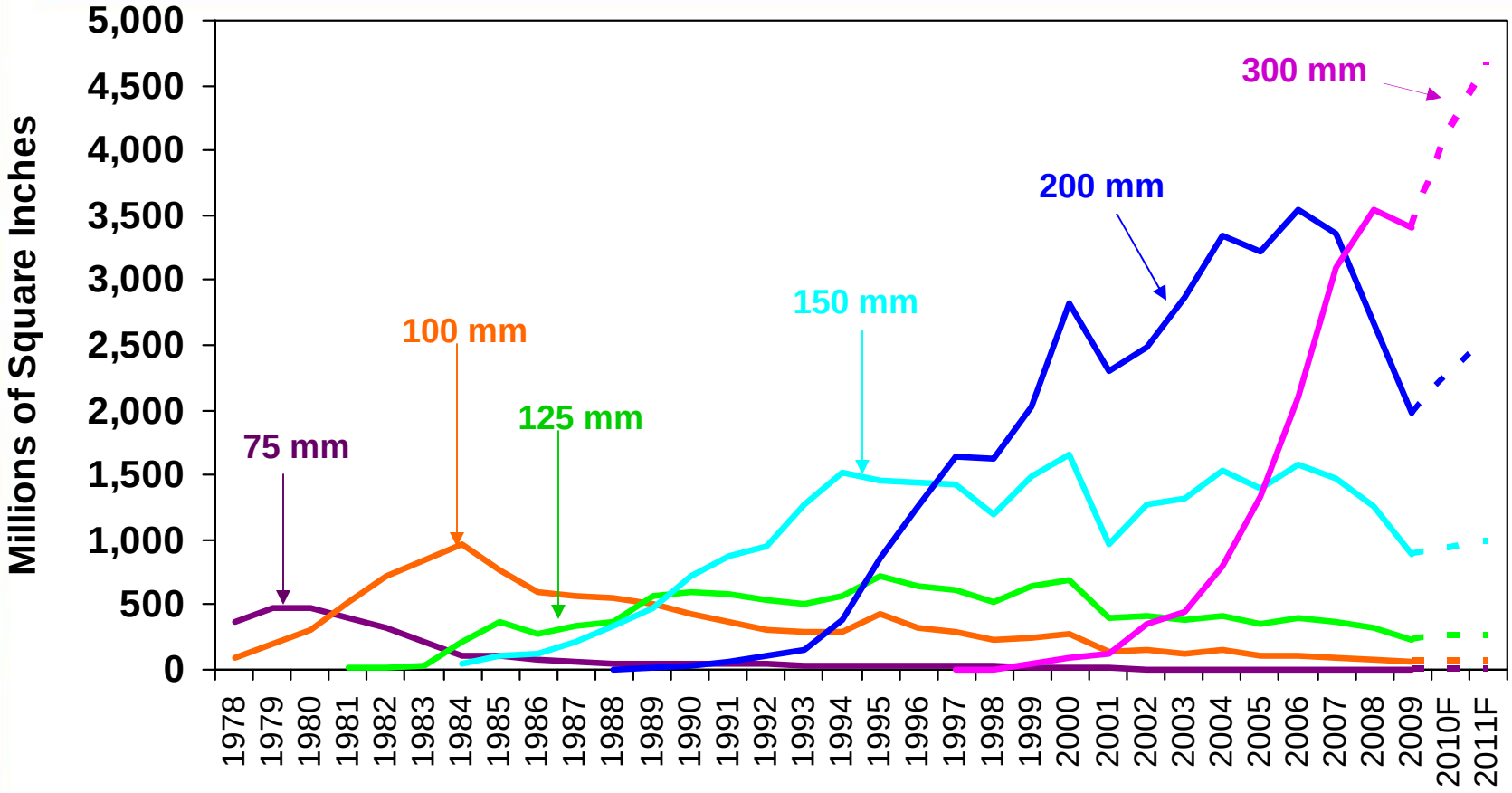
Source: SEMI Materials Market Data Subscription February 2010

Semiconductor Packaging Materials Forecast Notes

1. Source is TechSearch International. Includes PBGA, PPGA, LGA, and CSP laminate substrates and flex BGA and CSP substrates
2. Assume gold value of $660/trz for 2007, $872/trz for 2008, $920 for 2009-2011 forecast period
3. Includes die attach film (tape) materials
4. Other includes solder balls and wafer level package dielectrics
5. Source for all data is SEMI, unless otherwise indicated
6. All forecasts in current dollars

Source: SEMI February 2010

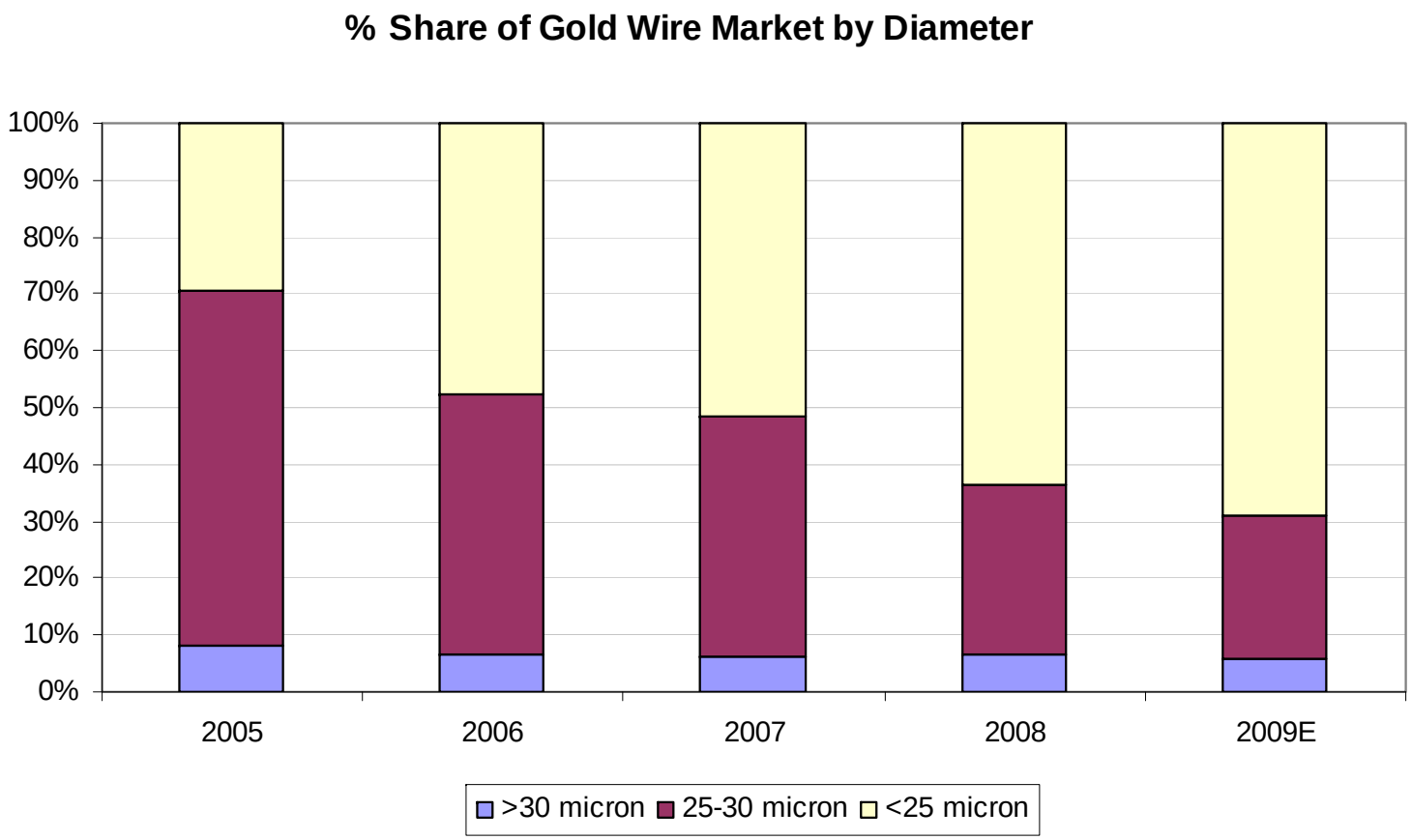
Global Silicon Wafer Diameter Trends



Includes polished and epi wafers. Excludes reclaim, non polished, and SOI.

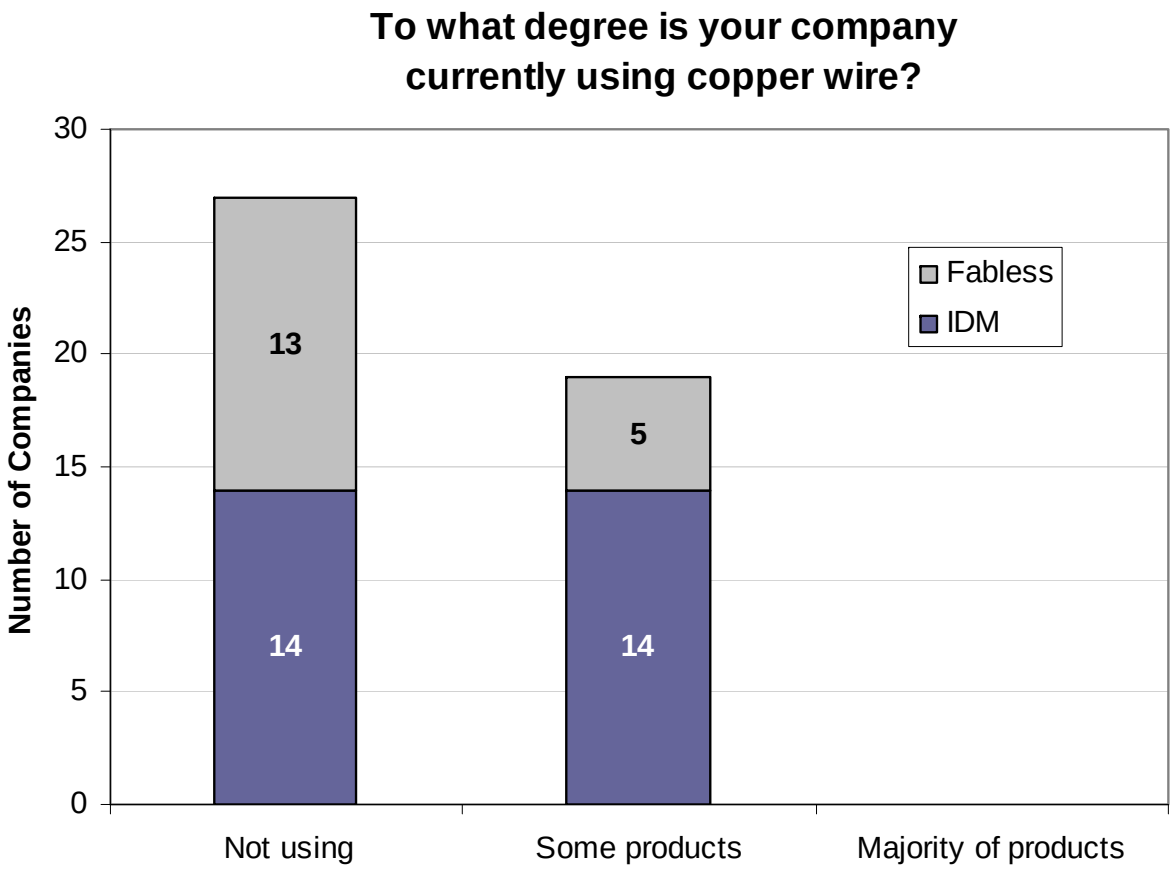
Source: Rose Associates 1978 to 1995; SEMI SMG 1995 to 2009; SEMI

Gold Bonding Wire- Clear Transition to Smaller Diameter

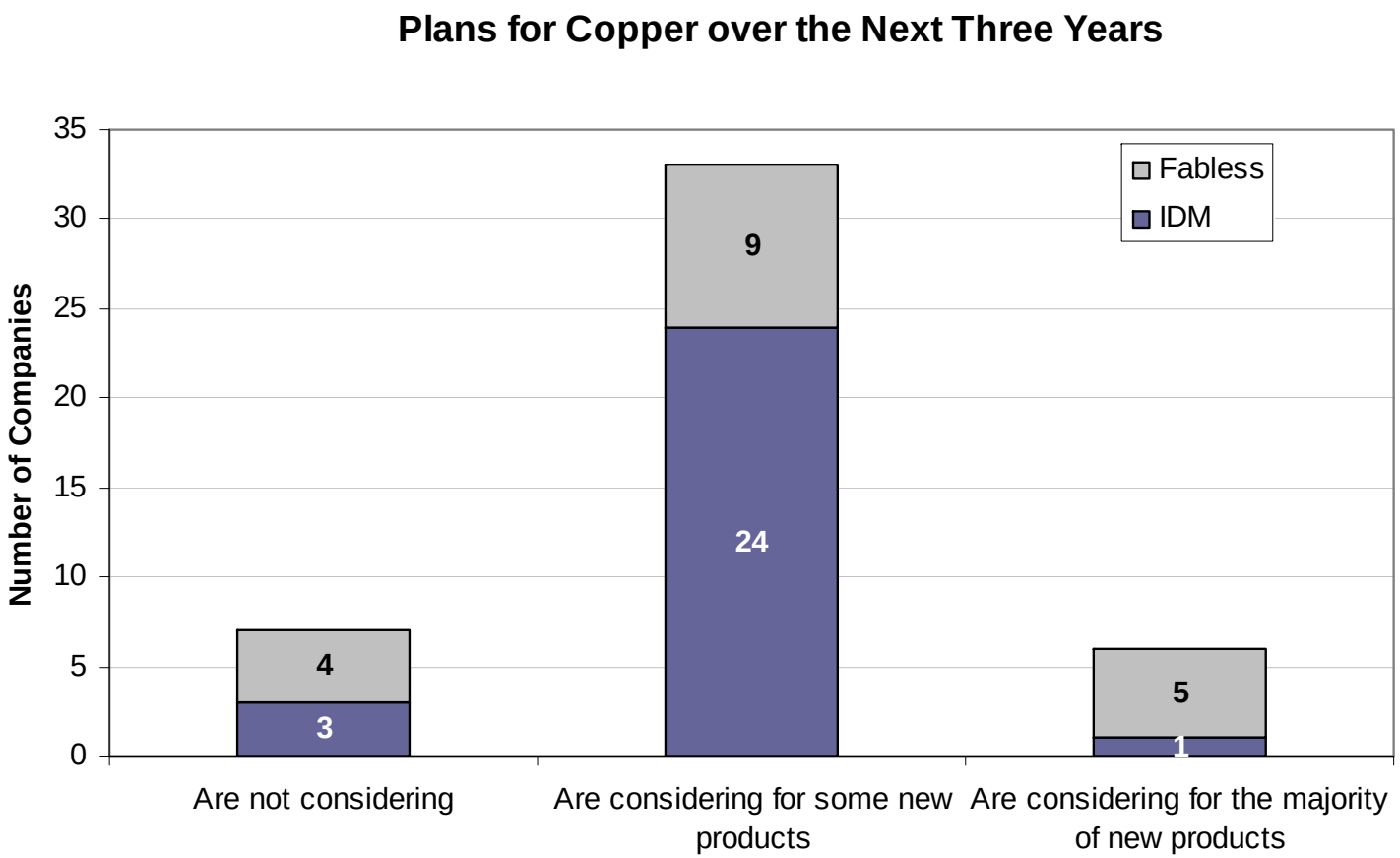


Source: SEMI and Techsearch International, Global Semiconductor Packaging Materials Outlook

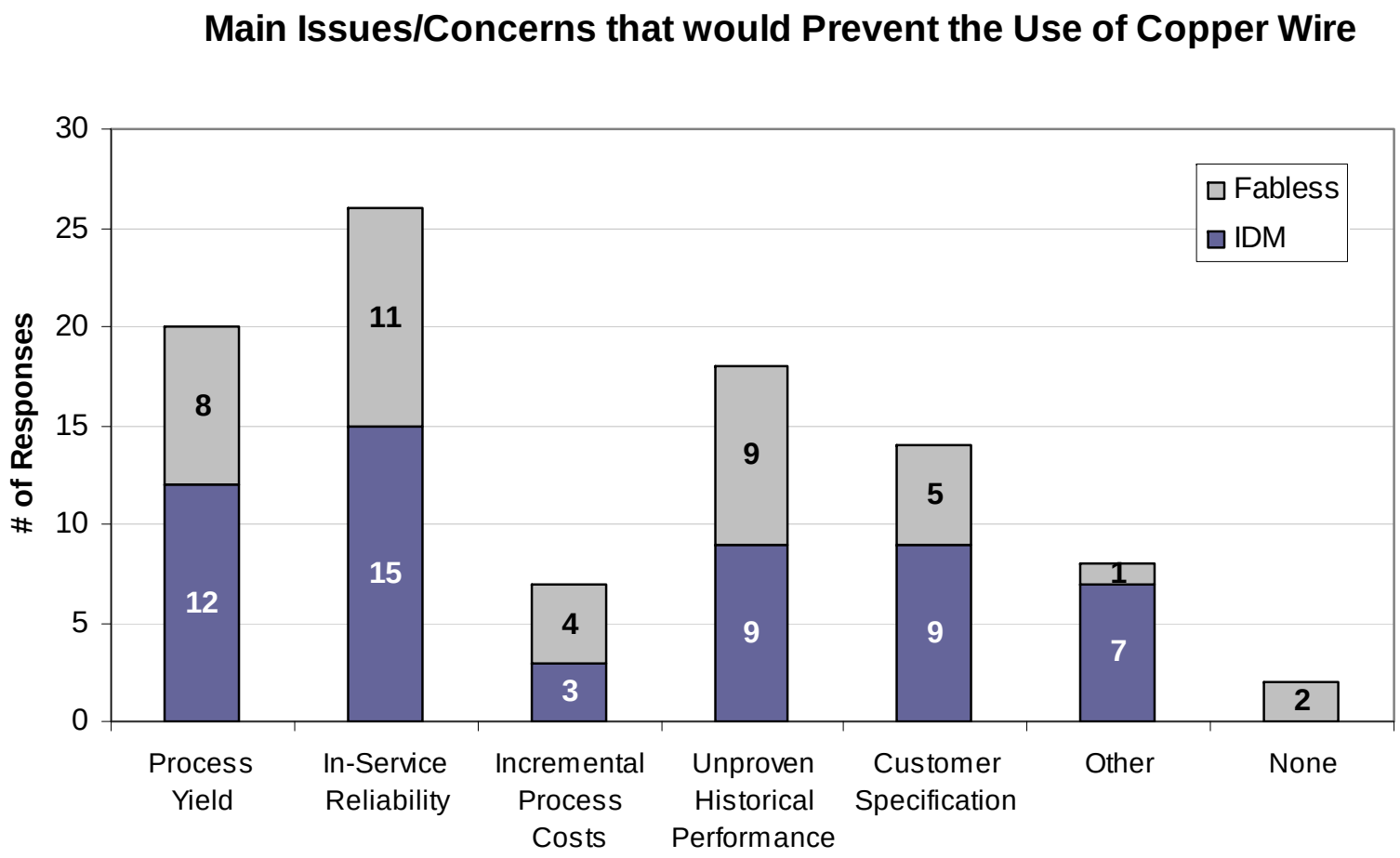
Wire Survey- Current Status



Wire Survey-
Potential use over the next three years



Wire Survey-
Issues and Concerns Remain



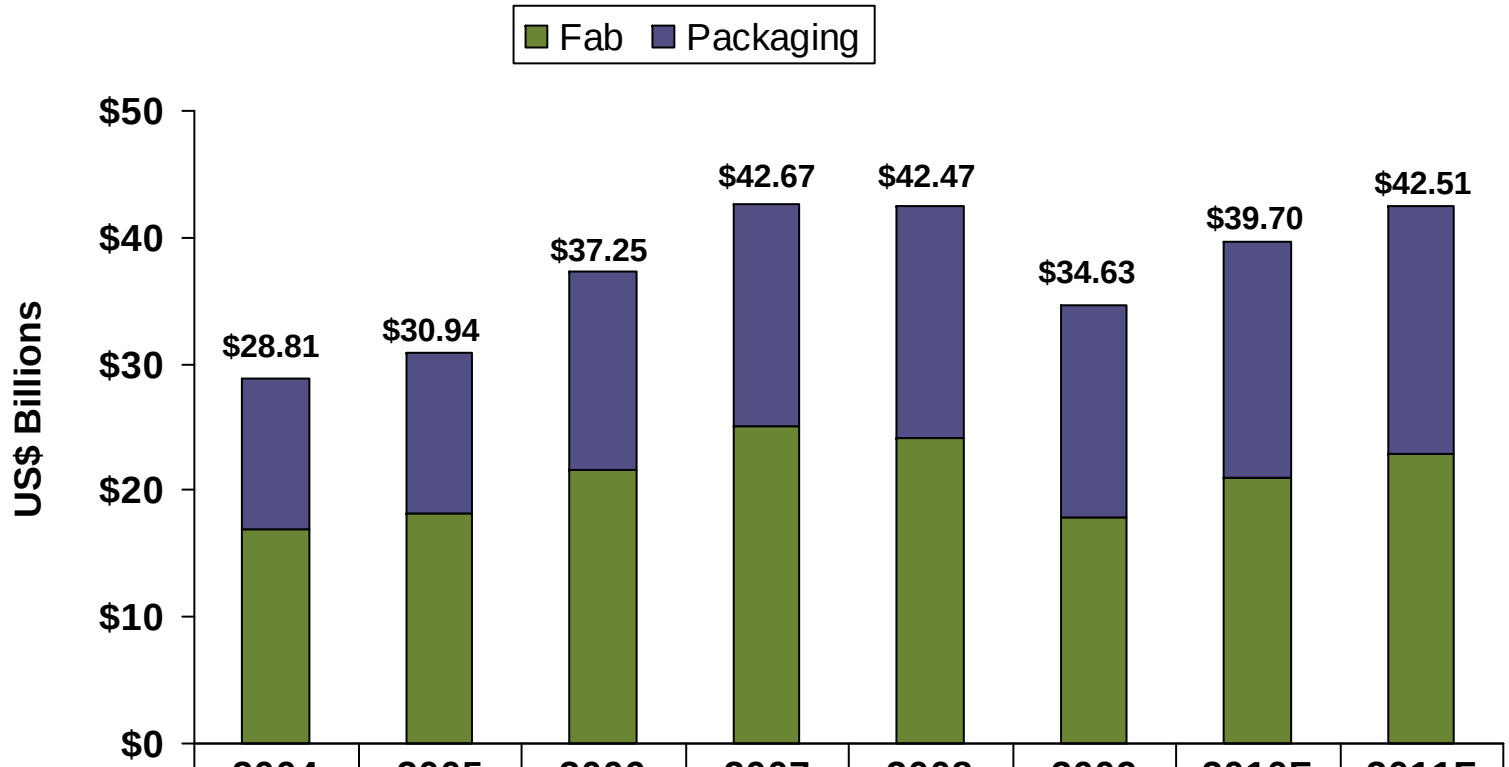
Global Bonding Wire Market

Global Bonding Wire Markets

Bonding Wire Market	2007 Actual		2008 Actual		2009 Estimate	
	Revenues $M	Millions of Meters	Revenues $M	Millions of Meters	Revenues $M	Millions of Meters
Gold Wire	3,552	15,287	3,921	14,422	3,779	13,680
Aluminum Wire	32.0	980	29.5	898	26.0	800
Copper Wire	8.0	272	17.4	476	33.2	885
Total Bonding Wire Market	**$3,592.0**	**16,539**	**$3,967.9**	**15,796**	**$3,838.2**	**15,365**

Source: SEMI and TechSearch International, Global Semiconductor Packaging Materials Outlook

Materials Forecast By Segment

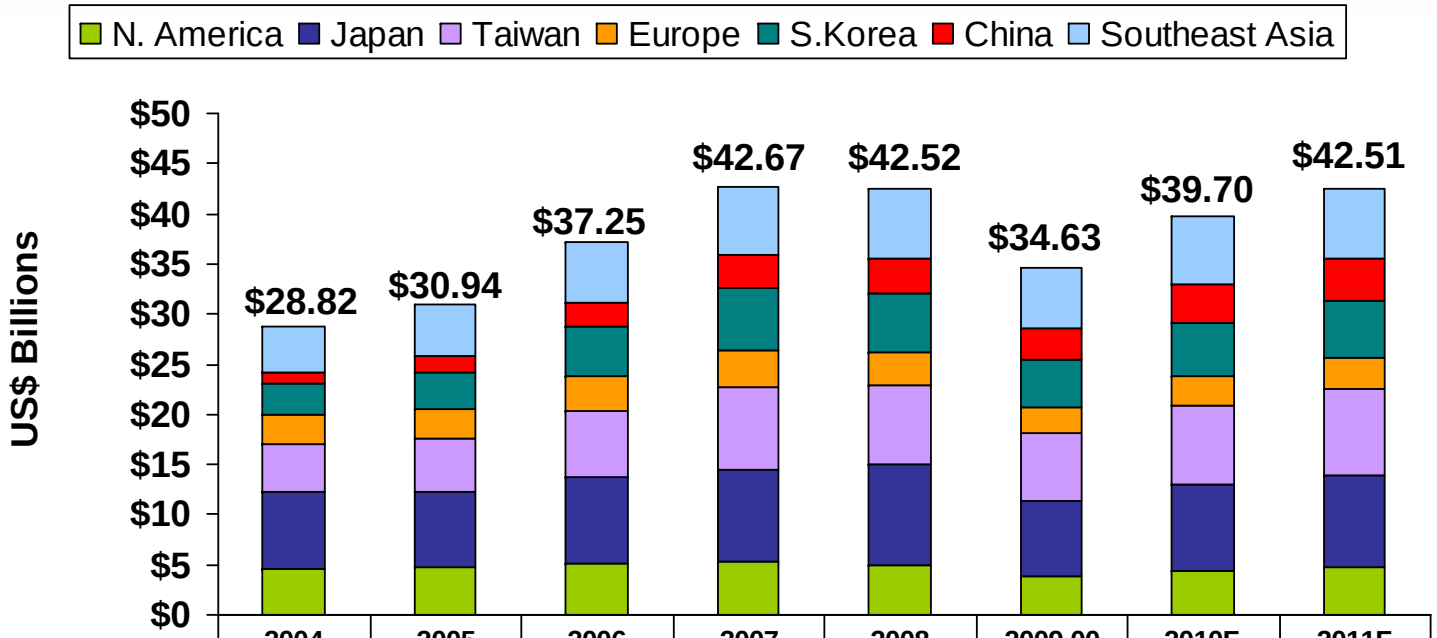


	2004	2005	2006	2007	2008	2009	2010F	2011F
Packaging	11.95	12.77	15.54	17.59	18.32	16.78	18.68	19.60
Fab	16.86	18.17	21.70	25.08	24.19	17.85	21.02	22.91

Totals may not add due to rounding.

Source: SEMI Materials Market Data Subscription February 2010

SEMI® Materials Forecast By Market Region



	2004	2005	2006	2007	2008	2009.00	2010F	2011F
Southeast Asia	4.55	5.03	6.18	6.79	6.90	5.98	6.68	7.02
China	1.28	1.64	2.38	3.31	3.57	3.26	3.82	4.20
S.Korea	3.10	3.78	4.88	6.10	5.90	4.69	5.36	5.71
Europe	2.80	2.88	3.39	3.68	3.32	2.52	2.89	3.09
Taiwan	4.85	5.31	6.74	8.34	7.87	6.77	7.91	8.50
Japan	7.61	7.58	8.57	9.19	9.96	7.63	8.63	9.24
N. America	4.63	4.72	5.11	5.25	4.99	3.79	4.42	4.75

Totals may not add due to rounding.

Source: SEMI Materials Market Data Subscription February 2010

Summary

- **Fab Trends**
  - Total fab investments could grow by over 80% in 2010
  - -4% decline in installed capacity in 2009, and forecasting 6% or more capacity growth in 2010.

- **Semiconductor Equipment Market**
  - -46% decline in 2009
  - Spending could increase 80% <u>or more</u> in 2010

- **Semiconductor Materials Market**
  - 18% decline in 2009
  - 2010 outlook to be in line with overall semiconductor market growth