Semiconductor Wafer Fab Equipment Forecast, Revised 2002

The third quarter of 2002 has not lived up to the expectations underlying our July forecast, and there are doubts about strength in revenue growth for the fourth quarter. With this said, Gartner Dataquest iterates our former position that the sequential quarterly picture has brought a turnaround and a renewed expansion since the first quarter of the year. It is just that the strength and speed of the ramp aligns more with the downside of our July forecast. So, we feel compelled to guide to the downside scenario of our forecast (of negative 27 percent) as the most-likely scenario for 2002 (see Table 1). For more information, please see the Gartner Dataquest Perspective "3Q02 Global Semiconductor Capital and Equipment Spending Forecast Scenarios Update: 2002-2004 (SEMC-WW-DP-0160). This revision does not alter our major position that the equipment industry will see strong growth in 2003.

Table 1
Revised Probabilities for July Release of Wafer Fab Equipment Forecast Scenarios, 2002

<table>
<thead>
<tr>
<th>Annual Growth (%)</th>
<th>Probability 1 July 2002</th>
<th>Probability 18 September 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upside</td>
<td>-15</td>
<td>0.1</td>
</tr>
<tr>
<td>Baseline</td>
<td>-20</td>
<td>0.55</td>
</tr>
<tr>
<td>Downside</td>
<td>-27</td>
<td>0.35</td>
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</tbody>
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Source: Gartner Dataquest (September 2002)

Changes in the Big Picture

This downward revision is largely based on a slower-than-anticipated recovery pattern. Earlier this year, Gartner Dataquest argued that the semiconductor industry has entered into recovery and we stand to it. However, we also cautioned that the speed of recovery is slow and lumbering. And since then, all signs are saying that it is slower than we initially anticipated, causing us to take a more conservative stance. A snapshot of some major segments is shown in Table 2. From GDP down to capital spending, expectations have been lowered. Some of the major points are as follow:

- Worldwide GDP — While worldwide growth is largely unchanged, increasing concern exists about the situation in Japan and Western Europe, not to mention a lumbering-while-improving condition in the United States.
- North America GDP — Prospects for the third quarter and fourth quarter GDP growth have dropped by about 1 percent to the 2.5 percent to 2.6 percent range from over 3 percent, according to DRI-WEFA. Consumption growth is weak, inventory restocking has significantly slowed and corporate spending remains muted. The consumer continues to carry the torch. But how much longer is the hot questions to ponder?

- Electronic equipment:
  - PC sales have been largely a disappointment in 2002, weighing down electronic equipment growth. Our latest forecast revision (which will be released shortly) points at lower unit and revenue growth than anticipated in July. While the first quarter might have been on the upside of expectations, the third quarter and fourth quarter are trailing at the low end of a seasonal demand pattern.
  - Wireless has been the shining light in the dark from a semiconductor production point of view, maybe not from an end-user sale point of view. For more detail, please refer to the Hardware and Systems August Spotlight.

- Semiconductor industry:
  - Strong demand for silicon since the third quarter of 2001 into mid-2002 underlines the effect of improving semiconductor unit sales for electronic equipment production and partly for inventory restocking. Unit shipments are positive in the year-over-year comparison but pricing conditions put downward pressure on revenue growth. Given lowered expectations for electronic equipment demand, semiconductor revenue growth is likely to come in on the slightly negative side, year over year. Our latest forecast has moved growth toward our downside, now showing negative 0.1 percent for 2002.
  - Nobody wants to hold inventories. In fact, the word "inventory" has become a four-letter word and nobody wants it to be associated with his or her company's name. Given an industry overcapacity and short lead times, sales are turning increasingly into real-time business transactions, with little warning to suppliers. This has increased market volatility and decreases the industry's visibility of demand.
  - Foundry — Following nearly six months of steady increases, TSMC and UMC combined monthly sales showed a 9 percent sequential decline in July and remained flat in August. The slowing sales growth is a reflection of sluggish end-user demand for PCs and other electronic products. Stagnating demand growth is keeping fab utilization at depressed levels, causing foundries to reduce their capital expenditure budgets for the year. TSMC has already lowered its spending plan from $2.5 billion to under $2 billion.

Table 2
Changes in Growth Scorecard (Percent)

<table>
<thead>
<tr>
<th></th>
<th>July 2002</th>
<th>September 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide GDP</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>U.S. GDP</td>
<td>2.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Electronic Equipment Revenue</td>
<td>+4</td>
<td>+1</td>
</tr>
<tr>
<td>PC Revenue</td>
<td>+7</td>
<td>+1</td>
</tr>
<tr>
<td>Semiconductor Revenue</td>
<td>+3</td>
<td>-0.1</td>
</tr>
<tr>
<td>Capital Spending</td>
<td>-21</td>
<td>-25</td>
</tr>
<tr>
<td>Wafer Fab Equipment Revenue</td>
<td>-20</td>
<td>-27</td>
</tr>
</tbody>
</table>

Source: Gartner Dataquest (September 2002)
Impact on Semiconductor Manufacturing and Equipment

Given an environment of slower-than-anticipated growth in end-user and, consequently, semiconductor demand, we see the following main points impacting our wafer fab equipment forecast:

- Supply-demand status:
  - The supply side of the supply-demand equation is coming under control. Fab retirement and restraints in capital spending have led to about a 6 percent decline in worldwide wafer fab capacity since it peaked in the third quarter of 2001. We anticipate a slower ramp for capacity addition compared with that published in the Gartner Dataquest Focus Report "Semiconductor Manufacturing Capacity: Revving the Engine Again" (SCEM-WW-FR-0137). Growth slippage could be as much as six months from our earlier estimate.
  - The demand side of the equation remains soft, exhibiting lackluster growth. This may lead to a temporary pause and maybe even a slide back in fab utilization improvements, until further restraints in new capacity addition take hold. With leading-edge utilization in the highly profitable 90-percent range, companies will be hesitant to add capacity until there are clear signs of increasing demand growth at a sustainable rate.

- Capital spending:
  - Spending growth in 2002 is largely driven by foundry. Also here, stagnating demand growth is reducing the need for increased capacity, leading foundries to reverse their course in the third quarter of this year. Foundries now have largely returned to their original spending budgets for 2002, after rescinding spending increases announced earlier this year.
  - As we have pointed out earlier, capital spending has a rational component as well as an emotional one. Given the volatility and low visibility in the market, we anticipate spending to remain guarded, leading us to our downward revision for capital spending this year.

- Equipment spending:
  - Bookings — Since the lows of last year, monthly bookings for wafer fab equipment appreciated by more than 100 percent until July 2002, returning to levels equivalent to those seen in August/September of 1999 during the most recent upcycle. However, recent capital spending cuts exert downward pressure on the bookings momentum. In the third quarter, the industry will likely see the start of renewed shrinkage in bookings. The decline should be of more temporary nature. We anticipate bookings to recede by 15 percent to 20 percent in the third quarter and at a slower rate in the fourth quarter.
  - There have been several push-outs of existing orders, postponing equipment shipments from later this year into early of 2003. For example, TSMC is delaying Phase I of Fab 14 (its second 300mm production fab) by one quarter. While there is no guarantee that this is the full extend of delays, it must be pointed out that the industry entered a state of underinvestment in 2002 that will drive investments as soon as demand accelerates again.
 Quarterly revenue picture — Building on solid gains in shipment revenue in the second quarter of this year, we believe that low double-digit growth in sales remains possible in the third quarter. This is, however, below our more bullish expectation from earlier in the year. As for the fourth quarter, our estimate was likely too bullish as well, given softening bookings and push-outs. Still, the quarter could remain on the positive side. In our mid-year forecast, we anticipated a pause in the first half of 2003. This pause is coming to pass but is most likely pulled forward into 2002. We will follow up with a more detailed quarterly analysis and renewed growth scenarios in October.

Gartner Dataquest Perspective

We have once again returned to the season when bad news is bad news and good news is bad news too. Uncertainty is a way of life and encourages cautious and conservative positioning but does not equate to the coming of doomsday. Since the lows of last year, the semiconductor and equipment industry has made quite some progress on the road of recovery and while possibly taking a breather, the industry should not be retesting last year's lows. Capacity situation is coming under control, leading-edge capacity is tight as companies watch spending closely. Improvements in supply-chain management do impact visibility, especially at a time when supply is ample. The industry will need to settle and get comfortable with a feeling of uneasiness, especially in bad times.

The focus was and is on the soft demand picture. Electronic equipment is pervasive and the Stone Age is well behind us. But with no real catalyst in sight, such as Y2K, there are only "soft" drivers for renewed demand and improvements will be slower than witnessed in the last cycle. Still, gradual growth in demand in 2003, a more controlled supply side and an overall industry underinvestment situation all combine to drive healthy growth for wafer fab equipment in 2003.

By Klaus-Dieter Rinnen