CHINA:

INVESTMENT FEVER KICKS IC INDUSTRY INTO HIGH GEAR

BY ADELE HARS
China’s chip industry is still posting double-digit growth, so the country’s leaders have decided to seize the moment and set their country on course to become a chip manufacturing powerhouse. They’ve tried to boost domestic manufacturing before, but with limited success. This time they have again set ambitious goals and offered up significant seed money, but it’s now up to the marketplace to make it happen. And the marketplace is responding with gusto.

According to SEMI estimates in January 2015, total Chinese government (central plus local) funding will reach US $100 billion over the next 5 to 10 years, while McKinsey & Co., in August 2014, suggested that national and provincial funds combined could reach US $170 billion over the same time period. Officially called the National Industry Investment Fund, it’s prompting the creation of a host of new VC funds and matching investments, and the bolstering of existing funds.

Which is why everybody is calling it the best time the industry’s ever seen. In his talk to a packed hall at Semicon China 2015, Handel Jones, China expert and CEO of IBS, called it a once-in-a-lifetime opportunity.

### THE GUIDELINES

In June 2014, the Chinese State Council issued the National Program to Promote the IC Industry Development, which provides the guidelines that industry is expected to use.

The guidelines begin by identifying the problems that impeded past efforts. Primary among those are financial bottlenecks, risk aversion, a shortage of key talent, general fragmentation, and holes in the supply chain.

The development goals outlined are as follows:

- For 2015, the guidelines call for the establishment of platforms for financing and policy; moving 32/28nm to volume across the spectrum of production, packaging and test; and investment in additional equipment for 65/45nm, world-class design, advanced technologies and 300mm wafers.
- By 2020, the technology gap should be narrowed, 20% CAGR should be sustained, and 16/14nm should be in production.
- By 2030, China should have tier 1 IC companies.
It is important to note that economic prowess is not the only driving force here. In the wake of recent security scandals, the program also notes that China needs a strong domestic chip industry to ensure security.

A task force was created, including members from key ministries in IT, science and technology, finance, and national development. But to ensure that the policy implementation is market-driven and focused, the task force also includes about a dozen industry leaders.

THE FUND

October 2014 marked the establishment of the National Industry Investment Fund. According to SEMI, the first round of ordinary share-raising was completed at the end of the year, having raised 98.72 billion RMB (US $15.9 billion). Another round in the first quarter of 2015 raised the total to almost 140 billion RMB (US $22.5 billion).

The cities and regions with major tech centers also raised funds. In initial rounds, Beijing, for example, raised almost 30 billion RMB (US $5 billion) to support manufacturing and equipment, as well as design and packaging. A Shanghai fund raised 10 billion RMB (US $1.6 billion).

Even so, it’s not enough, said Dr. Xi Wang, director general of the SIMIT institute, the Shanghai branch of the Chinese Academy of Sciences (CAS) and special advisor to the central government in Beijing. “It’s a critical moment,” he says, “and we need momentum to expand capacity.”

There are a hundred CAS institutes in China, with a budget of over 42 billion RMB (roughly US $7 billion). In previous government attempts to bolster the chip manufacturing industry, the institutes were given the lead. While they gave R&D a much-needed boost and created a strong academic base, they alone could not create the necessary momentum.

This time, says Dr. Wang, things will be different. “Now in the IoT era, China is a big market. It’s totally different from what it was ten years ago. There is huge demand in China, and Chinese vendors will be successful.”

CAS and the institutes still have a very important mission to fulfill, however. They are charged with both pure scientific discovery and transferring technology to industry. SIMIT’s SITRI institute in Shanghai, for example, is now completing the installation of an 8-inch R&D line that enables researchers to hand off More-than-Moore developments in power, RF, sensors and MEMS directly to industrial partners worldwide.

The automotive IC market is seen as a major opportunity, too. In 2010, China passed the US to become the world’s largest market for automobiles. While the Chinese auto industry is no longer posting the double-digit growth of a few years ago, relatively speaking it’s still growing more quickly than the rest of the world.

Charles Chesbrough, senior principal economist at IHS Automotive, told Nanochip Fab Solutions that the auto industry in China is expected to grow at a 4.1% annual rate from 2015 through 2020. “The rest of the world is expected to grow at a 2% annual rate through 2020, so China will be growing at near twice the rate,” he notes. This combined with chips per vehicle increasing from 800 to 1000 (Strategy Analytics, 2015) in that same time frame makes for a perfect storm.
China is the world’s fourth largest country in terms of area, and the largest in terms of population. So it is perhaps no surprise that there are multiple tech centers. Shanghai is often considered China’s Silicon Valley. Fiercely modern, it is home to more than 20 fabs and soon a major new 11 km² (4+ square miles) industrial park in the Pudong district near the airport. With a 30 billion RMB (US $4.8 billion) fund, the developers say they have already signed up two chip companies and many suppliers. They also promise it will have affordable housing, good schools, and since it’s on the ocean, clean air.

Beijing, seat of the central government and steeped in thousands of years of history, is nonetheless a hotbed of fabless start-ups. SMIC’s current and planned 300mm fabs are there, among others. They’re ready with 28nm this year, and have demonstrated functional FinFETs. Three years of consecutive profitability have helped.

Xi’an is home to over 70 universities and over 800 research institutes, national labs, and centers for technical research and industrial testing.
China: Investment Fever Kicks IC Industry Into High Gear

Samsung chose it for a 300mm memory fab, and in 2007, Applied Materials opened a Global Development Center there that provides worldwide engineering and software support.

In addition, the two Hynix-Numonyx 300mm fabs are in WuXi, and Intel’s 300mm fab is in Dalian. However, of the roughly 50 fabs around the country, about 40% are 200mm and 40% are 150mm. Overall, China’s equipment spending grew by 30% in 2014. But with so much 150mm and 200mm legacy equipment, SEMI indicates that the refurbishment market there is a very active business. (See related article, “Demand for 200mm Tools Outstrips Supply” on page 20 of this issue.)

Roger Chang, country president of Applied Materials China, noted, “China’s IC industry is developing rapidly. Much can be done on the part of equipment manufacturers who are ready to contribute to growth in this industry.”

Dr. Mike Rosa, director of strategy and technical marketing for 200mm products at Applied, added that the company’s Xi’an-based development center is a key asset in the region for supporting customers’ needs in semiconductor equipment engineering and field services, as well as in factory automation software, process diagnostics and control, and equipment engineering. “With so many new and existing companies entering the More-than-Moore segments, it is important that customers have a development partner who can demonstrate key enabling technologies locally and react quickly to their development needs.”

Investment Fever

The national fund’s goal of attracting large enterprises, financial institutions and talented people has generated an enormous degree of investment fever. Ex-pats are returning to China in droves to create new businesses and manage existing ones. The real estate boom is over, freeing up new money from private sources. Money’s coming in from abroad, too. Intel recently made a $1.5 billion investment in Tsinghua Unigroup, which just bought two of China’s largest fabless companies.

In three full days of presentations at Semicon China 2015, almost no one missed an opportunity to celebrate the China boom. Mergers and acquisitions (M&A) are viewed as the best way to fill holes in expertise and resources quickly, as the rush is on to meet the goals set out in the national guidelines.

Two pieces of advice kept coming through: one plus one has to equal more than two; and the main reason to acquire a company is to get their top talent, so it’s critical to keep them happy.

In fact, at the event’s Tech Investment Forum, a managing director of Goldman Sachs explained the dos and don’ts of a successful acquisition during a standing-room-only presentation. China is now #2 in M&A, just behind the US, he said, and 2015 is expected to be a record-breaking year.

Although a lot of the activity until now has been domestic (especially consolidating the huge but fragmented design community), and IPOs in Hong Kong are gaining in popularity, there’s a definite shift to Chinese companies buying outside the country. Chinese companies are being encouraged to take a perspective that is at once Chinese, international and market-oriented.

In glowing terms, the CEO of JCET described his company’s acquisition of STATS ChipPack, creating a new #3 in device packaging. The national fund, while not directly investing in the transaction, was effectively leveraged, he said.

Dr. Xi Wang is also very enthusiastic about the new investment era. Given his status and experience in the industry, he knows virtually everyone. He especially likes matching promising companies with funding.

“I like to do that—I have the vision,” he says.

One of several companies he himself has created over the years is Simgui, China’s wafer leader. Initially founded in 2001 to make SOI wafers for power and MEMS, the company extended its business to 300mm wafers. They now have a partnership with Soitec for wafers for RF-SOI. Dr. Wang posits that moving to FD-SOI could be an option for certain Chinese fabs, because it would enable them to quickly move into a leadership position. However, he cautions, it’s the market that will decide this time.

And that will make all the difference.

Adele Hars is a writer and director of High Tech International, based in Paris, France.

For additional information, contact nanochip_editor@amat.com