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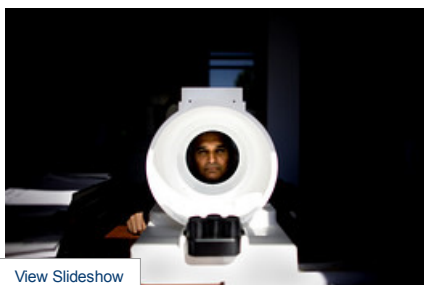
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Silicon Valley 3.0: Tech's New Wave

By PUI-WING TAM And CARI TUNA

SAN JOSE, Calif.—Edenvale Technology Park gives a glimpse of the new Silicon Valley.

Silicon Valley 3.0



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Brian Frank for The Wall Street Journal

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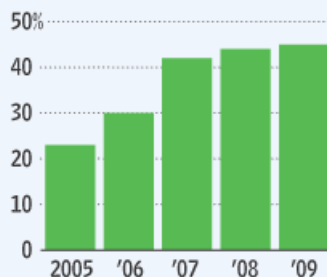
The long recession only tiptoed through the 2,300-acre office park, with many start-ups here expanding their operations over the past 18 months. One prominent tenant, solar company Nanosolar Inc., began producing solar panels in March and plans to add space and more employees to its 350-person work force.

Scientific-equipment maker Stratedigm Inc. moved into a 6,000-square-foot space in Edenvale—more than double its old office size—as it revs up sales. And several biomedical start-ups that were started under one roof also upgraded to bigger offices in the park.

Edenvale shows how Silicon Valley's start-up economy has quietly broadened beyond information technology. It now includes a growing cadre of bioscience and "clean technology" firms, presaging a more-diversified economic base and bolstering the valley's status as the world's innovation hotbed.

Seed Money

Percentage of total San Francisco Bay Area venture-capital investment that went to clean-technology companies



Source: VentureSource

Edenvale's relative strength contrasts with how it fared in the last downturn, a decade ago. Back then, the office park was filled with traditional tech companies such as [International Business Machines Corp.](#) and optical-networking company [ONI Systems Corp.](#) When the tech bust hit in 2000, the area imploded. Dozens of tech firms shut down or scaled back. Vacancy rates soared to 25%.

After that, San Jose officials sought to diversify Edenvale. "San Jose went through a soul-searching process on the nuts and bolts of our economy," says Julie Amato at the San Jose Redevelopment Agency, a governmental organization focused on creating jobs and removing blight. "We better understood how a diverse economic base could help us." Since then, Edenvale's make-up of start-ups has shifted.

It's a reflection of what's happening across Silicon Valley. Though local tech giants such as [Hewlett-Packard Co.](#) and [Google Inc.](#) still dominate headlines and payrolls, the area's start-up economy has branched out significantly in recent years.

The changes foretell how Silicon Valley's big-company makeup may shift 10 to 15 years down the road as some of the new start-ups take off into big successes, even as others fail, says Bill Miller, a Stanford University professor emeritus of computer science and management and a former entrepreneur.

"Whether these new industries will play a big role or a small role" in the overall economy remains to be seen, Mr. Miller says. But "my belief is they will play a pretty big role."

Already, the start-up ferment means Silicon Valley has become less reliant on its dominant information-tech industry, blunting the pain of the recession.

Less than a third of Silicon Valley's work force is now employed in chips and computer manufacturing, compared with more than 50% in 1990, according to research firm Collaborative Economics.

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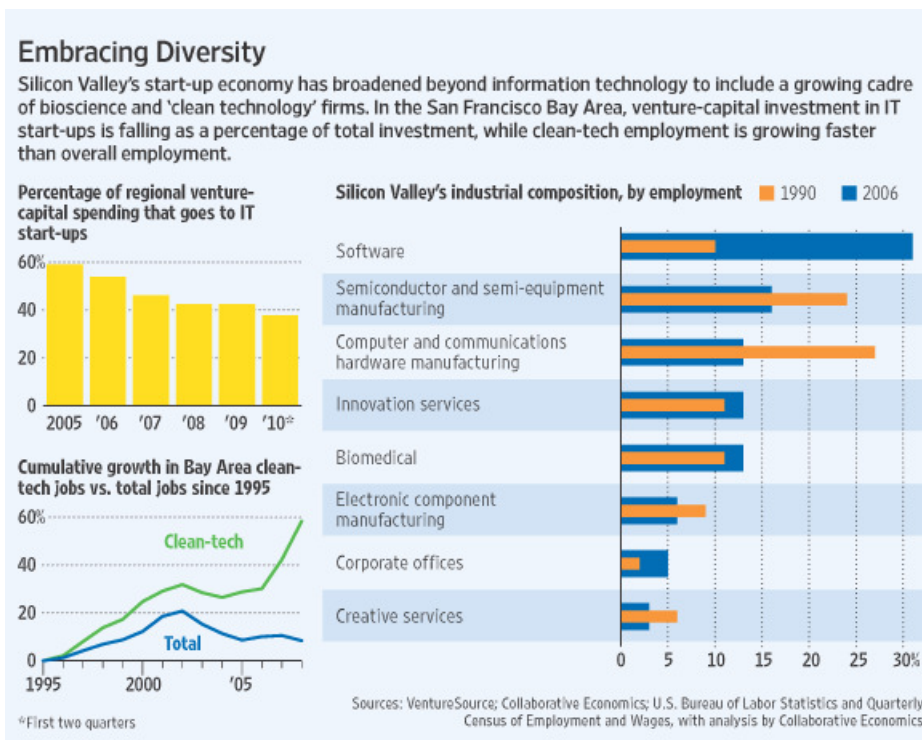
Instead, the area's jobs and local municipalities' tax base have begun spreading to emerging sectors such as clean tech. Between 1995 and 2008, the number of clean tech and related jobs in the San Francisco Bay Area rose 58% to around 44,000 positions, according to Collaborative Economics. Though such jobs remain a fraction

of the area's overall work force of 4.1 million, the growth far outstripped the region's 8% employment growth over the same period, the research firm says.

Today, less than half of the region's venture capital, which is used to finance start-ups, goes to tech companies—compared with nearly 70% five years ago, according to research firm VentureSource.

The amount of venture capital going into Silicon Valley and Bay Area companies—at \$8.3 billion in 2009—is far below its peak of \$11.8 billion in 2008, according to VentureSource. Nationwide, venture capital expenditures fell to \$22 billion last year, down from its peak of \$32 billion in 2007, according to VentureSource.

Silicon Valley's diversification should lead to greater economic stability and the creation of more high-paying jobs, says Mr. Miller, who likens a broader economic base to a diverse gene pool, which helps species adapt to big environmental shifts. The broadening also is necessary for Silicon Valley to retain its standing as an innovation center, particularly as some mainstay industries such as corporate software and hardware mature, he adds.



Like many tech start-ups before them, some of the new bioscience and clean-tech start-ups will disappear before they can become big-companies. Unlike Web start-ups, which can be started cheaply with a few programmers and inexpensive equipment like personal computers, clean-tech and bioscience firms require substantial capital to build manufacturing facilities and undergo drug trials. Such costs can keep the companies unprofitable for years.

Solar and many clean-tech industries also rely on government subsidies, and demand for their products could depend on government environmental policies, which are out of the control of those companies.

Still, Silicon Valley's start-up scene has often led to generational shifts in its big industries. In the 1970s, chip start-ups foreshadowed the chip-company era of the 1980s. A few software start-ups in the 1980s became a mainstream industry made up of behemoths such as [Oracle Corp.](#) in the 1990s. And the dot-com ferment of the late 1990s—much scoffed-at by 2002—foreshadowed today's established Internet industry of [Google](#), [eBay Inc.](#) and [Facebook Inc.](#)

Today's start-ups include clean-tech outfits such as [Bloom Energy Corp.](#), which is working on a fuel cell to deliver energy more efficiently. There are also bioscience companies like [Pacific Biosciences of California Inc.](#), which is developing a DNA sequencing process to help medicine and health research.

The growth of such firms is having a magnet effect, attracting more clean-tech and bioscience companies to the area.

In just one building in Edenvale alone, about half a dozen of the more than 20 bioscience start-ups residing there moved in all or some of their operations from outside the area. [GeneWeave Biosciences](#) came from New York. [Oxford BioTherapeutics](#), a U.K. company, opened lab operations in Silicon Valley.

Some of the region's new start-ups are already making a move toward big-company status. Electric car maker [Tesla Motors Inc.](#) went public in June and has signed a deal to develop electric cars with [Toyota Motor Corp.](#) Biofuels start-up [Codexis Inc.](#) raised \$78 million in an April initial public offering and expects to hit nearly \$100 million in revenue this year. In August, [Pacific Biosciences](#) filed plans for a \$200 million IPO.

In five years, "our vision is that we will have many factories and that we'll have an impact on the climate," says Chris Gronet, chairman of solar-panel maker Solyndra Inc. in Fremont, Calif. Solyndra has raised around \$1 billion in funding and took over the space of an old-tech hard-disk drive maker for its headquarters in 2007.

But Solyndra is already facing challenges. It pulled its IPO filing earlier this year, citing "adverse market conditions." Codexis, which is unprofitable, has also seen its share price trade down since its IPO. Imara Corp., a maker of high-power lithium-ion batteries, shut its doors last year after failing to raise more venture-capital funding.

Information tech start-ups also remain a big part of Silicon Valley's economic mix. The rise of social-networking companies such as Facebook and Twitter Inc. has spurred hiring and the creation of new sectors such as online social gaming. Apple Inc.'s iPhone has spawned a booming cottage industry of "app" makers for smartphones. Some 37% of app makers that it tracks are now in Northern California, estimates Mobclix Inc., which runs a nationwide app exchange, making the region the top locale for apps, ahead of 12% in the New York and New Jersey area.

Still, a shift in Silicon Valley's economic makeup appears inevitable, says Paul Holland, a venture capitalist at Foundation Capital, which is funding clean-tech start-ups. "Some of the diversification happening at the early stage is already starting to show up in the bigger players," he says.

Edenvale typifies Silicon Valley's latest crop of start-ups. Prior to the 1970s, the area was largely ranch and farm lands. In the early 1970s, property developers such as Carl Berg, CEO of [Mission West Properties Inc.](#), began buying land there.

Starting in 1976, the San Jose Redevelopment Agency designated 2,300 acres in the area as a redevelopment project, meaning the neighborhood was targeted for construction and job growth. Companies such as disk-drive maker [Western Digital Corp.](#) soon began opening facilities there, joining existing tenants such as IBM and then [Fairchild Semiconductor Corp.](#)

Edenvale took off in the late 1990s as dot-com fever and a telecom boom enveloped Silicon Valley. Networking companies such as [StrataCom Inc.](#) moved in, building a manufacturing facility in the office park before being acquired by [Cisco Systems Inc.](#) in 1996 for \$4 billion.

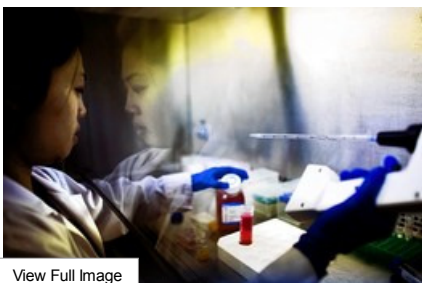
To accommodate the tech boom, more than 2.8 million square feet of new research and development space was built in Edenvale between 1998 and 2002, according to the Redevelopment Agency. Vacancy rates in the park still went to nearly nil. Tech companies "were spending money like mad," says Mr. Berg, the property developer.

Then the tech bust hit. In its wake, dozens of companies shut down or moved out.

That was when San Jose officials began studying industries beyond IT that it could potentially tap, such as biosciences. In 2004, San Jose funded and opened a 37,000-square-foot bioscience start-up incubator in Edenvale to nurture new companies. In 2007, the city created a program to give solar companies capital-equipment grants if they moved into Edenvale.

By that year, a trickle of non-IT companies began appearing in Edenvale. One was Nanosolar, a solar company founded in 2002 with funding from Google founders [Sergey Brin](#) and [Larry Page](#).

The start-up, which uses a high-speed printing technology to lower the cost of making solar panels, was initially located in Burlingame, Calif., in a 1,000-square-foot space with 10 people, says Nanosolar co-founder Brian Sager. By late 2007, it had raised around \$100 million in venture capital, grown to 50 people and needed to expand into a manufacturing space to start producing its panels.



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A technician works with cell cultures at Single Cell Technology in the San Jose BioCenter, which the city opened to house bioscience start-ups.

That year, Nanosolar scored a \$1.5 million incentive package from San Jose to move into Edenvale. In exchange, Nanosolar promised to create an undisclosed number of jobs in the area. In addition, San Jose officials promised streamlined permits to get Nanosolar's manufacturing facilities up and running, says Mr. Sager. The company moved into a 100,000-square-foot building in Edenvale that had previously been StrataCom's facility.

With production of solar panels now ramping up, Mr. Sager says Nanosolar has already expanded into a part of the parking lot. It plans to add an adjacent 110,000-square-foot space over the next few years.

"When we first came, there were a lot of empty buildings in Edenvale, since a lot of companies that focused on optical networking here had disappeared," says Mr. Sager. Now he notes that other solar companies have also appeared in Edenvale, including

Stion Corp. and SoloPower Inc.

Indeed, in the recent recession, Edenvale's vacancy rate didn't rise above 20%, says the Redevelopment Agency.

At the same time, bioscience-related firms have sprouted in Edenvale. Earlier this year, medical products maker [Hospira Inc.](#) signed a lease to shift some operations into the office park. Biomedical start-ups have also clustered there around the bioscience incubator, the San Jose BioCenter. The BioCenter leases out small lab spaces and "clean" rooms for testing products so that start-ups don't need to build their own research-and-development facilities.

Raj Chhibber, a former chip-industry executive, moved into the BioCenter incubator in 2005. He says he decided to go into bioscience and leave semiconductors because chips "are a mature technology." He named his start-up BrighTex Bio-Photonics LLC, and by late 2007, had created a \$10,000 to \$70,000 machine that cosmetics companies and others can use to analyze and test skin.

In 2008, the self-funded start-up graduated from the BioCenter into a 4,000-square-foot industrial space in Edenvale.

With BrighTex's sales set to grow 40% this year, Mr. Chhibber plans to boost his staff to 40 by the end of 2010, up from eight in 2007. He's also considering buying another 4,000-square-foot property in Edenvale for expansion.

"There's definitely been a shift here," says the 50-year-old. "In the late 1980s, it was all data-storage companies here. Now that's no more."

Write to Pui-Wing Tam at pui-wing.tam@wsj.com and Cari Tuna at cari.tuna@wsj.com

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