



silicon future

by Geoffrey Lean

It made its name with the silicon chip, but is likely to become even better known for the silicon cell. For the flat expanse of former orchard land at the southern end of San Francisco Bay, known worldwide as Silicon Valley, is gearing up to follow its world-transforming information revolution with an even greater one in renewable energy.

Many of the entrepreneurs and venture capitalists behind the Internet's astonishing expansion are now focusing on clean sources of power, especially the sun. So are iconic companies like Google. Recent years have witnessed the return of the buzz, bullishness and boundless confidence of the dot com boom.

John Doerr — dubbed “the most influential venture capitalist of his generation” as a partner in the Valley’s Kleiner Perkins Caufield and Byers — called that “the greatest period of legal wealth creation in history.” He should know: he helped finance such startups as Netscape, Amazon and Google, making well over a billion dollars. But by May 2007 he was predicting even greater things. “Remember the Internet? Green tech is bigger,” he told a top Silicon Valley conference. “This could be the biggest economic opportunity of the 21st century.”

Last May his firm, which had already invested \$200 million in such technologies, established a \$500 million Green Growth Fund to help develop them. Other Valley venture capitalists have also opened their cheque books wide. In 2007, says Brian Fan, Director of Research at the Cleantech Group, a research and strategy firm based in San Francisco, a staggering \$6 billion in venture capital was invested in green technologies worldwide, and about 40 per cent of it came from California.

That sum he adds, had almost quadrupled from \$1.4 billion in 2004. And it shot up again to \$8 billion in 2008, despite the credit crunch. The financial crisis and the plummeting oil price will take a toll, Cleantech admits, but it predicts a fall only to \$7 billion in 2009, with further rapid growth ahead.

Financial giant Merrill Lynch concurs. “We are more bearish short-term but more bullish long-term following our visit to the Valley,” it concluded in a mid-December report on clean technology, adding that it was “attracting senior management teams, many from the IT industry, who bring a sense of urgency and creativeness to energy problems.”

Firms on the ground are more positive still. “The fact that we are in this ugly economy is going to be good for the whole world” says Brian Halla, Chief Executive of top silicon chip company National Semiconductor, explaining that the crisis will force people to find innovative ways of producing energy. T.J. Rodgers, the CEO of Cypress Semiconductors adds: “I have every confidence that Silicon Valley is going to solve the energy problem.”

Russell Hancock, CEO of Joint Venture: Silicon Valley Network — an alliance of business, government, academia and communities — agrees with both of them. “The global climate crisis is an opportunity to grow the economy like we haven’t seen since World War II,” he says. “Promoting the development of new technologies for alternative energy is the nation’s best path to economic recovery because it will create whole new clusters of green collar occupations. Who is poised to lead this revolution? Silicon Valley.”

Dot com giants are out to justify such confidence. Google founders Sergey Brin and Larry Page have invested heavily in green energy start-ups, and their company is increasingly doing the same through its philanthropic unit, Google.org. They have set out to make renewable energy “cheaper than coal,” investing “hundreds of millions of dollars in breakthrough projects.”

Vinod Khosla, one of the founders of the pioneering Sun Microsystems in the early 1980s, is also investing heavily in renewables, as is Robert Metcalfe who invented the ethernet system used to link up computers in local networks. And Elon Musk, co-founder of PayPal, has invented an electric sports car.

Musk is also at the centre of what may prove the first big breakthrough, as chairman of the rapidly expanding SolarCity, California’s biggest solar installer, and as a big investor in First Solar, a pioneer of ‘thin film’ panels. These harvest the sun’s energy with a fine layer of a semiconducting material, such as silicon. Companies developing them say that they can produce 100 times more energy per gram of material than conventional solar cells, at a fraction of the cost.

“You can measure in months, not years, how far we are away from being able to produce solar power at prices competitive with fossil fuels”, says a bullish Alan Salzman, chief executive of VantagePoint Venture Partners, with \$4 billion of assets under management. Flisom, a Swiss thin film manufacturer, believes that within ten years the sun will produce electricity at half the price of coal, natural gas or nuclear.

Further funds are going into developing the technologies for solar power stations in sunny areas. In October, Governor Arnold Schwarzenegger opened a pioneering 5 megawatt plant in Bakersfield, north of Los Angeles. Built by Ausla, another of John Doerr’s start-ups, it will power 3,500 homes, generating electricity from steam produced by using mirrors to concentrate the sun’s rays on water pipes. Much bigger ones are planned soon.

Vinod Khosla, another big investor in Ausla, says similar power stations covering less than 150 square kilometres could enable the United States to cut its greenhouse gas emissions in half. He is also devoting much of his attention to developing second generation biofuels which avoid competing with food supplies by producing ethanol from, for example, corn stalks and other plant wastes or grasses like switchgrass. He predicts there will be six ways of producing such ‘cellulosic ethanol’ at prices competitive with petrol within four years.

Electric cars, which also have received much of their impetus from the Valley, are similarly close to breakthrough. Alan Salzman predicts that 2009 will prove a “watershed” with several big carmakers announcing production of “hundreds of thousands” of them.

Renault has already announced a wide range of electric vehicles for 2011. It is working closely with yet another former top IT entrepreneur — Shia Agassi, once a Vice President of the software giant SAP — who has developed a revolution in driving and car ownership, modelled on the marketing of mobile phones. Electric cars, like handsets, would be sold at heavily subsidised prices, or even given away free, in return for contracts to buy the electricity to drive them, Motorists would buy miles rather than minutes, giving them the right to use hundreds of thousands of recharge points and to have flat batteries replaced. Israel, Denmark, San Francisco and Hawaii have already signed up to the system.

World-saving it may all potentially be, but the Valley’s overwhelming motivation is profit. (“We are ruthlessly single-minded about our job, to make a lot of money for our investors,” says Doerr). It is after the vast \$6 trillion energy market, vastly bigger than IT and with a much more predictable demand.

But in the process Silicon Valley may indeed help beat climate change and the energy crisis, and satisfy the world’s yearning for clean power and a sustainable future. In which case it might return to the name it enjoyed when still covered with orchards — The Valley of Heart’s Delight. 