

(GUEST OPINION)

# Solar Makes Sense Now

BY DR. CHARLES GAY

➤ SOLAR PHOTOVOLTAIC ELECTRICITY HAS historically suffered from a troika of complaints that limited its deployment to niche markets: “Solar is too expensive,” “Solar is not reliable” and “Solar is not scalable enough to solve major energy needs.” The newest wave of technologies, equipment makers, module manufacturers and installers are putting an end to those misperceptions once and for all.

At the same time, our country’s reliance on imported oil, the environmental costs of fossil fuel energy generation and the predicted long-term increase in energy prices create an urgent need for solutions. The International Energy Agency estimates that global energy demand will increase by 45 percent between 2006 and 2030. As demand escalates with uncertain supply, prices will in turn increase, placing a huge strain on our economy. Clearly, the mandate to deliver new energy solutions has never been stronger, and solar PV is ready to deliver competitive prices with high-value job creation at the same time.

## NewsFlash

### CHINA POWER LINES

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China has announced plans to build three ultra-high-voltage power lines this year, according to *BBC Monitoring*.

Early this year, the State Grid Corp. of China put into service the first such line in the country. It plans to invest \$12 billion in power lines this year and in 2010. Such lines transport large amounts of power over vast distances with less power loss than normal.

Six are now planned for China.

the time 1.5 gigawatts of modules were being produced annually in 2003, the cost had fallen to \$3.53 a watt. This highly predictable pattern, typical of virtually all manufactured goods, demonstrates that as the scale of module production ramps, rapid improvements in process, throughput, and uptime

deliver continuous cost reduction.

Thin-film photovoltaic technology has an even greater chance of driving solar costs down to that of energy produced by fossil fuels, a concept known as grid parity. Thin-film technology dramatically reduces the amount of silicon needed to produce a module, thereby reducing costs. By applying our company’s 40 years of experience in driving down the cost of integrated circuits, and more recently flat-panel displays, we’re also bringing advances in deposition process, automation and factory efficiency to the thin-film production environment. All of these efforts further help to drive down the price of solar.

Importantly, solar has already achieved grid parity in several areas today. For example, California’s peak summer electricity rates hover above 40 cents a kilowatt-hour, which is more expensive than unsubsidized solar power generated today at about 30 cents a kilowatt-hour. In addition, solar can be distributed across the grid to relieve pressure on critical substations or transmission lines without the time or expense of wiring new transmission or distribution facilities.

As a resource for energy generation, solar is incredibly abundant. Every day, the sun provides 10,000 times more energy than we need for the planet. What this means is that from a cost, availability and rapid-deployment perspective, solar makes sense right now.

Questions about long-term reliability have also hampered solar photovoltaic deployment – and in particular, thin-film modules. But thin-film modules are neither new nor unproven. In the United States, the Sacramento Municipal Utility District began deploying amorphous-silicon, thin-film modules



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in 1992 and now has more than 1.5 megawatts of the modules producing electricity in its portfolio. According to SMUD, these solar arrays are performing at or above projected power outputs. Europe has also embraced the low-cost advantages of deploying utility-scale thin-film solar arrays, with more than 10 megawatts of capacity deployed in the last five years. Almost every reputable module manufacturer seeks International Electrotechnical Commission and Underwriters Laboratory certification for photovoltaic components, meaning the components must pass an arduous set of tests designed to accelerate the aging process to determine whether day-night temperature cycling, humidity or other stress conditions will cause them to fail.

Finally, solar has faced an obstacle of being too small a solution to truly make a difference in addressing the world's energy needs. Not anymore. As module factories increase in size, high-productivity tools and automation and factory process management continue to advance stride-for-stride to support growth. In addition to increasing the output of factories, scaling up the size of a manufacturing facility provides tremendous opportunities for materials cost reduction, utility cost savings, and improved efficiencies in logistics planning – all of which further help to reduce the cost per watt.

Applied Materials is currently ramping 11 thin-film photovoltaic factories for customers in six countries on two continents. Increased production around the globe is helping to transform solar photovoltaics from a cottage industry to a key long-term solution for alleviating the world's energy crisis with an affordable, clean source of energy.

*Dr. Charles Gay is corporate vice president and general manager of the Solar Business Group at Applied Materials.*

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# Where T&D Automation Is Headed

2009 AND BEYOND // BY CHARLES W. NEWTON

THE FINANCIAL ENVIRONMENT AND ECONOMIC OUTLOOK darken many segments of the national and global economies. Will the electric power industry significantly scale back planned capital expenditures and operations and maintenance spending on transmission and distribution automation? To find the answer, we conducted a global study of capital-expense budgets.

Several key reasons underpin the continued relatively strong investment in transmission and distribution of electricity planned for 2009 and 2010. Regulatory pressure and mandates for service reliability improvements require investment. Smart-grid initiatives aimed at modernizing the power grid infrastructure and enabling energy efficiencies need funding. Obsolescence of existing equipment and systems obliges utilities to buy replacements. And finally, a long-term investment view is necessary to accommodate long-term growth in electricity consumption. Many utility capital projects are complex and require years to complete, so project deferrals are often impossible, despite a poor economic outlook.

Charles W. Newton



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