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Virtual design speeds green reality

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Cleantech companies sell technology products and services that solve environmental problems, ranging from traffic monitoring solutions to bioplastics made from sewage sludge to new solar cell technology. These exciting new products and solutions offer the promise of creating a more sustainable world, while transforming the global economy.

Climate change, resource depletion, water scarcity and other major environmental challenges have prompted governments and venture capitalists to sponsor a wave of entrepreneurial innovation. Entrepreneurs worldwide are striving to address these issues through breakthrough technologies and new business models. Fortune 1,000 companies are also heavily

focused in this area, often collaborating with smaller firms to tap into new ideas. The resulting cleantech industry is a dynamic force in the economy today.

Private investors are active as well. Cleantech venture capital investments equalled \$5.64 billion in 2009, with notable concentrations in North America, Europe, and Asia — about a quarter of all global venture investments and the most of any single category. According to the United Nations Environment Programme and Bloomberg New Energy Finance, investment in the sustainable energy market defied the global recession, growing by around five per cent — from \$148 billion in 2007 to around \$155 billion in 2008. Industry analyst predictions suggest that cleantech investment in 2010 will recover and exceed 2009 numbers.

Scoping the challenge

Yet despite the strong recent growth of the cleantech market, the sector today is facing a range of complex challenges. One of the most important of these challenges is the need to accelerate time to market. Like all startup companies, new cleantech-focused organisations are heavily dependent on bringing their products to market quickly to tap into new revenue streams.

Speed to market is, however, a particularly key issue in the cleantech arena. Cleantech products often integrate with infrastructure and broader systems and they typically need to be developed using alternative materials, so bringing a product to market is a complex, lengthy process. Also, as cleantech is a relatively new and highly competitive arena, market timing for new products is often a key determinant not just of long-term success but of short-term survival. And from a broader societal perspective, it is important that new cleantech solutions are developed rapidly to find greener alternatives to the way organisations operate today.

Finding a solution



Erwin Burth, director of industry development for Autodesk

Fortunately, there is a new approach to product design that enables cleantech manufacturers to overcome this challenge called "digital prototyping." Developing cleantech products requires high-quality, 3D mechanical design and simulation software that allows product designers to create digital prototypes. Digital prototyping helps to make the cleantech product development process far more efficient by allowing manufacturers to digitally design, visualise and simulate how a product will work under real-world conditions before it is built. It reduces reliance on physical prototypes, which helps accelerate time to market in highly competitive industries like cleantech. It also assists cleantech manufacturers with using recyclable materials and to fully optimise materials usage.

By giving conceptual design, engineering and manufacturing departments the ability to virtually explore a complete product before it becomes real, digital prototyping makes the whole design process more streamlined and efficient. It also reduces the inherent risk in the process, helping to ensure that cleantech companies make their mistakes on the computer desktop — where the cost is low — and not in the factory or the marketplace. After all, an engineer can try out many design iterations to test if a digital prototype works at a much lower cost with fewer materials, and have confidence the physical prototype will perform better.

Digital prototyping also helps cleantech companies become cleaner and greener. Dedicated to solving environmental problems, it is important that these firms design and manufacture their products in a sustainable way. Part of this means selecting product materials that can be re-used or are biodegradable at the end of a product's lifecycle, and part of it is about reducing or eliminating toxic materials and sourcing materials more wisely. Twenty years ago, the development of a wind turbine would have typically involved significant materials waste. Today, this practice would be entirely unacceptable. Digital prototyping is the key to easily exploring alternative designs to see which ones best meet both a product's commercial and sustainability objectives.

Looking to the future of sustainable design



Pyrum Innovations, a German/French startup working on a newly invented recycling process for used tyres, is one of a growing numbers of cleantech companies that have joined the Autodesk Clean Tech Partner Programme.

Today, the clean technology industry has the opportunity to solve some of the most pressing environmental problems of our generation and is one of the most dynamic sectors of the global economy. As we look to the future, the increasing purchasing power and capital investments by multibillion-dollar global companies underscore the market opportunities that lie ahead in cleantech. In a recent survey conducted by Environmental Leader into the views and opinions of large corporations, the vast majority of respondents project their companies will spend at least \$10 million on cleantech investments by 2010, with 22 per cent predicting a cleantech spend of at least \$100 million. Case in point: giant conglomerate GE said it will double its eco-related R&D spending to \$1.5 billion in 2010 and aims to double its revenues from sales of cleantech products and services to \$20 billion.

This is positive news, but the success of the cleantech sector in coming years will depend heavily on the innovation of smaller businesses and startup companies, where digital prototyping will be critical in driving faster time to market and competitive advantage for cleantech businesses, from solar device-makers to wind turbine manufacturers. Embracing digital prototyping will separate the winners from the losers, particularly as consolidation occurs in sectors or geographies where there's been over-investment in recent years.

One thing is clear, those cleantech companies that employ digital prototyping are increasing their odds to seize more than their fair share of the market's rapid growth.

Editor's note: This was a guest article by Erwin Burth, director of industry development at Autodesk. Autodesk, which specialises in 2D and 3D design technology, recently launched a Clean Tech Partner Programme in the UK and across Europe. The scheme provides digital prototyping software grants to clean technology companies to help them innovate more rapidly.