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REVENUE FROM NANOTECHNOLOGY-ENABLED PRODUCTS TO EQUAL IT AND TELECOM BY 2014, EXCEED BIOTECH BY 10 TIMES

$2.6 trillion in products will incorporate emerging nanotechnology in 10 years

New York, NY – October 25, 2004 – Sales of products incorporating emerging nanotechnology will rise from less than 0.1% of global manufacturing output today to 15% in 2014, totaling $2.6 trillion. This value will approach the size of the information technology and telecom industries combined and will be 10 times larger than biotechnology revenues, according to a new report from Lux Research entitled "Sizing Nanotechnology's Value Chain." However, sales of basic nanomaterials like carbon nanotubes and quantum dots will total only $13 billion in 2014: Nanotechnology's economic impact will arise from how these fundamental building blocks are used, not from sales of the materials themselves.

The report refutes the popular misconception that nanotechnology is an industry or a sector – it isn't. Instead, nanotechnology is a set of tools and processes for manipulating matter that can be applied to virtually any manufactured good. Rather than envisioning a mythical "nanotechnology market," Lux Research recommends that executives focus on how nanotechnology is being exploited across industry value chains, from basic materials to intermediate products to final goods. The report presents separate forecasts by each value chain stage as well as by sector and region.

"Over the past several years, companies have selectively applied nanoscale innovations to products ranging from the Chevrolet Impala to Merck's anti-emetic drug Emend," explained Matthew Nordan, Vice President of Research at Lux Research. "These initial deployments have proven the value of nanotechnology, setting the stage for an explosion of applications. In 2014, we project that 4% of general manufactured goods, 50% of electronics and IT products, and 16% of goods in healthcare and life sciences by revenue will incorporate emerging nanotechnology."

Lux Research predicts that nanotechnology's growth will occur in three phases:

- In the first phase, ending this year, nanotechnology is being incorporated selectively into high-end products. In 2004 revenues from products incorporating emerging nanotechnology will total $13 billion, $8.5 billion of which lies in automotive and aerospace applications.
- Through 2009, commercial breakthroughs will unlock markets for nanotechnology innovations, with revenues rising to $292 billion. Electronics and IT applications will dominate as microprocessors and memory chips built using new nanoscale processes come to market.
- From 2010 onwards, nanotechnology will become commonplace in manufactured goods, with revenues rising to $2.6 trillion in 2014. Healthcare and life sciences applications will finally become significant in this period as nano-enabled pharmaceuticals and medical devices emerge from lengthy human trials.

The widespread use of nanotechnology in mainstream products will have profound ripple effects. Ten million manufacturing jobs worldwide in 2014 – 11% of total manufacturing jobs – will involve building products that incorporate emerging nanotechnology. Nanotechnology will shift market shares and introduce unconventional competitors: For example, silicon nanowire display printing technologies could cut capital requirements for flat-screen display plants by an order of magnitude, tempting fleet-footed manufacturers like Dell to enter the market. Supply chains will simplify as highly functional materials eliminate steps in manufacturing processes, negatively impacting sub-assembly manufacturers and transportation companies while making value-added taxes more productive for governments than sales taxes.

"Nanotechnology's increasing relevance creates clear mandates for business and government leaders," said Nordan. "Corporations need to develop an explicit nanotechnology strategy – apart from leaders such as DuPont and Praxair, few companies coordinate their nanotechnology activities at all today. Investors should focus on nanotechnology

applications in the middle of industry supply chains where profit potential is highest, and consider playing nanotech as a long-term secular trend. Public sector leaders should focus on fostering nanotechnology demand, not just supply, and establish informed regulation to address health and safety issues."

For "Sizing Nanotechnology's Value Chain," Lux Research built bottom-up, top-down, and evolutionary models of 42 product segments impacted by nanotechnology. The report team populated the models through exhaustive secondary research; interviews with more than 100 executives, researchers, and academics working to commercialize nanotechnology; and integration of macroeconomic data from organizations such as the U.S. Bureau of Economic Analysis and the World Bank. Additionally, Lux Research partnered with UK-based Volterra Consulting – founded by Paul Ormerod, influential economist and author of "Butterfly Economics" – to build advanced evolutionary models that measure how nano-enabled solutions compete for market share with alternatives.

The report is available immediately to clients of Lux Research's Nanotechnology Strategies advisory service. For information on how to become a client, contact Rob Burns, VP of Sales at (646) 723-0708.

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