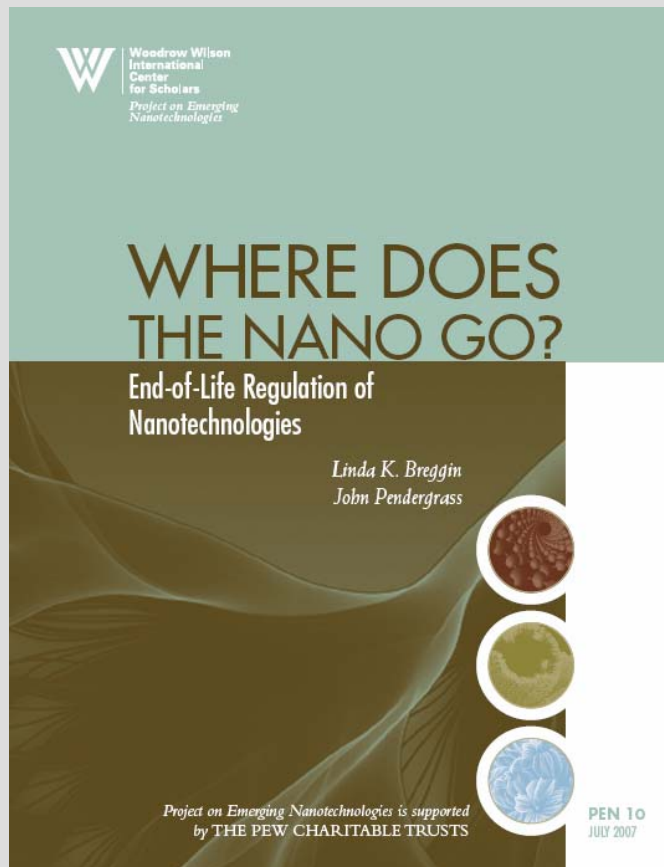


Where Does the Nano Go? End-of-Life Regulation of Nanotechnologies



July 26, 2007

12:30 PM

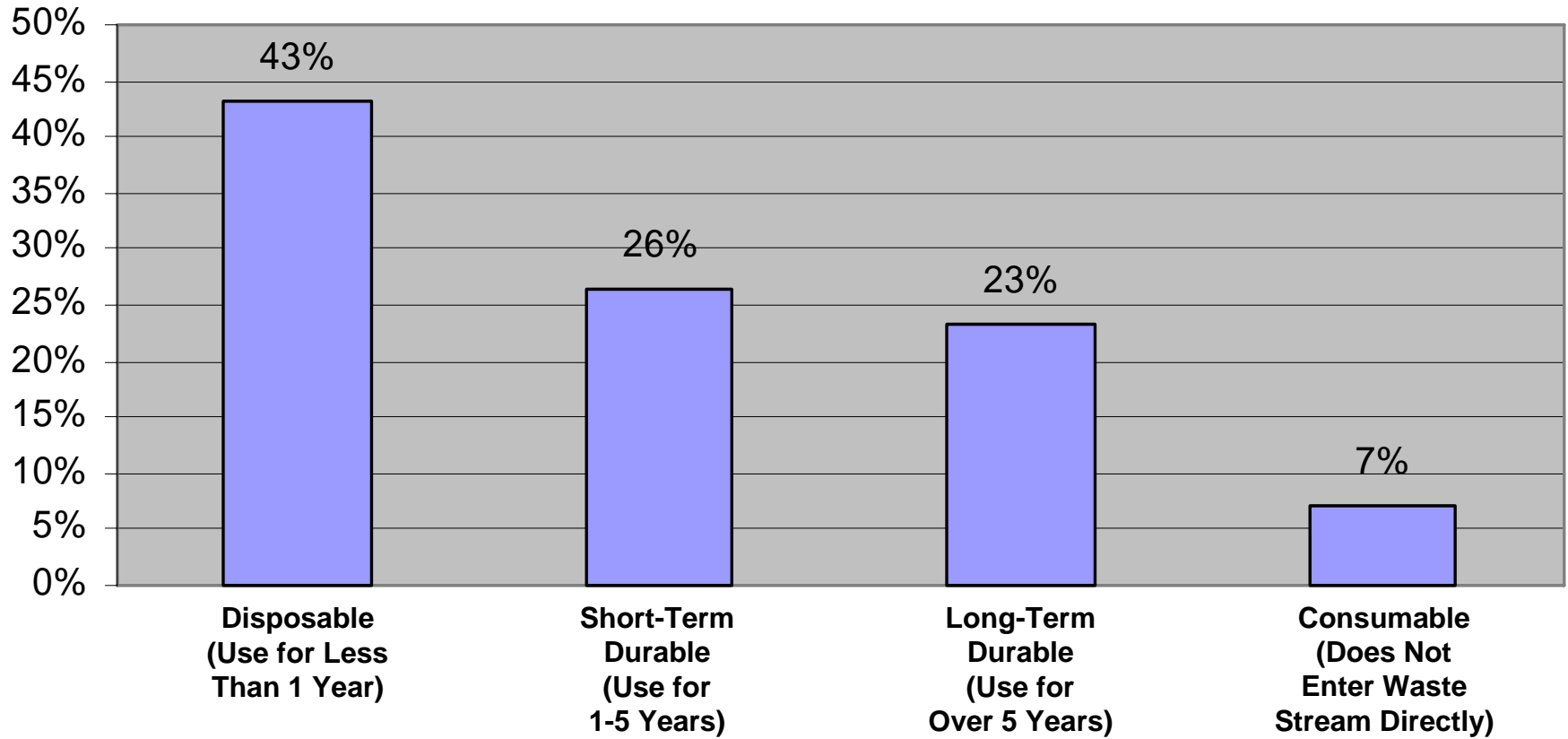
Estimated Global Production Rates for Various Nanomaterials and Devices

Application	Material/device	Estimated Production Rates (metric tons/year)		
		2004	2005-2010	2011-2020
Structural applications	Ceramics, catalysts, composites, coatings, thin films, powders, metals	10	10^3	10^4 - 10^5
Skincare products	Metal oxides (titanium dioxide, zinc oxide, iron oxide)	10^3	10^3	10^3 or less
ICT	Single wall nanotubes, nano electronics, opto-electro materials (titanium dioxide, zinc oxide, iron oxide), organic light-emitting diodes (OLEDs)	10	10^2	10^3 or more
Biotechnology	Nanoencapsulates, targeted drug delivery, bio-compatible, quantum dots, composites, biosensors	< 1	1	10
Instruments, sensors, characterization	MEMS, NEMS, SPM, clip-pen lithography, direct write tools	10	10^2	10^2 - 10^3
Environmental	Nanofiltration, membranes	10	10^2	10^3 - 10^4

Source: RS/RAE. 2004. *Nanoscience and nanotechnologies: Opportunities and uncertainties*, The Royal Society and The Royal Academy of Engineering, London, UK. Table 4.1. Available at: <http://www.nanotec.org.uk/finalReport.htm>

Note: Estimated global production rates for various nanomaterials and devices are based on international chemical journals and reviews and market research.

Nano Products in the Waste Stream



Less Than 1 Year

1-5 Years

Over 5 Years

Indirectly Enters Waste Stream

Strategies for Manufacturing Waste

- Store on site.
 - Incinerate on site.
- Move off site as hazardous waste and incinerate or landfill.
 - Recycle/Reuse
 - Material substitution
 - New products



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*Project on Emerging
Nanotechnologies*

WHERE DOES THE NANO GO?

End-of-Life Regulation of Nanotechnologies

*Linda K. Breggin
John Pendergrass*



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