



Introduction to the **RoHS** and **WEEE** European Union Directives



MEP Executive Briefing

RoHS & WEEE Directives: Implications for U.S. Manufacturers

Disclaimer:

NIST MEP and its MEP Center affiliates provide this Executive Briefing for the purpose of informing U.S. manufacturers and industry partners about emerging European environmental directives, laws and regulations that may affect their ability to compete in global markets. NIST MEP offers this information to help U.S. manufacturers assess their business risks and plan suitable strategies for process engineering, product design, manufacture and marketing.

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Global Shift in Environmental Policy and Legislation

- ❖ The **European Union (EU)** is leading a change in environmental regulations affecting the **electrical and electronic equipment (EEE)** industry
- ❖ Other countries and U.S. states are proposing/enacting similar legislation.
 - California enacts RoHS & WEEE laws for computer & TV monitors (RoHS portion effective January 2007); proposed expansion to cover same products as EU Directive
 - New Jersey's RoHS legislation restricts 7 hazardous substances.



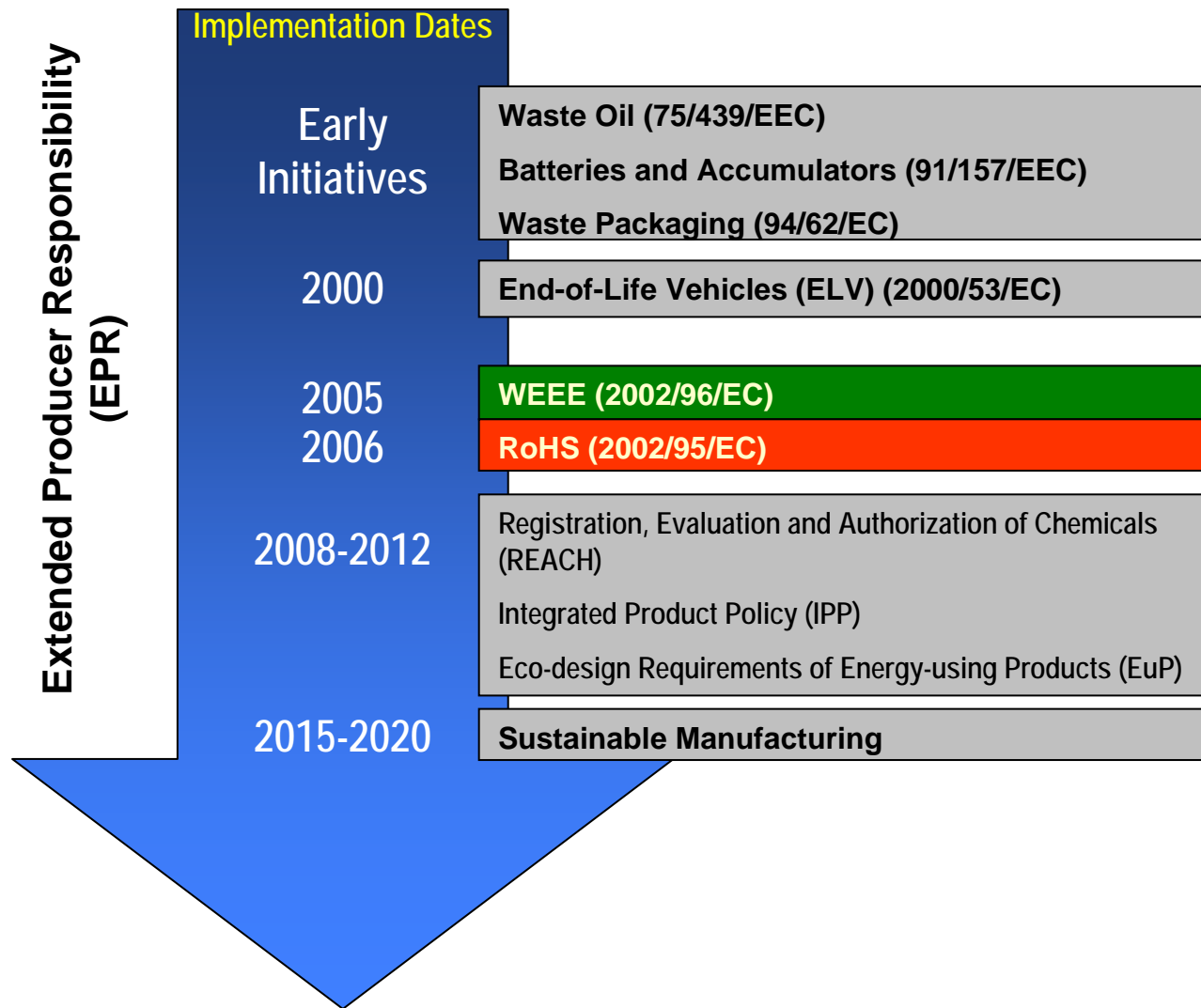
*Source: Stone & Associates,
RoHS-WEEE Directives:
Challenges for US Small &
Mid-Size Manufacturers
(May 2006)*

Product-Based Environmental Legislation

- ❖ There is a paradigm shift in public policy and legislation:
 - From environmental impacts of **manufacturing operations**
To environmental impacts of **products**.
- ❖ Product-based environmental legislation focuses on:
 - Eliminating or minimizing the use of hazardous materials/substances in products;
 - Providing post-consumer recycling options for end of life;
 - Product designs that minimize the environmental impact of products during their lifetime.



Emerging Trend of Product-based Legislation



RoHS and WEEE Directives



- ❖ **Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) EU Directive (2002/95/EC)** restricts the amount of hazardous chemicals and heavy metals used in the production of EEE



- ❖ **Waste Electrical and Electronic Equipment (WEEE) EU Directive (2002/96/EC)** aims to raise the level of recycling of EEE and encourage designers to create products with recycling in mind.
- ❖ **WEEE legislation** requires manufacturers to arrange and pay for recycling/reuse of their products

RoHS - The Most Complex and Costly EU Directive

“(RoHS) is potentially the biggest issue to hit electronics manufacturers, suppliers and retailers in living memory”

..... *Paul James, General Manager, Exel 8.12.05*



Products Impacted by the RoHS Directive?

- ❖ RoHS applies to any covered EEE product *put on the market* in the EU on or after July 1, 2006.
- ❖ EEE means equipment “which is *dependent* on electric current or electromagnetic fields in order to work properly, and equipment for the generation, transfer and measurement of such fields and currents” (RoHS Art. 3(b)).
 - “**Dependent**” means that the equipment needs electricity (e.g., not oil or gas) as its primary energy source to fulfill its basic function.



RoHS Restricts the Use of Six Hazardous Substances

Restricted Substance	Maximum Concentration	Typical Uses of Substance
Lead (Pb)	Up to 0.1% (< 1000 PPM)	Solder, batteries, paints, pigments, PVC cables, metal parts, lead finish
Cadmium (Cd)	Up to 0.01% (< 100 PPM)	Batteries, paints, pigments, plastic additive in PVC cable
Hexavalent Chromium (Cr _{VI})	Up to 0.1% (< 1000 PPM)	Metal finishes, aluminum conversion coatings, paints, copier toner, rust inhibitors
Mercury (Hg)	Up to 0.1% (< 1000 PPM)	Switches, paints, polyurethane materials, lamps
Polybrominated Biphenyl (BPP)	Up to 0.1% (< 1000 PPM)	Used as flame retardant in plastics, cables, fans, connectors, and paints.
Polybrominated Diphenyl Ether (PBDE)	Up to 0.1% (< 1000 PPM)	



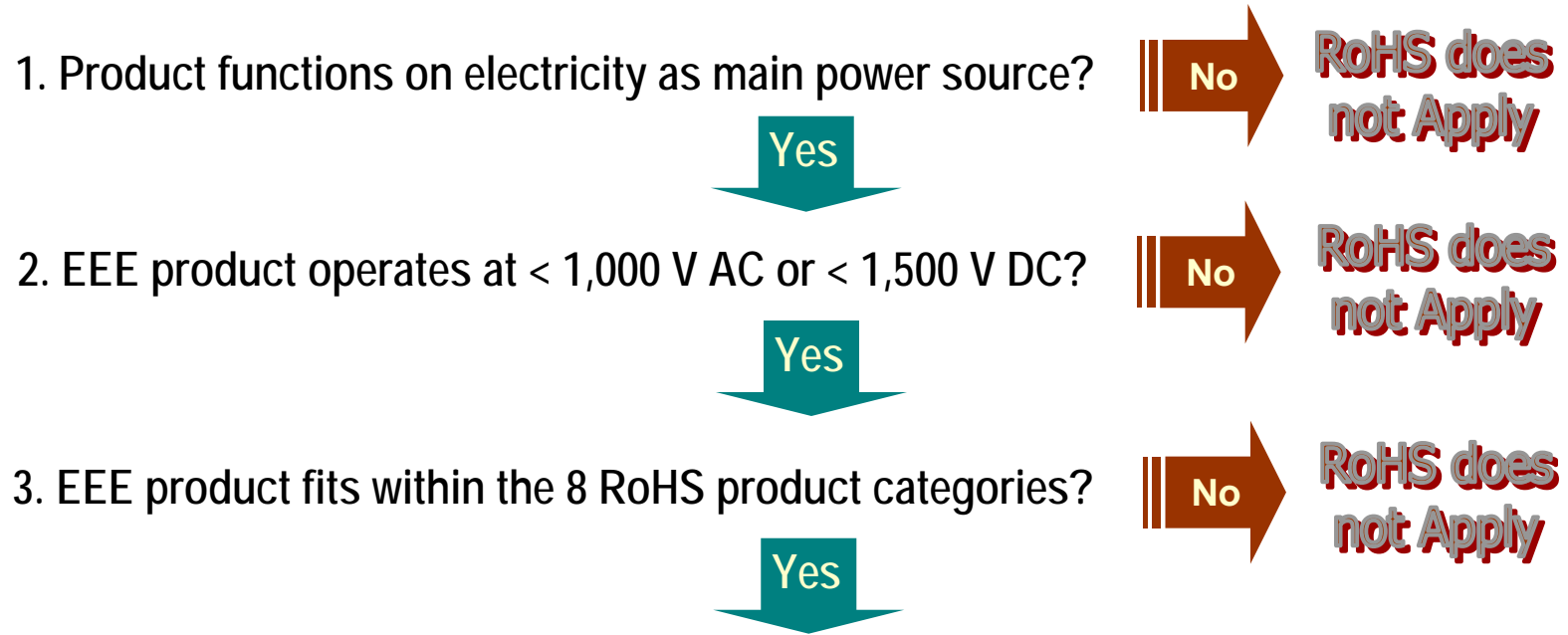
Scope of the **RoHS** Directive

- ❖ The RoHS Directive applies to most electronic products with an electrical cord or battery.
- ❖ Covers EEE up to and including 1000 volts AC, or up to and including 1500 volts DC (RoHS Art. 3(a)).
- ❖ Equipment covered includes the following 8 product categories* (RoHS Art. 3(a)):
 - Large household appliances
 - Small household appliances
 - IT and telecommunications equipment
 - Consumer equipment
 - Lighting equipment
 - Electrical and electronic tools
 - Toys, leisure, and sports equipment
 - Automatic dispensers



* *WEEE Directive includes 2 additional product categories: Medical Devices and Monitoring & Control Instruments*

RoHS Applicability Chart – Does RoHS Apply?



RoHS Directive Applies UNLESS:

- **RoHS Directive explicitly excludes this particular type of EEE product.**
(e.g. Military, Aerospace, Transportation, Medical devices, Monitoring & Control instruments, Batteries)
- **An exemption to RoHS has been granted for the specific product application.**
(e.g. Large-scale stationary industrial tools, Mercury in certain fluorescent and other lamps, Lead in glass for CRTs, electronic components, Cadmium, Hexavalent Chromium, Lead in certain applications, etc.)

RoHS does not Apply



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Why Do **RoHS** and **WEEE** Matter to My Company?



How RoHS and WEEE Apply to U.S. Manufacturers?

- ❖ Original equipment manufacturers (OEMs) are ultimately accountable for full compliance of their products sold
 - OEMs will be held accountable for non-compliant products reaching the marketplace where RoHS legislation governs, even if one of their suppliers causes the problem (e.g. Sony PlayStation example in the Netherlands).
 - Therefore OEMs must exercise due diligence in order to ensure full compliance of their systems and products including all component parts and materials.

- ❖ U.S. Manufacturers must comply with RoHS and WEEE if their products, components or materials are:
 - Exported to the EU directly (or to other Countries and U.S. States with similar RoHS & WEEE laws and regulations)
 - Sold to firms (e.g. distributors, trading companies, retailers) who export your products to the EU (or to other Countries and States with similar laws); or
 - Sold to original equipment manufacturers that incorporate your components into their EEE which is exported or sold to the EU (or other Countries and States).



What is the Status of U.S. EEE Manufacturers?

- ❖ Large U.S. OEMs are prepared for the RoHS compliance deadline, but many small and medium-sized companies are far behind:
 - Many have incorporated lead-free alternatives in their products, but still need to renumber their products, and determine a system for segregating and tracking compliant vs non-compliant inventory;
 - Most do not have compliance documentation and due diligence procedures in place;
- ❖ Due to business risks, OEM's are likely to replace suppliers who are non-compliant or who are not yet able to certify full compliance.
- ❖ Some industry experts report that Chinese EEE manufacturers are ahead of their U.S. counterparts in RoHS compliance readiness.



Why Should My Company Comply?

- ❖ To remain competitive in the EU market, the RoHS & WEEE Directives must be followed or else:
 - RoHS compliant companies will have the opportunity to take business from non-compliant companies
 - Competitors could turn you in to gain a market advantage.
- ❖ Even if your EEE products are now exempt or are not sold in the EU, you should **develop a RoHS migration strategy** because:
 - Exemptions are temporary, and may expire or be lifted when suitable alternative products and processes become available.
 - Countries outside of the EU such as China, Taiwan, Korea, Japan, as well as some states in the U.S. (California, Maine, New Jersey) may enact RoHS legislation with similar or more stringent restrictions and fewer exemptions.

How Will **RoHS** Affect My Company?

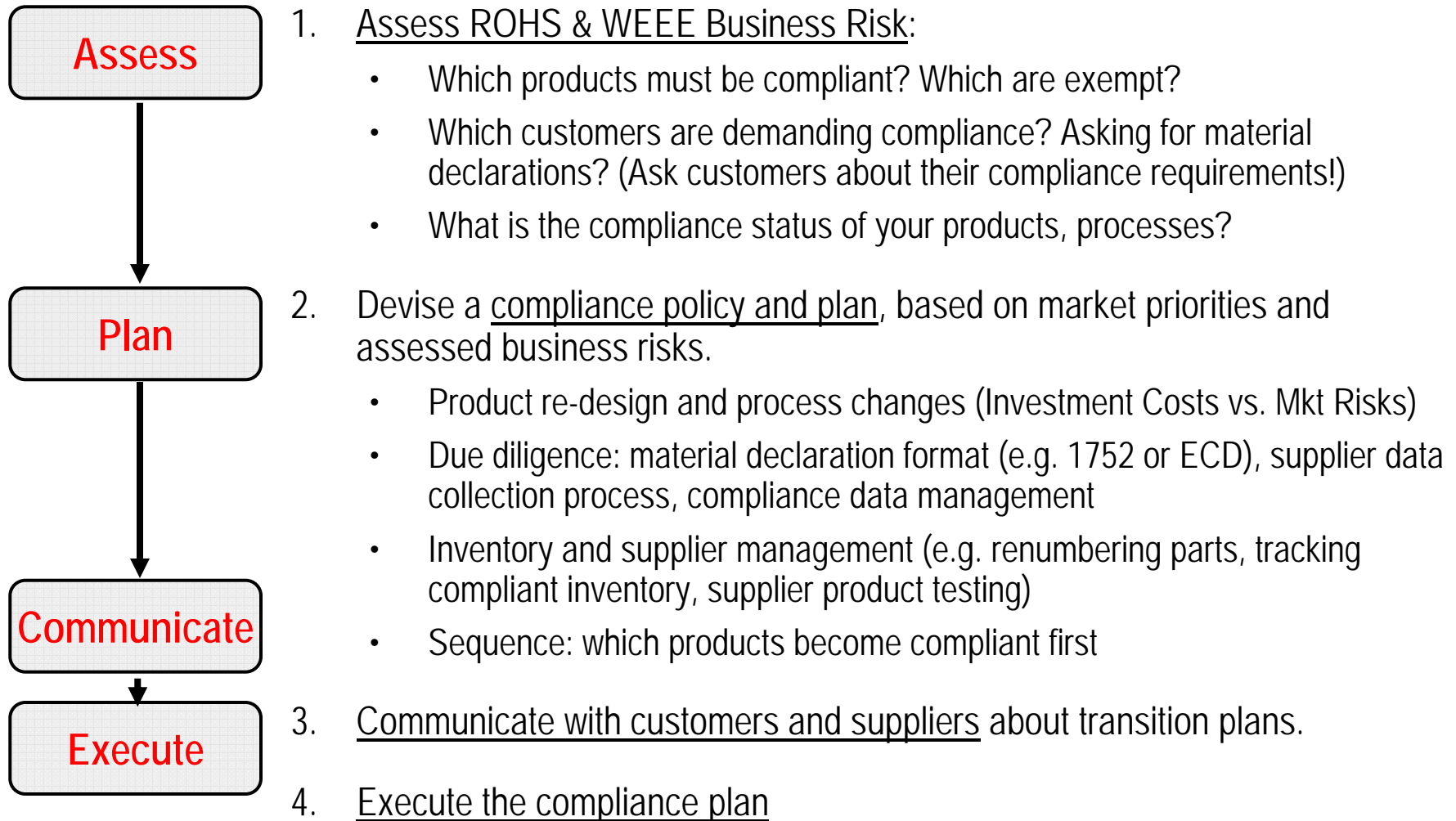
- ❖ Product substitution and/or process changes may be required.
 - Redesign products and manufacturing processes to eliminate or greatly reduce the use of hazardous substances defined by RoHS (or Joint Industry Group)
 - Change part numbers to control inventory and communicate RoHS transition
 - Changes in inventory management, such as marking/labeling or segregation of compliant vs non-compliant inventory

- ❖ Compliance records and data must be maintained.
 - Test and report hazardous substances at Homogenous materials level;
 - Due diligence compliance tracking of suppliers' components
 - Full documentation of compliance methods, records and data
 - Exchange compliance information with customers and suppliers.

- ❖ Costs may be higher.
 - Investment in processes that do not use RoHS restricted substances
 - Costs to test, evaluate and re-qualify processes and products
 - Extra process control and product testing to manage compliances
 - Extensive compliance documentation, data exchange and record keeping
 - Extra inventory (holding compliant and non-compliant versions, buffers against shortages)



RoHS Compliance Pathway



Summary for **RoHS** Directive



- ❖ RoHS restricts the use of six specific hazardous materials in EEE products supplied to EU countries after July 1, 2006.
- ❖ RoHS compliance will soon become a universal requirement for EEE products competing in most domestic and world markets.
- ❖ The risks of non-compliance can be severe – fines, loss of business, product removal, exclusion from EEE supply chains, brand disrepute.
- ❖ Small and medium-sized U.S. manufacturers that produce EEE products or supply components to EEE products will be compelled to certify RoHS compliance to their customers and supply chain trading partners.
- ❖ The pathway to RoHS compliance starts with market awareness, business risk assessment, and open communications with your customers, suppliers and trading partners.



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The **WEEE** Directive



Introduction to the **WEEE** Directive

- ❖ The WEEE Directive is a separate piece of environmental legislation, but is directly linked to RoHS.
- ❖ The WEEE Directive is primarily tasked with reducing the amount of electrical and electronic equipment (EEE) that is land-disposed at the end of its useful life by encouraging reuse, recycling and separate collection.
- ❖ The Directive covers EEE products in the eight RoHS categories, plus two additional categories – Medical Devices and Monitoring and Control Instruments (WEEE Art. 3(a)).

WEEE - Waste Electrical and Electronic Equipment

- ❖ The WEEE Directive mandates recycling of electric and electronic equipment throughout the EU at no cost to the consumer.
 - The consumer pays nothing at the point of collection
 - The manufacturer pays for all the costs associated with collection, transportation, and recycling
 - Manufacturers also responsible for recycling B2B WEEE
 - Creates an incentive for producers to design more environmentally friendly EEE
 - The effective date of WEEE was **August 13, 2005**, after which all non-complying products were banned from sale in the EU.



WEEE makes Producers Responsible for the Environmental Impact of their Products

❖ WEEE passes responsibility to the Producer for :

- Reuse
- Transportation
- Recycling
- Recovery

❖ Producers must take physical and financial responsibility for managing post-consumer waste.

❖ New products must be marked clearly with the producer's name and a symbol (the crossed-out wheelie bin) to indicate that it must not be disposed of as municipal waste.

The Recycling Loop



Summary of the **WEEE** Directive



- ❖ The WEEE Directive addresses the rapid increase in waste generation associated with EEE products.
- ❖ WEEE laws regulate end-of-product-life procedures (reduce, reuse, reclaim, recycle, proper disposal).
- ❖ WEEE-type legislation holds manufacturers of EEE products responsible for bearing the costs of product life cycle management.
- ❖ Other countries and U.S. states will enact similar WEEE legislation; therefore, WEEE requirements will spread to world markets.
- ❖ The pathway to WEEE compliance starts with understanding the specific regulations and procedures that apply in the various countries and states where your EEE products are sold and used.

RoHS & WEEE Directives: Implications for U.S. Manufacturers

How can MEP help you?

- ✓ Guidance on Compliance Requirements
- ✓ RoHS Assessment Tool for Applicability & Risks
- ✓ RoHS Compliance Planning
- ✓ Material Declarations and Compliance Data Exchange
- ✓ Compliance implementation and project management

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