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Flexible solutions.

Continuous Compliance

Global Environmental Legislation

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Agenda

- Global Environmental Legislation
 - EU RoHS
 - China RoHS
 - Korea RoHS
 - REACH
- Keys to Continuous Compliance

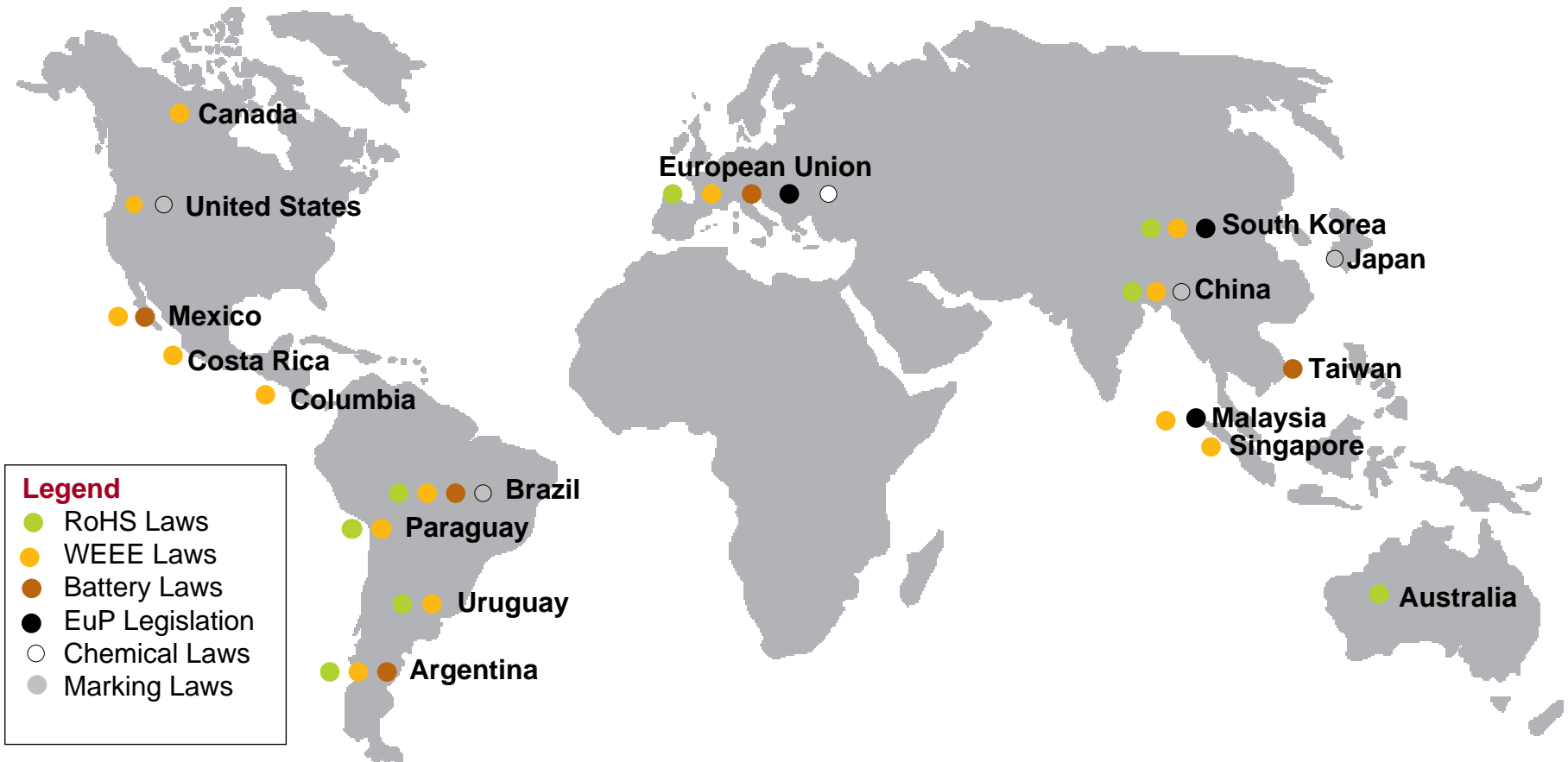
The Motivation



Source: Silicon Valley Toxics Coalition

Environmental Legislation by Geography

The EU is not the only region that had Enacted Environmental Legislation:



Legislation will evolve over time (e.g. additional material prohibitions, threshold level changes, wider geographical adoption, etc.)

EU RoHS

RoHS Restricted Substances and Max. Concentration Values:

- Lead (Pb) 0.1%
- Hexavalent Chromium (Cr⁶⁺) 0.1%
- Mercury (Hg) 0.1%
- Polybrominated Biphenyl (PBB) 0.1%
- Polybrominated Diphenyl Ether (PBDE) 0.1%
- Cadmium (Cd) 0.01%

Notes:

- Max concentration values expressed by percentage weight for homogeneous materials
- Homogenous material means a unit that can not be mechanically disjointed into single materials

Select Exemptions

- Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85% lead);
- Lead in solders for servers, storage and storage array systems (granted until 2010);
- Lead in solders for network infrastructure equipment for switching, signaling, transmission as well as network management for telecommunication (e.g. base stations, routers, etc.); and
- Lead in electronic ceramic parts (e.g. piezoelectronic devices).

Out of Scope

- Equipment deemed necessary to maintain National Security. (this is NOT a "catch all" for all military equipment).
- Equipment rated to operate above 1000 VAC, or 1500 VDC
- Medical, industrial, nuclear or biologically contaminated equipment and components. (but not if there is no contamination)

Would not recommend relying on exemptions to delay start
of company's RoHS compliant programs

Potential Sources of Non-Compliance

Solder joints

Lead in traditional solder; Eutectic SnPb

Printed wiring boards

Lead in pad plating

Some use PBBs & PBDEs as a flame retardant

Components

BGA devices have SnPb solder balls

Overmold and die attach materials contain Lead

Lead in lead plating



Potential Sources of Non-Compliance

Zinc plated cold rolled steel from sheet and coil

Cr6 in conversion coatings used to enhance corrosion resistance of zinc plating.

Plated steel fasteners

Cr6 - in Zinc chromate coatings

Aluminum castings

Cr6 in chromate conversion coatings

Molded Plastic parts

Stabilizers and in pigments

Vinyl Chloride routinely contains Pb & Cd.

Cables

Lead in lead plating and soldered connections

Cd in conductor alloy

Lead phthalate in the cable insulation

Cr6 in finishes of metallic parts

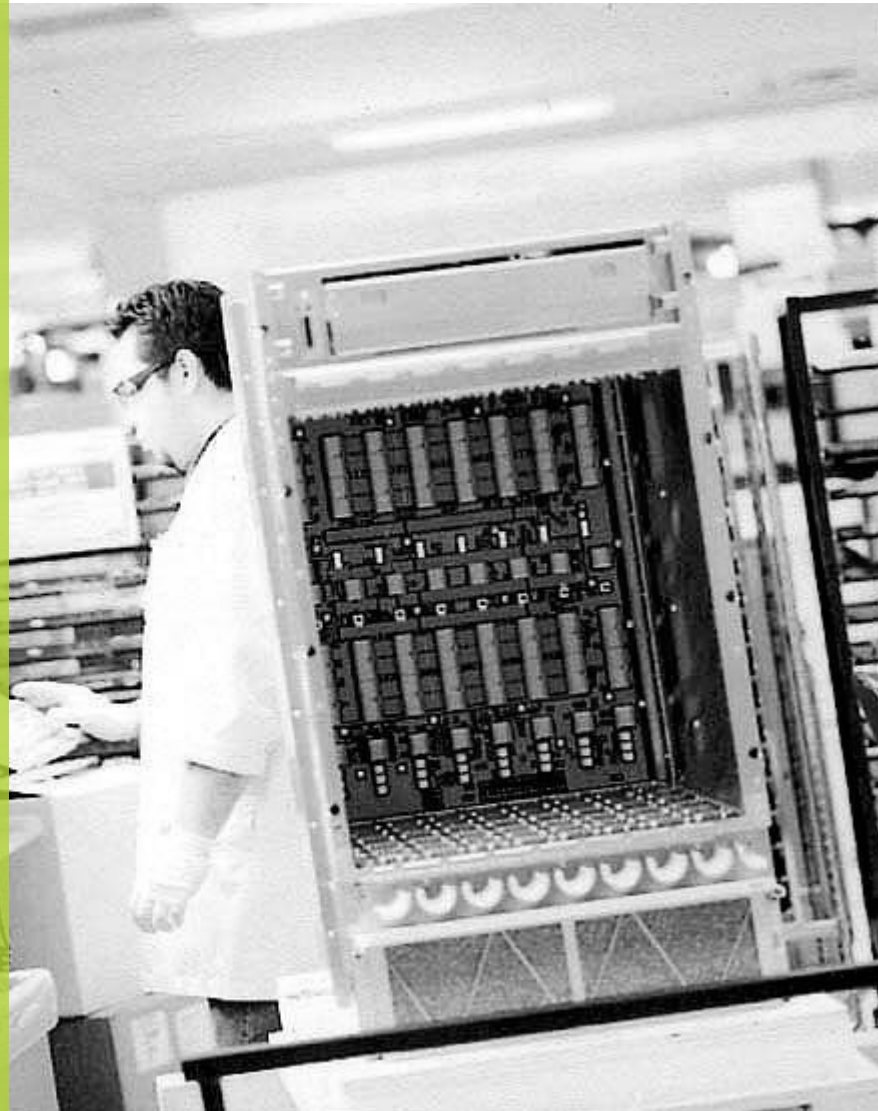
PBB and PBDE in plastic parts

Paints & Inks (labels)

Lead compounds as drying agents

Lead & Cadmium compounds as pigments

Cr6 added for corrosion resistance



China RoHS Summary

- Management Methods for Controlling Pollution By Electronic Information Products – Ministry of Information Industry Order #39
- Applies to products imported into China and products manufactured inside China for domestic use.
- Two elements: Phase 1 - labelling of products and hazardous material reporting; Phase 2 - restriction of products containing hazardous substances
- Hazardous chemicals are same as defined in EU RoHS directive (i.e. Lead, Mercury, Cadmium, Hexavalent Chromium, PBDE, PBB)
- Extensive scope – Broader than RoHS/WEEE
- Applies to products that are sold
- Phase 1 came into force March 1st 2007

China RoHS Scope

- **Part 1**
 - Labelling of products and hazardous material reporting
 - Applies to all products listed in the catalogue of electronic information product (EIP) categories verified by the China National Statistics Bureau
 - More extensive than RoHS scope however automotive products and domestic white goods are notable exceptions.
 - Applies to all EIP manufactured after 1-March-07.
 - Regulations also include labeling of packaging.

- **Part 2**
 - Restriction of products containing hazardous substances
 - Applies to products listed in the Catalogue for Priority Control Of Pollution by EIP.
 - No product currently in this catalogue. Will be added as and when products can be determined to be practical to manufacture without using any of the defined hazardous substances.

Part 1 – Product Marking

Products must be marked with one of the following labels:



Indicates that product does not contain hazardous substances



Indicates that product does contain hazardous substances

Number relates to Environmentally Friendly Use Period (EFUP)

- ▶ EFUP – Numbers of years before the hazardous substances in the product will 'leak or mutate' causing harm to humans or the environment.
- ▶ Size restrictions exist for the labels. If product is too small then labelling can be added to product instruction documentation

Part 1 - Hazardous Substances Table

Table 1 Marking Styles for Names and Contents of Toxic or Hazardous Substances or Elements

Part Name	Toxic or hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.
 X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.
 (Enterprises may further provide in this box technical explanation for marking “X” based on their actual conditions.)

Table must be completed for all products that contain hazardous substances

Part 1 - Packaging Materials

- China Nat'l Std for packaging material, GB18455-2001 applies.
- Packaging materials must be marked with their material content,
- E.g.

–Low density polyethylene (LDPE), Plastic code = 04



–Corrugated Cardboard



Part 2 – Hazardous Substance Restriction

- Hazardous substances will not be permitted in products that are listed in the Catalogue for Priority Control of Pollution by Electronic Information Products.
- Products listed in this catalogue must be subjected to rigorous testing by a Chinese accredited test house and must have formal certification.
- The first products are not expected to be added to the catalogue until late 2007.
- Chinese authorities will consult with industry and academia to determine which products are to be included – Based on the practicalities of manufacturing without the restricted substances.
- Some companies are being proactive and voluntarily having their products tested ahead of legal requirements.

China RoHS vs. EU RoHS

	China RoHS	EU RoHS
Differences	<ol style="list-style-type: none"> 1. Direct implementation 2. Scope only includes Electronic Information Products 3. No exemptions 4. Announced on 28th Feb 2006; Effective on 1st Mar 2007 (marking requirements) 5. Items in Catalog requires CCC Certification 6. Step by step progressive approach <p><i>*CCC= China Compulsory Certification</i></p>	<ol style="list-style-type: none"> 1. Required transformation by each EU member state 2. Scope: all EEE (<1000VAC or <1500VDC) 3. Exemptions apply with technical & economic considerations 4. Announced on 13th Feb 2003; Effective on 1st July 2006 5. Self-declaration 6. One step approach
Similarities	<ol style="list-style-type: none"> 1. Legal documents 2. Common purpose of environmental protection 3. Involve trade activities 4. Same restricted substances 5. Same maximum concentration values 	

Korea RoHS Summary

- Officially: “**The Act For Resource Recycling of Electrical/Electronic Products and Automobiles**”
- Comprehensive legislation covering elements of:
 - RoHS
 - WEEE
 - ELV
- Final version passed in plenary session of Korea National Congress - April 2, 2007 – originally introduced to WTO March 2006
- Implementation date: **January 1, 2008**
- Applicable to EEE and Automobiles
 - Very Broad definition; EEE = equipment or device (including components / parts thereto) operated by electric currents or magnetic fields

Korea RoHS Requirements

Key Requirements:

1. Limitations on the use of Hazardous Substances
 - Heavy Metals and Flame Retardants – not well defined
 - Expected Substances: Pb, Hg, Cd, Cr6+, PBB, PBDE
 - Expected MCV: Same as EU RoHS directive
 - Expected Exceptions as per EU RoHS Annex I

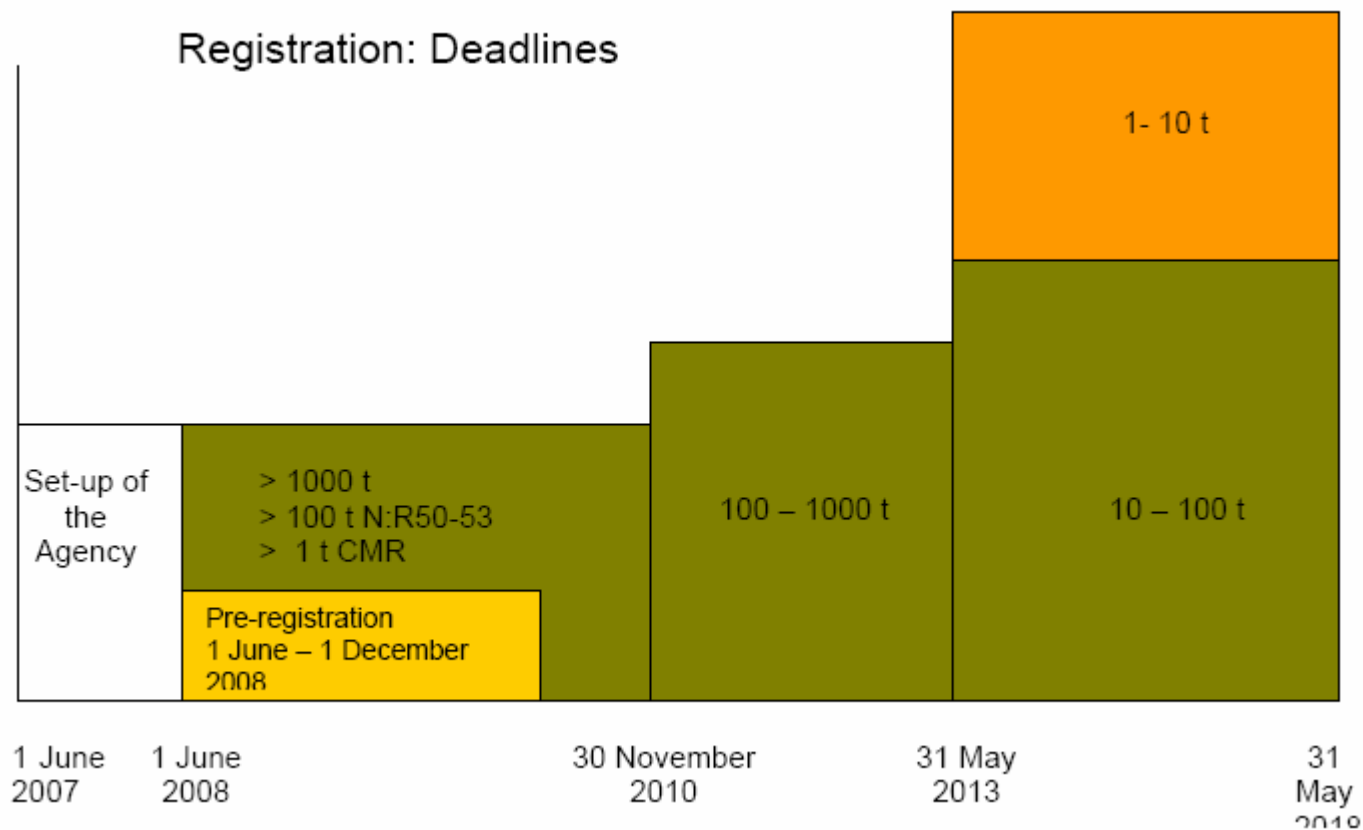
2. Obligation on Manufacturers / Importers relating to recycling
 - Observe the Recycling Promotion Guideline during design phase, eg.
 - Material simplification, Using recyclable plastic
 - Easy separability, Easy collection, Product minimization
 - Obligation to provide recycling information to recyclers upon request
 - Obligation on Producers / Importers to collect and recycle

3. Obligation on Manufacturers / Importers to self declare conformity
 - Hazardous substance declaration
 - Compliance to Recycling Promotion Guideline

REACH Summary

- EU regulation establishing a system for “Registration, Evaluation and Authorization of Chemicals
- European Chemicals Agency to be formed to:
 - Manage repository of information submitted by industry
 - Analyze data submitted
 - Restrict or Authorize the use of specific substances
- Applicable to all substances Manufactured, Imported, or Placed on the EU market
 - Standalone or as a component of a finished preparation / article
- Registration with EU Chemicals Agency required
 - Phased approach based on:
 - Tonnage per annum, and
 - Hazard Level
 - Substance of Very High Concern (SVHC) > 0.1% in homogeneous material and > 1 ton per year, notify Agency
 - EU Chemical Agency to Authorize use

Registration Deadlines - REACH



REACH - Importers of Articles

- Importers of articles may be required to submit a registration, if:
 1. Any substance in the article is “intended to be released under normal or reasonably foreseeable conditions of use” AND
 2. Substance is present in those articles in quantities greater than 1 metric ton per producer / importer per year
- Importers of articles do not need to register if another party (chemical manufacturer, for example) has already registered the chemical for the same specific use.

REACH - Downstream Users

- Definition: any industry or professional user of a substance or preparation (i.e. does not manufacture or import the substance / preparation)
 - i.e. OEM or EMS partner who manufactures, assembles, or repairs product in the EU
- Downstream Users required to consider the safety of substance use and mitigate risk to human health and the environment
 - Evaluate their usage against those in the manufacturer's Safety Data Sheet (SDS)
 - Apply appropriate Risk Management Measures
 - Create SDS if manufacturer's SDS does not cover specific use
- Downstream Users required to communicate Risk Management Measures (RMM) to customers to ensure risks adequately controlled
- Downstream Users have the right to communicate to the manufacturer of a substance / preparation, their specific use conditions of substance
 - If use conditions will not be included in manufacturer SDS, DU must create their own Chemical Safety Assessment and notify Agency (if greater than 1 ton per year threshold).

Reality Check

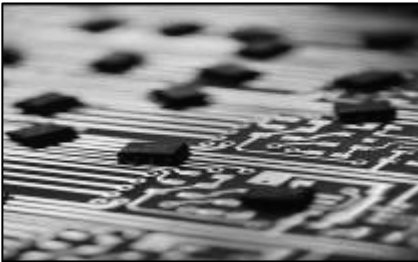
- Complying with RoHS will add US\$10 to cost of every PC sold in Europe this year (total US\$450 million) – to be paid by producers or buyers. (Gartner)
- Estimates indicate: cost required for electronics industry to meet compliance could reach US\$20 billion over the next decade.
- Legislation est. to cost Taiwanese companies US\$3-\$4 more per motherboard and reduce output speed by 10- 20% (Smith Barney).
- Results of 2004 British survey of small to mid-size OEMs: 57% of respondents didn't know what RoHS was (Business Week).
- All companies who rely on the electronics supply chain will be affected: even those that are exempt or out of the scope of the legislation.
- The cost of compliance will likely be overshadowed by the cost of non-compliance

Cost of Non-Conformance



Global Distribution

- **Without compliant products, suppliers will have to exit certain regions**
- **Further legislation is underway across the globe**



Component Prices

- **Component premiums for legacy parts are expected**
- **Last-time buys anticipated due to reduced demand & complexities of dual-production**



Legislation

- **Fines & monitoring expected for non-compliance**
“The penalties thus provided for shall be effective, proportionate and dissuasive”
- **Impact of non-conformance already seen**
(Sony – estimated \$100M in lost sales)



Competitive Advantage

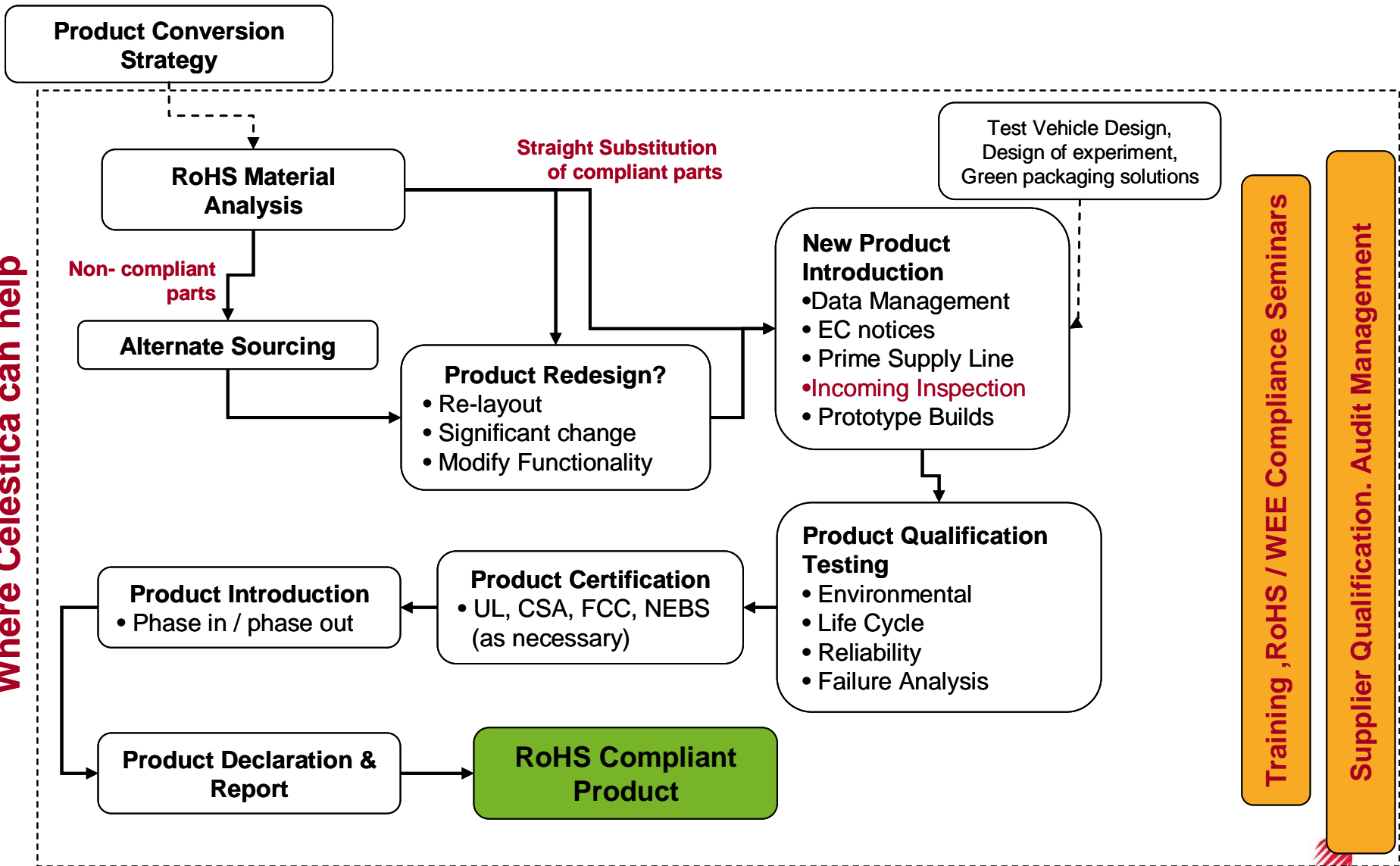
- **RoHS not seen as a differentiator – it will become the standard**
- **Competitors predicted to flag any non-conformances**

Keys to Continuous Compliance

- Stay abreast of existing and emerging environmental legislation
- Obtain executive sponsorship
- Establish a cross-functional environmental compliance team
- Anticipate impacts to the organization
- Develop and implement a compliance strategy
- Regularly assess effectiveness and revisit the strategy
- Confirm supply chain readiness
- Demonstrate due diligence and risk mitigation
- Incorporate environmental compliance into each operation's management system
- Choose your partners wisely to ensure continuous compliance

QUESTIONS?

Where Celestica can help



Thank you



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