



WEEE & RoHS European Green Directives

Impact & Solutions
for distributors & manufacturers
of electrical equipment.

Europe-Asia Trading Consultant
Agency Ltd.

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Workshop presentation: WEEE & RoHS Directives - Impact & Solutions.

HKGMA 1Nov2006 – Langham Hotel – Hong Kong



香港工業總會
FHKI Federation of
Hong Kong Industries

2006/11/6

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Presentation content.



- Introduction on EATCA.
- What means European Union and how does it work?
- EU green introduction.
- EU Waste Electrical and Electronic Equipment directive (WEEE)
- EU Restriction of the use of certain Hazardous Substances directive (RoHS)
- Consequences, Cost impacts, Penalties, Risks, Summaries.
- EU's RoHS versus China's RoHS.
- EU Next steps for EuP's
 - Ecodesign and Eco label
- Questions & Answers.

Who is EATCA ?



- **Europe-Asia Trading Consultant Agency Ltd.**
- We are a Business Consultant with HQ in Hong Kong and branch in Belgium (centre of Europe)
- We advise and support Companies and Investors, coach them into competitive and profitable solutions.
- In different countries, we are member of several Chambers of Commerce, Consulting- and Trading organisations.
- We work close together with other consultants in a global network.
- We offer strategic solutions and guide companies through their re-engineering processes.

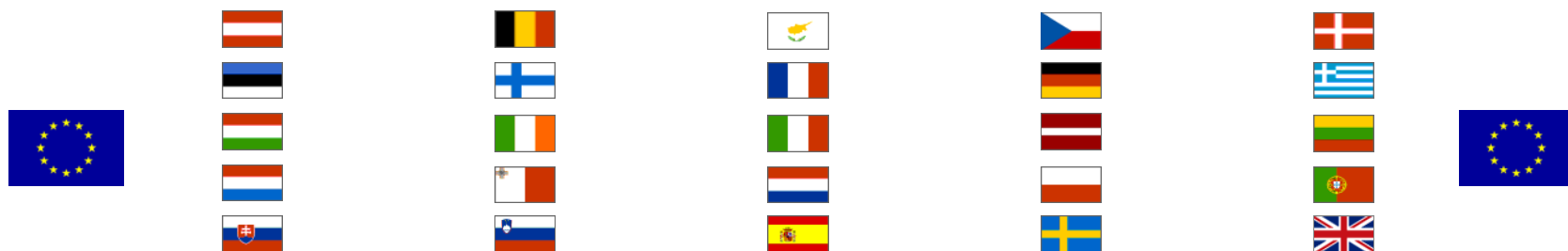
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What means European Union (EU) and how does it work?



EU, a growing family.

- **1950s – 6 states** – European Communities
6 countries: Belgium, Germany, France, Italy, Luxembourg, and the Netherlands
- **1973 – 9 states** – Joined by Denmark, Ireland, and the United Kingdom
- **1981 – 10 states** – Greece
- **1986 – 12 states** – Spain and Portugal
- **1995 – 15 states** – Austria, Finland, and Sweden
- **2004 – 25 states** – Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia, and Slovakia
- **2007 – 27 states** – Bulgaria and Romania (joins 1jan2007)
- Turkey and Croatia applied membership, no date confirmed to join the EU yet.



EU freedom, security and justice.

- Free movement of **people, goods, services, & capital** within the EU.

- Citizens can live, work, study and retire in another EU country if they so wish. (Gradually extended to citizens from the 10 countries which have joined the EU in 2004)

- Company laws have been harmonised.

- The Union is gradually putting together a common penal policy:

- **Schengen Information System (SIS):**

- Enables the law enforcement officers and judicial authorities to exchange information on wanted people and property.

- The “**Grotius**” programme, helps lawyers and judges to get to know how the legal systems of other EU countries operate.

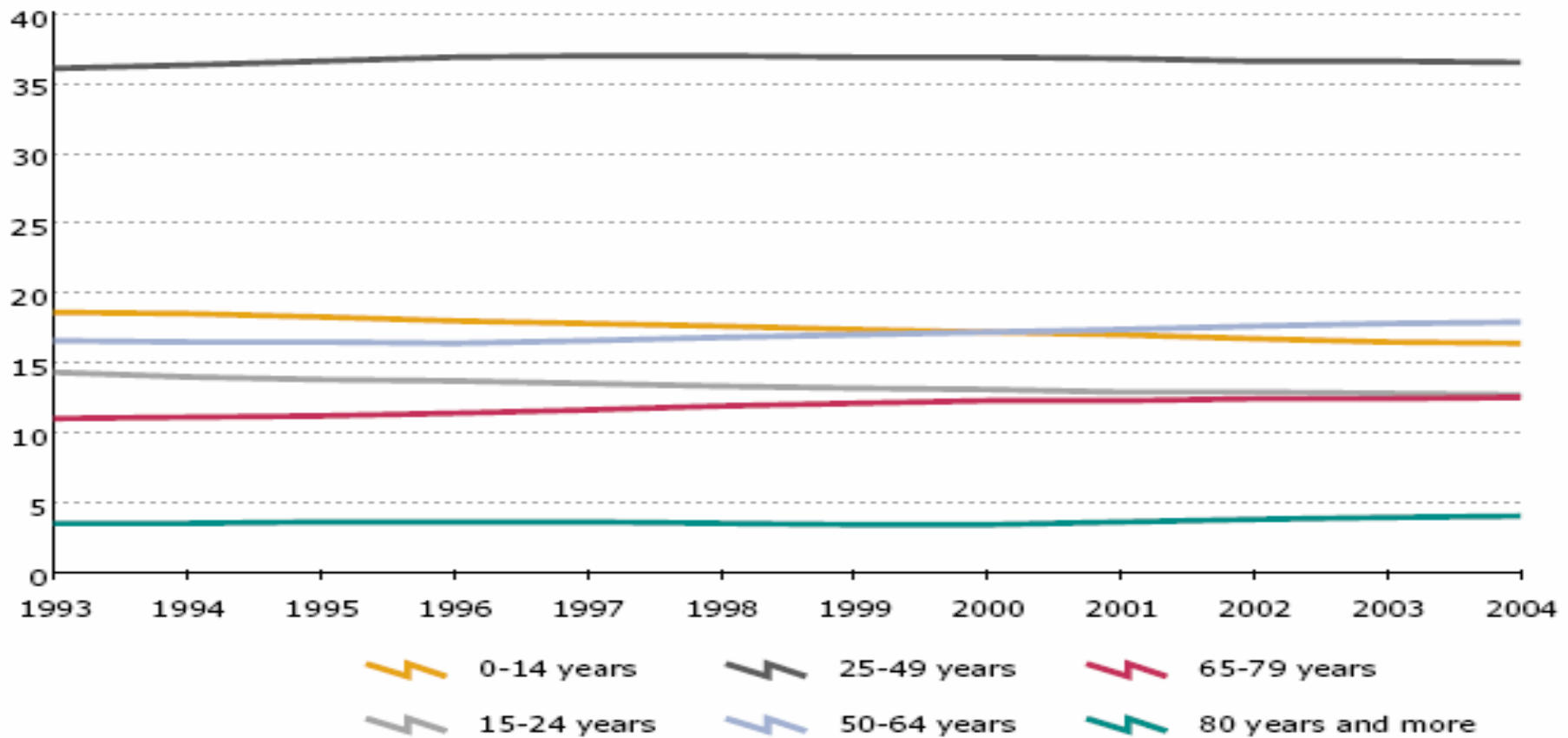
- The “**Falcone**” programme helps develop contacts between judges, prosecution services, police forces and custom officers.

EU Population (consumers).

- Population (1 Jan 2005).
 - EU-25: 461 million ppl (25 states)
 - Euro-currency zone: 313 million ppl (12 states)
- Germany: largest population within the 25 countries, about 18 % (82.5 million) of the total EU population.
- France, the United Kingdom and Italy with roughly 13 % each.
- These four countries together comprise 57 % of the total EU population.
- The new Member States represent almost 16 % of the total population (74.1 million).

EU Population by age.

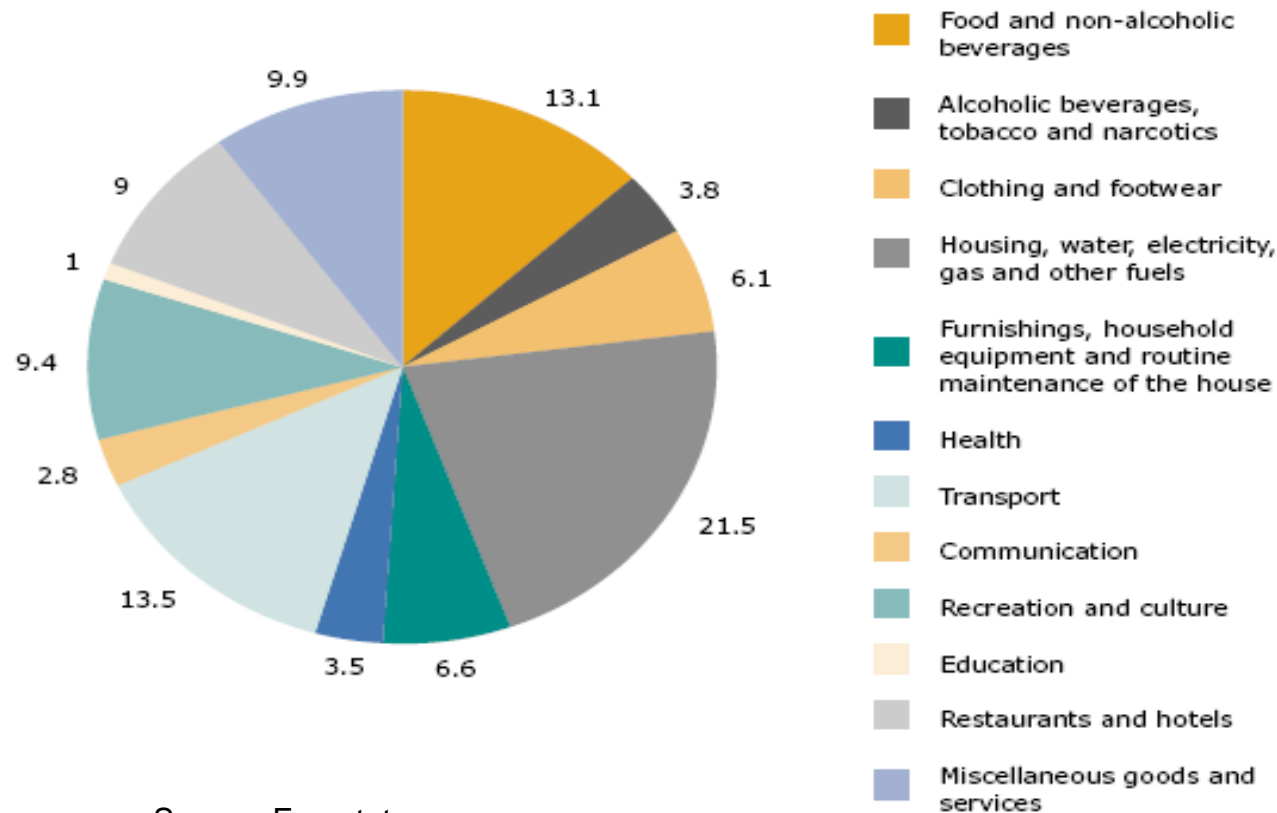
Population in the EU-25 by age classes
Share of total population in %



Source: Eurostat.

EU Consumer expenditure

Household consumption expenditure in the EU-25 in 2003
In % of total household consumption expenditure

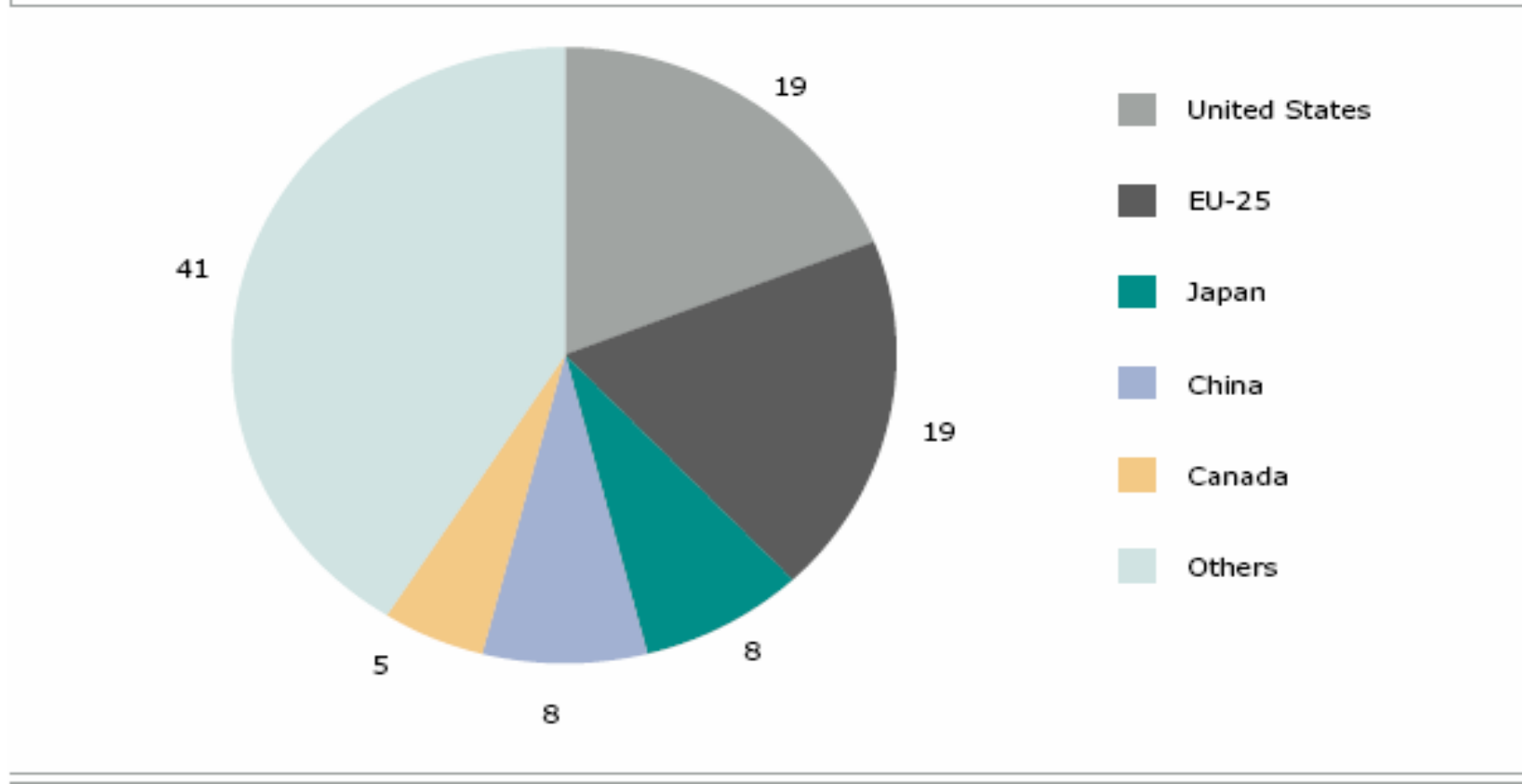


Source: Eurostat.

Estimated values.

EU Trade share.

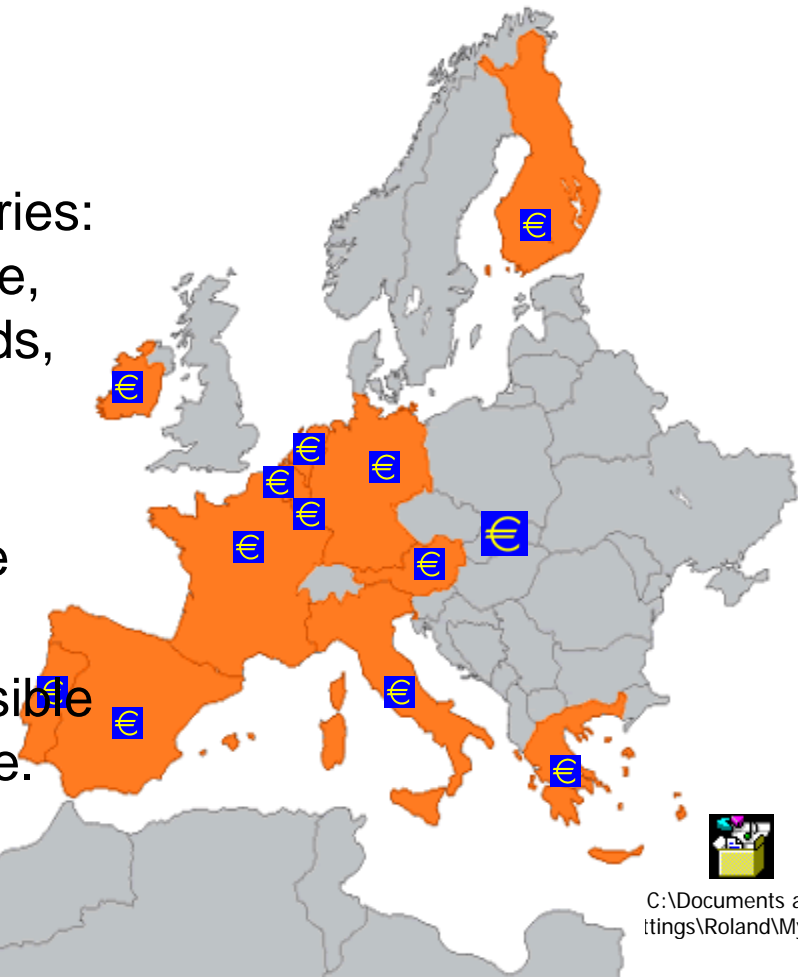
The EU-25's share in world trade ⁽¹⁾ in 2003
In %



⁽¹⁾ Imports + Exports. Source: Eurostat.

EU Currency (Euro)

- 1 Jan 2002: euro coins and notes are introduced.
- The euro is the currency of 12 EU countries: Belgium, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal and Finland.
- Slovakia is next to join on 1 Jan 2007.
- More than 300 million Europeans use the euro and live in the euro zone.
- European Central Bank (ECB) is responsible for the single monetary policy in euro zone.



Euro Symbol 

HK Imports/Exports with the EU.

•HK's exports to EU:

- grew by 16% to US\$42 billion in 2005,
- after an 18% growth to US\$36 billion in 2004.
- Major items in 2005:
 - clothing & clothing accessories (20% of the total), telecommunications equipment & parts (10%), toys, games & sporting goods (8%), audio & video recorders/players (8%), parts & accessories of office machines/computers (7%), computers (4%), travel goods & handbags (3%) watches & clocks (3%).

•HK Imports from EU:

- increased by 4% to US\$23 billion in 2005,
- after a 10% growth to US\$22 billion in 2004.
- Major items in 2005:
 - telecommunications equipment & parts (7% of the total), pearls, precious & semi-precious stones (5%), semiconductors & electronic valves/tubes (5%), textiles (5%), motor cars (4%), clothing & clothing accessories (4%), parts & accessories of office machines/computers (3%).

EU green Introduction.

The EU environmental regulations are related to the total life-cycle of products.

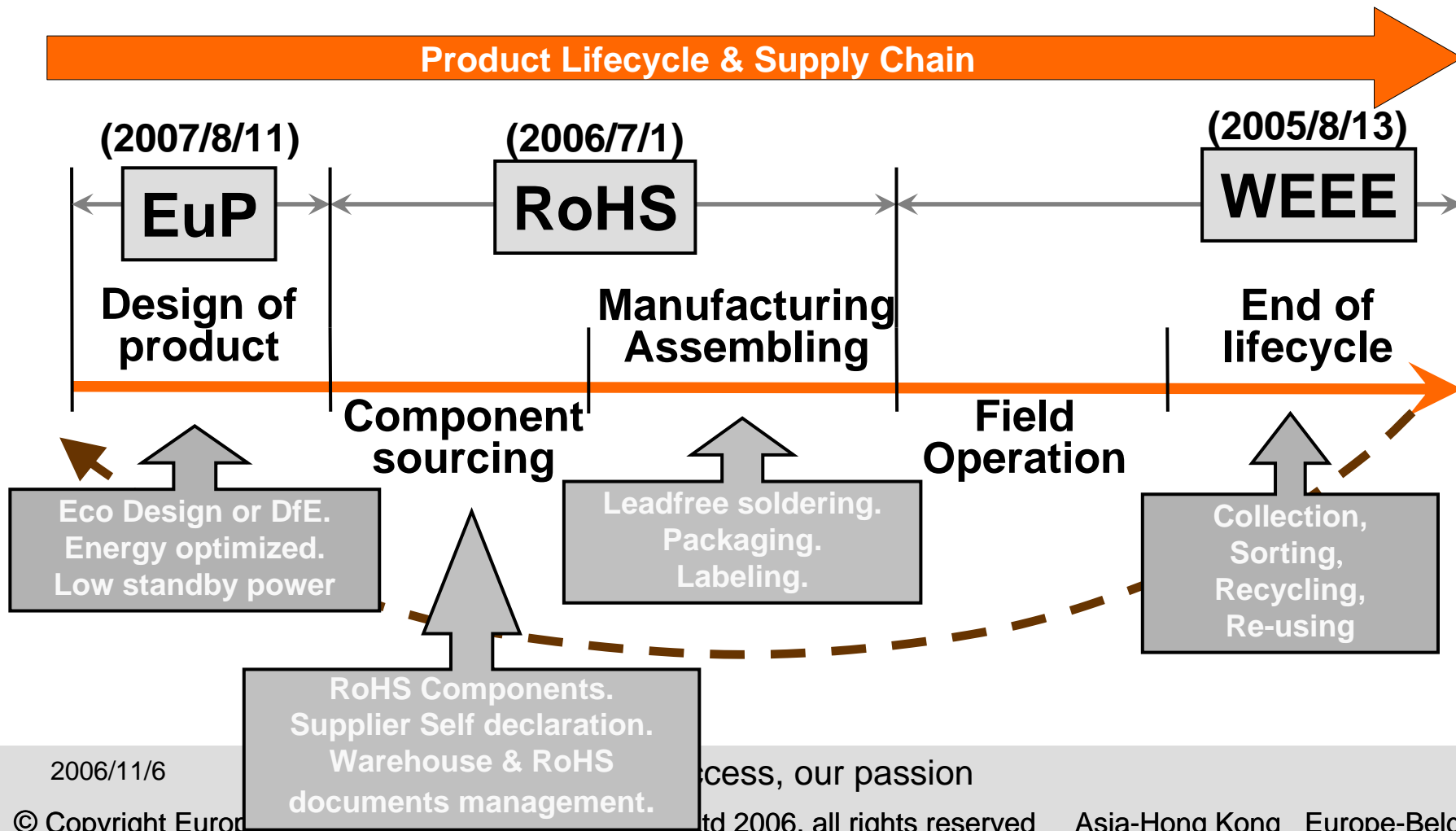


EU green directives

Way of working and consequences.

- While the EU commission lays out directives to the different states, it leaves the methods of enforcement and compliance to the discretion of the Member States.
 - The states are responsible to translate the directives in their national laws and for execution and follow up by a targeted date.
 - The in 2004 latest joined states (10) have more time to implement and become compliant.
 - The enforcement authorities of each EU will share expertise and intelligence.
- It might be a false assumption to think that the EU is the only region implementing those environmental rules....
 - Countries such as China, Taiwan, and Japan, along with 27 US states are currently developing legislation that will follow the example of the EU.
 - California, which will adopt the EU's RoHS Directive in January 2007, only six months after the EU's effective date.
 - 1st RoHS implementation by China effective 1Mar2007.

EU green regulations. Impact on product lifecycle.



EU green **WEEE** regulations.

Waste of **E**lectrical and **E**lectronic
Equipment directive.



EU WEEE definition.

•Waste Electrical and Electronic Equipment (WEEE).

- Related to the **End of Life (EoL) of Electronic & Electrical Equipment** (with voltage rating not exceeding 1000 Volt for AC and 1500 Volt for DC).
- Responsibility** for collection, recovery **rests with “producers”** at EoL.
- Producer pays for the EoL costs.



image: usedcomputer.com

•Applies to **10 product categories**:

- Large household appliances;
- Small household appliances;
- IT and telecommunications equipment;
- Consumer equipment;
- Lighting equipment;
- Electrical and electronic tools (with the exception of large-scale stationary industrial tools);
- Toys, leisure and sports equipment;
- Medical devices (with the exception of implanted and infected products);
- Monitoring and control instruments;
- Automatic dispensers.



WEEE directive

WEEE key provisions.

- EU States must:
 - set up systems for separate collection.
 - ensure WEEE collection of min4kg/inhab/year from households.
 - minimise co-disposal and encourage appropriate behaviour.
(no mandatory requirement for householders to separate WEEE).
- Producers must :
 - provide the systems for treatment of wasted EEE.
 - achieve re-use & recycling targets set as a proportion of collected WEEE. (50>80% depending on the category).
 - report data related to the amount of EEE put on the market and relevant levels of recycling achieved.
 - guarantee the financing of future waste.
(to minimise number of ‘orphan’ products of which original producers are no longer on the market)
 - Provide finances for the collection, the treatment, recovery and disposal of WEEE.

WEEE “Producer” definition.

- “Producer” possible definitions:
 1. Producer of equipment, *not components*.
 2. Manufactures and sells equipment under own brand.
 3. Resells under own brand equipment made by another.
 4. Imports or exports into a Member State on a professional basis.
- “Producer” is further defined by the national state legislations.
 - Definitions should be the same in all EU states.
 - A company or individual who imports equipment into the EU is the producer.
 - Manufactured in HK/China, Imported into UK, sold in France, UK importer is the “producer” in the EU.
- Producers will impose their WEEE & RoHS requirements on the manufacturers.
- If your company’s products are sold in Europe, one of the first WEEE compliance requirements that you will need to consider is to identify who has the legal responsibility to register as the ‘WEEE producer’ in each of the Member State.
 - This depends on your company’s sales arrangements in each Member State.

WEEE – End-of-life



- Collection, treatment and recycling.
 - Can be done individually or in collective schemes
 - Collective schemes already exist in some European countries (like Holland, Belgium, Germany, Norway, Sweden, France and Switzerland, UK, and more.)
 - Reuse is a lower cost option.
- Producers must finance collection and do treatment and recycling of WEEE “put onto the market” **from 13Aug2005 onwards.**
 - Costs incurred for collection, sorting, management, data destruction (IT), hazardous materials disposal and recycling.
 - Cost will (shall) most probably in most states be imposed on the consumer.

WEEE Hazardous components

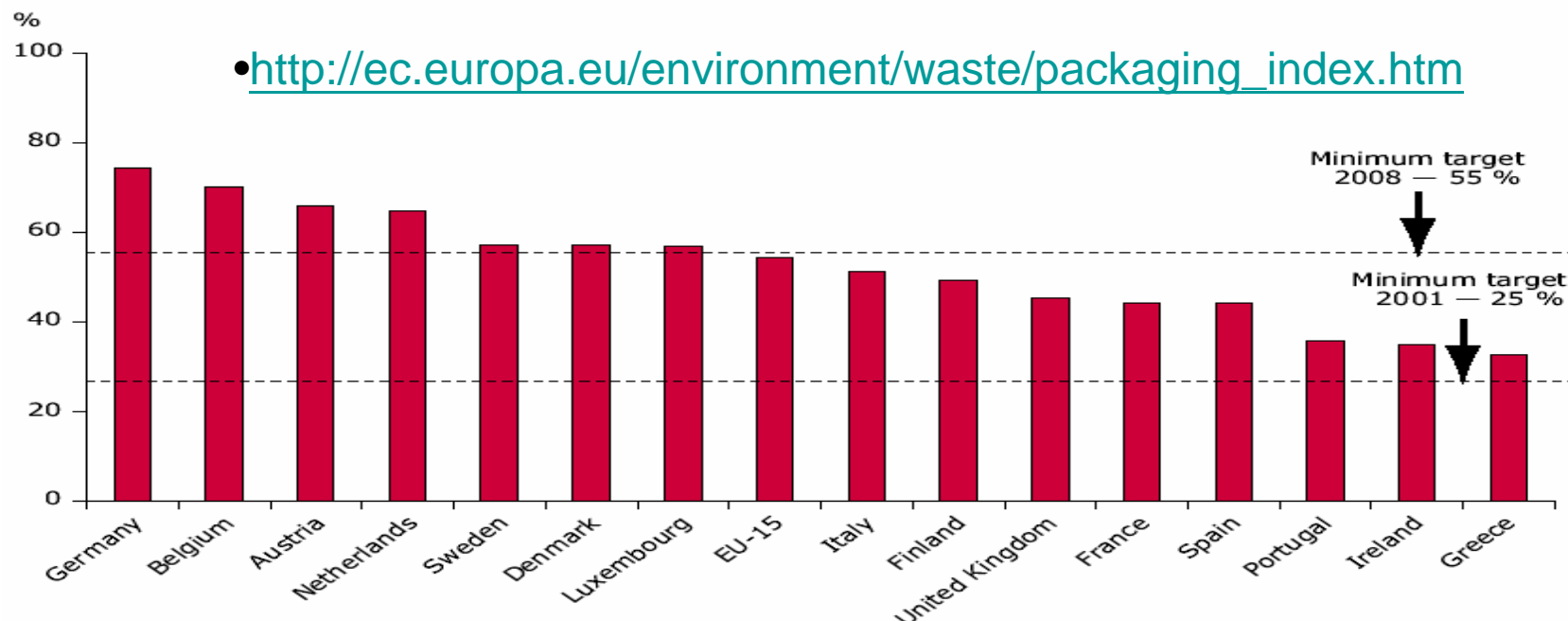
- WEEE directive requires the removal and separate treatment of specified items such as:
 - PCBs
 - Batteries
 - Plastics containing brominated flame retardants (PPB's).
 - Asbestos and mercury
 - CRTs
 - LCDs > 100cm².
- Recycling costs are minimised by avoiding these or ensuring that their removal is quick and easy.
 - Product design must be based on Design for the Environment (DfE) or Eco-Design.
- The sum of Cr , Hg , Pb , Cd in packaging materials may not be more than 100 [mg/Kg] . (EC Directive 94/62/EC , Article 11):



Recycling Packaging in EU.



Figure 3 Recycling of packaging waste by country, 2002



Note: Data source: DG Environment (Ref: www.eea.eu.int/coreset).

Table 2 Targets of the packaging and packaging waste directive

By weight	Targets in 94/62/EC	Targets in 2004/12/EC
Overall recovery target	Min. 50 %, max. 65 %	Min. 60 %
Overall recycling target	Min. 25 %, max. 45 %	Min. 55 %, max. 80 %
Date to achieve targets	30 June 2001	31 December 2008

Effect of WEEE legislation on product cost



- Prices are already including end of life costs.
- National recycling schemes already operate in many European countries
 - “Visible fee” used in some countries
 - Has become part of selling price for some products
- These “eco fees” are added to the selling price and financing the recycle process in many countries.

Televisions	8 – 26 Euro	1€~10HK\$
Small consumer equipment	1 – 3 Euros	
Computers	3 – 7 Euros	
Large household	5 – 10 Euros	

WEEE - minimising costs

- End of life costs will result in increased prices but can be minimised.
 - Main costs are labour and transport.
 - Innovative design (DfE or ECO-Design) can reduce recycling costs and so minimise impact on prices.
- Collaboration between manufacturers, producers, dealers/agents and users should minimise costs and therefore prices – economies of scale.
- **Environmental friendly products :**
 - **Will keep or increase your sales and your competitiveness.**
 - **Will let you start or stay in the EU market.**
 - **Will be a marketing asset.**

WEEE - summary

- Applies to 10 categories of electrical equipment from 13Aug2005
- Equipment producers responsible for end of life costs – collection, treatment and recycling.
- Planning is needed to minimise costs and stay competitive.
- Information requirements for users, recyclers and authorities.
- Users may want to return products.
- Professional support might be needed.

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EU green RoHS regulations.

Restriction of Hazardous Substances.



RoHS is most important
for Manufacturers
and a subpart of **WEEE**.

EU RoHS green directives(1).

•The **RoHS** Directive severely **limits the use of 6 hazardous** substances in 8 of the 10 categories of the WEEE Directive from the **1st July 2006**.

- Lead (Pb)
- Mercury (Hg)
- Cadmium(Cd)
- Hexavalent Chromium,(Cr)
- Polybrominated Biphenyl (flame retardants) (PBB's)
- Polybrominated Diphenyl Ethers
(the flame retardants used in some plastics) (PBDE's)

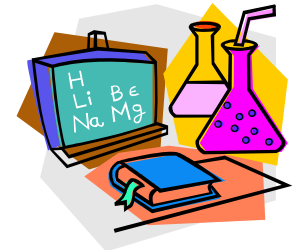
•**These 8 categories are:**

1. Large household appliances.
2. Small household appliances.
3. IT and telecommunications equipment.
4. Consumer Equipment.
5. Lighting equipment (including light bulbs and household luminaries).
6. Electronic and electrical tools.
7. Toys, leisure and sports equipment.
8. Automatic dispensers.



EU RoHS green directives(2).

- The equipment/products:
 - May **not contain** more than the permitted **concentrations of the hazardous substances**.
0.1%Pb, 0.1%CR, 0.1%Hg , 0,1%PBB,0,1%PBDE, 0.01%Cd.
 - "put onto the market" in Europe **must** be compliant.
- RoHS covers equipment/products that are:
 - manufactured in EU member states and available for sale there.
 - imported into the EU.
- RoHS doesn't just affect those companies involved in the supply chain of the 8 categories of electronic equipment
- The **RoHS Directive states** that the **'producer'** (manufacturer and seller of the product under its brand name)
 - is responsible for compliance under the Directive.
 - In some cases, the importer of the equipment into a member state can be designated as the 'producer'", and will therefore have to assume all the responsibilities under the definition of 'producer'. (See WEEE producer definitions)



EU RoHS green directives(3).

- By placing products on the EU market, producers/manufacturers are declaring that these comply with RoHS legislation.
 - This is the basis for '**self-declaration**'.
 - No specific mark is required.
 - Each member state will carry out market surveillance and conduct checks on products.

- The best means of assuring compliance is to **purchase materials and components which are themselves compliant**, completed with the assurance of **supplier declarations**.
 - The **component supplier's declarations is important as a producer must be able to demonstrate compliance** on request.
 - by submitting technical documentation or other information to the enforcement authority and retain such documentation for a period of 4 years after the equipment is placed on the market.

EU RoHS Exemptions.

- **Exempt :**

- products manufactured for certain industries, such as military, stationary industrial tools and medical, until 2010.
- Some Light bulbs and Fluorescent Lamps.
- Other specific substances can also be exempt from certain applications and need to be investigated individually case by case and by country.

- **Exempt /Non-Exempt conclusion:**

- Companies that leverage exemptions will be more adversely impacted than those who comply with the RoHS Directive in full.



EU RoHS Directive

- **So this means:**

- Try to comply as close as possible to avoid banning your products from the market.

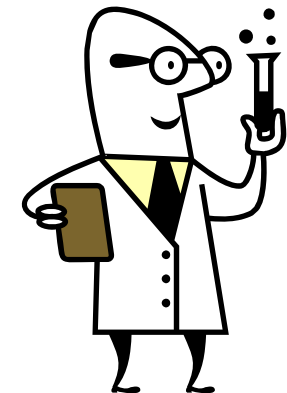
Demonstration of RoHS compliance

- Options

- Reliance on information from component manufacturers
 - Self declaration.
- Carry out spot checks and where is doubt.
- Analyse everything. (Lowest preference and too expensive)

- Problems which can occur:

- Is supplier information accurate? >Audit him...
- Grey market for components.
- Counterfeit components.
- How many spot checks are needed and how?
- To analyse everything would be prohibitively expensive.



- Protection of the environment

- Products sold in millions would have a much larger impact than specialist equipment sold in 10's or 100's.

RoHS effect on product reliability

- RoHS directive can affect the product reliability:
 - Alternative lead-free solders are main concern. (alternatives to tin/lead).
 - Changing to lead-free will involve a lot of work and expense.
 - Research into thermal fatigue and tin whiskers.
 - Uncertainty about extrapolation of accelerated test results >will have to wait 15 years for field data.
 - Lead-free solders have a higher melting point:
 - Can damage many types of components.
 - Little R&D done into effect on component performance.
 - Component specification might be different.

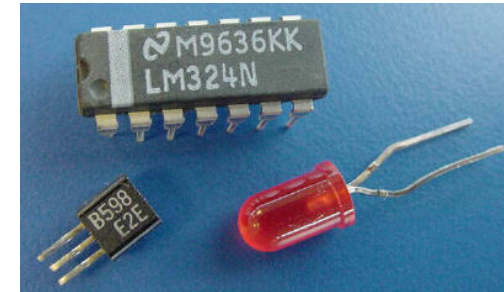
Conclusion : Time consuming work is required to guarantee long term reliability:

- Motorola took 3y to develop their first lead-free mobile phone.
- Philips took 2.5y to develop a Green LCD TV set.



RoHS Components

- Most component manufacturers changed lead termination coatings to lead-free:
 - Part number has changed.
- Many have already upgraded components to withstand higher wave & reflow soldering temperatures.
 - Some still difficult to use at lead-free temperatures
 - Connectors, many types of capacitors, LEDs, some ICs, Fuses etc.
- Other issues:
 - Accelerated obsolescence.
 - Grey market alternatives (unlikely to comply with RoHS).
 - Counterfeit components (unlikely to comply with RoHS).



Cost impact prognoses for RoHS & Lead-free products.



- Solder/Paste : Approximate increase 250%
- Component: Approximate BOM cost 4-8%
- PCB: Single Side PCB no cost impact
 - Multi-layer PCB cost approximate 10%
- Machinery: Investment on capital
- Organizational cost increase & risk 10%



- As the average material (BOM) cost in EEE is around 70% of the total product cost, it is estimated that your total product cost will increase between 5 >8%.
- To keep competitiveness, make your organization more efficient and work further on cost reductions.
- **Use the RoHS requirement to increase the efficiency.**

One view on RoHS



One view on RoHS in the Supply Chain

RoHS summary & conclusions.

- Effective **1 July 2006** onwards,
 - **8 product categories** are effected
 - **where 6 Hazardous substances are banned** from.
- RoHS Directive may affect prices and reliability.
- Information requirement is needed for component users.
- Advice/assistance is needed with lead-free and lead-free soldering process.
- You will have to **manage component changeover** to lead-free.
 - Component management has to be improved.
 - Suppliers need to be audited/assessed.
 - Warehouse management must be improved to limit obsolescence.
 - Need supporting IT systems.
- Documentation & information has to be managed.
 - Penalties might have severe consequences.
- Will require from you a more process oriented organisation.
- Professional advice and help might be needed to reduce your risks and time and costs.

Consequences of non-compliance.

- Lost competitiveness.
- Recall of all goods sold.
- Fines.
- Blocked for import.
- Impounding.
- Lost Customers...



RoHS Process Management (HSPM) IECQ-QC080000



- New International recognised standard from the Electro-technical commission. (IEC) <http://www.iecq.org>
- Effective integrated management discipline which defines the requirements for establishing processes to identify and control the introduction of Hazardous substances into its products.
- Is congruent with the elements of ISO9001.
- Is intended for manufacturers, suppliers, customers and users of HSF products to know the status of a product.
- A representative body organisation can assess you if you comply with this standard.
- This will enable you to indicate to your customers that you have the process in place to comply to the EU RoHS requirements.

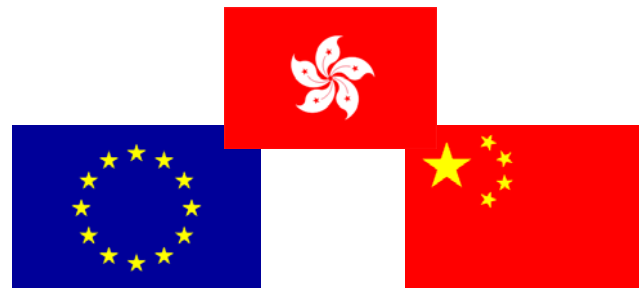


HSPM
IECQ-QC080000

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RoHS : EU's versus China's



The EU and China.



- The EU has become the largest trading partner of China in the first 9Months 2006 and overruled in value the US and Japan.
- Two-way trade between China and the EU reached 194.44 billion US dollars, up 23.3 percent from the same period of last year.

RoHS: China <> EU



Similarities between China & EU

- Both are legal documents.
- The main purpose of both documents is to control toxic and hazardous substances (restriction of use and reduction of amount).
- Both are involved in trade activities.
- Both have the same six restrictions of use regarding toxic and hazardous substances:
 - lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), polybrominated diphenyl ethers (PBDE).
- Both are more or less based on the principle of self declaration.

RoHS: China <> EU



Major Differences	China	EU
Administrative Measure/Directive	-Administrative Measure is an immediate effective law.	-EU Directives are transferred into members state's regulations & laws.
Scope	-Applies to the total supply chain.(Manufacturers, distributors, importers, retailers) -Not for products exported from China.	-Applies to "producers" definition. -For equipment imported & exported in/from EU.
Products	-Electronic Information Products (EIP) & Packaging materials. -Key products in a catalogue. No exemption list. -Focus on "End-Products", not on all components or sub-assemblies in the supply chain.	-EEE of Voltages less than 1KVac/or1.5KVdc in 8 categories from RoHS. -Exemptions list available (Medical, Industrial...) -All components in the supply chain are covered (incl. assemblies and subassemblies). -WEEE covers return, process & recycling.
Timetable (In-Force Date)	-Effective 1Mar2007 of step1 (see 2step approach below) -No timeline yet to ban the HS ??	-Effective 1July2006 -Effective to ban HS.
Related standards	Implementation is subject to industry standards & catalogued products.	-Clear catalogue & Technical requirement
Management	2step approach: 1.Manufacturers requires to expose (indicate) E-unfriendly information on label or users manual. 2.Strictly RoHS supervise and 3C certified before entering Chinese market.	Due diligence.

RoHS: China <> EU



- In China, the allowed concentrations of HS are determined by the EIP group.
- The latest examination document on EIP HS concentration is attached.
A final version will be out soon.
- Website: Ministry of Information Industry.
<http://www.mii.gov.cn/>



Adobe Acrobat
Document

EU's next green regulations.


EuP's

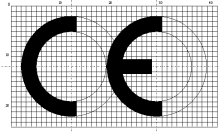
Energy using Products.

Eco-Design & Eco Label



EU directive for EuP's.

- **EuP: Energy using Products.**
- EU directive 2005/32/EC of 6 July 2005.
- Aims **end-product design to be energy optimized and improved.**
- Effective (in-force) by **11/8/2007**
- Practical example : Energy consumption of EuP's in stand-by mode or off-mode should be reduced to bare minimum needed for their operation.
- EuP's bear the “**CE**” “**conformity marking**” and have a “conformity declaration” **before placed onto the market.**The CE marking, consisting of the letters 'C' and 'E' in a bold, black, sans-serif font, enclosed within a square border with a fine grid pattern.
- **The manufacturer bears ultimate responsibility** for the conformity of the product.
- CE marking, should be **affixed**:
 - **To all new products**, whether manufactured in the Member States or in third countries;
 - **To used and second hand products** imported from third countries
- EuP's with Eco-design can receive Eco Label based on parameter assessments. (EC regulation 1980/2000)
 - http://ec.europa.eu/environment/ecolabel/tools/sitemap_en.htm
 - Two ways of CE conformity assessment:
 - Internal design control.
 - Management system control



CE conformity assessment.

- Relates to following phases of a product:
 - The Design.
 - The Production.
- A notified body may be involved in these two phases.
 - If involved in the production control phase
 - its identification number will follow the CE marking.
- The decision provides for eight assessment procedures or "modules" which cover the design and production phases:
 - internal production control (module A);
 - CE type-examination (module B);
 - conformity to type (module C);
 - production quality assurance (module D);
 - product quality assurance (module E);
 - product verification (module F);
 - unit verification (module G);
 - full quality assurance (module H).

EuP's Eco-design & Eco-Label.



Eco-Design definition: integration of environmental aspects into product design with the aim of improving the environmental performance of the EuP throughout its whole life-cycle with parameters which are quantifiable and measurable.

- Identified to following **phases** of the life-cylce.
 - Raw material selection and use.
 - Manufacturing
 - Packaging, transport and distribution
 - Installation and maintenance.
 - Use
 - End-Of-Life
- For each phase, following **aspects** are to be assessed.
 - Prediction of consumption of energy, materials and resources.
 - Anticipated emission to air, water and soil.
 - Anticipated pollution trough physical effects (Noise, vibration, radiation, Electro Magnetic Field)
 - Expected generation of waste material.
 - Possibility of reuse, recycling and recovering of materials and/or energy.
- In the assessment following **parameters** will (can) be used:
 - Weight and volume of the product.
 - Use of material issued from recycling activities.
 - Consumption of energy, water and other energies throughout the lifecycle.
 - Use of hazardous substances.
 - Quantity and nature of consumables needed for proper use and maintance.
 - Ease of reuse and recycling.
 - Time needed for recycling, number of components used, standard components, tools needed for disassembly, easy access...
 - Extension of lifetime (guaranteed lifetime...)
 - Amount of waste generated.
 - Emissions to air , water and soil



EuP label award
scheme

End summary & advices...



- Aim for the highest Eco-design label as a starting point to design a new product.
 - It keeps you ahead of competition...
 - It saves you a lot of rework afterwards...
 - It will pay off in the end...
- EU regulations are followed by many other countries.
- Keep you informed.
 - Talk to your suppliers, customers and different organisations.
- Look for help to assist you to limit the risks, time and costs.

EATCA can advise-assist-train you
further if needed.

Thanks ! HKGMA

Europe-Asia Trading Consultant
Agency Ltd.



www.eatca.com



Any Questions ?



Kindly fill the Questionnaire !