Japan Business Council in Europe

Date : 1 April 2008

Dear Madam/Sir,

Please find enclosed the JBCE reply to the Öko Institut questionnaires concerning existing ROHS exemptions.

The reply consists of two parts:

- **Part 1: Reply to the exemptions questionnaires from the specific perspective of Category 8 & 9 equipment**

- **Part 2: Reply to the exemptions questionnaires**

- No. 3: Mercury in strait fluorescent lamps for special purpose
- No. 4: Mercury in other lamps not specifically mentioned in this Annex
- No. 5: Lead in glass cathode ray tubes, electronic components and fluorescent tubes
- No. 7(a): Lead in high melting temperature type solders (i.e. lead based alloys containing 85% by weight or more lead)
- No. 7(c): Lead in electronic ceramic parts (e.g. piezoelectronic devices)
- No. 13: Lead and cadmium in optical and filters glass

Please note that JBCE submitted a joint response with EICTA to the questionnaire concerning No. 6: Lead as an alloying in steel containing up to 0.35% lead by weight, aluminium containing up to 0.4% lead by weight and as a copper alloy containing up to 4% lead by weight.

Finally, JBCE is of course willing and ready to make further contributions and explanations.

Yours sincerely,

Lars Brückner
Chairman Environment Committee
Japan Business Council in Europe (JBCE)

Comments related to the general and specific questionnaires of exemption 3&4

Japan Business Council in Europe

The following are our comments concerning the necessity for the continuation of the exemptions and the reason for substitution being difficult in conjunction with the consultation regarding exemptions 3 and 4 of Directive 2002/95/EC (RoHS Directive.)

Lot 3; “Mercury in straight fluorescent lamps for special purposes”
Lot 4; “Mercury in other lamps not specifically mentioned in this Annex”

General Questionnaire

1. For which substance(s) or compound(s) should the requested exemption be valid?

   Hg (Mercury)

2. What is the application in which the substance/compound is used for and what is its specific technical function?

   Hg in backlights for LCD displays used in items such as notebooks, LCD computer monitors, and TVs.

3. What is the specific (technical) function of the substance/compound in this application?

   Cold cathode fluorescent lamps (CCFL) have inert gases such as argon (Ar) and neon (Ne) and mercury (Hg) inside. Impressing a high voltage between its electrodes generates an electric field, which accelerates electrons. The electrons hit and excite the mercury atoms, resulting in the emission of UV rays. The UV rays excite the phosphor applied to the interior of the CCFL, converting its energy to visible light, and leading to illumination. Mercury is a key substance in this illumination process within the CCFL. At present CCFL is widely used for the backlight of LCD panels for notebook PCs, LCD monitors and TVs, etc.

4. Please justify why this application falls under the scope of the RoHS Directive (e.g. is it a finished product? is it a fixed installation? What category of the WEEE Directive does it belong to?).

   i. All finished products that use applications of item 2 fall under RoHS Directive.
   ii. These finished products are not fixed Installation.
   iii. These finished products fall under category 3 and 4 of WEEE Directive.
      - Category 3 : IT and telecommunications equipment
      - Category 4 : Consumer Electronics

5. What is the amount (in absolute number and in percentage by weight) of the substance/compound in: i) the homogeneous material[1], ii) the application and iii) total EU annually for RoHS relevant applications?

   i) the homogeneous material
      See ANNEX I.

   ii) the applications
      See ANNEX I.

   iii) total EU annually for RoHS relevant applications?
      See ANNEX I.

6. Please check and justify why the application you request an exemption for does not overlap with already existing exemptions respectively does not overlap with exemption requests covered by previous consultations.

Not applicable – this is only for new exemption requests

7. Please provide an unambiguous wording for the (requested) exemption.

Mercury in straight fluorescent lamps for special purposes (current exemption #3) or Mercury in other lamps not specifically mentioned in this Annex (current exemption #4)

8. Please justify your contribution according to Article 5 (1) (b) RoHS Directive whereas:

;

i) Substitution of concerned hazardous substances via materials and components not containing these is technically or scientifically either practicable or impracticable;

The substitution of other materials for mercury in the LCD backlight is technologically and scientifically impracticable.

ii) Elimination or substitution of concerned hazardous substances via design changes is technically or scientifically either practicable or impracticable;

It is impracticable by changing the design to substitute other materials for mercury in the LCD backlight. However, substitution by a completely new design, such as adopting an LED (light emission diode) backlight unit, is practicable. Currently white or RGB LED backlights and OLED (organic light emitting diode) are cited as nominees for substitution material and some models have already been released onto the market. However, it will be some time before they are widely disseminated due to technological problems.
At this point in time, it is difficult to determine the time when the technological improvement will be accomplished to the level at which they can be disseminated. Therefore, the time of transition to LED should be reviewed in 2012, when next exemption review takes place, considering the technological level and the available supply of LEDs. (For technological problems, see ANNEX II)

iii) Negative environmental, health and/or consumer safety impacts caused by substitution are either likely or unlikely to outweigh environmental, health and/or consumer safety benefits thereof (If existing, please refer to relevant studies on negative or positive impacts caused by substitution).

CO_2 emissions during the LED backlight production process are considerable higher than CO2 emissions during the CCFL production process (see ANNEX III).
Producing LED backlights for large LCD panels (52 inches in size), for example, results in approximately forty times more CO_2 emissions than is the case with producing CCFL backlights for such LCD panels. Moreover, LEDs are estimated to have a shorter lifespan than CCFLs (ANNEX II).

9. Please provide sound data/evidence on why substitution / elimination is either practicable or impracticable (e.g. what research has been done, what was the outcome, is there a timeline for possible substitutes, why is the substance and its function in the application

indispensable or not, is there available economic data on the possible substitutes, where relevant, etc.).

Although companies are in the process of making LEDs practicable, even now, there remain technological problems as mentioned below:

Technological problems related to LEDs (ANNEX II):

- Amount of CO_2 emission in the production process is approximately 40 times that of CCFL (52 inch size)
- Shorter life
- The light emission efficiency of LED is approximately 60% of CCFL (in the case of TV applications: the efficiency varies depending on the location used)
- Quality is significantly temperature-dependent.

10. Please also indicate if feasible substitutes currently exist in an industrial and/or commercial scale for similar use.

As mentioned in item 8 ii), some models have already been released to the market.
Examples: NEC's LCD computer monitors、Samsung's LCD computer monitors, Sony's LCD backlight for notebook PCs, etc.

11. Please indicate the possibilities and/or the status for the development of substitutes and indicate if these substitutes were available by 1 July 2006 or at a later stage.

See item 8 ii)

12. Please indicate if any current restrictions apply to such substitutes. If yes, please quote the exact title of the appropriate legislation/regulation.

- None in particular

13. Please indicate benefits / advantages and disadvantages of such substitutes.

LEDs have the advantage of not containing mercury, which is hazardous. However, the CO_2 emissions during the production process are considerable higher in comparison with CCFLs at present. In addition, there are quite a few technological problems to solve.

- Comparison of CO_2 emissions in the production process between CCFL and LED: See ANNEX III.
- For technological problems, see ANNEX II.

14. Please state whether there are overlapping issues with other relevant legislation such as e.g. the ELV Directive that should be taken into account.

The same as the ELV Directive

15. If a transition period between the publication of an amended Annex is needed or seems appropriate, please state how long this period should be for the specific application concerned.

In addition to the technological problems mentioned in item 9 above, application development using an LED panel, as well as the supply and distribution of LED panels in the market, is newly required, with the transition taking another several years. The industry must again determine the time of transition in 2012. The demand prediction for each application in the market is shown in

ANNEX IV.

Specific Questionnaire

1. Please specify the different **lamp types that use mercury**, including the technology used, the amount of mercury contained (also mercury per burning hour), the function of mercury in the lamp, the lifetime of the lamp and its energy consumption.

- Type of lamps using mercury

Hg in backlights for LCD displays used in items such as notebooks, LCD computer monitors, and TVs.

- Technology used

Cold cathode fluorescent lamps (CCFL) have inert gases such as argon (Ar) and neon (Ne) and mercury (Hg) inside. Impressing a high voltage between its electrodes generates an electric field, which accelerates electrons. The electrons hit and excite the mercury atoms, resulting in the emission of UV rays. The UV rays then excite the phosphor applied to the interior wall of the CCFL, converting its energy to visible light, and resulting in illumination. Mercury is a key substance in this illumination process within the CCFL. At present CCFL is widely used for the backlight of LCD panels for notebook PCs, LCD monitors, TVs, etc.

- Total amount of mercury contained

See ANNEX I.

- Comparison between CCFL and LED in the amount of CO_2 emission in the production process
- See ANNEX III.

- Life of lamps

LED needs to provide itself with a function to control the color and luminance distribution within, shortening its lamp life. (See ANNEX II.)

2. What is the total **amount of mercury** put on the market in the EU annually and currently in use for each of these different mercury-using lamp types?

See ANNEX I.

3. For which of these lamp types is the use of **mercury avoidable** (e.g. through substitution of the substance itself or through use of other lamp technologies not containing mercury)? Where has a reduction of the amount of mercury or a full substitution already begun or been completed? Please describe alternatives in (technical) detail.

It is impracticable by changing the design to substitute other materials for mercury in the LCD backlight. However, substitution by a completely new design, such as adopting an LED (light emission diode) backlight unit, is practicable. Currently white or RGB LED backlights and OLEDs (organic light emitting diode) are cited as nominees for substitution materials. Some models have already been released onto the market.

Examples: NEC's LCD computer monitors、Samsung's LCD computer monitors, Sony's LCD backlight for notebook PCs, etc.
However, there remain some technological problems to solve.
(See ANNEX II)

4. Please specify the **maximum amount of mercury** contained in each lamp type today and how it will decrease over time due to technological progress. Support your statement with appropriate documentation such as a roadmap or results of tests and research activities. What is the currently best available technology with regard to lowest mercury content in each lamp type?

- Maximum amount of mercury contained in each lamp type

  See ANNEX I.

- Best technology today to minimize the amount of mercury contained

  White or RGB LED (light emission diode) backlight

5. Please provide appropriate information on the **benefits of the use of mercury** in lamps, compared to lamps not using mercury; especially with regard to energy savings and hence reduction of mercury emissions during electricity production.

LED has the advantage of not containing mercury, which is hazardous. However, the CO_2 emission during the production process is considerable in comparison with CCFL at present. Therefore the transition from CCFL to LED backlights increases the environmental burden. Moreover, LED is estimated to have a shorter lifespan than CCFL (ANNEX II), which means early LED dissemination will encourage wastage of electronic appliances.
In addition, there are quite a few technological problems to solve.
it currently consumes more power in its production process in comparison with CCFL. In addition, there are quite a few technological problems to solve.
Comparison of the CO_2 emission in the production process between CCFL and LED: See ANNEX III..

- Comparison between CCFL and LED in terms of the amount of CO_2 emission in the production process See ANNEX III.
- For technological problems, see ANNEX II.

6. Assuming that in the EU a **total phase-out of mercury** is possible for the use in lamps, please specify until when such a phase-out would be completed for which application.

Although companies are now proactively striving to solve LED-related technological problems (ANNEX I), it is not foreseeable to determine the time of dissemination and procurement of LED panels in the market, making it currently impossible to fix the time of canceling the exemption. The industry needs to review the market situation by 2012. (ANNEX IV)

7. Assuming that the existing exemptions do not anymore reflect the status of best available technologies and that an exemption for the use of mercury in lamps in future would only be limited to very specific cases, please provide a **wording proposal** (which may also include an expiry date for the exemption of a certain application).

None in particular

8. Please provide an opinion on the recommendations for limits of mercury content included in the preparatory studies for **implementing measures** under the Ecodesign framework Directive (2005/32/EC, "EuP").

None in particular

ANNEX I
Hg content in LCD panels（CCFL）

	Hg (mg/CCFL)	Hg (mg/LCD Panel)	Annual volume (unit/year)	Total amount of Hg (kg/year)
Notebook PCs	2.5~5	2.5	80M~120M	200~300
LCD displays (around 17 inch)	2.5~5	10	100M~150M	1000~1500
TVs (under 40 inch)	3.5~5	75	36M	2700
Total				3900~4500

ANNEX II
Technological problems with regard to LED backlight

White LED type	RGB type
● Light emission efficiency is low. (Approx. 60%） ● Efficiency, luminance and chromaticity vary significantly, depending on the temperature fluctuation.	● Light emission efficiency is low. (Approx. 60%） ● Efficiency, luminance and chromaticity vary significantly, depending on the temperature fluctuation.
	● Requires a complicated control for each light emitting element in order to achieve high picture quality. ● Requires a function to control the internal color and luminance distribution, shortening the life of the LED. ➢ A larger current is run through the elements whose light intensity reduces (or deteriorates) more quickly in order to balance the light emission amounts of R, G and B respectively. This causes the phenomenon whereby the color element of a certain point deteriorates quicker than another. ➢ Because of this, it is predicted that the life of LEDs used for this purpose will become much shorter than that of those used for illumination purposes, and color deterioration with age cannot be compensated for.

ANNEX III

1)Comparison of CO_2 emissions in the production process between CCFL and LED: (for a 52 inch type TV)

	Q'ty required	Corresponding power consumption (kwh)	Amount of CO_2 emissions (kg-CO_2)
CCFL	24 pcs	13.4	5.5
LED (RGB)	4,500 pcs	552.0	226.3

※ Reference: Annual power consumption in use (52-inch TV): Approx. 240kwh

※ CO_2 corresponding value: 0.41kg-CO_2/kwh (The Federation of Electric Power Companies in Japan)

2)Comparison of CO_2 emissions in the production process between CCFL and LED: (for a 20.1 inch type Computer Monitor)

	Q'ty required	Corresponding power consumption (kwh)	Amount of CO_2 emissions (kg-CO_2)
CCFL	6 pcs	3.3	1.3
LED (RGB)	756 pcs	92.7	38.0

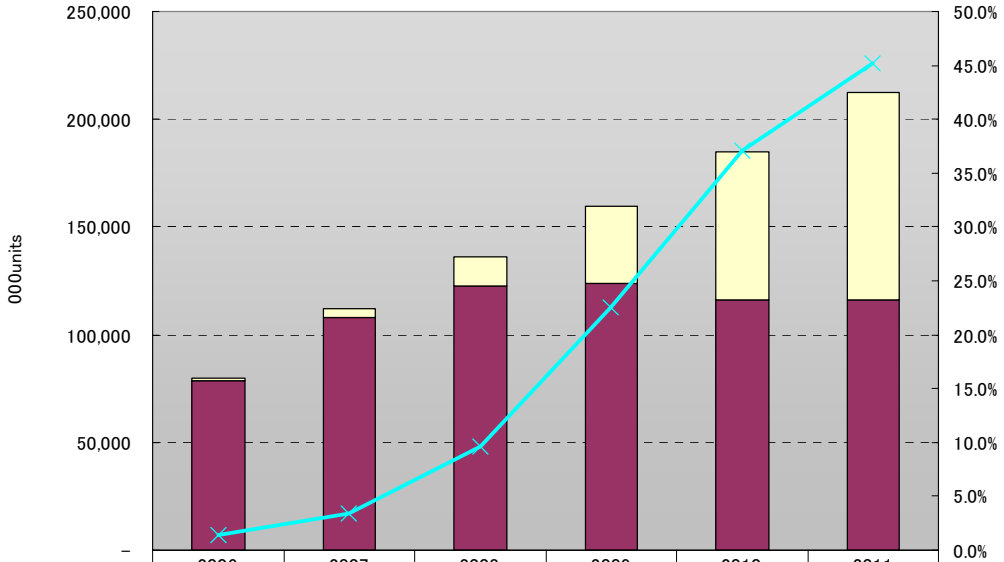
※Reference: Annual power consumption in use (20.1 inch TV): Approx. 135kwh

ANNEX V

Estimated demand for each application in the market

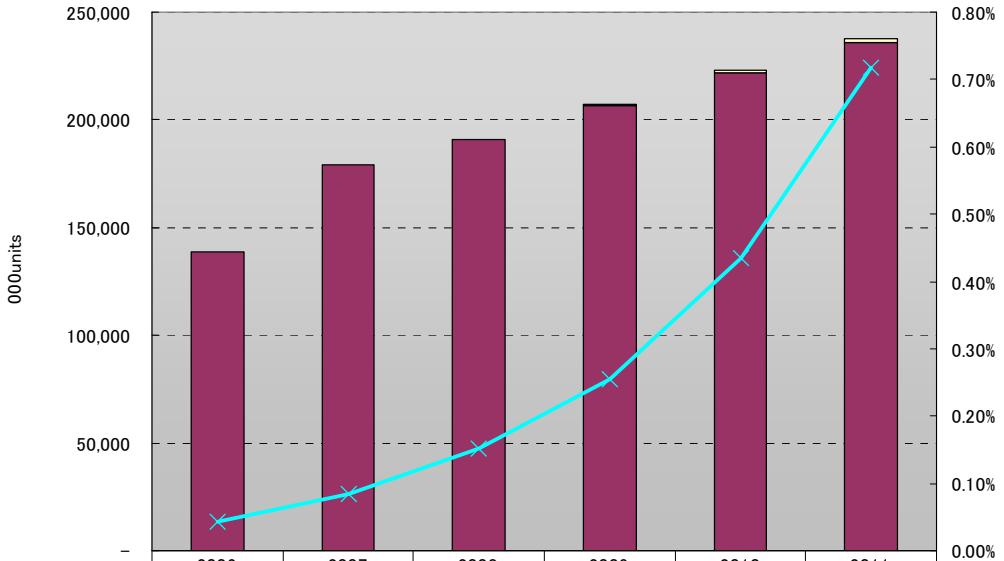
The 14th DisplaySearch Japan Forum (Jan. 30-31, 2008)

Demand forecasting backlight for Note PCs



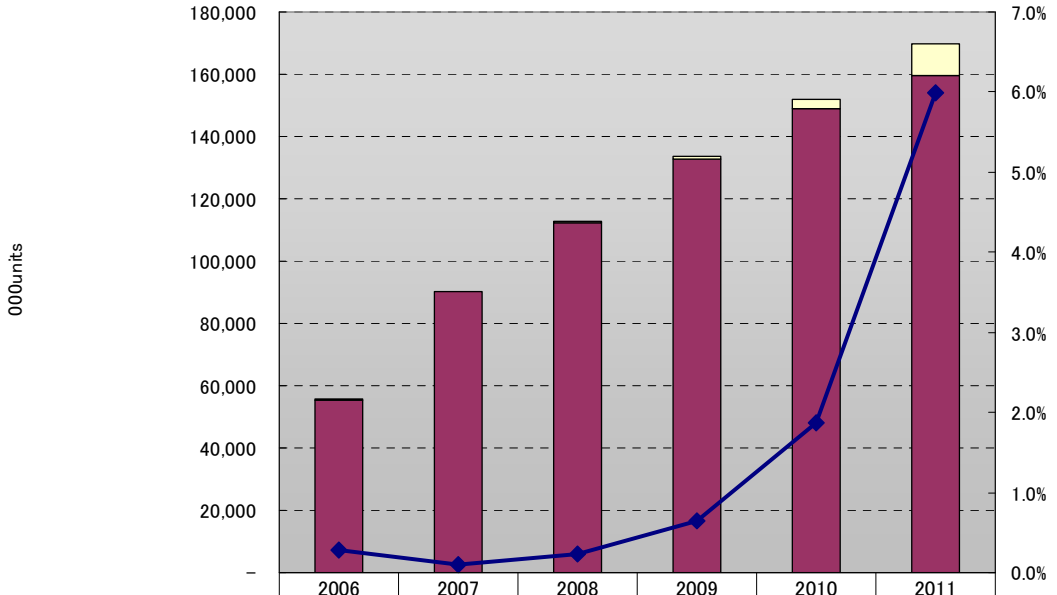
	2006	2007	2008	2009	2010	2011
LED Backlight	1170	3852	13102	35917	68562	96208
CCFL Backlight	78602	108030	122924	123814	116182	116429
LED Backlight %	1.5%	3.4%	9.6%	22.5%	37.1%	45.2%

Demand forecasting backlight for Monitor



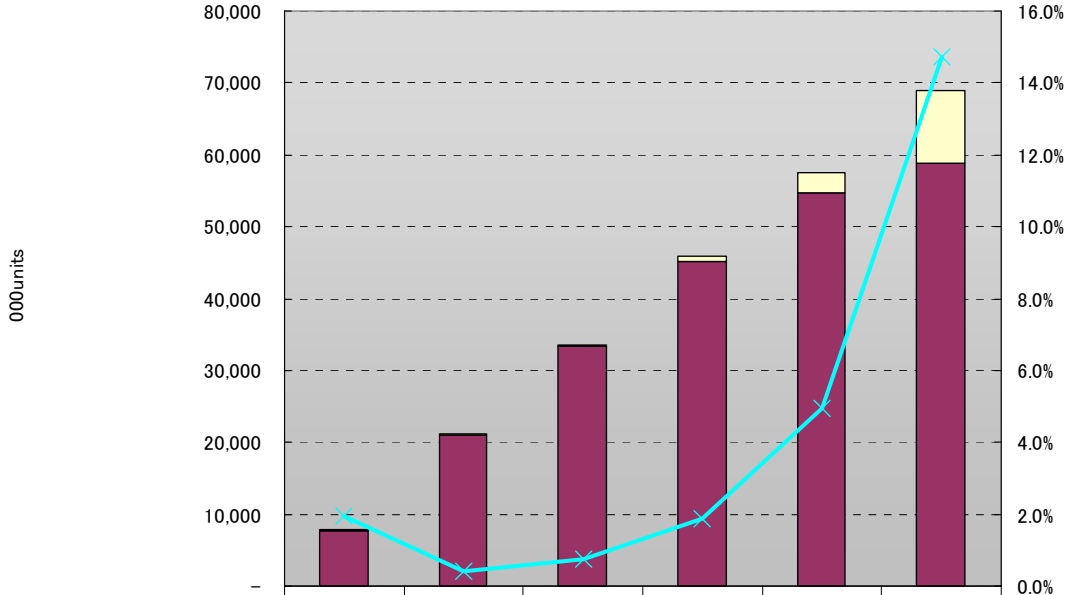
	2006	2007	2008	2009	2010	2011
LED Backlight	59	150	290	527	970	1,707
CCFL Backlight	138,593	178,889	190,821	206,763	222,006	236,065
LED Backlight %	0.04%	0.08%	0.15%	0.25%	0.44%	0.72%

Demand forecasting backlight for TV



	2006	2007	2008	2009	2010	2011
FFL Backlight	450	84	0	0	0	0
LED Backlight	154.8	88.4	253.5	854.2	2,843.9	10,167.4
CCFL/EEFL/HCFL Backlight	55,274	90,001	112,414	132,905	148,985	159,431
LED Backlight %	0.3%	0.1%	0.2%	0.6%	1.9%	6.0%

Demand forecasting backlight for TV over 40”



	2006	2007	2008	2009	2010	2011
LED Backlight	155	88	254	854	2,844	10,167
CCFL/EEFL/HCFL Backlight	7,735	21,070	33,290	45,106	54,659	58,806
LED Backlight %	2.0%	0.4%	0.8%	1.9%	4.9%	14.7%