

Cadmium in TV screens

Exemption requests under the RoHS Directive

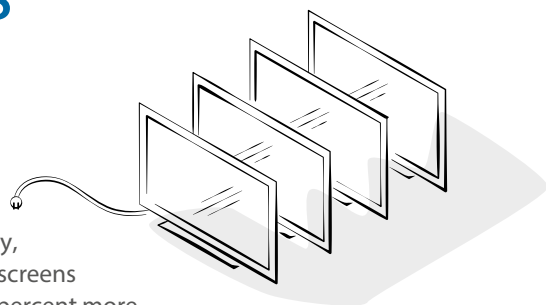
The EU Directive on Restriction of Hazardous Substances (RoHS) is intended to restrict the use of hazardous substances in electrical and electronic equipment. Temporary exemptions from the restrictions can be granted if it is technically or scientifically impracticable to substitute an alternative, or if the alternative is prohibited or would have adverse impacts on humans and the environment. On behalf of the European Commission, the Oeko-Institut has examined two exemption requests for the use of cadmium in quantum dot technologies and produced recommendations for future exemption rules.

One of the uses of cadmium quantum dots is in televisions, where they enhance the colour and contrast of the image. However, cadmium is a heavy metal that is highly toxic; it is classed as carcinogenic and is therefore a prohibited substance under the RoHS Directive. In 2014 the Oeko-Institut submitted an evaluation report on exemption requests for cadmium quantum dots. In 2016 this report was updated and alternatives such as indium phosphide technology were also investigated. The evaluation was made particularly difficult by the existence of different standards for assessing the image quality

of cadmium-free versus cadmium quantum dot technology. Another issue is that energy consumption depends not only on the screen technology but also on the efficiency of the electronic circuit that activates the screen.

This meant that the Oeko-Institut could make recommendations only at the level of the technology comparison; it also used the latest standards for evaluating image quality. The study shows that

for the same image quality, cadmium-free screens use around 20 percent more energy than screens with cadmium quantum dots. The alternative substances used have no significant advantages or disadvantages. The decision was ultimately swung in favour of the exemption request by an evaluation criterion that specifies that replacement of the disputed substance must not result in displacement of environmental impacts. In this case the 20 percent higher energy consumption is such a displaced impact. However, the Oeko-Institut has suggested that the exemption should apply for a short period of just three years. This should incentivise innovations that improve TV images without having to use harmful substances.



Project profile

Project title: Study to assess 2 RoHS exemption requests

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Client: European Commission

Timescale: August 2015 – May 2016

Further information:

<http://rohs.exemptions.oeko.info>

Yifaat Baron

Yifaat Baron has evaluated many exemption requests linked to substances banned under the RoHS and the equivalent directive on end-of-life vehicles (the ELV Directive) that applies to the automobile sector. For example, she has reported on the use of mercury in energy-saving lamps. She gained her MA in environmental management at the University of Haifa and has worked since 2012 at the Oeko-Institut, where she is now a Senior Researcher.

“Our analysis makes clear that no technology is currently able to combine high image reproduction quality with high energy efficiency while avoiding the use of harmful substances. The recommended short validity of the exemption for cadmium quantum dots incentivises environmentally oriented refinement of screen technology.”

