

WLICC WG1 Activity Report on the 2010 FCs Emissions Reduction

World LCD Industry Cooperation Committee

November 10th, 2011, Tokyo

The World LCD Industry Cooperation Committee (WLICC) was organized by members of the LCD Industries Research Committee (LIREC)/Japan Electronics and Information Technology Industries Association (JEITA), the Environment Association of LCD (EALCD)/Korea Display Industry Association(KDIA) and the Taiwan TFT-LCD Association (TTLA) in July 2001 as a new industrial mechanism aimed at promoting the global LCD industry's cooperation and work on environmental issues. The WLICC consists of Working Group 1(WG1) which makes efforts for Fluorinated Compounds (FCs) emissions reduction and WG2 which exchanges information on disposal of waste thin-film-transistor liquid crystal display (TFT-LCD) panels.

It is the principal mission of WLICC to address efforts, and share understanding on issues concerning environmental protection and resource recycling within the LCD industry, and ensure its sound development through periodic meetings and other information exchanges.

The FCs* emissions reduction goal proposed by WG1 was approved at the second WLICC main committee meeting held in Hsinchu, Taiwan on January 20, 2003.

1. Emissions reduction target

WG1 reached a consensus to voluntarily reduce the aggregate absolute FCs emissions from TFT-LCD production lines to less than 0.82 MMTCE (million metric tons of carbon equivalent) by the year of 2010. Unless countermeasures are taken, aggregate emissions in 2010 would likely reach more than ten times of the emissions target. The reduction goal will be achieved through impartial efforts by LIREC, EALCD and TTLA, and will be reviewed as required by future technical progress. (taken from 2003 report)

2. Status of the achievement regarding the emissions reduction target

As a way of achieving this target, efforts to reduce emissions have been made by, for example, improving abatement efficiency, development of cost-effective FCs massive abatement technology, adopting substitute gases and mainly increasing current technology abatement devices installation.

Firstly, evaluation data on abatement efficiency for each type of gas was submitted in conjunction with a review of the 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines. As a result, utilization by using remote plasma source chamber (RPSC) and abatement efficiency for NF_3 gas were improved. This contributed to an improvement in the accuracy of abatement efficiency and change of useful default values.

Accordingly, abatement devices were installed in both existing and new production lines.

Additionally, due to the success in developing substitute gases, lower Global Warming Potential (GWP) FCs were adopted in some production lines instead of high GWP FCs.

Consequently, abatement devices were installed in process lines and reduction ratio for FCs was improved to around 80% in 2010 compared to around 10% in 2001 when WLICC's emissions target had not been confirmed yet.

However, in spite of these efforts by WLICC, FCs emissions grew much higher than expected because there was a surge in the production of LCDs due to rapid and faster-than-expected integration of LCDs into television sets, *etc.* This faster growth resulted in the total glass areas of the panel production for 2010 to increase 1.8 times higher than our forecast.

WLICC's aggregate emissions ended up at 1.75 MMTCE with a reduction of 10.1 MMTCE by way of installation of abatement devices, *etc.* These emissions are about 15% of the emissions without countermeasures. And the value is almost double the reduction target which is close to the increase of forecasted glass areas.

Even though WLICC could not achieve the emissions target of 0.82 MMTCE, LCD industries have greatly contributed to preventing global warming by reducing a lot of emissions through its activities.

Future activities from 2011 onward will focus on further efforts to reduce FCs emissions in line with greenhouse gas reduction targets of each country.

* The LCD Industry mainly uses CF_4 , C_2F_6 , C_4F_8 , CHF_3 , SF_6 , NF_3 and we define these gases collectively as FCs.