

Oct 14th, 2011

Ms Verena Radulovic
U.S Environmental Protection Agency

Subject : Feedback on "ENERGYSTAR 6.0 Draft 2 Program Requirements for Displays–Draft Partner Commitments "

Dear Ms. Verena Radulovic

With reference to your "ENERGYSTAR 6.0 Draft 2 Program Requirements for Displays–Draft Partner Commitments " presented on Sep 27th, 2011, feedback from the Environmental Committee of Display of Korea Display Industry Association(KDIA) is enclosed herein as attached document.

Please note that the contents of this feedback are based on the results of questionnaire investigation with businesses participating in the Committee as well as discussions held in the Committee.

We kindly ask for your understanding on the marked paragraphs in bold.

Sincerely,

Han Dong Hoon
Chairman, Environmental Committee of Display
Korea Display Industry Association(KDIA)

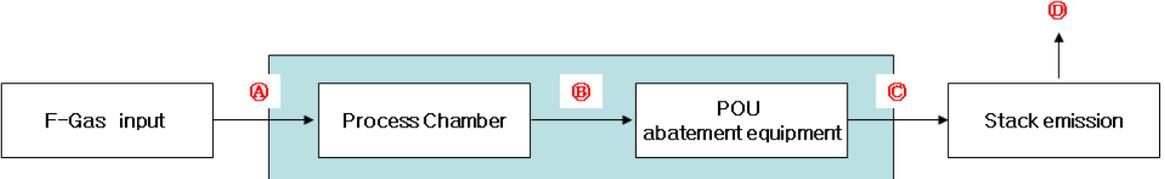
Oct 14th, 2011 Environmental Committee of Display of KDIA G

Feedback on "ENERGYSTAR 6.0 Draft 2 Program Requirements for Displays–Draft Partner Commitments G

No.	Description in EnergyStar 6.0 Draft 2	Feedback
1	(Page 2) Other	<p style="text-align: center;">< General Comments ></p> <p>– Additional or separate regulation to LCD panel manufacturers is not appropriate F–gas reduction related regulation of ENERGYSTAR 6.0 because ENERGYSTAR is a certificate standard of end products.</p> <p>ENERGYSTAR is program for energy–saving products of set maker voluntarily certified (Labeling on the product itself), so it should be managed regulations on only products not specified parts.</p> <p>In addition, separate regulations on specified parts relatively could mean the relaxation of regulations on the end product or service so for those products should be evaluated for overall carbon emissions.(Cabon–Lifecycle Assessment, Carbon Trust Footprinting).</p> <p>Thus, for certification of low carbon products should be evaluated considering carbon emissions of the entire process not only in manufacturing process but also from the input of raw materials to waste products.</p> <p>The purpose of evaluating the product's carbon emissions is to certify low carbon emissions products compared to normal ones so, it should be established baseline of the product's life cycle carbon emissions with standardizing how to estimate emission and minimized relative uncertainty among manufacturers.</p> <p>In addition, for low–carbon product certification, reduction rate should be evaluated whether it achieved reduction target compared to baseline and efforts of reducing both of input gas and stack emission should be recognized.</p>

No.	Description in EnergyStar 6.0 Draft 2	Feedback
2	<p>(Page 2) Other</p> <p>10. For products with LCD panels, Partner shall source LCD components from suppliers who have demonstrated that, for manufacturing processes that emit fluorinated greenhouse gas emissions (F-GHGs), they are recovering or destroying on an annual basis at least 90 percent of the F-GHGs used in the production of LCD panels for ENERGY STAR qualified products. The 90 percent reduction rate refers to the average rate across all of a supplier's manufacturing facilities, and can be based on measurements from a representative and random sampling of abatement equipment.</p>	<p>< Gradual enforcement of F-Gas reduction rate ></p> <p>– LCD panel manufacturers needs a period to prepare for reducing F-gas so, reduction rate also should be applied gradually divided yearly.</p> <p>If conformed to reduction rate 90% according to ENERGYSTAR 6.0 draft 2 until Sep, 2012, global LCD industries including Korea, Taiwan, China will face with huge damage and risk because LCD panel manufacturing process is operated 24 hours continuously and production should be stopped to install abatement equipment (POU) additionally to old lines.</p> <p>Due to this manufacturing process problem, Korea LCD panel makers developed massive-scale SF6 abatement equipment, much better for abatement efficiency than POU, in 2010 and it is being test-operated currently on some TFT-LCD plants for monitoring abatement efficiency.</p> <p>But it needs long term period to verify abatement efficiency and due to taking long term for its installing and test operation.</p> <p>Therefore, period to apply F-gas reduction rate should be considered to extended to Dec, 2020 not within a short period such as Sep, 2012 due to taking long term for its installing and test operation to verify abatement efficiency.</p> <p>Also, considering that 100% of LCD panel is being produced only in northeast of Asia, it could be serious and unfair trade barriers to Asian countries without consideration of these circumstances.</p>

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3	<p>(Page 2) Other</p> <p>10. For products with LCD panels, Partner shall source LCD components from suppliers who have demonstrated that, for manufacturing processes that emit fluorinated greenhouse gas emissions (F-GHGs), they are recovering or destroying on an annual basis at least 90 percent of the F-GHGs used in the production of LCD panels for ENERGY STAR qualified products. The 90 percent reduction rate refers to the average rate across all of a supplier's manufacturing facilities, and can be based on measurements from a representative and random sampling of abatement equipment.</p>	<p>< The 90 percent Reduction rate of F-Gas ></p> <p>– It should be considered various factors not to be achieved 90% reduction rate when F-gas decomposed by abatement equipment.</p> <p>Abatement equipment practically could not operated 365 days fully because it occurred frequent defect and fast deterioration of main parts and cleaning due to clog with generating lots of powder and toxic gas when it decompose F-gas.</p> <p>Therefore, it should be applied virtually possible reduction rate in consideration of non operating period of abatement equipment due to regular maintenance, repair, cleaning and change of the parts etc.</p> <p>Accordingly, Korea government, after researching a couple of years in consideration of these problems, also allocated reduction rate 60% of F-gas to be reduced until 2020 on Oct 12th, 2011 to LCD manufacturers such as Samsung LCD, LG display, Samsung mobile display through Energy Target Management System guideline.</p> <p>Therefore, F-gas reduction rate should be decreased from 90% to 60% including in respect that conforms to the national environmental regulation.</p>

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4	<p>(Page 2) Other</p> <p>10. For products with LCD panels, Partner shall source LCD components from suppliers who have demonstrated that, for manufacturing processes that emit fluorinated greenhouse gas emissions (F-GHGs), they are recovering or destroying on an annual basis at least 90 percent of the F-GHGs used in the production of LCD panels for ENERGY STAR qualified products. The 90 percent reduction rate refers to the average rate across all of a supplier's manufacturing facilities, and can be based on measurements from a representative and random sampling of abatement equipment.</p>	<p>< Measuring point of abatement equipment for estimating reduction rate ></p> <p>– Reduction rate can be based on measurements from a representative and random sampling of abatement equipment but it could lead to seriously wrong consequences due to complicated technical reasons.</p> <p>Because, there are lots of measuring points in case of verifying reduction (abatement) rate of abatement equipment so, it could be occurred error and variation very seriously.</p> <p>Therefore, estimating reduction rate depend on emission from stack compared to gas input could be minimized measuring points(refer to the figure as below).</p> <p>Additionally, installing realtime monitoring equipment for density and quantity in stack and making sure to get audit from the third parties could be obtaining credibility.</p> <p>Also, Not only operation of abatement equipment but also manufacturing process optimization for reducing F-gas input and adopting substitute gas of low GWP should be included when F-gas reduction rate estimated in consideration of the purpose of establishing Energystar 6.0 for minimizing F-gas emission in manufacturing process.</p> <p>Over the past years actually, LCD manufacturers have kept making a lot of efficient efforts as above.</p>
<p style="text-align: center;">Figure <A structure of F-gas emission and reduction factor></p>  <p>○ Reduction rate by EPA = $(B - C) \div B \times 100$</p> <p>○ Reduction rate proposed by KDIA = $(A - D) \div A \times 100$</p>		

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5	<p>(Page 2) Other</p> <p>10.1. Gases covered include CF₄, C₂F₆, C₃F₈, C-C₄F₈, C₄F₈O, CHF₃, Nitrogen Trifluoride (NF₃), Sulfur Hexafluoride (SF₆).</p>	<p>⟨ Scope of F-Gas to be regulated ⟩</p> <p>Nitrogen Trifluoride(NF₃) shall be excluded from F-GHG list EPA specified.</p> <p>Because, NF₃ is not specified as GHGs to be reduced worldwide according to GHGs included in Kyoto protocol in 1997, the 3rd COP(conference of the parties) of UN. Kyoto protocol agreed by UN specified only HFCs, PFCs and SF₆ as F-gas to be regulated for emission. Therefore, CDP reports that LCD panel manufacturers presents annually has not covered NF₃ as GHGs</p>