F-GHG Emissions Reduction Efforts: Flat Panel Display Supplier Profiles

Summary

U.S. Environmental Protection Agency
Office of Air and Radiation
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The Supplier Profiles (PDF) detail the efforts of large-area flat panel suppliers to reduce their F-GHG emissions in manufacturing across key areas. They cover current mitigation measures, future reduction goals, and public disclosure efforts. They also highlight whether emissions reduction efforts address all F-GHGs used in all manufacturing processes and the extent to which emissions abatement technologies are installed on newer generation fabs (i.e. those that make today's large-area panels used for products such as TVs and computer monitors). This summary reflects information, which was assembled from public sources and the suppliers themselves, on F-GHG emissions for calendar year or fiscal year 2014, depending on the supplier's reporting cycle. Public sources of information include suppliers' responses to the annual Carbon Disclosure Project Investor Questionnaire and annual sustainability reports. The twelve global suppliers named among the profiles produce 99% of all large-area flat panel displays sold globally.

Over the past few years, brands and retailers Walmart, Dell, HP, Lenovo, Best Buy, and Acer took an important public step to foster further voluntary F-GHG reductions among their LCD suppliers. These companies asked their LCD suppliers to develop a standard method for measuring and recording F-GHG emissions for the industry, establish a voluntary long-term F-GHG emissions reduction goal with public timelines for demonstrating progress, and develop an annual progress report that can be shared with them and/or other supporting organizations. Since then, other brands have followed suit by engaging their LCD suppliers to better understand their F-GHG emissions and efforts to reduce them.

In late 2015, LCD suppliers who were members of the World Display Industry Cooperation Committee (WDICC) committed to a new goal of reducing F-GHG emissions intensity by 30% by 2020. EPA commends LCD suppliers for taking this important step to further reduce F-GHG emissions.

Also, beginning in late 2015, the IEEE 1680.1 standard denoting improved environmental performance for computers and monitors--which also underpins the Electronic Product Environmental Assessment Tool (EPEAT) used in institutional procurement--began its revision. One of the criteria stakeholders are examining at the time of this writing would reward reducing F-GHGs from LCD manufacturing.

Findings from 2014 LCD supplier data

In an update to the previous year's LCD supplier data, the 2014 supplier data provided the following key insights:

- Six out of the twelve major large-area LCD panel suppliers publicly report their F-GHG emissions. Greater transparency is needed on all LCD panel suppliers' F-GHG emissions to better understand overall trends in F-GHG emissions projections from LCD manufacturing.

- Of the suppliers who publicly report their F-GHG emissions, most are reducing the majority of these emissions with installed F-GHG emissions abatement equipment. However, at least one is reducing emissions in the etch process via use of alternative gases. An improved understanding is needed on the extent to which F-GHG emission reductions result from both the use of F-GHG reduction technologies and the use of alternative F-GHGs in key processes. Doing so will better equip brands to understand all of the effective methods their suppliers are implementing to reduce F-GHG emissions.

- Some suppliers reported their emissions intensity per square meter of glass produced. Since F-GHG emissions decreases and increases are often dependent on changes in production levels, an optimal F-GHG emissions intensity based on full abatement and/or the fullest use of alternative gases could serve as an indicator for brands and other interested stakeholders on whether emissions reduction efforts have been implemented to the fullest extent possible.

Summary of Supplier Profiles:

This summary reflects information as it appears in each supplier's profile. Profiles will be updated as new information becomes available.

AU Optronics (AUO): AUO installs abatement systems on all newer generation fabs, targeting SF_6, PFCs, HFCs and NF_3 in all etch and clean processes. AUO reports having reduced their F-GHG emissions by approximately 10.6 million tons of CO_2e between 2003 and 2014, up from a 9.34 million ton reduction between 2003 and 2013.

BOE Technology: Information on F-GHG reduction efforts in flat panel manufacturing is unknown, though general information on its broader GHG emissions management efforts is publicly available.

CEC-Panda: Information on F-GHG reduction efforts in flat panel manufacturing is unknown.

ChinaStar: Information on F-GHG reduction efforts in flat panel manufacturing is unknown.

Chunghwa Picture Tubes (CPT): CPT installs abatement systems on all newer generation fabs, targeting SF_6, PFCs, HFCs and NF_3 in all etch and clean processes. In 2014, CPT implemented PFC reduction methods and evaluated process equipment, targeting its 4.5 generation fabs, an earlier generation of fabs built prior to 2004. CPT estimates reducing F-GHG emissions by approximately 30 million tons of CO2e between 2002 and 2014, up from approximately 28 million tons of CO2e by 2013.

HannStar: HannStar installs abatement systems on all newer generation fabs, targeting SF6, PFCs, HFCs and NF3 in all etch and clean processes. HannStar reduced F-GHG emissions by approximately 1.33 million tons of CO2e from 2007-2012 and reduced F-GHG emissions by 91,000 tons of CO2e in 2014, compared to 89,000 tons of CO2e in 2013.

Infovision: Information on F-GHG reduction efforts in flat panel manufacturing is unknown.

INX (Innolux): INX installs abatement systems on all newer generation fabs, targeting SF6, PFCs, HFCs and NF3 in all etch and clean processes. In 2014, Innolux (INX) reduced its F-GHG emissions to 0.123 MMTCE, eliminating 11,505,930 tCO2e of F-GHGs due to the employment of combustion local scrubbers between 2010 and 2014. In 2015, INX began focusing on installing more combustion local scrubbers and reducing PFC emissions to 0.116 MMTCE. INX attributes achieving its results to 1) optimizing manufacturing processes and thereby reducing the amount of F-GHGs needed and 2) replacing or installing local burn-type scrubbers at newly built factories and those constructed prior to 2003 to achieve better abatement.

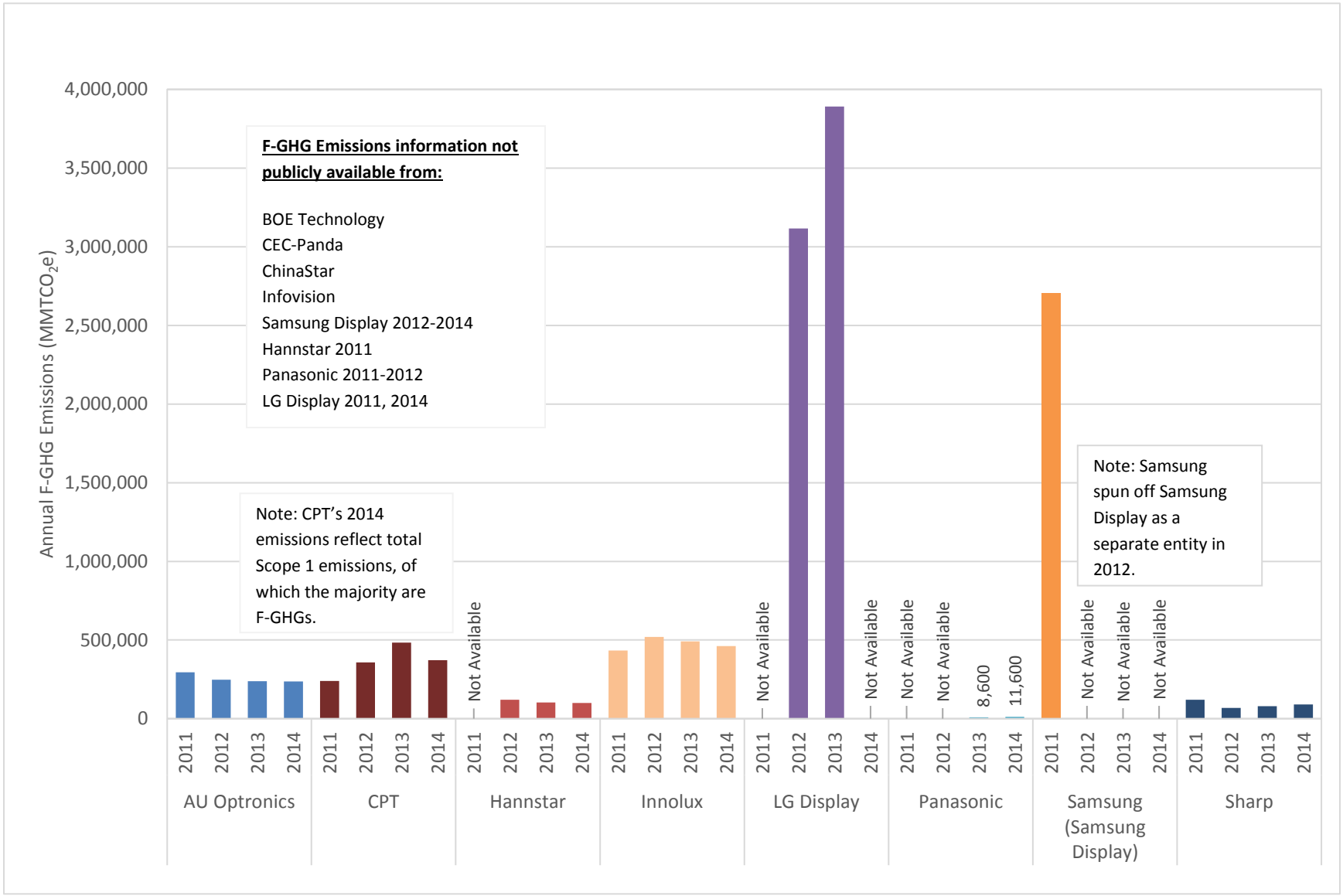
LG Display: LG Display has installed F-GHG abatement systems on all lines of chemical vapor deposition (CVD) tools and on three lines of etch tools in its newer generation fabs. Its reduction efforts target SF6, PFCs, and NF3 (LG Display does not use HFCs). Overall LG Display estimates that it reduced F-GHG emissions by 888,404 metric tons of CO2e in 2013. Information on F-GHG emissions reductions in 2014 is unknown. However, in 2014 LG Display disclosed that it is developing a clean production technology to replace the use of SF6 with an alternative gas.

Panasonic: Panasonic Liquid Crystal Display (PLD) installs abatement systems on all newer generation fabs, targeting SF6, PFCs, HFCs and NF3 in all etch and clean processes. In its 2014-2015 fiscal year, PLD increased SF6 emissions from 5,100 tons of CO2e in FY 2013-2014 to 6,100 tons of CO2e.

Samsung Display: Information on F-GHG reduction efforts in flat panel manufacturing is unknown for 2014, though information on Samsung Display's F-GHG emissions reductions for 2011 and part of 2012 are publicly available in previous supplier profiles.

Sharp: Sharp installs abatement systems on all newer generation fabs, targeting SF_6, PFCs, HFCs and NF_3 in all etch and clean processes. In its 2014-2015 fiscal year, Sharp's F-GHG emissions increased by 17,000 tons of CO_2e when compared to emissions in the 2013-2014 fiscal year.

LCD Suppliers' Annual F-GHG Emissions (2011-2014)



LCD Suppliers' Annual Global Market Share of Large Area Panel Production (2011-2014)