



“Defining Display Greenness”

Why it Matters for Consumers,
Manufacturers and Regulators

Phillip Wright, Ph.D.

Insight Media Analyst

Managing Director, WRT Associates, LLC

philwright@wrtassoc.com

www.wrtassoc.com

+1-970-219-8800

- **Announcing a New Report from Insight Media**
 - *“Green Display Report - The Business Threats and Opportunities of Green Displays”*
 - Authored by Phillip Wright and Ken Werner
 - Scope of the Report
- **Why do we care about green displays?**
- **What makes a display green?**
- **Where are we today?**
 - Green characteristics of benchmark display products
 - Green display specifications and trends
 - Regulatory framework and trends
- **Where do we go from here?**
- **How will we know when we get there?**

- **Display Coverage**
 - Televisions (LCD, PDP)
 - Monitors (LCD)
 - Notebook PC displays (LCD)
- **What Makes a Display Green?**
- **Why be Green?**
- **The Selling of Green Displays**
- **Qualitative Green Trend Impacts**
- **Regulatory Framework**

- **This presentation covers some aspects of the report**
- **Full Table of Contents available**

Why do we care about green displays?

- **To be (or appear to be) good corporate citizens**
- **See areas of cost saving in green design, manufacturing, and recycling**
- **Wish to comply with (or get ahead of) government regulations**
- **See opportunities for marketing and sale of green products**
- **Take advantage of on-going energy saving and eco-friendly trends to promote as green products**

- Lower energy consumption will save money
- Want to contribute to environmental sustainability
- Need assistance in correctly disposing of display products at end of life
- Want high quality display products with green attributes without price increase
- Want to be seen as an eco-friendly consumer

- **There are substantial energy savings and GHG reductions to be obtained**
- **Electronic waste is a growing global problem**
- **Hazardous materials pollute the environment**
- **Negative effects on the environment need to be reduced and controlled**
- **Regulations can change behavior (corporate and consumer) as well as drive technology innovation**

- **Examples of factors determining “Green-ness”**
 - Energy and raw materials consumed and GHG produced in manufacturing the display
 - Energy consumed and the carbon footprint involved in transporting the display to the point of sale
 - Energy consumption in operation
 - Hazardous materials content
 - Ease and cost of recycling

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- **A display is considered to have green attributes if in its design, manufacture, use or disposal, it:**
 - Conserves energy
 - Results in fewer greenhouse gas emissions
 - Reduces pollution
 - Yields a more environmentally sustainable outcome compared to prior products.

- **LCD and PDP technology have evolved over time to deliver key display performance attributes**
 - high luminance
 - high resolution
 - high contrast ratio
 - wide color gamut
 - fast response
 - large screen size with thin profile

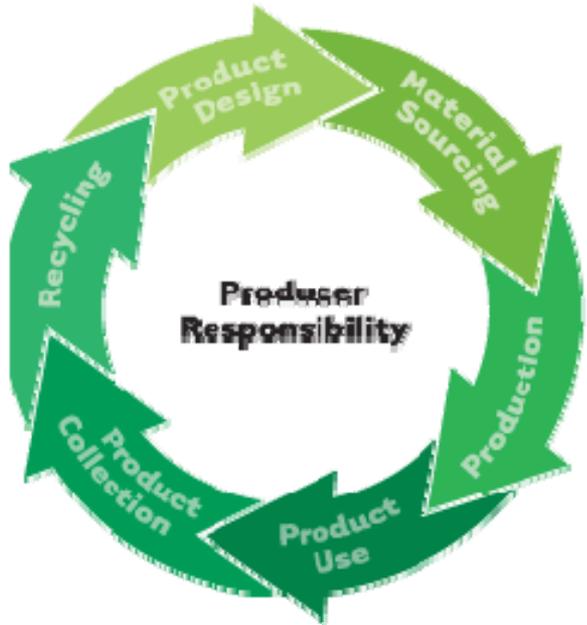
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- **“Green” properties of earlier displays have often been secondary or background considerations**
 - Energy Star
 - RoHS
 - WEEE

- Energy Star points out there are 275 million TVs in U.S. consuming >50 billion kWh of energy each year
 - 4 % of all household electricity use
 - Enough to power all the homes in New York state for a year
- Consumers have/are upgrading their sets to digital and the long term trend has been to more and larger screens



Why Energy Savings from Televisions?

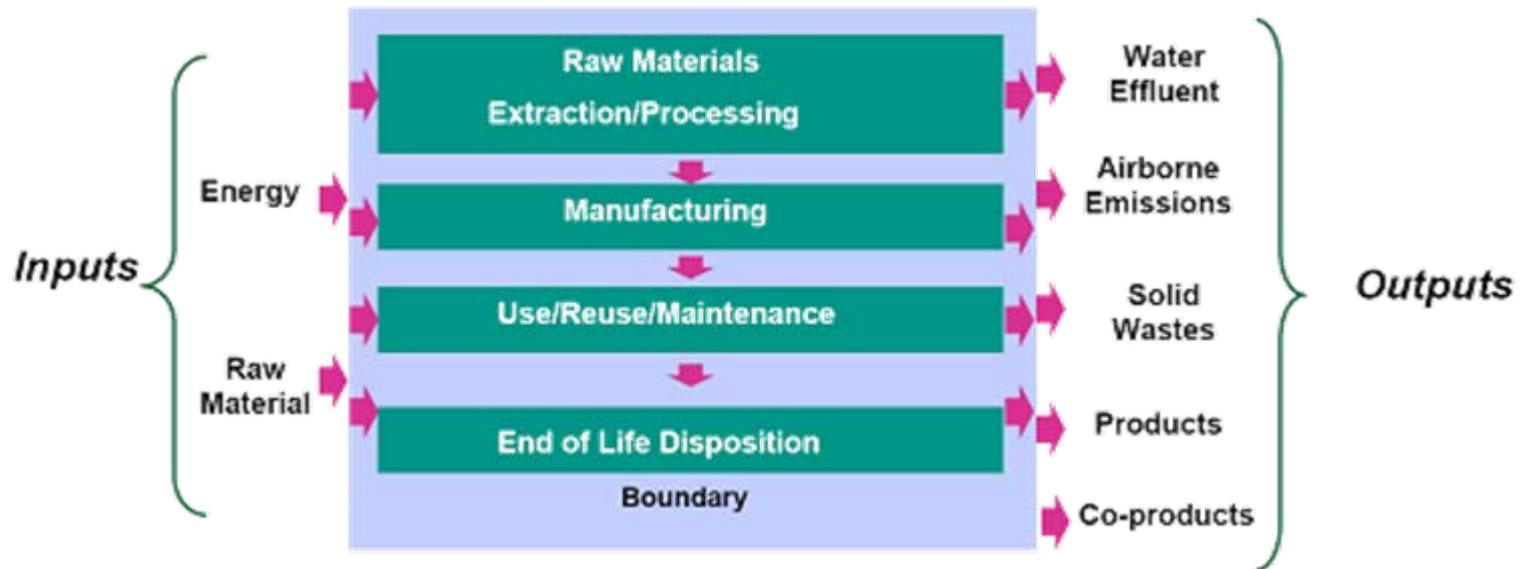
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- *However, realizing substantial energy savings from televisions will require changes*



- Energy used by the display
- Materials, Components and Supply Chain
- Energy and processes used for display manufacturing
- Transportation through the distribution supply chain and recycling process
- Recycling

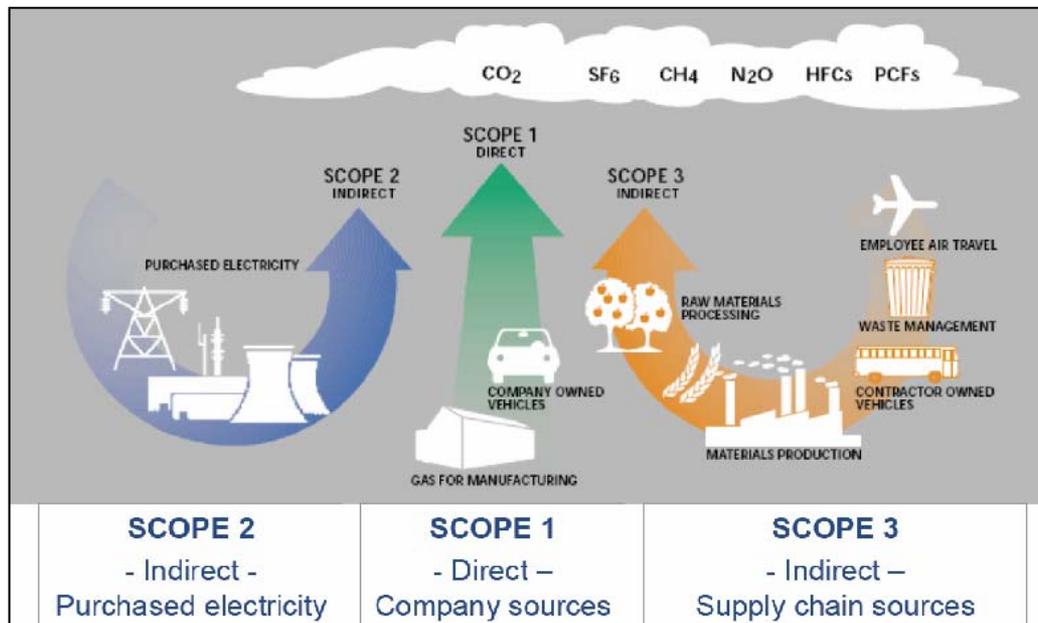
- **Intent of LCA**

- Capture all inputs and outputs involved in the manufacture, use and disposal or recycling of a product.



Source: US EPA

- ECA should account for all direct and indirect sources of GHG emissions
- As the industry moves to adopt comprehensive LCA there have been some difficulties establishing common methods and definitions



Source: Climate Earth, Inc.

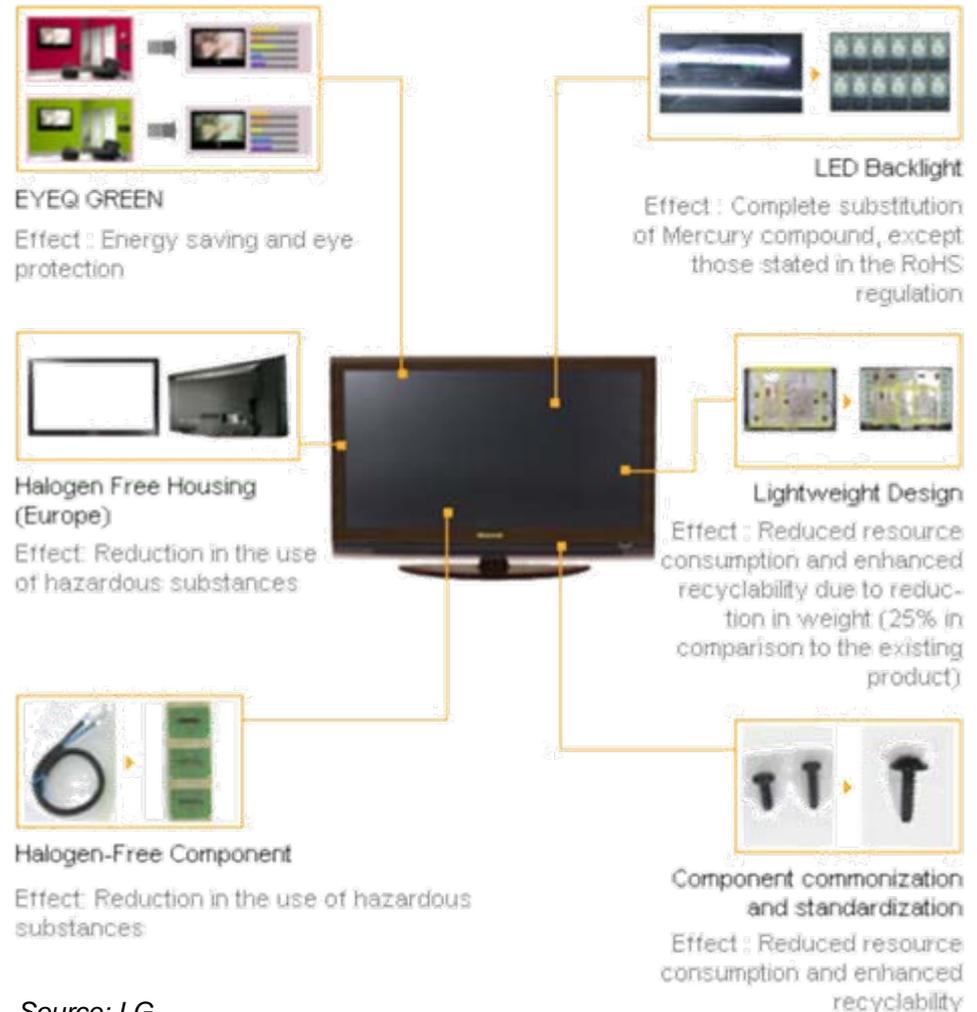
- The green attributes of a display can be defined
- No accepted way to call a display product "green"
 - Just shades of green-ness today
- Should meeting Energy Star ratings make it a green display?
 - Suppose the manufacturing and disposal are not eco-friendly?
- Should guidelines in several categories be established to qualify a product as green?
 - Who sets the guidelines?
 - How will they change over time?
 - Who validates the results?

- **Green characteristics of benchmark 2009 display products**
- **Green display specifications and trends**
- **Regulatory framework and trends**

- **Needed to establish baselines for green-related specifications of commodity products available in 2009**
 - Reasonable definition of “green-ness” would be if a product’s ecologically relevant characteristics significantly exceeded this commodity baseline.
- **Power consumption and energy efficiency features of 2009 televisions compared to 2008 models suggest some current sets are “greener”**
 - Practical difficulties with this view
 - Before late 2008 there was no ratified standard method for measuring flat panel TV power consumption
 - Finalization of IEC 62087 Ed. 2 test procedure and its adoption by US EPA for Energy Star 3.0 - there is now a method for measuring energy consumption and comparing current and subsequent set models.

- **Specifications and features of green display products**
 - Power consumption
 - Energy saving features
 - Reduced shipping and packaging materials
 - Reduced size and material content
 - Reduction or elimination of hazardous substances
 - Recyclability
 - Use of recycled material in the product or manufacture

- Display panel and set manufacturers are incorporating green features in the design of their products
- Ambient light sensors and new concepts to use eye tracking or proximity sensors to turn off the display if no one is watching



Source: LG

- **Material choices**
 - Aluminum rather than thermo set polymer
 - Recycled plastics
- **Free of pollutants**
 - Mercury, lead, arsenic (in glass), and halogens
 - Pollutants would have to be removed from the waste stream
- **Easy to disassemble and separate into their component parts at end of life**
- **Reducing the size and material content**
 - Material that is never included in a product to begin with does not have to be sourced, shipped, stocked, disassembled, recycled or disposed of at all.

- **Comparison of TV sets as of mid-2009**
 - **Samsung set with LED backlight**
 - 1.25 inches thick
 - weights 48.5 lbs (w/o stand)
 - Consumes 120 W.
 - **Toshiba set with CCFL backlight**
 - 4 inches thick
 - weighs 70.7 lbs. (w/o stand)
 - Consumes 201 W.
- **LED backlight**
 - thin, lighter weight, and lower power consumption (40% less)
- **Price comparison**
 - Samsung LED \$2,560
 - Toshiba CCFL \$2,000

| | | |
|-------------------------------|---|---|
| Set pix |  |  |
| Brand | Toshiba | Samsung |
| Description | 55" 1080p LCD HDTV CCFL Backlight | 55" 1080P LCD HDTV LED Backlight |
| Model No. | 55ZV650U | UN55B6000 |
| Price | \$1999.99 | \$2,559.99 |
| Recycling (old set) | Included (Best Buy) | Included (Best Buy) |
| Energy Star 3.0 | Yes | Yes |
| Product Weight | 80.5 lbs. 70.7 lbs. w/o stand | 60.0 lbs. 48.5 lbs. w/o stand |
| Product depth | 4.02" w/o stand | 1.25" w/o stand |
| Standby Power Consumption | 0.6 W | 0.08 W |
| On Mode Power Consumption | 201 W | 120 W |
| Ambient Light Sensor | Yes | No |
| Proximity Sensor | No | No |
| Other | | |
| Resolution | 1920x1080 | 1920x1080 |
| Carton Dim. (WxHxD) Weight | 57.64" x 39.25" x 15.59" 102.5 lbs. | 56.9" x 39.2" x 15.7" 77.6 lbs. |
| RoHS | | |

- Regulation of displays is increasing
- Major outstanding questions
 - Mandatory vs. Voluntary?
 - Labeling vs. Laws?
 - How will the cost of recycling be recovered?
 - What are the business needs and opportunities for greener displays?
- Need and opportunity to rationalize global requirements, regulations, labeling initiatives, standards, and practices for display products
 - Currently at least 35 labeling programs for electronic equipment worldwide - 9 in Asia, 7 in North America, 7 in Europe, and 5 in Oceania
 - Globally, recycling regulation is being applied predominately at the national or federal level
 - In US, there are widespread moves by state and local governments to establish local recycling regulations

- **Serious need to simplify and clarify recycling regulations and practices.**
- **Widespread proliferation of requirements, regulations, labeling initiatives, standards, and practices for green displays is bewildering - likely to lead to increased industry costs, and consumer confusion.**
- **Harmonizing requirements, regulations, labeling initiatives, standards, and practices for green displays at all levels – city, state, federal, region, global – will absorb a great deal of effort and debate for at least the next several years.**
- **Harmonization is essential if expenses and benefits are to be optimized.**

- **Realizing energy savings from displays**
- **Designing sets that are thinner and lighter**
- **Designing for the environment**
- **Designing for recycling**
- **Saving and making money through recycling**
- **Harmonizing global requirements and recycling practices**

- **Recyclability**
 - Recycled materials, smart design, smaller volume and weight
- **Eco Impact of Manufacturing and Distribution**
 - From manufacture to packaging and distribution
 - Mfg energy, GHG emission, water use, waste stream, recycled materials, hazardous materials
- **Operational Efficiency**
 - Scaled by screen size
 - Energy Star as first model
- **Goal**
 - Set up numeric index for these parameters by year and levels to be considered "green"
 - Easy to communicate to the consumer (EPEAT model?)

- **A display industry lobbying effort is needed to:**
 - **Influence the harmonization of WW standards and regulations**
 - **Help create a green display index and roadmap**

- For further details about the new report:
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