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International Electronics Manufacturing Initiative

**2009
Environmentally
Conscious
Electronics (ECE)
Roadmap:
Future Initiatives for
Sustainability**

Scott O'Connell, Dell Inc.

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Outline

- **Introduction**
- **Major ECE Focus Areas:**
 - **Materials**
 - **Energy**
 - **Recycling/Reuse**
 - **Eco-Design**
 - **Sustainability**
- **Plan for Action**
- **Conclusions**

2009 Environmentally Conscious Electronics (ECE) Roadmap

Five Chapters

- **Materials** **Holly Evans, Strategic Counsel, LLC**
- **Energy** **Valerie Rickman, ITI**
- **Recycling-Reuse** **Jason Linnell, National Center for Electronic Recycling**
- **Eco-Design** **Cliff Bast, Acer, Inc.**
- **Sustainability** **Markus Stutz, Dell**

Trend Analysis

- To produce environmentally-conscious electronics the ECE TIG must continue to keep pace with:
 - Continuing emergence of material restrictions
 - Energy efficiency requirements and renewable energy
 - End-of life requirements
 - Holistic Eco-design requirements
 - Sustainable business practices
- As many of these issues are shared by industry, it's best to work together!



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Materials

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Materials

Short Term Needs - Identified in 2009 Roadmap

- **A strategy and action plan to facilitate low risk conversion of high-reliability applications to Pb-Free solders**
- **Prepare for possibility of additional substance restrictions under RoHS and/or REACH (HBCDD, phthalates)**
- **Proactive programs to convert to halogenated flame retardant (HFR) - free and PVC-free material alternatives**

Pb-Free Conversion by Segment

Industry Segment	Status
Portable / Consumer	Full global conversion to Pb-free. Working improvements to mechanical shock.
Office Systems / Large Business / Communication Systems	Most have taken Pb exemption for mission critical electronics – exemption may sunset ~2014 Working to close Pb-free knowledge gaps.
Medical Products	Either out of scope or have taken Pb exemption.
Automotive	Mission critical electronics still using SnPb. Entertainment/communication systems moving to Pb-free.
Defense and Aerospace	Either out of scope or have taken Pb exemption. Working to ensure ongoing availability of SnPb components.

- The components supply chain is rapidly converting to RoHS compliant offerings (Pb-free) with little motivation to continue to produce SnPb product.
- Taking the Pb exemption has changed the risk profile for High Reliability producers.

Proactive HFR Free/PVC-Free Activities

- **US EPA Design for Environment Program: Alternatives Assessment of Flame Retardants for the Electronics Industry**
 - EHS assessment of PCB laminates, report published by end 2009
- **iNEMI HFR-Free PCB Project**
 - Technical evaluation of key electrical and mechanical properties
- **iNEMI HFR-Free High-Reliability PCB Project**
- **iNEMI PVC Alternatives Project**
- **Intel-iNEMI Symposium on Environmentally Friendly Materials**
 - November 11-12, Shanghai, China

Materials

Recommendations

- **Need for development and implementation of good scientific methodologies to assess true environmental impacts of materials and potential trade-offs of alternatives (LCA-type approach)**
- **Greater involvement of industry on policy making for material restrictions to assure better understanding of trade-offs inherent in substitutions**



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The Big Picture

Climate/ Energy Example



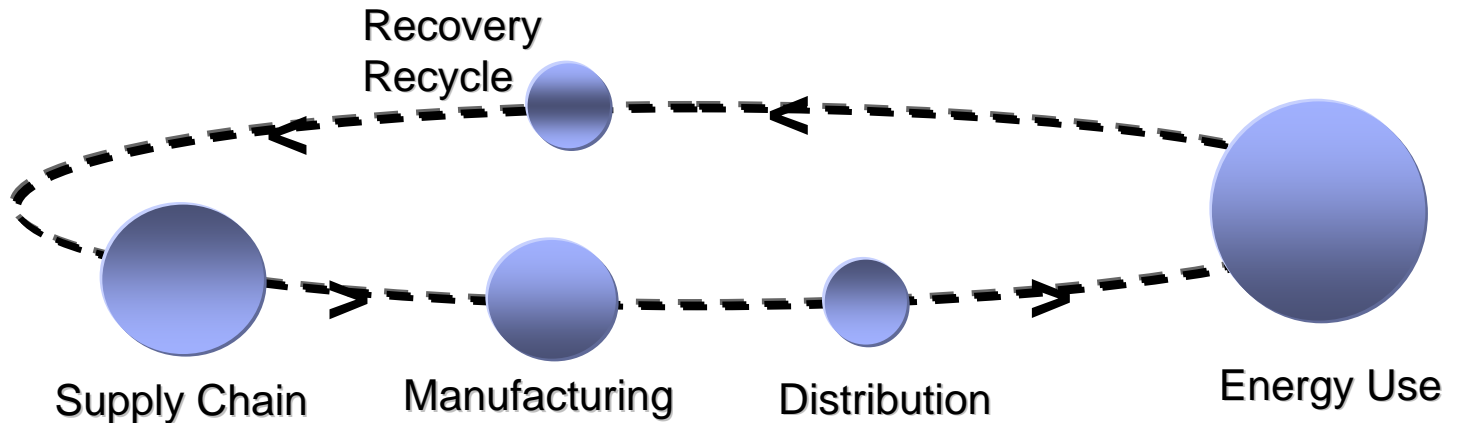
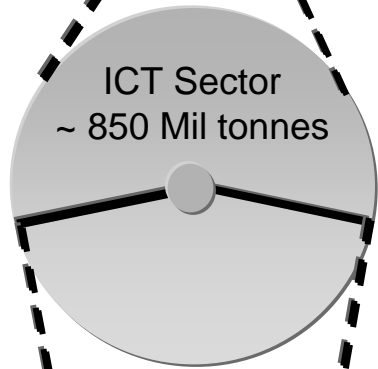
How do we get the facts and data?

- Standardized Product Lifecycle Assessment
- Identifies opportunities & issues
- Allows identifying what counts most

Global CO₂ Emissions

~ 40 Billion tonnes

~2%



Sources: Smart 2020 Report 2008; IDC; Gartner



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Energy

Situation Analysis

- Energy Costs Impacting End User
- Regulations impacting technology choices
- Energy Management
 - Reducing Energy Use in Data Centers is a Market Opportunity

Needs

- More efficient power supply technology
- Harmonize energy management standards (Energy Star, EuP, etc)
- New innovative energy sources



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**Recycling-
Reuse**

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Recycling-Reuse

➤ Develop metrics and infrastructure for effective resource management

- Quantify & promote dematerialization efforts underway within industry
- Increase information sharing between brand owners and electronics recyclers to increase reuse/recycling efficiencies & lower costs
- Prioritize product & packaging design features that will enable cost-effective, environmentally-responsible reuse/recycling, use data to influence emerging regulations and standards (Basel Convention, R2 guidelines, EPEAT, etc)

➤ Identify opportunities for post-industrial & post-consumer recycled content

- Quantify use of recycled content metals and plastics in “common” electronic components today, identify opportunities for further R&D



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Eco-Design

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Eco-Design

➤ Promote life cycle thinking

- Develop building block approach to LCAs in IT industry (iNEMI Eco-Impact Evaluator Project, in progress)
- Participate in international carbon footprint standards, particularly as they relate to product carbon footprint (PCF) labeling (ex: GHG Protocol)

➤ Encourage harmonization of green procurement standards in both B2B and B2C markets

- Prepare for revision to IEEE 1680 (EPEAT standard for PCs) and future EPEAT standards for printers, servers, etc
- Identify key requirements differences in regional green procurement standards, work towards global harmonization (ex: painted plastics)
- Address emerging retailer interest in sustainability “indexing” in EU, US

➤ Engage in international eco-design standards

- Existing ICT/CE Vertical IEC Standard 62075
- New Horizontal “Environmental Conscious Design” IEC Standard 62430





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Sustainability

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Sustainability Requires Balancing Competing Objectives

- **Environmental Regulations do not always lead to sustainability**
 - **Legislating the use of corn based ethanol in automobile fuels without considering environmental, social and economic impacts**
 - **Legislating the use of Compact Fluorescent Lamps without requiring the development of a recycling infrastructure for the mercury in the lamps.**

Sustainability

Electronics as solution to climate change

- Smart city planning
- Smart buildings
- Smart appliances
- Dematerialization
- Smart industry
- I-optimization
- Smart grid
- Integrated renewables
- Smart work
- Intelligent transport

Potential Impact: Reduction of 1 billion tons of Green House Gas emissions.



iNEMI Sustainability Summit

“The electronics industry must develop a strategic vision of sustainable electronics” iNEMI Board of Directors

- **iNEMI Sustainability Summit, September 22-23,2008 at Motorola, Schaumburg, Illinois, USA**
 - The motivation for the workshop was a recognition that the electronics industry should act strategically on environmental issues.
- **The goals of the workshop, breakout groups and action groups were to:**
 - Evaluate opportunities for industry collaboration on proactive environmental programs
 - Define academic research needs to support these programs
 - Stimulate funding for the necessary research
 - Form and execute the required industrial collaborative program
- **Speakers Represented:**
 - Intel, Cisco, Motorola, Alcatel-Lucent, Rohm and Hass; Purdue University, Arizona State University, Clean Production Action

Four Proposed Projects from Summit

- 1. Non-Competitive LCAs for ICT Products based on a building block approach using assembly emulators (Contact: Tom Okasinski at tokrasinski@alcatel-lucent.com or Todd Myers at Cisco)**
- 2. PVC Replacement Alternatives (Contact: Scott O'Connell at Scott_OConnell@Dell.com)**
 - LCA comparing PVC versus PVC-free cables
 - Technical evaluation of alternatives
- 3. Establish market for postconsumer plastics as feedstock for “Green” products (ex. Polycarbonate, ABS)**
- 4. Establish new electronic applications for postconsumer blended plastics (ex. housings for power supplies)**



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Conclusions

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Concluding Thoughts

- **New global environmental requirements continue to multiply – faster than industry can effectively respond**
- **Industry needs to be more proactive in developing solutions that:**
 - **Are based on science and engineering, delivering value to customers**
 - **Are available in advance of new regulations**
 - **Can influence future regulations and stakeholder groups for more sustainable results**
- **iNEMI and its members plan to play a significant role in preparing industry for these future needs.**
- **Sustainability will be a major undertaking for industry as well as society.**
- **Electronic solutions can help to empower people to live a more sustainable lifestyle**

www.inemi.org

Email contacts:

Bob Pfahl

bob.pfahl@inemi.org

Grace O'Malley-Europe

gomalley@inemi.org



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