



Electronics EPR

Issues and Opportunities

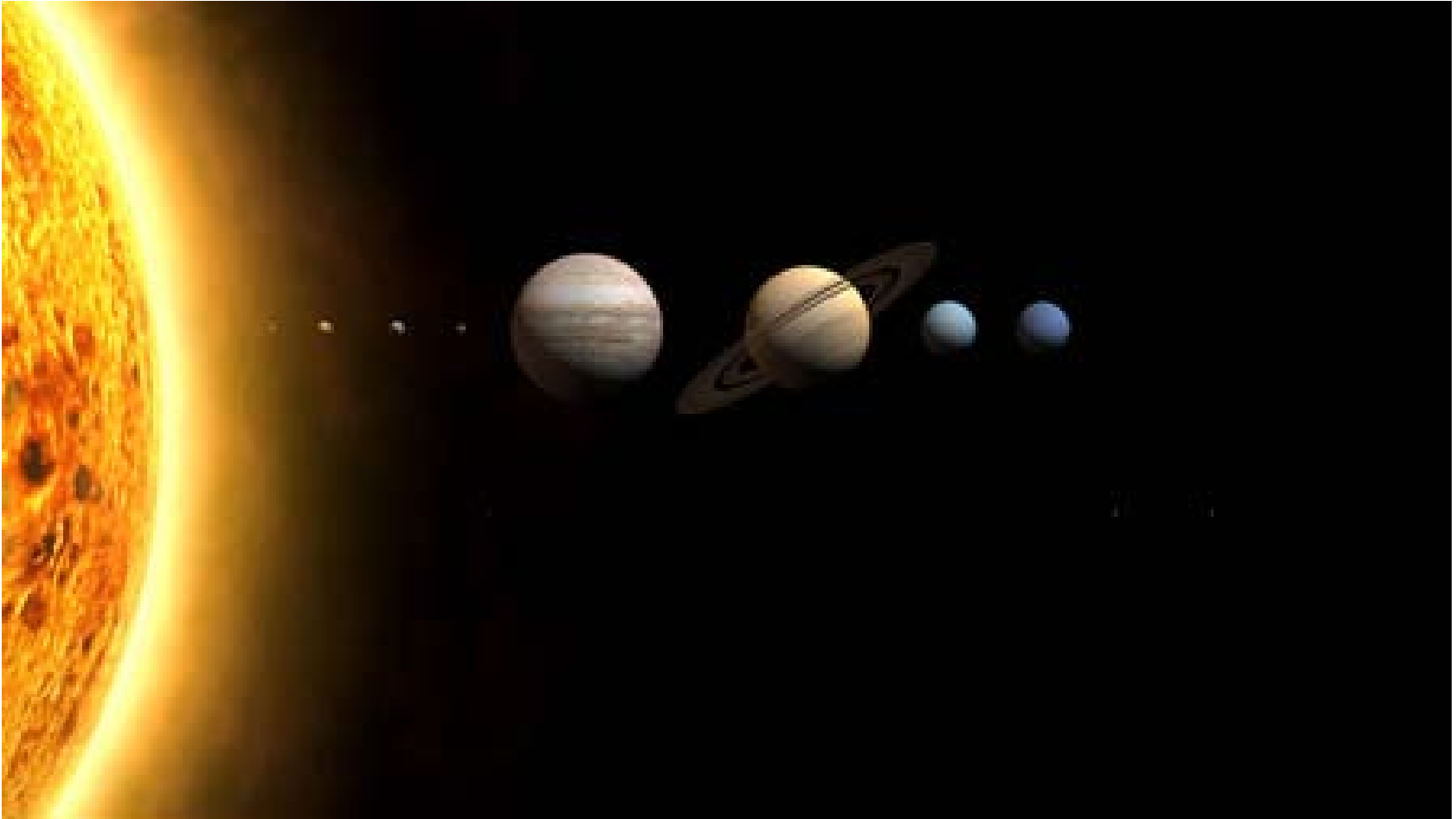
Presented to the Extended Producer Responsibility Roundtable:
Exploring Solutions for the Future

Haas School of Business, UC Berkeley, November 16, 2010

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- Disclaimer: Comments, Conclusions, Opinions are Those of the Analyst and NOT Necessarily Those of Pike Research. My Views Can be a Bit Aggressive. I'm an Advocate of CHANGE.
- It's OK to Disagree. We All have Different Perspectives. Solutions Come from Discussion and a Willingness to Consider AND Accept New Approaches and Change
- Diverse Group for Roundtable - Starting at the Million Mile Level
 - Quick Perspective and History
 - E-waste / EPR Today
 - The Paradigm Shift and
 - The Link Between EPR and Sustainability

We Live on the 3rd Rock from Our Sun Alone, Accountable and No Where To Go!



Beautiful from Space

BUT Upon Closer Inspection ...

We Have **NATIONAL** Political, Economic, Resource, Environmental, Cultural & Population Issues, But the **GLOBAL Solutions** to All of These Issues Will Determine IF the Ecosystem Survives. E-Waste is a Contributing Factor & Increasing – EPR is a Solution

2010 World
Population
6.9 Billion



2050 World
Population
9.1 Billion

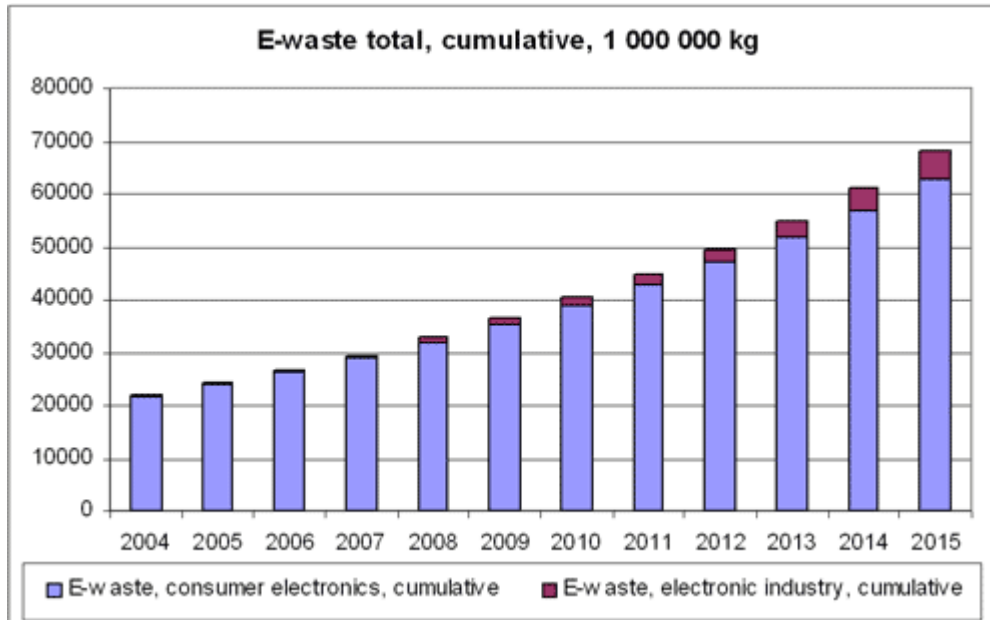
- Electronics Business Models are Based on Continuous, Short Term Sales Growth.
 - Time to Market
 - Feature Sets
 - Market Share and Profits Before Competitors can Respond
 - Stabilize Revenue by Contract with Significant Penalties for Early Exits
 - Mobile Phones – 3G to 4G to
 - Cable and Satellite TV, Internet and Phone Bundles
 - IT Asset Management and the ‘Refresh’ Cycle
 - Meet or Exceed Quarterly Analyst and Shareholder Expectations
- Marketing Encourages Upgrades, Leading Edge & ‘Get Ahead’ without Regard for Customer Needs or Capability
 - I type 3 words a minute with 2 errors. My old word processor with a 286 chip set sat idle 99.9% of the time. I’m incapable of fully utilizing a dual core chipset with a terabyte of RAM. But have you tried to buy a new, low-end, PC lately?

- Modern Business Models have Typically Ignored the Impact of Their Products when Consumers No Longer Want Them
 - Obviously there are exceptions
 - But, in General, Once a Sale was Made and the Profits Booked, Businesses Moved On
 - Few Asked the Question or Checked to See What was Happening to Their Products when Their Customers Moved On
 - Consumers have NOT Helped
 - Don't Want It, Broken etc. THROW IT AWAY
 - But IT doesn't Go Away – It is Being STORED in a Landfill
 - The Absence of Oxygen in a Modern Landfill is Preserving Our Discards
- **Issue: Exploitation Globally to Benefit Locally**
 - Focus on 'ME' [Inward] without Regard for 'US' [Global]
 - Low Labor Rates in Developing Countries, Lower Operating Costs
 - Fewer / Less Restrictive Environmental Mandates [EPA / OSHA]
- Documentaries and News Reports have Helped Bring Changes to Some Segments of the Global Economy [BAN in Electronics]

- The 3R's: Reuse and Recycling are Gaining Traction in Electronics, Especially Where Mandated. Reduce has NOT Yet Caught On
- Supply Chain Management to Environmental Standards is Improving
- However, the Consumer is NOT YET Engaged
 - Still Too EASY and Relatively INEXPENSIVE to Throw Stuff Away
 - Do NOT Believe it is THEIR RESPONSIBILITY to Do More Than Pitch the Stuff They Do Not Want
 - Typically Unwilling to Pay a Recycling Fee for Environmentally Appropriate Handling and Management
 - California's ARF – Customers Accept It, but it is NOT an Incentive and Now; Issues with Fraud and Out of State Payments are a Concern
 - Sponsored Collection Events are More Efficient - "Free To Me"
- **Electronics is a Bellwether Commodity**

Issue: E-Waste Volumes are Increasing

There are Opportunities to Make a Difference



Source Unknown, but Typical

- My Analysis 2 years ago Concluded E-Waste Volumes Would Stabilize and Begin to Decline in 2014-2015 Based on Assumptions about Legislation, the 3R's [Sustainability Initiatives] and Poverty Rates in Developing Countries
- Most Recent Projections Appear to be Based on Population Growth NOT PPP
 - Over $\frac{3}{4}$ of the World's Poor Reside in the Two Biggest Potential Markets [India & China]

E-Waste / Why EPR?

Consumer /Industrial Electronics & Appliances

- VOLUMES INCREASING, But COMPOSITION of E-Waste is the Problem
- The Basel Convention and it's Amendment
 - Bans the Export of Hazardous Wastes from OECD to non-OECD Countries
 - USA is the Largest Economy in the World and Has NOT Ratified
- E-Waste Management Began in the EU with the WEEE Directive and Their Concept of Producer Responsibility [Affects both Products and Packaging]
 - The Advance Recycling Fee [ARF] implemented in California is an Alternative
 - There are 22 States with PR based legislation, seven others are considering, UNFORTUNATELY for Everyone – They are all a Little DIFFERENT
 - Compliance for Producers is Unnecessarily MORE COMPLEX
- **OPPORTUNITY: Collaborate Across Industry Boundaries and Use Your Industry Associations to Lobby for A UNIFORM, NATIONWIDE EPR LAW**
- **OPPORTUNITY: Lobby for USA RATIFICATION of the Basel Convention and Amendment**

- Silica / Glass ~26%
- Plastics ~23%
- Ferrous Metals ~20%
- Aluminum ~14%
- Other [Non-Ferrous, Precious, Rare Earths] PLUS the Hazardous / Toxic Compounds of Concern ~17%

- Composition of Other Electronic Equipment is Similar

- **These are the RESOURCES We Should be Recovering and Conserving**

- Estimated Average E-Recycle Rates in OECD Countries 15-20%, [Depends on Who's Counting & Assumptions] - ROW <10%

E-Waste / Why EPR?

Toxic and Hazardous Materials in Electronic Products

- Mercury [lamps, switches etc.]
- Lead (in CRTs, older electronics still have tin-lead solder or SMOBC with HASL)
- Cadmium
- Beryllium
- Hexavalent Chromium [Cr VI]
- Antimony
- Brominated Fire Retardants [BFRs]
- Polyvinyl Chloride [PVC]
- PolyChlorinated Biphenyls [PCBs] and
- Batteries [old Ni-Cd and newer Lithium]

- There are other Exotic 'Chemical Compounds of Concern' Being Addressed by RoHS Amendments in the EU
 - The new 'Lead-Free' Solder Compounds MAY Have Lifecycle Impacts Worse than Tin-Lead

- Copper, Zinc and Other Compounds while not 'Toxic' per se have Recovery Value

- IF Landfill Leachate is an E-Waste Concern We Need to Divert It to Beneficial Reuse and Create Assurance of Supply for Recovery.
 - I'm Skeptical - in Modern Sanitary Landfills Because of the Daily Cover & Clay Cap Required at Closure
 - Old, Closed, Municipal Landfills Should be Superfund Sites
- **Opportunity: Nationwide Ban on Landfill Burial of Electronics and Electrical Equipment** [with Consumer, Asset Manager and Hauler Incentives to Divert]
- **Issue: Should E-waste be Classified as a RCRA Hazardous Waste?**
 - Would Make Export to Non-OECD Countries More Difficult
 - Should Provide for Reuse and Recycling as Alternatives to Burial
- **Opportunity: Require R2 or e-Stewards Certification in Your Supply Chain**

- NOT Working
 - Consumers NOT Engaged – No Cultural Incentive to Return Stuff [Conserve Resources] – Link to MONEY [PAYT]
 - TOO EASY to EXPORT E-Waste for Inappropriate Processing
 - Little Political Will, 'Capital' or Cooperation between the States and the Feds to Change the SOW
 - The Developing Countries are Behind in Environmental Management in General and E-waste in Particular

OECD Exports of E-waste Results in Revenue and Environmental Damage in Developing Countries

There is Significant LEAKAGE that Circumvents Proper Handling of E-Waste



From www.onlineafrica.net

- Tracking Systems ACROSS International Boundaries are Inadequate or Non-existent
- E-Waste Can Be Categorized as ‘Scrap’ to Avoid Higher Import Tariffs, Manifest Requirements and Auditing. ‘Don’t Ask / Don’t Tell’
- The ‘Secret Agents’ [Importers, Exporters, Brokers] are the E-waste Market Makers
 - Few, if any, Constraints – Follow the Money
 - Need More Controls for Customs Organizations at Ports of Export AND Entry
- There is Very Little, IF ANY, Political ‘Capital’ in Waste Management
 - BUT Solution ‘Metrics’ Should be in Terms of Domestic JOB CREATION

The Good Where We Need To Get



From www.cpmfg.com

The Bad

Billions of Mobile Phones Replaced Every Year



The Really Bad Open Dumps, Manual Processing



The Ugly Piles of E-Waste Accumulating



- EPR Places Primary Responsibility for End-of-Life Management of Products on the Manufacturers
- Product Stewardship has Evolved as a way of Re-allocating Costs of Collection and Recycling Away from Governments and Toward Producers
- Companies within the Electronics Sector have and will always Compete in the First Phases of a Product Lifecycle [Design / Features, Price, Distribution, Market Share]
- **Opportunity: Collaboration Across Sector Boundaries in the After-USE Phases of a Product Lifecycle [Collection, Transportation, Processing (Reuse, Recycle, Recovery) and Disposition of Residuals]**
 - Solutions must be Flexible, Transparent and have Accountability
 - Stakeholders Must Engage and Relax Some of Their ‘Sandbox’ Protections
 - Individual Producer Responsibility [‘I take care of mine’] is not as efficient

- Program Objectives Must be Clearly Understood by All Stakeholders
- Participate in ‘Solution Design’ and Measurement / Metrics – No ‘Arm Chair Quarterbacks’
- Decisions Made At Product Design Not Only Affect Product Cost and Performance, but Determine the Resource Recovery Efficiency After the Product is Returned by a Customer
- Preventing Inappropriate Movement and Processing of Products at End-of-Life Creates Local and Regional JOBS
- End-of-Life Costs are Incorporated into Cost of Sales Calculations
 - **Opportunity: Consider a Rebate Scheme [% of Sales Price?] based on an In-House Coupon Exchange [Staples model] AND Budget for one or more Local / Regional Collection Events [50+ Semi-loads to Clear Household Storage of Electronics] – SPONSOR WITH OTHER COMPANIES**

- Working
 - The EU Continues to Lead the World in E-Waste Management & Packaging Initiatives
 - The WEEE and RoHS Directives with Multiple Amendments and Reinventions
 - The US is SLOWLY Making Progress with EPR Legislation – One State at a Time. Now 22 with Seven Pending. Would be More Efficient IF there were National E-Waste Legislation
 - EPR Creates Transparency and Accountability When Consumers Return Electronics to a Producer **IF** R2 or e-Stewards Certification is Complete
 - California has Always been a Leader in Environmental Legislation
 - **Opportunity: The ARF system needs to be converted to an EPR system [consistency – help make EPR a uniform national system]**
 - **Issues: Dismantling the ARF infrastructure and conversion of ARF jobs into EPR / Resource Recovery Jobs**
- Not Working – Transboundary Shipments of E-waste to Non-OECD Countries

- Provide Producers with Incentives to Incorporate Changes in Product Design that Reduce Environmental Impacts
- Policies should Advocate Innovation and Specify the 'What', Not 'How'
- Use a Life Cycle Approach such that Environmental Impacts are Not Negatively Affected Somewhere Else in a Supply Chain
- Responsibilities and Accountabilities MUST be Well Defined
- Policy Attributes Should be Flexible – One Policy Doesn't Fit All Situations
- EPR Must be Communicated & Implemented Throughout the Supply Chain

- All Stakeholders Should be Involved in Goal and Objectives Setting & Identify Costs and Benefits as well as Risks and Negative Impacts
- Solicit Local Government Input on Operations and Logistics
- Both Voluntary and Mandatory Approaches Should be Considered that Best Meet the Specified Environmental Priorities, Goals and Objectives
- Complete a Comprehensive Characterization of Product Categories and Their BOMs
- Complete Periodic Reviews of EPR Programs and Advocate Transparency

- EPR is One Spoke in a Large Wheel of Changes Necessary to Create a Culture Based on Sustainability.
 - An Increasing Number of Fortune 500 Companies are Adopting Sustainable Practices and Requiring their Supply Chains to do the Same
 - HP and IBM have been a Leaders for Years – Not Saints [Skeletons, RCRA Rules]
 - Sony Recently had an RFP for E-waste Management Companies to Service Operations in the US and Mexico. One of the Requirements was Certification to R2® or e-Stewards®
 - Xerox is making progress on their stated goal of ‘Zero Waste’
 - Unfortunately the Further Away You Get from the Top 5 of the 500 in Consumer Electronics Related Categories the Sustainability Efforts are Minimal or Non-Existent
 - EPR is Applicable to EVERY Commercial / Business Sector, Irrespective of Size
 - A Cornerstone of the Transition to Sustainability
 - Keep Resources Out of Landfill, Do Not Incinerate for Energy [Ash NOT as Reusable]
 - Creates Jobs in Every Country, Be Accountable for Resource Recovery of the Stuff You Consume

Extended Producer Responsibility [EPR] A Critical Component of a Sustainable Future

- **Sustainability REQUIRES a Paradigm Shift**
 - New / Different Business Models
 - Conservation of Non-Renewable Resources - Less Extraction
 - **Opportunity: Develop SHORTER Cross-Boundary Re-Supply Chains with REGIONAL Processing Capability**
 - Precious Metals Recovery from Electronics Pays for the Bulk of Metals Recycling – Transportation Distance / Cost and Commodity Value of Other Reclaimed Materials are Issues – They are Undervalued when Lifecycles are Characterized
 - Enhanced Supply Chain Management – ALL Levels are Sustaining, Recycle Rates > 95%

Extended Producer Responsibility [EPR] A Critical Component of a Sustainable Future

- Sustainability **REQUIRES** a Paradigm Shift
 - **Opportunity: Landfills Converted to MRFs**
 - Near Population Centers, Already Permitted, Reduced Impact of Transporting Materials Long Distances [Larimer Co to Denver], Creates Jobs
 - **Opportunity: US EPA Funding Research into Mining Closed Landfills WITHOUT Exploding Methane Pockets**
 - **Opportunity: Source Separation by Generators / Consumers**
 - PAYT: Municipal Curbside and MRF Gate Fees Triple for 'No-Effort Trash'
 - Source Separated Resource Recovery is FREE
 - **Opportunity: Enterprise Zones Near Local MRFs for New Product Development and Distribution**

Attributes of a Sustainable Business Model

Dr. Sally Uren, CEO, Forum for the Future

- Traditional Business Models Driven Purely by Profit and Short Term Planning, without Regard for Environmental Impact or Recognition of the Social Value of Goods and Services, will Not Prosper in a Sustainable Culture
- Moving to a Sustainable Business Model will Require a Wholesale Transformation of How a Business does Business
- Transitioning to a Sustainable Business Model will Take Time, Dismantling of ‘Sandboxes’ and Changing the ‘Same Old Way’
- Get Your Stakeholders Involved. Stock Analysts and Shareholders will also need to be Retrained to Think about Business Success in Different Terms

- Dr. Uren Proposes Seven Ways that Businesses can BEGIN the Transition Toward a Sustainable Business Model
 - 1. Experiment with New Financing Mechanisms by Creating a Sustainable Innovation or Investment Fund
 - A Pot of Money Held Centrally that Funds Development of New Ideas
 - 2. Strategically Plan to Profit from Sustainability – it is NOT an Operating Cost
 - Sustainability is an Investment that will Yield Financial Benefits to the Business
 - 3. Integrate Sustainability into the Core Values of the Business
 - Sustainability is NOT ‘just another program’, Reward Successes, Manage Change

- Dr. Uren Proposes Seven Ways that Businesses can BEGIN the Transition Toward a Sustainable Business Model
 - 4. The Business' Value Proposition Must Change – Equate Quality with Things Other than Volume and Consumption
 - Sustainability is Ethical Manufacturing, Efficiently Used and Reusable or Recyclable
 - 5. Start to Shift Your Product Portfolio, Promote Increasingly Sustainable Products and Stop Selling Unsustainable Products [Worst Offenders First]
 - 6. Identify the Significant Transformational Changes that **MUST** be Made
 - Create a Roadmap, Identify Critical and Major Milestones – NO Baby Steps Allowed
 - 7. Encourage and Reward INNOVATION Everywhere, from Product Design to Packaging, Service Delivery, Marketing and Communications

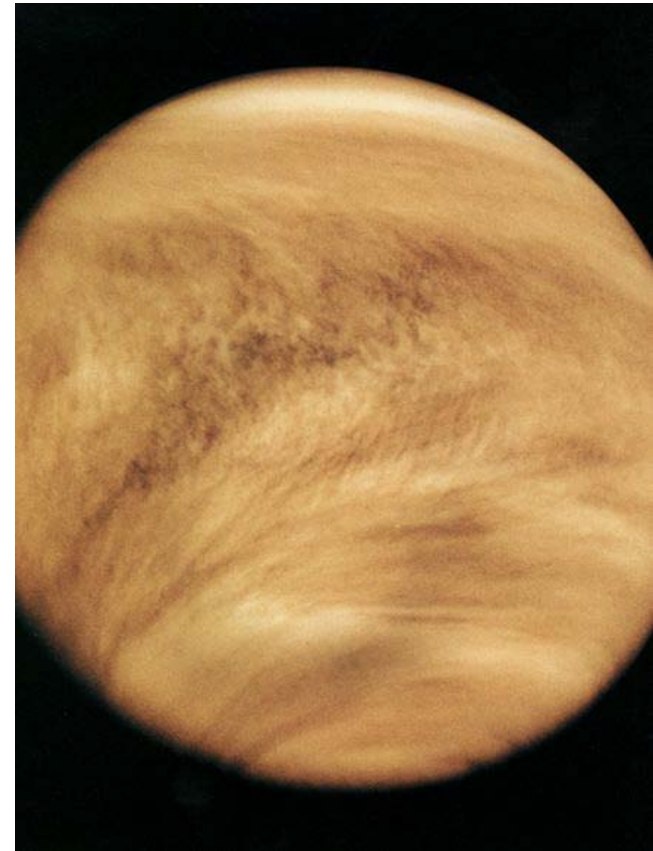
Extended Producer Responsibility [EPR] A Critical Component of a Sustainable Future

- A Sustainable Product Lifecycle is the OPPOSITE of Today's Lifecycles
 - Multi-year Form Factor Commitments
 - Modular Designs – Upgrade the Sub-Assemblies
 - Longevity vs. Planned Obsolescence
- The Term 'End-of-Life' is Misleading. In a Sustainable Global Economy there are ONLY Continuous Cycles of Resource Recovery
- Sustainable Consumption – Do More With Less [Reduce], Reuse, Recover and Repeat
- **This Roundtable has the Opportunity to Make History – Become Advocates for EPR, A Sustainable Culture and Cross-Boundary Solutions**

What IF VENUS was Like Earth at One Time Venus' Atmosphere is Now CO2 with Little H2O

Sustainable vs. Consumptive

Where is the Cliff? Change Takes Time, the Clock is Ticking



THANK YOU!

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