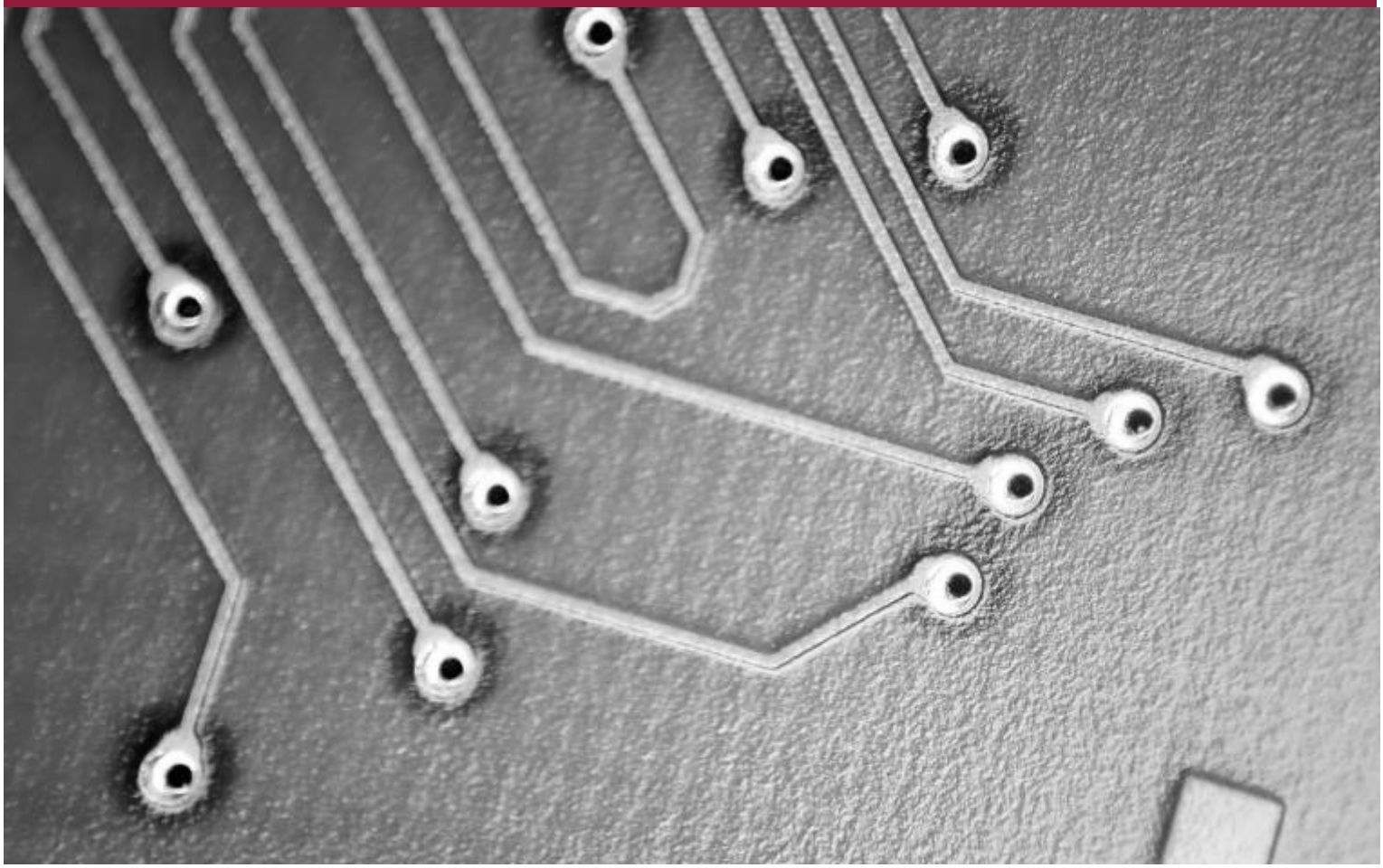
A Practical Approach to Greening the Electronics Supply Chain

Results from the 2009 EICC “Carbon Reporting System” Pilot Initiative

June 2010



BSR

www.bsr.org

EICC
Electronic Industry Citizenship Coalition

www.eicc.info

About This Report

This report was commissioned by the Electronic Industry Citizenship Coalition (EICC) and written by Betsy Fargo and Danica MacAvoy of Business for Social Responsibility (BSR) Advisory Services team. The report is based on the EICC's Environmental Sustainability Work Group work in collaboration with BSR on the Carbon Reporting System. Throughout 2008-2009, the work included a literature review on the Carbon footprinting, review of software vendors, and information provided by members. In addition, BSR conducted independent analysis of company submissions to the EICC Carbon Reporting System in 2009.

The authors would like to recognize the co-leads of the EICC Environmental Sustainability Work Group, Marsha Ali of Nvidia, Jay Celorie of Hewlett-Packard, and past co-lead Ted Reichelt of Intel who were instrumental in championing this work for the EICC. The authors would also like to thank the EICC Environmental Sustainability Work Group and other participating companies for contributing their feedback on the Carbon Reporting System, their time in submitting data, and their review of this report for accuracy. Any errors or inaccuracies that remain are those of the authors alone. Please direct comments or questions to Betsy Fargo at bfargo@bsr.org and Wendy Dittmer at wdittmer@eicc.info.

DISCLAIMER

The EICC and BSR publish occasional papers as a contribution to the understanding of the role of business in society and the trends related to corporate social responsibility and responsible business practices. BSR maintains a policy of not acting as representative of its membership, nor does it endorse specific policies or standards. The views expressed in this publication are those of its authors.

ABOUT BSR

A leader in corporate responsibility since 1992, BSR works with its global network of more than 250 member companies to develop sustainable business strategies and solutions through consulting, research, and cross-sector collaboration. With offices in Asia, Europe, and North America, BSR uses its expertise in the environment, human rights, economic development, and governance and accountability to guide global companies toward creating a more just and sustainable world. Visit www.bsr.org for more information.

ABOUT THE EICC

The EICC was established in 2004 to improve social, economic, and environmental conditions in the global electronics supply chain through use of a standardized code of conduct. The EICC was incorporated in 2007 as an association to ensure greater awareness of the Code, and to expand its adoption across the industry. Through the application of shared standards, the EICC believes in better social, economic, and environmental outcomes for all involved in the electronics supply chain. The EICC includes over 45 global electronics companies. For more information or to view the EICC Code of Conduct, see www.eicc.info.

Contents

Executive Summary

Climate change and the increasing demand for energy are systemic challenges that require systemic solutions. These challenges cannot be addressed by one company or country alone. They require maximizing the power of supply chain networks—the web of business relationships and interdependencies that exist in order to bring products to market.

Complex business networks are the heart of the electronic industry, wherein a company can simultaneously be a supplier, customer, competitor, and collaborator with another. It is through these networks that the Electronic Industry Citizenship Coalition (EICC) believes there is significant opportunity to take a systemic approach to the pressing environmental challenges of today.

The electronic industry is estimated to contribute two percent of global greenhouse gas (GHG) emissions[1]—called here "carbon" in shorthand. While that sounds like a small contribution, it's substantial when considering that the industry's emissions are projected to double by 2020. These emissions stem primarily from energy consumed during product manufacturing and consumer use. Energy efficiency in manufacturing is a key concern, as the threat of emissions regulation increases and energy prices continue to fluctuate with rising energy demand. It is also important to note that the electronics industry is being looked to as a solutions provider—offering technology that enables others to reduce their environmental impact—and must manage emissions from product manufacturing in order to talk credibly about the environmental benefits of products. Given these factors, the potential cost of not taking action to address the "two percent" far outweighs the cost and effort required to take action.

In 2009, the EICC set out to measure GHG emissions and energy consumption in the electronics supply chain. Gathering emissions and energy data across the thousands of companies in the electronics industry was not insignificant and demanded a practical, scalable approach. A handful of organizations, including the Carbon Disclosure Project (CDP), World Resource Institute and World Business Council for Sustainable Development (through their work on the Greenhouse Gas Protocol) were concurrently embarking on developing an approach. While groundwork was being laid by these organizations, the field of GHG accounting in supply chains lacked a proven, practical and standardized approach.

Thus, the EICC developed the Carbon Reporting System—a straight-forward process for directly engaging companies in the electronics supply chain to submit enterprise GHG emissions data into a central online repository. Access controls were setup in the repository such that suppliers could share their data with their enterprise customers. As a result of the data submission and reporting process,

Participating Companies

- Applied Materials
- EMC[2]
- Hewlett Packard
- Hitachi Global Storage Technologies
- Jabil
- Lenovo
- LSI
- NVIDIA
- Philips
- Sony
- Sun Microsystems
- Xerox

[1] McKinsey Quarterly, "How IT Can Cut Carbon Emissions," 2008.

suppliers were more aware of how to measure GHG emissions, customers have increased visibility into their suppliers' emissions, and suppliers saved time by sharing their data with multiple customers simultaneously through the tool. Armed with this information, customers have a clearer picture of risks in their supply chain and are in a better position to work with suppliers on emissions reduction activities.

The EICC also saw the need to invest in increasing supplier understanding of how to measure GHG emissions. Accordingly, training materials and webinars were made available to customers and suppliers. The System also provided an online calculator that estimated emissions based on a supplier's raw data from its facilities and globally recognized GHG emissions accounting standards, including the Greenhouse Gas Protocol.

Twelve companies piloted the EICC System in 2009. These companies collectively requested more than 280 of their suppliers complete a brief questionnaire. This survey collected data on annual GHG emissions and energy consumption (including renewable energy), and emissions management practices.

Of those suppliers contacted, 26 percent responded. Analysis of the responses revealed several key takeaways:

- There are large gaps in supplier data sets
- Repeated requests for a supplier's data increase the likelihood of a response
- Emissions and energy data needs qualitative explanation; numbers alone do not paint a clear picture
- Emissions and energy data needs to be reported in both absolute and normalized terms

The pilot also uncovered several challenges. Participant feedback following the pilot indicated that:

- The System's online interface was not intuitive, too complicated, and was a barrier to responding.
- Multilingual interface and support is critical to increasing the response rate, since the majority of suppliers contacted were located in non-English speaking countries
- Additional training is needed to increase supplier knowledge and awareness of how to measure GHG emissions

Learning from these challenges, the EICC plans to revise and expand the Carbon Reporting System to gather more carbon emissions data from customers and suppliers in 2010. This will likely entail changes to our outreach strategy, processes, and support provided to suppliers.

In addition, the EICC will use its experience to influence the landscape of emerging standards for GHG accounting in supply chains. For example, the EICC submitted a case study to the GHG Protocol Scope 3 Initiative outlining lessons learned and recommendations for the Scope 3 supply chain guidance.

While there is much more work to achieve increased standardization in approaches, improved reporting on GHG emissions across the supply chain, and more collaboration around emissions reduction activities, the EICC is pleased to reflect on its first step toward a systemic response to climate change and energy demand in the global electronics industry.

Context: Responding to a Global Challenge

Global greenhouse gas (GHG) emissions increased by 24 percent between 1990 and 2004.[2] As government, investors, and business are grappling with climate change projections, the need for a supply chain–based approach to emissions and energy management becomes more evident.

The Need for Action

There is general agreement that the increasing concentrations of GHG in the atmosphere, resulting from human activity, pose a threat to the environment, economy, and society at large. The U.S. Energy Information Administration has projected total global CO_2 emissions will increase 39 percent from 2006 to 2030, assuming no further policies to reduce emissions.[3]

Much of the increase in CO_2 emissions stems from an increase in energy demand. In the United States, for example, 81 percent of 2008 CO_2 emissions stemmed from energy use.[4] Barring no government intervention, the International Energy Agency has forecasted that global energy consumption will increase 40 percent between 2007 and 2030, with more than half of the increase attributed to China and India alone.[5]

With rising consumption of carbon-intensive fuel comes rising CO_2 emissions. Eighty-six percent of the global energy supply in 2006 was generated from fossil fuels.[6] Low-carbon alternatives such as

---

[2] Intergovernmental Panel on Climate Change, "Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change," 2007.
[3] U.S. Energy Information Administration, "International Energy Outlook 2009," 2008.
[4] U.S. Energy Information Administration, "Emissions of Greenhouse Gases Report," Dec 2009.
[5] International Energy Agency, "World Energy Outlook 2009," 2009.
[6] U.S. Energy Information Administration, "International Energy Annual 2006," 2008.

Brown Outs in China

China is home to one of the largest concentrations of manufacturers in the electronics industry. It is also facing severe energy resource shortages. Despite aggressive efforts to increase energy production, brown outs have occurred with some regularity since 2002. In the summers of 2003-2005, China rationed energy and limited production in industrial areas, forcing factories to cut production, operate only at night and weekends, or buy diesel generators, all of which has an impact on manufacturing costs. Some factors causing the shortage?

- **Surging demand.** Between 2000 and 2006, China's electricity generation more than doubled to keep up with demand.
- **Energy inefficiency.** China ranks 43rd in energy efficiency as measured by energy intensity (energy consumption compared to GDP)

Sources: U.S. Energy Information Administration, July 2009; Energy Efficiency and Productivity of China: Compared with Other Countries (Xu, X.P. and Liang, L.)

nuclear, wind, solar, hydroelectric, and geothermal power have yet to reach a scale where they can reliably meet the world's energy needs.

Climate change and CO_2 emissions aside, increasing energy demand poses financial risks for any business. As the energy supply is further strained, the price and reliability of energy becomes more uncertain. Potential carbon regulation and carbon trading schemes could make fossil fuel–based energy a costly and unsustainable power source, while investments in low-carbon energy and energy efficient practices become a competitive advantage. The International Energy Agency, for instance, assumes energy prices will follow a rising trend through to 2030. They also expect oil prices to rise as a result of tightening international oil markets.[7] In addition, there is risk of energy supply not keeping pace with demand in regions where demand has surged.

Stakeholder Pressure

Scientists, investors, and governmental organizations alike are calling for action. While detailed projections on the impacts of climate change are imprecise and evolving, the risk of not acting is far greater than that of acting.

The Kyoto Protocol has been signed by 34 countries, and is expected to be replaced in 2012 by an even more aggressive global commitment, which is currently in draft state as the Copenhagen Accord. At the time of this report's publication, 123 countries have submitted plans to the UN Framework Convention on Climate Change (UNFCCC) for reducing GHG emissions, including 41 countries that have committed to a specific emissions reduction target for 2020.[8] In addition, dozens of regions have implemented climate regulation (such as California's Assembly Bill 32), supported carbon trading schemes, or implemented voluntary initiatives to promote energy-efficiency. In 2009 alone, several countries committed over US$1 billion each to support "green" programs.

The potential impact of increasing GHG emissions on a company's bottom line are now a key concern of many mainstream financial firms and institutional investors. The Carbon Disclosure Project (CDP), an independent nonprofit organization that collects GHG emissions data from the world's largest corporations on behalf of institutional investors, had more than 475 signatories in 2009, up from roughly 300 investors in 2007. A 2009 survey of signatory investors to the CDP revealed a general consensus that the significance of climate change in investment decisions has been increasing and will continue to do so.[9]

The increasing interest and concern among investors is also exemplified by a significant increase in shareholder resolutions related to climate change. In the 2010 proxy season, U.S. investors filed a record 95 shareholder resolutions related to climate change, up 40 percent over 2009.[10] Moreover, the U.S. SEC had mandated annual GHG emissions reporting for publicly held U.S. based companies whose emissions are over a certain threshold.

---

[7] International Energy Agency, "World Energy Outlook 2009," 2009.
[8] UN FCCC, Apr 2010.
[9] Mercer, "Investor Research Project—Investor Use of CDP Data," 2009.
[10] Ceres, "Investors File a Record 95 Climate Change Resolutions: a 40% Increase Over 2009 Proxy Season," March 2010.

International Green Stimulus: Amount Allocated to Green Measures in 2009

Country	*US$ billions*
China	$221.3
United States	$112.3
South Korea	$30.7
EU	$22.9
Germany	$13.8
Japan	$12.4
France	$7.1
Canada	$2.6
Australia	$2.5
United Kingdom	$2.1

Source: Financial Times, "The Greenest Bail-out", 2009

While brands and multinational companies likely feel the greatest direct pressure from government, investors, and NGOs, companies in a supply chain are not exempt. Enterprise customers and consumers are increasingly extending the pressure into product supply chains. Walmart, for example, announced a sustainability index initiative in 2009, wherein their 100,000 global suppliers are being asked to provide energy and climate data, among other things.

In times of uncertainty, it is often difficult for a company to make a business case for action. With the issue of climate change, however, one thing is quickly becoming clear: it is a pervasive issues that could touch many aspects of a business, whether through regulation, investor pressure, customers and consumer pressure, or energy prices.

The Role of Supply Chains

The complexity and scale of the global climate change challenge demand a collaborative response. Supply chains are a key focus area for addressing climate change and rising energy demand. A supply chain–based approach to energy management is critical for several reasons:

First, at an individual company level, a company's total climate impact is more likely to come from its supply chain than from its owned operations. Forty to 60 percent of the total carbon footprint of high-tech companies, makers of consumer goods, and other original equipment manufacturers (OEMs) likely resides in their supply chain.[11] From a risk mitigation perspective, the impact of a company managing and reducing its direct emissions is moot if its suppliers are not doing the same. Thus, a company that wants to meaningfully respond to the risks associated with climate change and energy consumption must consider its supply chain.

Second, at an industry level, climate change could change market dynamics. Whatever affects one link in an industry supply chain, affects the industry at large. In the ICT industry in particular, the interdependency of companies couldn't be more evident and demands a collaborative approach. "Nodes" in the ICT supply chain cannot be clearly defined due to the networked nature of supply chain relationships. It is common for an ICT company to be a supplier, peer, *and* customer to another ICT company. Thus, minimizing climate risk for any one company in the industry requires working across the network of relationships.

Third, at a global level, supply chains play a critical role in achieving national and supranational reduction targets. Supply chains cut across national borders. In order for the top global emitters (such as China and the United States) to reduce emissions, they must look at the issue through the lens of global supply chains and supply-demand models. Sourcing decisions and leverage in a supply chain are critical levers for driving practical, large-scale emissions reductions.

Fourth, supply chains are an opportunity to make a practical and tangible impact *immediately*. Unlike a regulatory approach to climate change, which can take years to effect, a supply chain–approach can be implemented immediately. By engaging directly with suppliers, companies can gain visibility into energy management practices, increase suppliers' accountability for year-over-year performance, and ultimately drive measurable improvements in energy efficiency.

[11] McKinsey Quarterly, "Climate Change and Supply Chain Management," 2008.

This is a powerful opportunity to stimulate innovation in industry as well as reduce operational/manufacturing costs.

A Call for Leadership

The EICC is not the only member of the business community recognizing the need for action for measuring and managing carbon emissions. Under the United Nations Global Compact, 30 business leaders have challenged the business community to take "practical actions to increase the efficiency of energy usage and to reduce the carbon burden of products, services, and processes, to set voluntary targets for doing so, and to report publicly on the achievement of those targets annually."[12]

There are currently a handful of initiatives underway that recognize a supply-chain based response. These initiatives represent a mixture of activities and focus areas, including: emissions accounting, goal setting, and reporting on impacts. A few of the most significant initiatives are summarized on the following page.

These initiatives are a step in the right direction as they all reflect an approach that looks beyond an organization's direct impacts to a broader network and related activities. At the same time, their scope of application is somewhat limited. Thus, for business to meet the challenge that's been outlined, further leadership is needed.

[12] UN Global Compact, "Caring for Climate: The Business Leadership Platform," 2007.

Initiatives Focused on Climate and Supply Chains

Initiative	Description	Scope of Application
WRI / WBCSD Greenhouse Gas Protocol: Scope 3 Initiative	Guidelines for how to account for Scope 3 GHG emissions. Currently in draft form, the guidelines take an LCA-based approach to estimating emissions from supply chain and product use.	Requires LCA and uses macro-economic assumptions for estimating emissions. This method is difficult to apply to complex products and not useful for tracking emissions reductions as a result of operational improvements.
PAS 2050	Standard for measuring embedded emissions in products, reflecting emissions across a product's lifecycle.	Requires LCA and uses macro-economic assumptions for estimating emissions. This method is difficult to apply to complex products and not useful for tracking emissions reductions as a result of operational improvements.
ISO 14064, 14065	Specification for quantifying and reporting GHG emissions and removals for organizations, as well as guidance for validation and verification bodies to accredit GHG emissions inventories.	Focused on a company's owned operations; no guidance for supply chain carbon accounting.
Carbon Disclosure Project Supply Chain Program	Questionnaire issued to the key suppliers of large multinational corporations to gather information on climate risk management for investors.	Questionnaire is written on behalf of investors, and as a result, emphasizes transparency around financial risks rather than opportunities for operational improvements.
MIT Environmental Assessment and Benchmarking of ICT Products	Assessment scheme for ICT products that takes into account embedded emissions and other environmental metrics. The scheme is currently in draft form.	Unclear what guidance will be provided to quantify embedded emissions, although it is likely to require LCA and use macro-economic assumptions for emissions.
iNEMI Eco-Impact Evaluator Project	Process-sum based LCA methodology to provide a simplified means for calculating the significant environmental impacts of a particular product type over its life cycle stages. The framework is in draft form and is in pilot stages.	Focused on a product-based LCA. It will initially account for CO_2 emissions and will expand in the future to include water use and other environmental impacts.
World Semiconductor Council and Semiconductor Industry Association Reporting Program	Tracking system for PFC emissions, energy use, water use and waste in semiconductor manufacturing	Applicable to semiconductor manufacturers. Includes quantitative targets for energy, PFCs, water, and waste.
Climate Leaders	Guidelines provided by the U.S. Environmental Protection Agency on emissions accounting for organizations.	Focused on a company's owned operations, and limited to U.S. companies.
Climate Savers	Initiative of the World Wildlife Fund to promote emissions accounting and adoption of reduction goals.	Focused on a company's owned operations.

The ICT Industry's Response: A Practical Approach to Carbon Management

Many industries and government leaders are turning to the information and communication technology (ICT) industry to provide solutions for transitioning to a low-carbon economy. The ICT industry has the potential to develop and apply technologies that abate GHG emissions in other sectors and reduce annual global emissions by 15 percent by 2020.[13]

ICT-enabled GHG emissions abatement by 2020

Source: The Climate Group, GeSI, "Smart 2020: Enabling the Low Carbon Economy in the Information Age," 2008.

"Although the electronics sector only accounts for two percent of global greenhouse gas emissions, proactively managing our own emissions reduces operational expense, helps establish a methodology for other industries to consider, and is the right thing to do."

Ted Reichelt
Intel Corporation

Key opportunities lie in logistics, facilities, manufacturing, and power supply. For example, technology could play a key role in increasing efficiency in power transmission and distribution, reducing a facility's power consumption by managing heat and air systems dynamically. Technology additionally can help reduce fuel used in shipping through providing efficient, real-time routing information.

As the ICT industry is being looked to as a solutions provider, it must also consider its own direct impacts on climate change in order to talk credibly about emissions reductions. The manufacturing and use of electronic products, including computers, data centers, mobile phones, and telecommunications networks, currently accounts for two percent of global atmospheric emissions.[14] By 2020, its emissions are projected to double and account for three percent of global emissions today.[15]

Direct emissions from the ICT industry, while small relative to the industry's potential to reduce global emissions, cannot be ignored. The majority of emissions in the upstream and downstream ICT supply chain are tied to energy consumption. This includes energy consumed during product use, as well as

[13] The Climate Group, "Smart 2020: Enabling the Low Carbon Economy in the Information Age," 2008.
[14] McKinsey Quarterly, "How IT Can Cut Carbon Emissions," 2008.
[15] Ibid.

energy consumed to manufacture, transport, and store the product before it reaches a consumer.

ICT companies are limited in their ability to reduce the energy impacts associated with product use. Beyond designing products for energy efficiency, companies often have very little ability to change consumers' product use habits. The ICT supply chain, however, presents a clear opportunity to reduce the industry's impact.

About the ICT Supply Chain

The supply chain for any given electronics product can include hundreds of companies. This is primarily due to the complex nature of electronic products. Unlike a garment (e.g., shirt), an average laptop computer consists of hundreds of individual parts that must be sourced and assembled according to precise specifications. These parts come from all over the world. The following illustrative supply chain map gives an indication of the complex web of relationships involved in the ICT supply chain.

Simplified Supply Chain Map for an OEM

It is important to note that a significant portion of the ICT supply chain resides in developing countries where environmental impacts, such as GHG emissions, are particularly concerning to stakeholders. Non-OECD countries, for example,

account for 90 percent of the projected increase in energy demand between 2008 and 2030.[16]

The EICC's Validated Audit Process, which detects overlap in the manufacturing supply base of OEMs (or "brands") and contract manufacturers, has consistently found the greatest number of major, direct suppliers to EICC members to be in China. China also represents one of the most GHG intense economies in the world. Cutting energy waste in China could reduce global energy demand by five percent.[17]

Thus, addressing climate change and energy consumption in the ICT industry requires collaboration across vast supply chain networks, particularly in developing countries where environmental impacts are potentially greatest and the supply chain has a significant presence.

The EICC Carbon Reporting System

Since its inception in 2004, the EICC has demonstrated a commitment to improving social and environmental conditions in the electronics industry. With over five years of experience collaborating around a common Code of Conduct and supplier engagement model, the EICC turned to the supply chain to address the challenge of climate change and rising energy consumption.

"Hewlett-Packard views this system as valuable because it supports standardized, consistent, comparable, scalable and reliable reporting among suppliers to advance transparency and accountability across the industry."

Jay Celorie
Hewlett-Packard

The EICC envisions a world where standardized emissions data is easily, efficiently, and accurately passed between companies up and down the supply chain, thereby increasing transparency around climate risks and spurring business-to-business collaborations on emissions improvement.

To that end, the EICC partnered with BSR in 2008 to develop a standardized system for ICT companies to measure and report carbon emissions and energy data across the supply chain. Over the course of 12 months, the EICC and BSR conducted desk-based research and interviews with industry and climate experts to assess the state of carbon measurement and reporting in the ICT sector, leading practices, and third-party standards and initiatives. Based on this work, BSR led the EICC through a consensus-based process to design and develop the EICC Carbon Reporting System.

OBJECTIVES
EICC set out to design a system to spur global action on energy measurement and management. Specifically, the EICC aimed to design a system that would:

- Increase transparency of carbon and energy data in the ICT supply chain by providing a standard, open, and verifiable method for sharing data among companies.
- Increase efficiency for sharing data by eliminating redundant or conflicting requests for carbon and energy data.
- Empower companies in the supply chain to measure their carbon and energy impacts and risks.
- Create actionable information by focusing on measurable facility and enterprise data that reveals potential improvement opportunities.

[16] International Energy Agency, "World Energy Outlook 2009," 2009.
[17] McKinsey, "Curbing Global Energy Demand Growth: The Energy Productivity Opportunity," 2007.

» Increase awareness of the risks associated with weak carbon and energy management.

» Expand data collection to include other environmental impacts, such as water use, waste generation, and recycling.

"NVIDIA is a fabless semiconductor company that collaborates with its suppliers to manufacture products. It is important for us to support joint industry initiatives that provide suppliers with the tools to become more efficient in their energy and water usage at a factory level."

Marsha Ali
NVIDIA

These objectives reflect the EICC's belief that what gets measured gets managed. Thus, while the system's immediate objectives were gathering data and increasing transparency, the EICC ultimately strives to inspire practical improvements and investments in energy efficiency.

ASSUMPTIONS

In developing the Carbon Reporting System, the EICC agreed on several common definitions and assumptions.

First and foremost, the EICC recognized "supply chain emissions" as the emissions associated with creating a product, including the emissions associated with manufacturing, transportation, and storage but *not* those associated with product use. To calculate supply chain emissions, we believe that each company can asks its direct, or "Tier 1," suppliers to report emissions, and its direct suppliers can ask their direct suppliers to report emissions, and so on throughout the supply chain, enabling the EICC to eventually calculate and report on manufacturing emissions across the entire supply chain.

Secondly, the EICC believes that gathering observed emissions data (or data measured based on annual energy and fuel consumption) will improve performance. This belief stands in contrast to the other common way of studying supply chain emissions: an approach based on a life cycle analysis (LCA) or economic input-output (EIO) assessment of a product that leverages modeled, rather than observed data. LCA-based approaches are useful for identifying major emissions or energy hot spots in a product's life cycle, but improving performance requires direct engagement with suppliers at a facility level. In particular, an approach based on gathering observed data provides the following advantages:

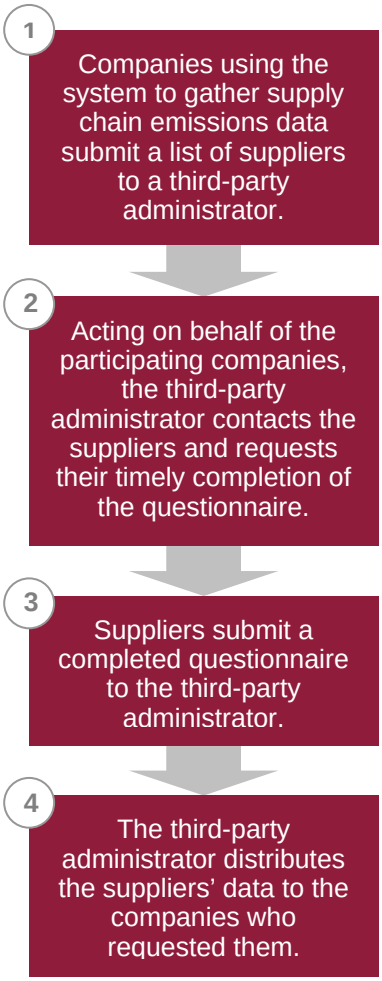
» *Data accuracy.* Data based on actual energy and fuel consumption at a facility -level reflects unique operating conditions, including efforts to increase energy efficiency or changes in the energy mix powering a facility. Also, it minimizes the need to use modeled data based on macroeconomic assumptions.

» *Applicability across product line.* An approach based on supplier engagement enables a company to identify carbon and energy risks that cut across product lines, as opposed to being product-specific. Since ICT companies can have thousands of product lines, this approach can be more efficient for managing carbon and energy risks as well as identifying opportunities to reduce costs.

» *Supplier ownership.* By putting measurement into the hands of the supplier, the system creates incentives for the supplier to become more aware and improve carbon and energy efficiency while reducing operating costs. While skilled experts can use secondary data to model cradle-to-grave emissions and identify hot spots, the use of models does not enable nor encourage suppliers to become aware of their emissions or strive for operational improvements.

» *Propagation.* This method can spread to multiple tiers of suppliers, eliminating the need for subjective boundaries.

Carbon Reporting System: How It Works



SYSTEM DESIGN

Based on the objectives for the System, the EICC designed the Carbon Reporting System around two key components:

1. *Enterprise Reporting Questionnaire.* A required, standardized questionnaire for reporting relevant emissions data.
2. *Emissions Calculator.* An optional, easy-to-use tool for calculating a company's emissions based on facility-level energy and fuel consumption data. The calculator is consistent with the approach outlined by the Greenhouse Gas Protocol Corporate Accounting Standard.

For both components, the EICC's top priority was to make it easy for companies to participate and respond. As a result, the EICC intentionally focused the questionnaire on gathering only the most relevant and useful data, avoiding unnecessary questions. The EICC also invested in providing the best-available emissions factors and unit conversions so that companies who were new to carbon footprinting would be successful. This had the added benefit of ensuring companies new to carbon footprinting were following generally accepted protocols and emissions calculations.

To encourage widespread participation, companies were invited to complete the questionnaire even if they had incomplete or uncertain results, provided that they estimate how complete their data is and how confident they feel about it. Such disclosure encourages continuous improvement in data quality and comprehensiveness, and gives context to business customers that analyze and use the data to attribute emissions.

The EICC designed a process for gathering data on an annual basis. The process was designed to leverage a third party to aggregate supplier lists and detect overlap. The third party asks a supplier once, rather than multiple times, to complete the questionnaire and satisfy their enterprise customers' requests for emissions data. A third party was deemed necessary to protect the commercial sensitivity of customer-supplier relationships.

In the end, the system was designed to serve both as a resource companies can use to track their own data, as well as a tool they can use to report data to business customers. As the system is used by more companies, the standardized reporting questionnaire will drive increased efficiency and transparency in carbon reporting.

Pilot Findings

Pilot Design

Several EICC members piloted the system by releasing a web-based version of the questionnaire and emissions calculator to a subset of their supply chain. All direct suppliers representing more than 80 percent of a company's total supplier spend were potential recipients because of their strategic importance to participating companies. A third-party administrator oversaw the distribution of the questionnaire to 280 suppliers; suppliers were given 90 days to respond.

The EICC also provided a series of webinars to help suppliers understand the importance of reporting their data. The webinars also provided a tutorial on how to calculate carbon emissions, and answered supplier questions.

Results: By the Numbers

12

companies queried their suppliers

375

suppliers were nominated for inclusion,

280

of which were unique companies (removing duplicate submissions)

73

suppliers submitted a questionnaire to be shared with at least one enterprise customers

On average, a supplier shared their questionnaire with

3.3

companies

Analysis of the Questionnaires

The EICC Carbon Reporting System received 73 questionnaires back from suppliers, a 26 percent response rate from the 280 unique suppliers. Responses reflected the following:

- 78 percent of companies that submitted a questionnaire included emissions data. The remaining 22 percent of responding suppliers did not provide figures for their Scope 1, 2, or total emissions. Several participating companies stated that they felt their emissions data was commercially sensitive information. Other companies stated that it was difficult to use the web-based interface for answering the questionnaire.
- 73 percent of companies that submitted a questionnaire provided data on electricity use. Of these, 32 percent (17 companies) claimed to have purchased electricity from renewable sources, and 16 percent (12 companies) claimed to have generated electricity on-site from renewable sources (e.g. solar).
- 71 percent of companies that submitted a questionnaire answered questions about carbon management. Of those, 69 percent (36 companies) claim to have an emissions reduction target or energy efficiency goal. Targets reflected a mixture of absolute reduction in emissions and reduction of emissions per product unit, and ranged from a 0.1 percent absolute reduction to a 33 percent normalized reduction by 2012.
- 58 percent of responding companies claimed to have made measurable progress toward their energy efficiency goal.
- Responding companies have been measuring their annual GHG emissions for an average of 3.4 years, and a median of 2 years. This includes 21 companies who claimed to not previously measure their emissions, and 19 companies who have measured their emissions for over five years.
- Over 70 percent of companies that submitted a questionnaire disclosed operational information, such as global revenue, number of workers, and square footage of operations, which can be used to normalize their emissions data.
- 66 percent of responding companies provided data on water consumption.

In analyzing the data collected, the EICC looked for patterns and trends among supplier responses. Large gaps in the data set prevented extensive quantitative analysis on emissions hot spots in the supply chain. However, the following trends were noted:

» **Reported data needs qualitative explanation.** Companies reported that the emissions data represented in their questionnaire reflected anywhere from 5 percent to 100 percent of their estimated total footprint. We can infer from this that companies are knowingly reporting incomplete data sets. Therefore, a qualitative explanation of what is being reported is necessary to provide context and a more complete picture of the data. However, in the interest of promoting emissions reduction, it is more desirable for companies to report with explanation of their dataset than to wait until reporting is an exercise in perfection.

» **Emissions and energy data needs to be reported in both absolute and normalized terms.** It's important to assess data in both absolute and normalized terms, as no single metric gives a complete picture. Absolute emissions are important for tracking overall contributions to climate change. Scientists have projected that absolute annual emissions need to plateau by 2020. Yet, as companies grow and acquire other companies, their absolute emissions are likely to grow despite their best effort to increase efficiency. Thus, reporting emissions in normalized terms (such as tons of CO_2 per dollar revenue) is useful for tracking year-over-year improvements.

» **Multiple requests for a supplier's data increase the likelihood of a response.** As suppliers were asked to complete the questionnaire, we observed a direct correlation between number of requests and likelihood of responding. While 100 percent of suppliers that received requests from seven customers responded to the survey, only 23 percent of suppliers that received requests from a single company did so.

» **The shared approach to gathering data created efficiencies.** As demonstrated by the fact that one supplier shared its completed questionnaire with seven companies, there is value to working through a single system to collect emissions data. A single system also reduces the pressure on suppliers, saving them time, costs, and other resources. It also facilitates more direct conversations and sets the stage for more effective training and capability building.

Comparison to the Carbon Disclosure Project

In addition to analyzing the complete questionnaires, we looked at submissions by the same companies to the CDP supply chain initiative. This analysis was intended to understand whether the EICC Carbon Reporting System was achieving our objective of spurring *more* companies to measure and report their carbon footprint than would have otherwise. This analysis found that:

» **The EICC is reaching new companies in the supply chain.** Of the 280 companies queried by the EICC, 208 had not been contacted by CDP as part of the corporate reporting or supply chain reporting initiatives. Of the 75 suppliers that submitted an EICC questionnaire, slightly more than half were companies not previously contacted by CDP.

» **Companies that already respond to CDP were less inclined to respond to the EICC request.** Seventy-two companies that responded to the CDP request were also queried by the EICC. Only half of these companies responded to the EICC. Some companies chose not to respond because they felt it was redundant with the CDP initiative.

As an industry group, we are committed to eliminating redundancy in individual company efforts and are exploring ways to collaborate with CDP to achieve our shared objectives.

Process and Implementation Challenges

The final part of our analysis of the pilot looked at the System design and support. A brief survey was distributed to all responding participants (78); 77 participants responded. Key observations included that:

» **Online interface was difficult to use.** Only 31 percent of respondents felt the system was easy to use. Another 32 percent felt neutral on the topic, and 38 percent did not find the system easy to use. Anecdotally, we have heard that the online interface was not intuitive and was too complicated. Eight companies claimed that the system was so complicated they were unable to respond.

» **Multilingual interface and support is critical.** Over thirty percent of respondents cited language as a barrier to participation, including a handful of companies that did not participate at all as result. The System's online interface could be translated into over 20 languages, but training materials were provided in English and simplified Chinese, and day-to-day support was only available in English.

» **Additional training is needed.** While many companies took advantage of the guidance materials and webinars that were made available, 33 percent of survey respondents cited a lack of knowledge or training as a key barrier to participation.

This feedback provides important context for analyzing the response rate and aggregated data. The EICC is committed to implementing changes to the System in the coming year to improve the reporting process. Specific opportunities include:

» Streamlining the online interface or moving to a simplified system for submitting completed questionnaires

» Providing additional training and coaching

» Starting the annual reporting process earlier to provide suppliers more time to respond

» Provide support in additional languages

A Path Forward

As the Carbon Reporting System pilot demonstrated, knowledge and data on carbon emissions is still nascent. Businesses that work collaboratively to gather data and identify practical solutions will be best positioned to effectively manage and reduce the risks and costs associated with climate change and rising energy demand. As businesses and other industry groups continue down the supply chain emissions reporting path, they should learn from the EICC's experience and future plans.

Opportunities and Recommendations

Through its piloting of the Carbon Reporting System, the EICC recognizes many barriers that must be overcome to achieve its vision for standardized, efficient reporting of emissions data across the ICT supply chain. These barriers present several opportunities for enhancing the EICC's efforts going forward:

» **Invest in training and capability building.**

Barrier: Suppliers do not believe they have the capability to measure and report their operational emissions.

Recommendation: Customers requesting data need to continue to provide training resources and capability-building opportunities. They could provide tools that make emissions management and measurement easier, refer suppliers to local consultants who can provide assistance, and coordinate trainings on carbon accounting. Customers must lead by example. Completing the EICC Carbon Reporting System questionnaire and participating in initiatives like the Carbon Disclosure Project and the U. S. EPA's Climate Leaders program demonstrate that carbon measurement and reporting is important and feasible.

» **Establish a clear business case for carbon reporting.**

Barrier: Suppliers do not see carbon management or reporting as a risk nor an expectation of doing business. Suppliers do not see the potential business benefit to sharing carbon data and managing carbon.

Recommendation: For suppliers to voluntarily disclose their data, the demand for data needs to be explained by their customers. Suppliers are overwhelmed by a deluge of redundant and sometimes contradictory requests for data. Customers' requests can be standardized to reduce supplier burden, with a clear explanation of confidentiality procedures and how the information will be used.

Customers must individually take steps to demonstrate their commitment and interest in carbon management. Some steps could include integrating carbon reporting expectations into a supply chain management program, such as quarterly business reviews, training activities, and contracts. Customers could provide incentives for supplier reporting on emissions or actions to reduce emissions, including identifying and rewarding suppliers that are minimizing emissions.

» **Establish a standardized approach to emissions allocation.**

Barrier: Network complexity, including process loops (e.g., companies can both buy from and supply each other), blurs the distinction between business and end users. The end points of supply and demand are not always clear. These circumstances make prescribing meaningful allocation and boundary rules difficult.

Recommendation: Through groups like the EICC, industry supply chains need to establish common rules for allocating emissions across operations, business models, and multilayer supply chains. The EICC believes the best method in the ICT industry is to allocate emissions proportionally based on a company's spend with a supplier relative to the supplier's total revenue. For other industries, this approach may be less applicable. Working together with stakeholders in the field, such as the World Resource Institute, companies need to agree on a straightforward, consistent methodology for their sector that they can implement.

» **Drive on-the-ground improvements in energy efficiency.**

Barrier: Suppliers that are new to tracking GHG emissions and energy consumption are not likely to take the next step of investing in energy efficiency initiatives. Access to capital and lack of technical skills and knowledge are among the key reasons that energy efficiency doesn't automatically follow GHG and energy measurement.

Recommendation: Brands and other companies sourcing products have a specific role to play in spurring suppliers to leverage their measurement activities toward the ultimate goal of increasing energy efficiency and reducing energy consumption. Brands should:

- Build supplier awareness of the linkage between GHG emissions and energy efficiency and the inherent cost savings
- Connect suppliers with diagnostic tools and professional energy service companies that can conduct energy audits and help identify key opportunities for investment
- Ask suppliers to set energy efficiency targets and provide incentives for improved performance

Next Steps for the EICC

The EICC believes it is important for companies to measure and report their supply chain emissions. Working with suppliers to track emissions reveals opportunities to improve operational performance in a way that's good for both business and the environment and can therefore be sustained over time.

The EICC also believes our approach is a logical first step toward the goal of robust accounting for emissions across the ICT supply chain. Learning from the pilot in 2009, we plan to revise and expand the EICC Carbon Reporting System to gather more carbon emissions data from customers and suppliers in 2010. We expect this to include changes to our outreach strategy, processes, and support provided to suppliers who are new to carbon accounting.

In addition, the EICC aims to influence the evolution of the emissions accounting practices. The EICC will continue discussions with the Carbon Disclosure Project, World Resource Institute / World Business Council for Sustainable Development, and the Sustainability Consortium toward the goal of promoting practical, standardized solutions for reducing climate risk and managing energy consumption. The EICC is concerned that some of these emerging standards will be impractical and fail to drive the on-the-ground improvements in energy efficiency that are critical to an effective global response to climate change and rising energy consumption.

Finally, the EICC is very interested in expanding our focus to encourage real emissions reductions and evaluate related sustainability issues, such as water scarcity and resource conservation. In 2009 our questionnaire included two

questions about water use as a precursor to a more robust set of questions around water management practices. In the coming years, the EICC plans to expand the System to drive transparency and increase understanding around water and other environmental issues. In addition, the EICC is are exploring ways to provide training to suppliers on energy efficiency and emissions management.

Taken together, the EICC believes these activities are critical to increasing the sustainability and competitiveness of the electronics supply chain.

Appendix

EICC CARBON REPORTING SYSTEM: 2009 RESPONDING COMPANIES

The following companies responded to the EICC's request for data in 2009 and made their response available to at least one of their enterprise customers:

- AcBel Electronic
- Alps
- Applied Material Devices
- Amtek
- Applied Materials*
- Aspeed Technology
- AU Optronics Corporation
- AVC
- Banta Global Technologies
- Benwin
- Brocade
- Celestica*
- Chartered Semiconductor
- DHL
- E. I. Dupont
- ELPIDA
- Emulex
- Ericsson
- FedEx
- Foxsemicon Integrated Technology
- Fuji Film
- GemTek Technology
- Hewlett-Packard*
- Hitachi Global Storage Technologies*
- Huntkey
- Hynix
- Ibiden
- Imation
- Innolux
- Intel Corporation*
- Inventec
- JSI Logistics Corporation
- LG Display
- Lite On*
- Logitech
- Longwell
- LSI Corporation
- Micron
- Nanya PCB
- Nanya Technology
- Network Engines
- NVIDIA*
- Omnova Solutions
- Philips*
- PLX Technology
- PPT
- Primax
- Qlogic
- Quanta Computer Lnc
- Quantum
- Ramaxel
- Rockwell Automation
- Samsung*
- Samtec
- Sandvik
- Sanmina-SCI*
- Sanyo
- Seagate*
- Siliconware Precision Industries, Co Ltd
- Simatelex
- SMART Modular Technologies
- Sony*
- STATS ChipPAC (Thailand)
- STEC
- STMicroelectronics*
- Sun Microsystems*
- Taisol
- Taiwan Semiconductor Manufacturing
- Taiyo Yuden
- Unimicron Technologies Corp.
- Vectron Technology
- VIA Technology
- Yageo

*EICC member company

Acronyms and Abbreviations

BAU	business as usual
CDP	Carbon Disclosure Project
EICC	Electronic Industry Citizenship Coalition
GHG	greenhouse gas
ICT	information and communication technology
IEA	International Energy Agency
LCA	lifecycle assessment
OEM	original equipment manufacturer
PAS	publicly available specification
PFC	perfluorinated compounds
UNFCCC	UN Framework Convention on Climate Change
U.S. EIA	U.S. Energy Information Administration
U.S. EPA	U.S. Environmental Protection Agency
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

References

Ceres, “Investors File a Record 95 Climate Change Resolutions: a 40% Increase Over 2009 Proxy Season,” March 2010. http://www.ceres.org/Page.aspx?pid=1221

The Climate Group, GeSI, “Smart 2020: Enabling the Low Carbon Economy in the Information Age,” 2008. http://www.smart2020.org/_assets/files/02_Smart2020Report.pdf

Financial Times, “The Greenest Bail-out”, Mar 2009. http://www.ft.com/cms/s/0/cc207678-0738-11de-9294-000077b07658.html

International Energy Agency, “World Energy Outlook 2008,” 2008.

http://www.worldenergyoutlook.org/docs/weo2009/fact_sheets_WEO_2009.pdf

Intergovernmental Panel on Climate Change, “Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,” [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)], 2007. http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch4s4-2-2.html or AR4

McKinsey, “Curbing Global Energy Demand Growth: The Energy Productivity Opportunity,” 2007. http://www.mckinsey.com/mgi/publications/Curbing_Global_Energy/index.asp

McKinsey Quarterly, “How IT Can Cut Carbon Emissions,” 2008.

Mercer, “Investor Research Project—Investor Use of CDP Data,” 2009.

Schell, Orville, “The Challenge of Copenhagen: Bridging the U.S.-China Divide,” 2009. http://e360.yale.edu/content/feature.msp?id=2159

UN FCCC, Apr 2010. http://unfccc.int/home/items/5262.php

UN Global Compact, “Caring for Climate: The Business Leadership Platform,” 2007. http://www.unglobalcompact.org/Issues/Environment/Climate_Change/index.htm

U.S. Energy Information Administration, “International Energy Outlook 2009,” 2008.

U.S. Energy Information Administration, “Emissions of Greenhouse Gases Report,” Dec 2009. http://www.eia.doe.gov/oiaf/1605/ggrpt/

U.S. Energy Information Administration, “International Energy Annual 2006,” 2008.

BSR
111 Sutter Street, 12th Floor
San Francisco, CA 94104
USA

T: +1 415 984 3200
E: info@bsr.org
www.bsr.org

Electronic Industry Citizenship Coalition
1155 15th Street NW, Suite 500
Washington, DC 20005
USA

T: +1 202 962 0167
E: info@eicc.info
www.eicc.info