Preparing Supply Chains for the Disruption of Green Transitions

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Abstract

The European Union list of Substances of Very High Concern (SVHCs) published in the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) regulation, requires producers of Articles to provide a declaration regarding the presence of SVHCs to their customers within 45 days of request. To effectively communicate regulatory compliance, organizations require infrastructure and application development to incorporate 1752 and 9535 template standards.

Concurrently, a "green" movement is transitioning product design focus beyond regulatory and legislative compliance to market-driven, eco-friendly electronics. This is causing many supply chain partners to be pulled in the direction of green leaders with a serious impact on organizations dependent upon the same sources of supply, design standards, and supply chain constituents.

This session will review today's global manufacturing direction to eco-friendly products and its impact on electronic components and systems. It will explore compliance pressures and other very real concerns such as counterfeit parts, high reliability design, pursuit of Pb-free alternatives, supply volatility, and obsolescence.

From component manufacturer and OEM/EMS perspectives, it will also discuss PCN/EOL, data transfer, and published standards that are de facto communication methods but vary significantly in practice. Given complex BOM configurations and the nature of specialized, outsourced supply chains this presents a greater threat to lifecycle performance. A framework will outline preparatory product lifecycle actions and leading approaches taken to address the Green product development movement.

This Executive Briefing discusses the results of two benchmark studies conducted in 2008 by Supply & Demand Chain Executive, in conjunction with IHS, "Benchmarking Green Supply Chain Priorities" and "Benchmarking Product Lifecycles for Green Performance." Research of more than 300 companies demonstrates that Green is a disruptive market transition that has introduced supply chain volatility and unbalance without any apparent near term resolution.

This paper previews the most serious issues that impact supply chain stakeholders. Along with more comprehensive companion papers, it may serve as a guidebook to plan, prioritize and execute programs. Its central objective is to inform business leaders of both, direct and indirect, influences of Green marketplace behavior, and equip their organizations with strategies to maintain competitive performance, mitigate business risks, and ensure supply chain continuity.

It is a misconception that Green applies only to makers of eco-friendly products or those required to comply with regulations like RoHS, REACH and EuP.* Although industries like aerospace and defense or communications may seem once-removed from the issues, they cannot ignore the supply chain changes that Green imposes, and they are arguably at greater risk to its influences.

The bottom line: Green is a mainstream marketplace shift, the influence of which ultimately impacts and changes supply and demand dynamics. Regardless of regulatory compliance requirements, environmental product ambitions, or even short-term competitive gains, those who chose to ignore its impact may face dire consequences and run the risk of being left behind.

Top Concerns and Priorities

When reviewing the two benchmark studies, one can see how deeply rooted regulatory and social pressures are within supply chain concerns, priorities and enabling investments:

- **Fifty-eight percent say ownership resides at the VP level**. With 20 percent having C-level sponsorship, our study shows sourcing, procurement, and supply chain to own Green programs.
- **Sixty percent say budgets in economically challenging times are increasing**: Whether these were site level or enterprise budgets, 43 percent will exceed $100,000, while 20 percent say $1 million, and 11 percent say more than $10 million+.
- **Fifty-eight percent say RoHS is their No. 1 concern**: From July 2006, RoHS requires that EE equipment does not contain excess lead, mercury, cadmium, hexavalent chromium, PBBs or PBDEs.
- **Of second concern, 43 percent indicated RoHS II**: Expected to require compliance by January 2012, RoHS II adds medical device and industrial equipment to RoHS, as well as new substances.

- **Forty-three percent also indicated that REACH is a top concern**. The Registration, Evaluation, Authorization and Restriction of Chemicals, came into force June 2007, requiring registration and potential substitution of chemicals.
- **Twenty-nine percent say systems to track information are their top concern (No. 3):** Not a regulatory need, systems enable management of regulatory, product and supply chain data.
- **Data has been the top issue impacting cycle performance and supply chain continuity:** According to 38% of respondents, the time required to collect item level data is the least understood or properly scoped redesign activity.

Product Lifecycles, Regulations and Social Responsibility Must be Mastered Together

For over a decade, issues like global climate change, world trade balance, and consumer health and safety have manifested into various aspects that touch impact manufacturing:

- **Corporate social responsibility (CSR),** including ethical business conduct and corporate culture, e.g. policies on energy, the environment, and citizenship.

- **Governance, risk, and compliance**, including regulatory matters such as health and safety, national security, or environment policy e.g. RoHS, REACH, or ITAR/ EAR.

- **Product lifecycles**, including innovation, design and development activities over product lifespan, e.g. short lifecycle handheld mobile phones, or long-lifecycle medical equipment. Green business approaches possess elements of each. It is arguable whether Green origins itself are to a greater extent, driven by either regulatory mandates or social pressures, but it is inarguable that each have affected how companies plan and execute product lifecycle strategies. We contend that, although regulatory- and socially- oriented business practices have operated independent of one another that they are converging out of necessity within supply chains. Therefore, akin to other cross-functional processes like Sales & Operations Planning, the planning and execution of strategies to mitigate Green performance disruption will require Social, Regulatory and Product activities to be synchronized.
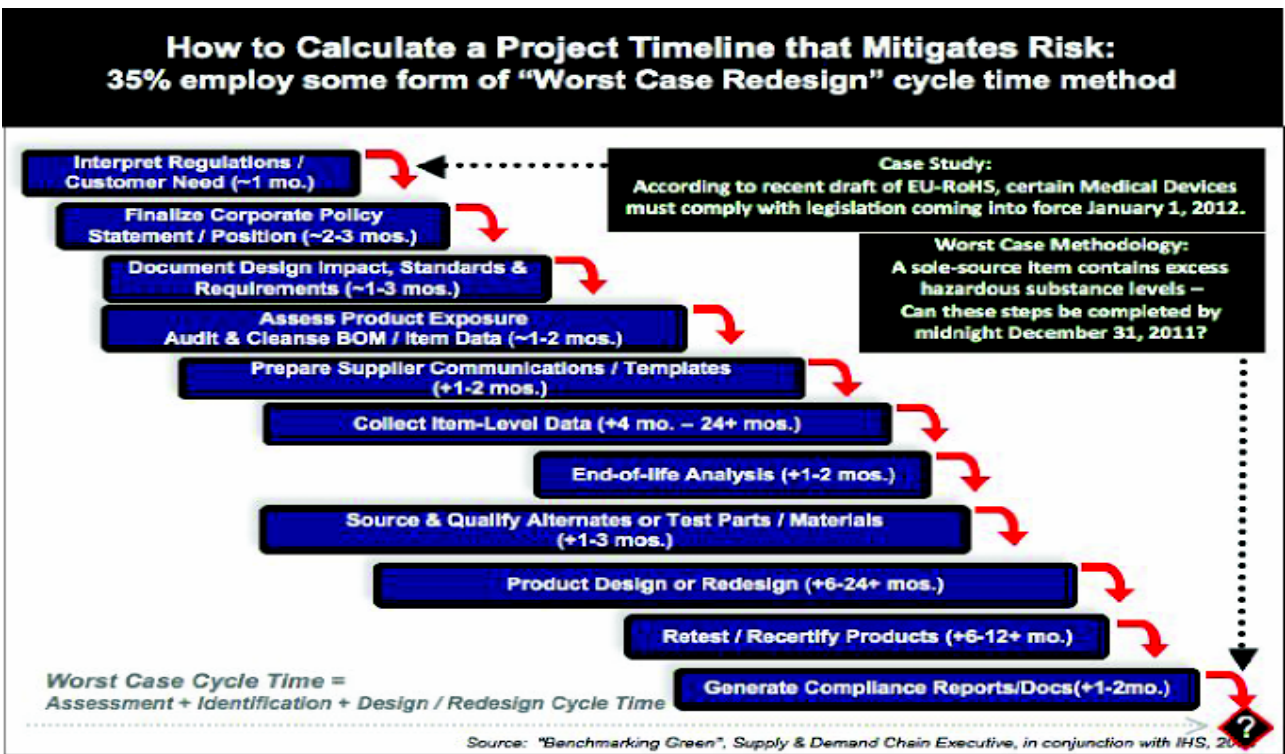

Figure 1

Supplier Management is Critical to Performance: 70% of those surveyed said that capabilities to meet environmental substance or compliance requirements were included in supplier performance and risk evaluations, while 64% say those who provide no visibility are viewed the same or worse as non-compliant suppliers. 15% would add a probationary-like period "e.g. 6-12 months" to schedules and 53% would add time to resolve initial cases of non-compliance.

Benefits: Short- and Long-term Performance Opportunities The Business Opportunity: Corporate executives see Green as driven, to some extent, by social responsibility and regulatory obligations. However, many also see top- and bottom-line opportunities in moving toward Green:

- **Customer Service and Market Share**: 64 percent of those participating in one of our studies said they believed that Green gave them a customer service or market share advantage.
- **Market Advantage**: 82 percent of participants in the Green Product Lifecycle study said that promoting a product's Green attributes offers advantages over a competitor's offering.
- **Price Advantage**: 56 percent indicated that Green products command a higher price than equivalent non-Green products. By moving more quickly than competitors, companies can take advantage of market perceptions of supply chain disruptions and the opportunity to maintain customers that are themselves challenged or to win customers away from competitors that are slower to respond. Margins can benefit from these advantages through short-term price power, which is likely to diminish over time. Companies also have the opportunity to leverage supply chain initiatives to effect cost reductions that can reduce cycle times and deliver savings directly to the bottom line. Fifty percent of participants agreed with the statement that "When introducing a replacement Green or compliant product, or redesigning an existing product, there are net total cost reduction opportunities." Some savings drawn from our findings include:
- **Reduction of complexity** in supply chains through supply base rationalization based on compliance/non-compliance of suppliers
- **Reduction of bill of materials (BOM)** complexity as part of product redesign initiatives, and the elimination of SKU as part of a supply chain transition strategy

Supply, price and demand economics resulting from changing demand patterns and their impact. For instance, 55 percent in our second study said that traditional supply such as parts not compliant with RoHS present greater price and availability volatility.

Business Justification: Not a Case for Green Business Advantage, but to Avoid Supply Chain Disadvantage
Yes, many global manufacturing players are required to meet regulatory mandates and social responsibility goals. But all players must mitigate the risks associated with how these issues in adjacent industries and segments change the playing field.

As Figure 2 depicts, "Regardless of compliance requirements or environmental ambitions, supply chains must prepare for Green adoption" due to critical mass across direct and indirect industry segments. The most obvious cases are compliance violations that are most routinely discussed, and the graphic shows how a top Japanese consumer electronics company faced a $160 million+ regulatory disruption resulting from excessive hazardous substance levels that violated a regulation. However, the other cases show how compliance is but one factor when arguably more consequential supply chain issues cause less-obvious product lifecycle disruption and social disruptions that must be mitigated.

Below is a summary of five select supply chain issues drawn from our studies. They are not exclusively regulatory compliance or eco-product strategies. They are supply chain vulnerabilities that can have serious consequences to performance metrics resulting from improper handling of Green transitions:

1. Supply risks begin to materialize as supplier consolidation, supply shortages or inconsistency or spikes in pricing and availability emerge as supply chains make Green transitions; 57 percent of our study participants agreed there is greater supplier volatility. Amazingly, about one-in-five of all participants said each of part changes, energy consumption, environmental substance presences, toxicity, supply chain disruptions, competitive part number cross-references for substitution and regulatory compliance transitions are present in their product change notification (PCN) and end-of-life (EOL) documentation.

2. Sustained design reliability as new materials, design principles and manufacturing processes are required. Our study validated to some extent the ongoing debate about reliability, as 37 percent believe that new parts/materials have greater risk of quality or reliability failure, while 47 percent do not. It cannot be argued that new materials are inherently different and must undergo scrutiny in how and where they are used. Certain issues like lead-free component reliability or the relative health and safety of various chemicals are well-known, and mishandling them can impact key performance metrics. Sixty-six percent of our respondents said that asking suppliers for reliability information can "drastically reduce the amount of rework and repair," while 57 percent are doing it today.

3. Obsolescence: Obsolescence must be closely monitored, as companies find that unsafe or non-compliant supply are "sunsetted"; 55 percent of our study respondents said obsolescence has increased due to Green market transitions, while a separate study from IHS validates that 76 percent of component EOL events in recent years were a direct result of RoHS compliance.

4. New product design or redesign required as a result of supplier disruption or customer and consumer requirements can pose a major hurdle to meeting top-line goals for all companies. According to our study results, 70 percent said that it would take more than six months to redesign a product as a result of supply interruption. Thirty-five percent say it would take more than one year, which can seriously impact product launches and business plans.

5. Counterfeit parts include, among other things, falsely branded components and lesser-quality or poor yield product that can cause design failures or even be used as a back door security threats to electronic equipments. Often counterfeit parts profiteers target traditional military or other markets requiring high- reliability components that are not lead-free. It is no surprise then that our study found 67 percent say they are concerned about counterfeits, 42 percent said they believe the shift to lead-free components has been a cause of counterfeit proliferation, and 56 percent say that one should transition to lead-free alternatives to reduce their risk of exposure to counterfeit parts. Proactively, 49 percent say that improvements at predicting obsolescence can mitigate most counterfeit component risk by avoiding the need to source aftermarket replacements altogether.
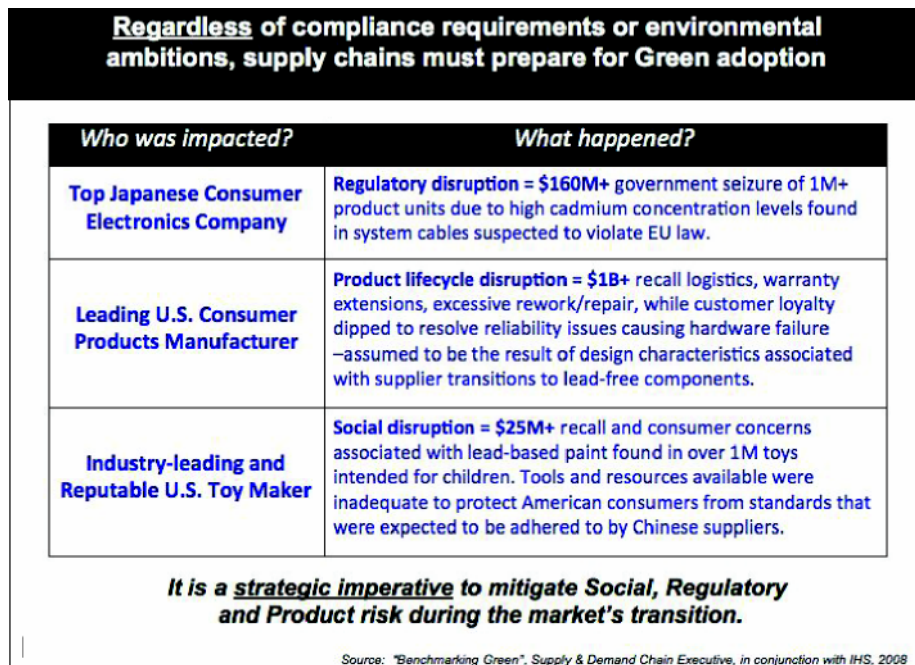

Regardless of compliance requirements or environmental ambitions, supply chains must prepare for Green adoption

Who was impacted?	What happened?
Top Japanese Consumer Electronics Company	Regulatory disruption = $160M+ government seizure of 1M+ product units due to high cadmium concentration levels found in system cables suspected to violate EU law.
Leading U.S. Consumer Products Manufacturer	Product lifecycle disruption = $1B+ recall logistics, warranty extensions, excessive rework/repair, while customer loyalty dipped to resolve reliability issues causing hardware failure –assumed to be the result of design characteristics associated with supplier transitions to lead-free components.
Industry-leading and Reputable U.S. Toy Maker	Social disruption = $25M+ recall and consumer concerns associated with lead-based paint found in over 1M toys intended for children. Tools and resources available were inadequate to protect American consumers from standards that were expected to be adhered to by Chinese suppliers.

It is a _strategic imperative_ to mitigate Social, Regulatory and Product risk during the market's transition.

Source: "Benchmarking Green", Supply & Demand Chain Executive, in conjunction with IHS, 2008

Figure 2

Laying out a Roadmap for Sustained Supply Chain Performance
Given restraints on resources, companies must set priorities for dealing with Green supply chain transitions. Below are key planning and execution considerations excerpted from our full published report, intended to summarize the framework that business leaders can review:

- **Scope and Priority**: Not surprisingly, our studies revealed that companies have largely focused their initial efforts on dealing with regulatory mandates in sequential order. The top priority thus far was RoHS, followed by REACH and then EuP. Digging in more deeply, these issues are converging and adding supply chain complexity.
- **Ownership:** 58 percent of participants in our studies said that ownership of Green supply chain initiatives at their companies resides at the vice president level.
- **Budget:** Initiatives will require investments in people, processes and technology, and companies increasingly are allocating dedicated budgets to these programs. Our studies show why approximately 20 percent pegged budgets at $1 million or higher and 41 percent would be increasing in the year ahead.

- **People:** It also is worth highlighting the "people" component and why executives overseeing these initiatives must ensure that they understand the level of commitment that will be involved in executing product lifecycle strategies.

  Many companies (about one-third in our study) have rolled all their compliance-side issues up under the umbrella of a single competency center responsible for environmental but also other product-related compliance issues.

- **Time:** Green is not a one-time event but rather a continuous process. Sixty-two percent of participants in our studies said that their company approached RoHS as an ongoing program once initial compliance had been achieved. Meanwhile, executive scoping the time necessary for a product lifecycle program must include such factors as redesign time and the time necessary to gather information.

- **Technology:** A substantial minority (22 percent) of companies studied currently employ technology to enable these issues within their four walls and across the supply chain. It is critical to understand that the Green product lifecycle encompasses an enormous amount of data on each item of each product, and managing the business impact will require more than spreadsheets.

Conclusion

Green supply chain management is becoming mainstream, but it nevertheless is still emerging as a discipline. The two studies conducted for this Executive Briefing, along with interviews with industry practitioners and a review of relevant studies from the analyst community, point to best practices that leading firms are adopting to ensure the long-term success of their initiatives to address these risks.

As the analyst firm AMR Research has pointed out, even companies that do not engage directly in Europe must ask whether or not they sell into a supply chain that imports into the EU, or if they purchase out of a supply chain that exports from the EU. Irrespective of EU regulations, other global regulations or social pressures, this demonstrates the longevity of the "supplier's supplier, and customer's customer" when considering supply chain performance.

In the Green Product Lifecycles survey, 91 percent of participants indicated that they were taking some action to either comply with environmental regulations or develop more environmentally friendly products. Thus, nine in 10 companies already are incorporating some strategy into their operations, reflecting the extent to which Green is not unique but rather should be viewed – and acted upon – as any other paradigm shift in business. This Executive Brief only delved into the leading issues, intended to highlight this strategic imperative organizations need to realize in order to maintain competitive performance, mitigate business risks, and ensure supply chain continuity.