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The Green Way *Technology-Enabled Sustainability*

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EXECUTIVE SUMMARY

Private corporations and the public sector are facing increasing pressures to reduce their carbon emissions and energy bills, driven by enforced legislation and regulation, increasing energy costs, and, perhaps as important, a constantly growing demand from customers for more sustainable operations and products. In focusing on carbon reduction related to IT departments, many companies respond by attempting relatively simple fixes—for example, by cutting data center energy usage or reducing the number of PCs in the organization. Those are important steps, but not nearly enough to create a sustainable environmentally conscious program. Instead, top corporate management working with CIOs should develop a robust, comprehensive, and holistic green IT model that leverages technology to minimize the carbon footprint of the entire organization. Such a program would view environmental sustainability as a business strategy, driving eco-friendly approaches throughout the organization to improve business operations, better preserve the environment, enhance productivity, and cut costs at the same time.

GREEN IS THE NEW IMPERATIVE

For most companies, going green is rapidly becoming an imperative, not an option. As greenhouse gas emissions proliferate, industrial pollution continues to be a scourge, and waste from packaging, materials, and shipping overruns landfills, businesses globally are facing calls from customers, regulators, shareholders, and directors to do their part to minimize their carbon footprint and the impact of their operations on the environment. Yet, as critical as green strategies are—as a measure of social responsibility, a possible mechanism for cost reduction, and a potential revenue stream by winning the loyalty of green-conscious consumers—many companies are unsure about how to begin, puzzled about how to integrate such a set of essentially new activi-

ties and behaviors into the organization, and unclear about how to calculate the success of environmental improvements.

Such uncertainty is understandable. Going green is a significant cultural shift for most organizations, requiring the substantial change management skills that are the hallmark of any transformation. When going green fails, it does so for the same reasons that, for example, a product launch in an entirely new market or an M&A integration would: a lack of unambiguous direction and tactics communicated well throughout the organization; poor executive leadership; and an incremental, rather than a holistic, strategic framework.

It's clear that information and communication technology (ICT) usage by companies contributes significantly to the carbon footprint, making up nearly 2 percent of global CO₂ emissions today—about the same level as the entire airline industry. What's more, the number of PCs worldwide is projected to double between now and 2014, and mobile voice and data

traffic is forecast to rise fourfold by 2012. As a result, total ICT emissions are on track for a 50 percent increase by 2020. Faced with these realities, many companies take a narrow view of the way IT can help reduce their carbon emissions. The approach they choose (shortsightedly, we believe) is what we call “greening IT”—carbon footprint reduction programs focused solely on minimizing energy usage and non-recyclable waste in corporate IT departments.

However, by only targeting IT department emissions, companies miss the opportunity to make a real and very large difference in their carbon footprint with a macro, business performance-oriented strategy that can be termed “going green through IT.” Under this approach, CEOs and CIOs jointly lead a green campaign in which IT innovation is leveraged to make the organization's operations as a whole more eco-conscious. With this path, sustainability programs are seen as a cross-functional, cross-organizational activity, not limited to one department or a small subset of the organization's carbon footprint.

GOING GREEN THROUGH IT

A host of activities unrelated to IT operations within an organization can yield dramatic carbon reduction when green applications are leveraged in areas such as process and building automation, logistics, energy, motors, and teleconferencing. In fact, IT advances targeted at low-carbon solutions could lower the global carbon footprint by as much as five times the emissions from ICT itself, according to Smart 2020, a report published by the Climate Group. Just as important, these applications not only substantially diminish environmental impact in an organization but also have a positive effect on performance by driving down energy and waste costs. Possible IT solutions:

- *Operational process automation:* This involves, among other things, sharing databases so that more information is available throughout the organization; installing wireless data communication equipment and distributing portable computers; and integrating decision support tools so that aspects of management are decentralized.
- *Automating internal building operations with climate control equipment, motion and light detection and control devices, and temperature sensors:* The reduction in carbon emissions in global facilities could be as much as 10 percent by 2020.
- *GPS and other logistics technologies:* These can help reduce travel time and lower vehicle emissions in companies that rely on transportation to conduct day-to-day business activities.
- *Upgraded industrial motors:* Industrial activity uses nearly half of all the electrical power generated globally, with industrial motors contributing 65 percent of that figure. With an increase in the efficiency of motor systems, potential emissions savings could reach 15 percent by 2020.
- *Tele- and videoconferences:* Long-distance meetings and telecommuting can significantly lower the amount of employee travel and measurably reduce carbon footprint.

GREENING IT

Although it has limited value alone, a greening IT program can have tremendous impact on reducing carbon footprints when it is integrated with a vigorous campaign of going green through IT. Among the possible facets of a green IT program are consolidating data centers; adopting cloud computing; installing advanced cooling systems and power management software in data centers; and deploying thin clients.

In addition, the relatively short life cycle of ICT products, and the lack of thought given to dealing with end-of-life ICT assets, has led to a growing dispersal of toxic chemicals.

Electronic waste constitutes about 2 percent of total landfill garbage in the U.S.; however, it contributes 70 percent of all toxins (lead, cadmium, mercury, arsenic) to the waste stream. Corporations, of course, are the largest users of ICT and hence are responsible for a significant portion of its overall carbon footprint. CIOs can work with ICT vendors to participate in—or establish, if one doesn't already exist—an asset recovery program that can extend the life of systems by refurbishing equipment, properly dispose of units that cannot be refurbished, and extract useful components and materials from recyclable systems to make use of them elsewhere.

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GREEN IT GOVERNANCE

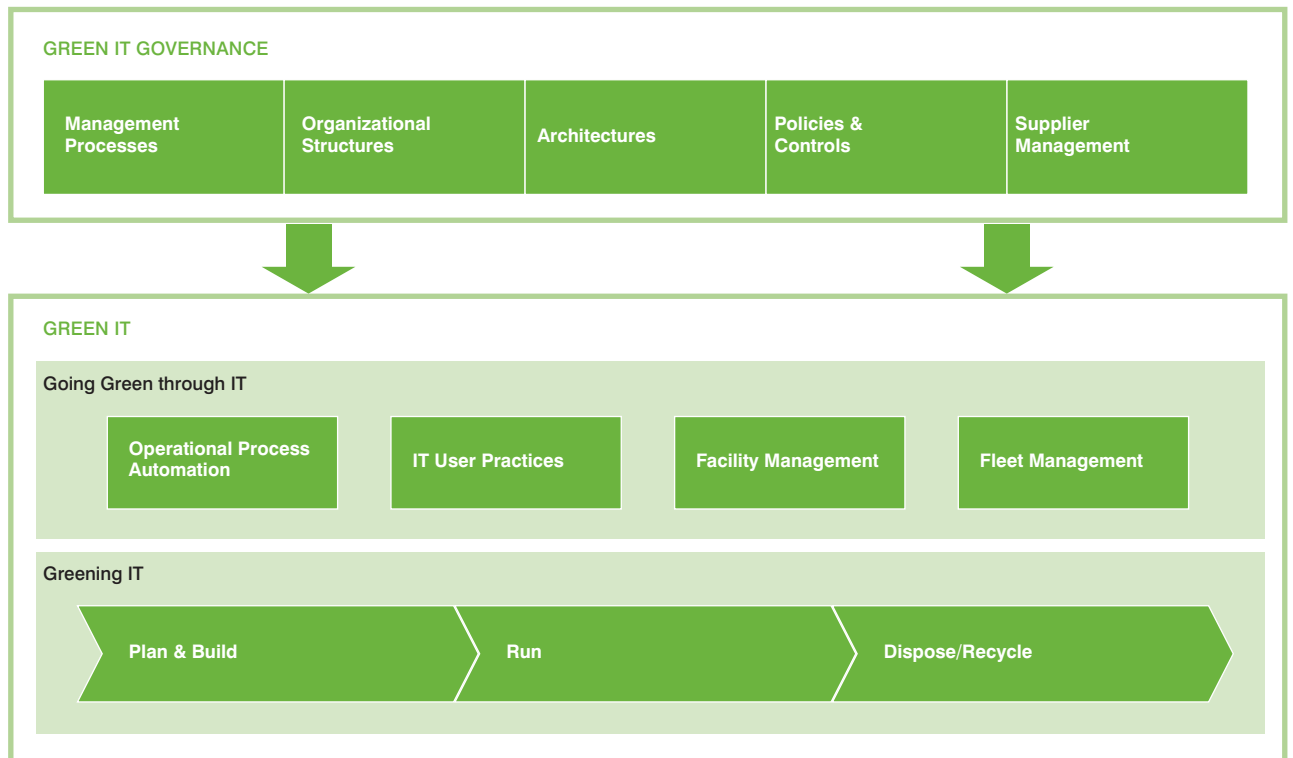
For strategies of greening IT or going green through IT to be effective, IT governance has to reflect sustainability on an ongoing basis with clear steering mechanisms and key performance indicators (KPIs). This is true whether these eco-conscious strategies are being employed in the building of a massive green city or a much smaller effort like creating a paperless office or replacing standard fuel engine delivery vehicles with electric trucks. Typical governance considerations:

- *Management processes:* What are the oversight requirements for green IT practices? Which executives and which departments are required to do which activities to make sure that the green IT programs and policies are implemented well?

- *Organizational structures and footprint:* What is the appropriate operational model to deliver the green IT programs?
- *Architectures:* Which technology solutions should be adopted for green IT?
- *Policies and controls:* What are the measures and rules used to monitor the environmental impact of green IT?
- *Supplier management:* What types of incentives can suppliers be given to embrace the organization's green IT approach?

Exhibit 1 contains a framework for a comprehensive green IT strategy.

*Exhibit 1
Green IT Strategy Framework*



Source: Booz & Company

FOUR-STEP APPROACH

Creating a green IT strategy that combines a strong and effective going green through IT approach with an equally robust greening IT road map is extremely challenging because it requires significant management support, internal cultural changes, diligence in monitoring performance indicators, and overcoming the tendency to view small and incremental green initiatives as sufficient. But the effort is well worth it, particularly when the green IT program delivers cost savings, an enhanced global reputation, and even new potential revenue streams. On the basis of our experience, Booz & Company has developed a four-phase framework to keep a green IT program on course and overcome the obstacles to its implementation (*see Exhibit 2*).

Phase 1: Diagnostic/Baselining

Baselining consists of bottom-up data collection and top-down vision-

ing process. The bottom-up aspect involves assessing a company's carbon emission footprint currently and in previous years in (a) the IT function and (b) the organization's entire business operations. In this step, the goal is to delineate and quantify the carbon footprint of high-emitting activities, such as production facilities or travel, by using available data including electricity bills, travel and purchasing records, energy usage data, and waste reports. As part of this, the organization's energy consumption is evaluated by assessing, for example, what portion of equipment and facilities has environmental certification, the energy consumed using renewable sources, the percentage of materials recycled or refurbished after use, and the number of employees using eco-friendly travel alternatives (public transportation, videoconferencing, telecommuting). In addition, a carbon inventory is conducted on IT activities including data centers, distributed assets (desktops, laptops, printers), and local and wide area networks. These baseline results are compared with benchmarks available from other organizations of similar types and sizes, in part to identify where improvement opportunities exist.

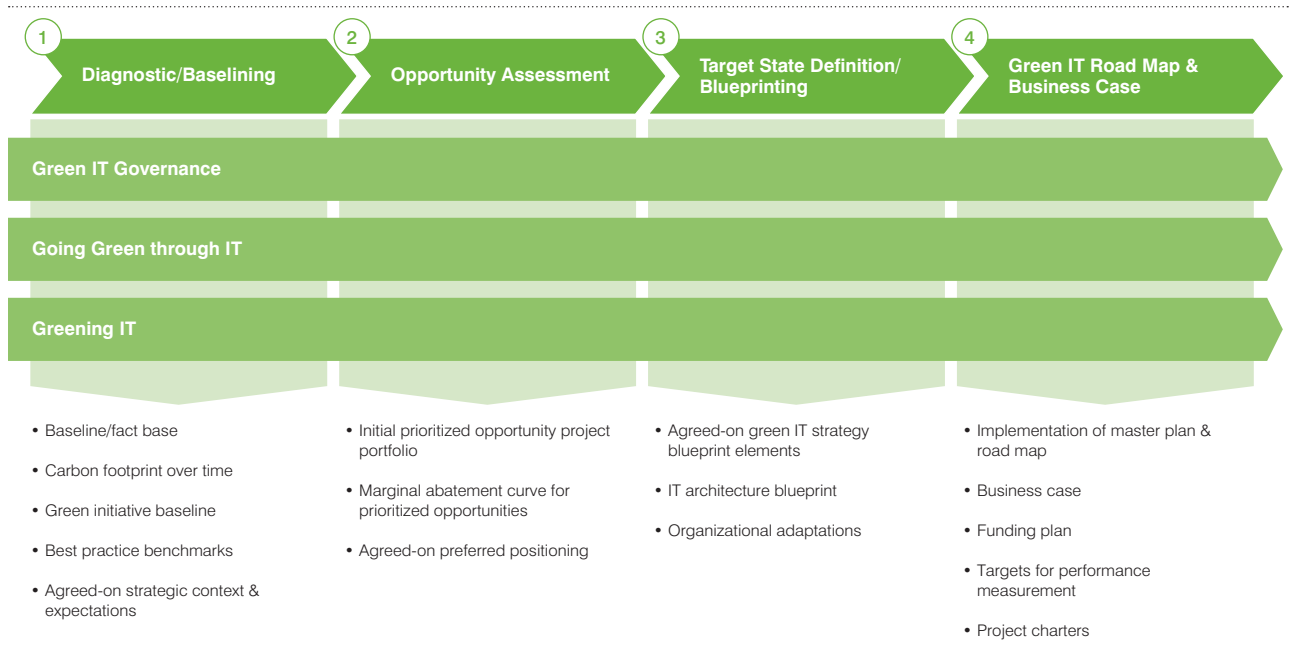
At the same time, the top-down process involves interviewing and sur-

veying senior stakeholders—such as top management, department heads, directors, and heavy IT equipment users—about their level of satisfaction with IT and their expectations for sustainability in both the IT group and the overall business. The key is to align the organization's sustainability targets with the company's aspirations for its green program. Some companies are satisfied with minimal carbon reduction and have limited ambitions for green IT; thus, these businesses would not be candidates for a fully integrated, cross-corporate green IT strategy.

Phase 2: Opportunity Assessment

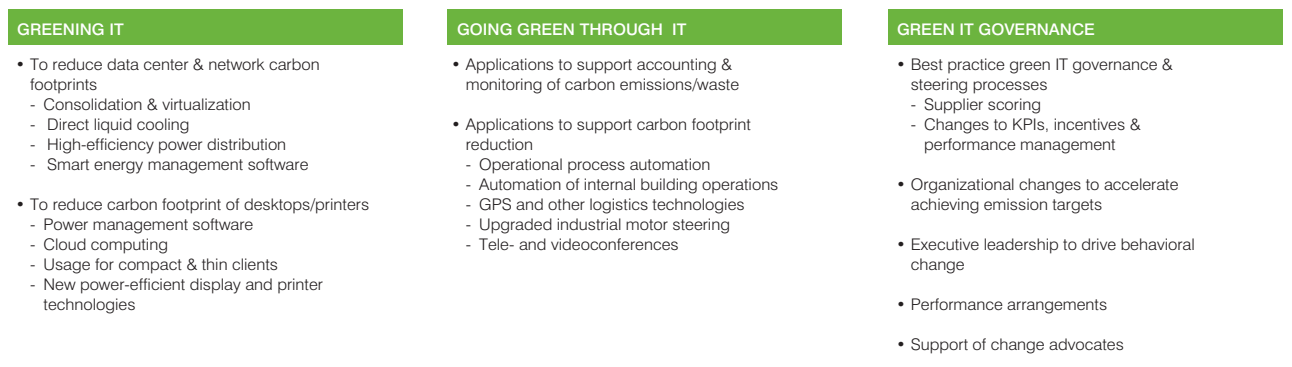
Based on the results of baselining, top company stakeholders meet in a series of workshops to identify and prioritize IT and organizational alternatives for reducing carbon footprint and energy costs. Options to be explored include, for greening IT, levers to reduce data center, network, and desktop carbon footprints; for going green through IT, deployment of applications and solutions along the organization's entire value chain; and for the green IT governance as a whole, required organizational changes, establishment of oversight committees, and identifying key metrics to use as performance guides (*see Exhibit 3*).

Exhibit 2
Four Steps to Green IT



Source: Booz & Company

Exhibit 3
Levers for Carbon Emission Reduction



Source: Booz & Company

In preparation for the workshops, appropriate green strategy benefits to focus on are culled from these sources:

- Databases of companies that have successfully implemented green IT strategies to find possible areas of savings
- Review of processes and practices in the IT group or throughout the organization that could be improved. For example, is there a data center that could be shut down, or is the budget allocated for green IT sufficient?

**Phase 3: Target State Definition/
Blueprinting**

Based on the prioritized initiatives and opportunities, recommendations for a

green IT strategy are offered. Among the detailed aspects of the blueprint:

- The landscape of future applications needed for the going green through IT program; such things as videoconferencing facilities, energy consumption dashboards, and building automation systems are likely candidates.
- The planned technology infrastructure for greening IT—e.g., cloud computing and the future landscape for desktops, servers, printers, data centers, wireless communication devices, and networks.
- The governance and organizational processes to manage and measure

the performance and delivery of the green IT strategy. Which entities, cross-functional executive teams, quality specialists, reporting and audit channels, and KPIs are needed to properly oversee and determine the efficacy of the eco-conscious plan?

For maximum leverage of existing capabilities and to ensure skill transfer, it's best to conduct the development of the green IT blueprint in teams made up of representatives from all of the organizational departments that will be affected.

**Phase 4: Green IT Road Map and
Business Case**

The green IT strategy is translated

into a master plan with a short- and long-term project road map. For each prioritized initiative in the plan, KPIs are established. Among them: aggregated IT and non-IT emissions abatements; the percentage of budget allocated for carbon reduction R&D projects; the percentage of workers dedicated to the development of green solutions; aggregated energy improvements; gains in eco-friendly packaging and products; and the percentage of suppliers audited for eco-friendly products and practices. Ongoing program assessment transparency and organizational change management procedures are also defined in this phase.

In addition, an overall business case is developed that balances carbon foot-

print reduction goals for both greening IT and going green through IT with a self-funding implementation plan when possible. To achieve such a plan:

- Projects are phased in, starting with anticipated quick wins and using generated savings to fund more capital-intensive parts of the road map.
- External funding, such as from government incentive programs, is sought for initial seeding.
- When possible, equipment is phased out at the end of its useful life with savings from this effort transferred to the green IT campaign.

Finally, there should be a robust change management function incorporated in a green IT program. Top executives must champion the strategy, both working with and directing the CIO on a frequent basis while keeping the rest of the company informed about the goals of the strategy and what is expected of company employees. Successfully adopting green IT approaches is not achieved without substantial behavioral change, and such a cultural shift is impossible without visible management support.

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Case Study

The View from a Green City

Organizations that take green IT seriously establish clear goals and benchmarks, prioritize critical steps, form partnerships, delineate the business case, and set up essential governance procedures. A major eco-conscious urban program under development is a good illustration. The plan is to build an environmentally sustainable, zero net carbon emissions community with housing, stores, and office space using a series of technologies as the backbone and a strong governance function guiding it. Even before breaking ground, the developers designed an ambitious set of tiered IT innovations to meet their baseline goals. Among the program's most novel features:

- Dashboards to track environmental impact of each aspect of the project
- Project-wide ERP systems for tenant registration, lease management, financial management, maintenance, and coordination between services
- Call centers to handle multipurpose calls and information portals for residents and visitors
- Electronic wallet—that is, an e-money system for internal transport and some retail operations; credit in e-money is given for sustainable behaviors
- Smart home and office facilities management systems for all buildings
- Eco-conscious computing services, including thin client PCs, servers, storage, and backup equipment
- Environmentally sensitive ICT infrastructure services
- Carbon-neutral light rail and personal transportation systems
- Flow rate sensors on showers linked to high-visibility displays

The business case for the development's green IT strategy was based on establishing partnerships with IT vendors to share the cost of implementation in exchange for long-term royalties paid if specific benchmarks related to zero carbon emissions are met. For example, a combination of banks and computer systems providers will implement the e-wallet networks; smart facilities will be a blended venture of hardware, software, and electronic controls companies; and smart grids will be managed by computer providers and energy-efficiency equipment makers. By joining a variety of companies together to achieve singular aims and sharing risk with these companies, the developers are hoping that their commercial partners' drive for profits will be sufficient motivation to ensure that the businesses compel one another to succeed.

With such a massive development program and the high degree of technology underpinning it, the right governance model—a strong, centralized office to oversee policy, implementation, and management—is imperative. At its simplest level, governance must address day-to-day operational issues—such fundamental but critical concerns as the ways that computer technology can help train people to limit their water use, the techniques for delivering entertainment and digital information to homes seamlessly using ICT networks with a zero net carbon footprint, and the framework for an eco-conscious transportation network.

But these basic aspects of the green city project just begin to hint at the role that governance must play in setting high-level standards and policies as well as controlling and monitoring environmental performance in this program (or any other small or large eco-conscious effort). Among the broader IT questions tackled by the governance team in this project:

- What does it mean to have a carbon-neutral lifestyle, and what precise role can IT play in supporting it?
- What is the longer-term target technology architecture that best supports the project's requirements? What application functionality is required?
- How should IT functions be resourced and organized?
- How can management and delivery processes be better enhanced to support green IT objectives?
- How should the IT organization be governed? Is there a need for a stronger interface role between IT and the project developers? Does the IT organization have the right level of support to ensure adoption of the green IT strategy?
- How can management effectively oversee program implementation while properly mitigating risks and ensuring timely completion at minimal cost?

For its governance model, the development team established a CIO office, charged with these basic responsibilities: set overall ICT strategy, policy, standards, and architecture; gather ICT requirements and needs from the project's disparate user communities; and manage and coordinate delivery and installation of individual equipment by supplier partners. Simply put, in a green IT project, governance establishes the benchmarks and manages the campaign as it moves toward its key objectives. It ensures that the radical retooling of everyday life that programs like the green city represent is rigorously adhered to.

Key Highlights

- Going green—reducing carbon emissions, energy use, non-recyclable waste, and facilities inefficiencies—has become an imperative for many private corporations and the public sector to decrease costs, enhance productivity, and satisfy demands from customers for more eco-conscious products and services.
- Many organizations fail to take advantage of the full range of possible IT solutions for going green by defaulting to the easy path: asking CIOs to reduce carbon footprint solely in the IT department.
- To enjoy the operational gains and sustainable improvements to processes and reputation that a robust green IT strategy can deliver, organizations should develop a comprehensive and holistic model that combines carbon emissions reductions in the IT department with leveraging IT and related technologies to make overall performance of the supply chain, distribution channels, travel, and energy usage more environmentally sound.
- Four steps are required to generate a full-fledged and successful green IT strategy: baselining; opportunity assessment; blueprinting; and green IT road map and business case.

CONCLUSION

For most companies, going green the right way remains a mystery or a problem too daunting to tackle in a full-fledged approach. And that explains why executives often pass the green IT problem along to CIOs, avoiding the heavy lifting of partnering with them to find answers that can improve operations throughout the organization. But punting this issue in hopes that it will resolve itself with half measures is not acceptable anymore, as many organizations are learning; this can result in continuing inefficiencies, expensive energy costs, wasteful processes, and less than stellar relationships with potential customers. The four-phase approach for a holistic green IT strategy takes a longer-term vision to implement, but the sustainable results over time will more than pay for the effort it took to reach them.

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