Assessment of Global Low-Carbon and Environmental Leadership in the ICT Sector

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Simon Mingay, Dennis Pamlin

With increased pressure to reduce carbon emissions, enterprises are approaching this new situation in very different ways. Some are still struggling to assess their own business environmental and climate impact. Other enterprises approach the need to reduce carbon emissions among customers as an opportunity to move beyond their relatively smaller direct impact and also focus on the opportunity that low-carbon ICT services can provide. The difference in how companies approach the need for a low-carbon economy is creating a new corporate landscape where new winners and losers will emerge and where ICT customers must learn to navigate. This is an assessment of 24 of the industry's world-leading providers and an analysis of where the ICT industry is today in relation to its maturity in mitigating environmental risks and exploiting the opportunities that the need for reduced carbon emissions will create.

Key Findings

- 2008 has seen the emergence of some low-carbon "leaders" in the ICT industry. They are just starting to wake up to the risks and opportunities of climate change, and move beyond pushing a more energy-efficient device. However, on the whole, the industry has been sleepwalking toward a low-carbon economy. 2009 will see rapid progress.
- There is frequently more talking than there is action on behalf of the ICT providers. The results show those who need to make significant steps forward if their actions are to match their marketing.
- Some of the "self-professed" leaders in environmental performance have some significant weaknesses in their programs.
- Most providers still view "the environment" and "climate change" as a risk rather than as an opportunity.
- Most ICT technology providers have outsourced most, if not all, manufacturing. So looking at the vendors' performance is looking at the tip of the iceberg — which is further compounded by most of those vendors only looking at the environmental performance of their Tier 1 suppliers.
- Service organizations are quite immature in their environmental programs and their innovation for a low-carbon economy.
- There is a lack of interindustry partnerships to create innovative solutions to tackle high-carbon areas of the economy.

- The vendors from Asia (not Japan) are still lagging behind but some have begun to put comprehensive programs in place, and it is likely that they will move rapidly to the front in this area, driven by the urgent needs for low-carbon solutions in their domestic markets.
- Fifteen of the 24 providers invited to participate did so, which is a good level of commitment from the industry. However, nine providers chose not to participate. With one exception, we believe that reflects their immaturity in environmental and low-carbon leadership.
- This is a rapidly changing area.

Recommendations

- Use this assessment to help you make choices about strategic partners and choices related to suppliers of ICT equipment, services and solutions.
- You will find it useful to help increase your own understanding of the issues.
- Use it to stimulate a dialogue with your providers to drive improvements in the providers' environmental performance.
- IT providers should use this assessment to identify current best practices and compare their actual or estimated performance with their current investment and strategy. Participating providers that have been given very unbalanced scores can assess their balance between communication and action, both those that communicate more than they act and those acting more than they communicate.

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1.0 Introduction

Climate change and the need for reduced greenhouse gas (GHG) emissions represent one of the most significant long-term discontinuities to face most enterprises. The understanding of the role for information and communication technology (ICT) in tackling climate change has matured dramatically in the past 18 months. Up to early 2007, the focus of policymakers and influencers was on the big emitters of GHGs (for example, transport, construction, pulp, paper and board, electricity generation, ferrous metals and minerals). The role of ICT vendors and service providers (hereafter referred to as "ICT providers" or just "providers") was often limited to discussions about their supply chain management and the energy use of the products. As the focus during the end of 2007 and into 2008 shifted to also include the companies that through their services can help reduce GHG emissions, the ICT providers have found themselves in the spotlight (see Note 1).

Enterprises that buy ICT equipment, solutions and services increasingly want to do business with ICT providers that are proactively attempting to reduce the environmental impact of their business. They are increasingly looking to these providers as potential partners in innovation to exploit the opportunities of a low-carbon economy. These buyers and their businesses are further potentially affected by an economy in which the broader issue of environmental sustainability is starting to influence consumers and commercial behaviors.

The creation of the assessment framework, scoring and subsequent analysis has been a joint effort by Gartner and World Wildlife Fund (WWF). This assessment of ICT providers is a world first in attempting to look at the breadth of these issues. As such, it provides a challenging and unique insight into the performance of the ICT industry to date, and into which providers are best positioned to exploit the opportunities during the next two years and potentially beyond. It looks at some broad environmental basics, but has a strong focus on climate change strategies.

This analysis will tell you how individual providers are performing in their environmental and climate change programs — covering their corporate practices as well as how they are developing products and services. It will help you identify the issues that your enterprise might choose to prioritize in selecting providers, guide you in choosing potential partners for exploiting the opportunities of a low-carbon economy, and give you a unique insight into the ICT state of maturity as far as environmental and climate change strategies are concerned.

1.1 The Low-Carbon Economy

Most enterprises have not woken up to the reality that CO_2 will be a constraining resource with an associated price. Most of those that have some level of recognition view it as a risk and a distraction. Only a relatively small number have recognized the opportunity that a low-carbon economy will present in terms of new business models, technologies and so on.

In addressing a low-carbon economy, there is a need to differentiate between two important approaches with significantly different value propositions. On the one hand, there are potential cost savings to be gained in one's own operations through the effective implementation of carbon reduction strategies. On the other, there is the potential for significantly greater profit to be made from enabling one's supply chain and customers to optimize their use of technology to achieve greater carbon efficiency. The business opportunity stems from the established position that a significant number of measures could achieve savings or profit at either no or less-than-no net cost. To benefit from these opportunities, however, companies must adopt a medium- to long-term business strategy.

Most climate-change-related activities by enterprises have so far focused on risk management and internal emissions rather than opportunities and the GHG-reducing services and business models that enterprises could provide. Although a risk perspective makes sense in the short term for carbon-intensive operations, these enterprises are not the only ones that need to act. If society is to reach the targets that scientists and politicians have voiced — for example, a 20% reduction in the European Union (EU) by 2020 and global reduction of at least 50% by 2050, as discussed in the 2008 G8 Summit in July — a proactive approach is needed.

An increased number of initiatives to reduce GHG emissions have resulted in activities among both public and private companies in sectors that are not big emitters themselves, but that in fact have products and services that can be used to reduce GHG emissions. Even for enterprises operating in high-carbon activities, a medium- to long-term perspective can turn reduction of CO2e (GHG emissions) into a business opportunity.

1.2 ICT and Climate Change

ICT is in many ways a unique technology. It has the characteristic of a threshold technology, with the potential to rapidly change the whole structure of society and reshape the way we organize our economy, in much the same manner as did inventions such as the internal combustion engine of the last century. ICT's growth has already had and continues to have a major impact on how we live, work, spend our leisure time and even think. These characteristics make ICT a critical consideration if we want to shift toward a sustainable low-carbon society.

It is the view of the WWF, the United Nations and a significant number of world leaders that one of the world's most pressing challenges — climate change and the need to radically reduce GHG emissions globally while continuing to enable economic development, both in Organisation for Economic Co-operation and Development (OECD) countries and in emerging economies and poor countries — requires innovative action.

Although significant opportunity exists for ICT products and services to enable climate change mitigation, the opportunity is far from realizing its potential. With climate change now being one of the top issues at global, intergovernmental levels, a better understanding of the role of ICT is urgently required.

1.3 ICT Providers and Climate Change

On the technology and service provider side, an increasing number of ICT providers have begun to explore the opportunities provided by reduced GHG emissions. They are starting to explore ways in which they can leverage GHG emission reductions as a driver of innovation, growth and profit.

A number of business and nongovernment organization (NGO) initiatives exist and studies have been published over the past two to three years that indicate the significant role ICT can have in reducing GHG emissions. Of note has been the World Economic Forum's (WEF's) work to unify many of these individual efforts. The resulting work, a synthesis of the main ways ICT can mitigate climate change, was approved by more than 50 CEOs and ICT ministers in the 2008 Davos meeting. This WEF process aims to synthesize the best of existing approaches and generate greater momentum by linking efforts, improving consensus and raising the profile of the most impactful efforts to non-ICT CEOs and key decision makers in governments.

A lot is happening on the demand side as well. An increasing number of companies in high-carbon sectors, such as transportation, energy and construction, are looking beyond incremental reductions of GHG emissions and are looking into ICT solutions as a possible means to reduce their footprint. Such a transition to a low-carbon economy could result in significant revenue flows to those ICT companies that can provide low-carbon solutions. Although most investors remain

focused on the "risk" side of the issue, some are starting to assess potential winners in a low carbon economy. Many governments are also looking into possibilities to support the use of ICT solutions that can help reduce CO_2 emissions, especially in carbon-intensive sectors (see Note 2). The progress made by different ICT companies active in creating these new markets, what kind of strategies they have adopted, whether these measures translate into concrete business offers and so on are therefore of significant interest.

It is in this context that we have created this assessment that looks at the risk side of the equation as well as the opportunity side. In the five assessment sections outlined below, we have looked at the choices the ICT providers have made in terms of how they manage their own internal business and its impact on the environment ("environmental basics," "supply chain basics" and "carbon basics") as well as how they are positioning themselves to address the opportunities ("carbon delivery" and "carbon champions").

2.0 Objectives

The overall objective of the Gartner/WWF assessment is to provide insight into the commitment, transparency, capabilities and effectiveness of ICT technology and service providers related to:

- Reducing the environmental impact of their business operations, their supply chain, and that of their products and services
- Innovating, collaborating and exploiting the use of information and communications technology to tackle climate change
- Their ability to exploit carbon dioxide reduction as a commercial and cost-saving opportunity for themselves and their customers
- Providing the independent, unbiased advice needed to cut through some of the "greenwash"

There is very limited information available to buyers of ICT products and services related to the environmental programs of the providers. This assessment is different from other sources of information, such as the Carbon Disclosure Project, Greenpeace Guide to Greener Electronics or the Dow Jones Sustainability Index (DJSI), that still focus mainly or exclusively on the direct impacts from these companies and treat climate as a risk. This assessment has a strong focus on the ICT providers' core business, and how that links to a much wider reduction of GHG emissions, beyond that of their own operations. As such, it is an instrument that we believe provides insight into which providers will be best able to exploit the opportunities of a low-carbon economy as well as potentially make good partners for enterprises looking to innovate.

2.1 What This Assessment Is

The results afford an assessment of an ICT provider's strategic engagement in tackling climate change and in reducing the environmental impact of its business operations, its supply chain, and its products and services. It is, however, selective and nonexhaustive. It focuses on areas that are critical and where we believe there will be differentiation between the providers. It is meant to be challenging for the participants in order to see which providers are leaders in different areas.

The assessment instrument consists of a common set of questions for all the providers, regardless of the sector(s) they operate in — hardware, software, services or all three. It should be recognized, however, that different kinds of businesses will have different risks and opportunities and, hence, also different priorities, and thus their results will differ. There are no weightings applied for the different sectors.

2.2 What This Assessment Is Not

The study is not a definitive statement of the adequacy of the provider's complete environmental program, nor does it provide an audit of its program. In particular, we did not drill down into particular lines of business, product lines, service lines or products.

The assessment will not tell you who is providing the most energy-efficient PC or server today. Neither does it look at issues of how hardware providers handle e-waste or their plans to remove hazardous substances. If you want that information — and it is good information to possess — you can obtain it in other ways.

2.3 How to Use the Framework

- Use this assessment to help you make choices about strategic partners and choices related to suppliers of ICT equipment, services and solutions.
- You will find it useful to increase your own understanding of the issues.
- Use it to stimulate a dialogue with your providers to drive improvements in the providers' environmental performance.
- IT providers should use this assessment to identify current best practices and compare their actual or estimated performance with their current investment and strategy. Participating providers that have been given very unbalanced scores can assess their balance between communication and action, both those that communicate more than they act and those acting more than they communicate.

3.0 Framework Overview

"Green IT" is an oxymoron, until you consider use of ICT to "green" business and society. With the inherent lack of greenness in the technology and the potential for positive effects through its use, it is very important for providers in the ICT space to do two things:

- Minimize the negative environmental effects of ICT technology and technology services, throughout their life cycles
- Ensure the maximization of the positive impacts of employing ICT technology and services

Both of these goals apply to the providers in terms of running their business and, more importantly, in terms of effecting more systemic or societal change that has an impact on climate change. The assessment framework is structured to cover both aspects across technology, service and software vendors. It is also structured to look at what the providers are doing internally and externally with customers, partners and other people that they interact with and influence.

The framework has five sections:

- Environmental basics
- Supply chain basics
- Carbon basics
- Carbon delivery
- Carbon champions

Each one tells you something different about the organization.

The first three — environmental basics, supply chain basics and carbon basics — are more inward focused, looking at how providers run their business internally, their supply chains, and how well they communicate their work and impact on climate change. All three are more focused on performance today.

The remaining two — carbon delivery and carbon champions — look at the extent to which the providers are focusing on climate change as a commercial opportunity and are actively engaging with a range of constituents to influence awareness and the frameworks that will govern the political and commercial responses to climate change.

These latter two, along with some of the aspects of carbon basics, examine how well they are able to deliver solutions, services and/or products that help enterprises and buyers of ICT-related products and services to reduce their own greenhouse gas emissions; and the extent to which they are innovating and driving emissions reduction forward. The following will look at each of these sections in more depth.

3.1 Environmental Basics

Objective: Assess whether the company has undertaken some of the basics to understand and tackle the environmental impacts of their business operations and gain insight into the maturity of their capabilities here. Throughout the framework, the scoring does reward providers who have been managing the environmental effects for longer, which reflects the maturity of their processes, systems and, to some extent, their culture.

Some of the questions in the instrument look at:

- Environmental policy
- Environmental impact assessments
- Objective of compliance
- Environmental management system and ISO 14001 certification, Eco-Management and Audit Scheme (EMAS) registration
- Staff training and engagement
- Transparency
- Management of waste (looking at data points as far back as 2000)
- Recent or pending environmental infringements

3.2 Supply Chain Basics

Objective: Assess whether the company has undertaken some of the basics in managing the environmental standards and risks associated with the physical supply chain as well as the service value chain.

Some of the questions in the instrument look at:

- Responsibility for the management of the environmental issues in the supply chain
- Staff training
- Climate change in contract adjudication

- Environmental assessment of physical supply chain and service value chain
- Environmental audits of suppliers and service providers, particularly high-risk suppliers

3.3 Carbon Basics

Objective: Assess the extent to which the provider has undertaken some of the basic steps to formulate and execute a climate change strategy.

Carbon basics has two axes: housekeeping with an internal focus and raising awareness that is focused more externally.

Housekeeping

This axis looks at internal practices regarding the organizations' policies and procedures regarding climate change. Do they have an assigned person for dealing with climate? Do they report on emissions?

Some of the questions in the instrument look at:

- Analysis of GHG sources
- Governance associated with the climate change strategy
- Methodology used, precision and independent verification of GHG emissions
- Reporting and longevity of managing GHG emissions (we only look as far as 2000)
- Setting of GHG targets
- Reducing emissions
- Precision of GHG emissions reporting

Raising Awareness

This axis looks at the policies and practices for promoting awareness and support for emission housekeeping practices. Is there publicity, promotion and support for internal practices? Is there publicity, promotion and support for climate change?

Some of the questions in the instrument look at:

- Publicizing GHG emissions and targets
- Publicly supporting measures to reduce GHG emissions
- Actively encouraging action on climate change with clients and other stakeholder groups
- Supporting others involved in climate change campaigning

3.4 Carbon Delivery

Objective: Assess the extent to which the provider is developing a capability to deliver products and services that will help their customers reduce their GHG emissions. In other words, it is primarily focused on what providers are doing internally today to meet external demand for low-carbon solutions, and to target high-carbon and potentially high-revenue areas.

Most enterprise now understand they need to purchase ICT equipment that reduces their emissions through improved energy efficiency, or source services that have been designed with a

lower carbon content. However, they should also be looking for partners that can help them to reduce the sources of carbon in the value chains in which they participate and help them challenge their current way of doing business — for example, do they need to fly or is it better to have virtual meetings, and how can products be delivered as reduced-carbon services? Particularly in carbon-intensive areas like transportation, energy and buildings, companies can ask how ICT equipment and services can help them actually to reduce the big chunks of emissions.

Carbon delivery has two axes focused on the entire product/service portfolio. The first axis focuses on the extent to which the product/service portfolio contains low-carbon solutions — that is, a low-carbon impact from the product itself (a direct effect) or an indirect effect from the product's use of the service provided. The second axis looks at how the products or services address high-carbon areas where the need to reduce GHG emissions is urgent and where significant revenue streams could be made available.

Product/Service Portfolio With Low-Carbon Solutions

Some of the questions in the instrument look at:

- Have the providers assessed the impact of products/services (positive and negative)?
- Have they assessed the market opportunity of low-carbon solutions, and are those seen as a strategic opportunity?
- Do they have products/services that help clients reduce or monitor their GHG emissions?
- Are they employing life cycle assessments to understand the full life cycle impact of their products and services and make improvements accordingly?

Product/Service Portfolio With High-Carbon Solutions

Some of the questions in the instrument look at:

- Is there evidence of cross-industry collaboration on solutions that tackle high-carbon problems?
- Do the providers have solutions targeting high-carbon areas, such as solutions that dematerialize, reduce travel/transport, reduce energy consumption or enable use of renewables?
- Are they trying to understand the direct, indirect or systemic impacts of the solutions?
- Do they support others involved in climate change campaigning?

3.5 Carbon Champions

Objective: Assess the extent to which the providers have identified ways to treat climate change as a strategic opportunity, and the extent to which they are trying to influence the policies and frameworks that will govern a low-carbon economy.

The carbon champion section is divided into an internal part that assesses future products for a low-carbon economy and an external part that assesses how companies push for a low-carbon future. Internally, the issues focus on what their R&D structures look like. Did they design their products and services with climate change as a design consideration? Do they have incentive schemes and recognition structures for coming up with these new solutions? Do they have future products for a low-carbon economy? Are people looking ahead?

On the external-facing side, are they actually talking about these things? Are they just doing it internally or are they also making people and customers understand that they think this is important? How public are they? Are they raising awareness around the issue? Are they contributing to development of new legislation for a low-carbon future? Are they contributing to reports that push the issue forward and help us understand these issues better?

Future Products/Services for a Low-Carbon Economy

Some of the questions in the instrument look at:

- Is there clear responsibility and accountability for the development of low-carbon solutions?
- Do climate change factors influence R&D and service development?
- Are low GHG emissions part of all design remits?
- Are the providers designing based on full-life-cycle GHG emissions?
- Are there appropriate incentive schemes and controls?

Pushing for a Low-Carbon Future

Some of the questions in the instrument look at:

- Are the providers reporting Scope 3 (see Note 3) GHG emissions?
- Are they contributing to development of legislation or regulation processes?
- Are they contributing to thought leadership, increased awareness and understanding the impact of these efforts?
- Are they putting in place processes or tools that help clients procure and use low-carbon products and services?

4.0 Method

4.1 Providers

Twenty-four providers were selected for the assessment. They were chosen to be a geographically dispersed blend of market-leading technology providers in the hardware, services and/or software sectors. Geographically, they are North American, European, Chinese, Japanese, Taiwanese and Indian organizations.

The providers invited to participate are shown in Table 1.

Table 1. Provider Groups

Providers
Accenture
Acer
AT&T
BT Group
China Mobile

Providers
Cisco
Dell
Deutsche Telecom
EDS
Ericsson
Fujitsu
Google
HP
IBM
Lenovo
Microsoft
Nokia
Nortel
Oracle
SAP
Sun Microsystems
TCS
Verizon
Wipro Technologies

Source: Gartner and WWF

4.2 Survey Instrument

The survey instrument consisted of 82 main questions organized in the five sections of the framework. The instrument was sent to each organization and completion was overseen by a senior executive — in most cases, with direct responsibility for environmental programs. Although we entered a dialogue and sought clarifications from the respondents, we assumed that the responses were accurate; thus, we recognize that there is a possibility of inaccurate responses that could distort our results.

The instrument had to be very selective in the areas it looked at, as 82 questions are insufficient to cover everything. The questions were developed to touch on the most important elements that we felt would be symptomatic of what is going on in the wider organization, as well as to identify differentiation between providers. The questions also looked for evidence of historical data to give a better indication of how long the respondent had been managing the issue.

It is important to note that all the information was volunteered by the respondents and is the only information used in the analyses.

4.3 Scoring

Each individual question is scored against a scoring system that includes weightings based on how important the question is. The actual scoring process was a joint effort between Gartner and WWF. The scoring recognizes longevity and past performance in that there are points awarded to organizations that have been managing and improving their environmental activities within their

core business for a longer period of time (we ask for waste and GHG data points back to 2000). The scoring is also strongly focused on what has actually been done, rather than intentions and aspiration.

Each dimension within the section is scored as a percentage, the environmental and supply chain basics both being single-dimensional and each of the three carbon sections being two-dimensional.

With only a couple of exceptions, the questions, scoring and weighting are the same for a software, hardware or services company. There is no attempt to adjust or weight the scores based on the risks or opportunities of the sector. So, for example, the environmental issues and risks in the supply chain of a hardware manufacturer are significantly higher than those of a pure software company — but both are scored equally. However, our comments and analysis reflect that obvious difference.

The Graphs — Representing the Scores

Scores in the first two sections, environmental basics and supply chain basics, are represented in simple, one-dimensional scales ranging from zero to 100% (see Figure 1). These depict whether or not the providers have done their basic housekeeping. The higher in the graph they appear, the more completely and comprehensively they have addressed the basics.

Figure 1. Environment Basics and Supply Chain Basics Graph Type

Source: Gartner and WWF

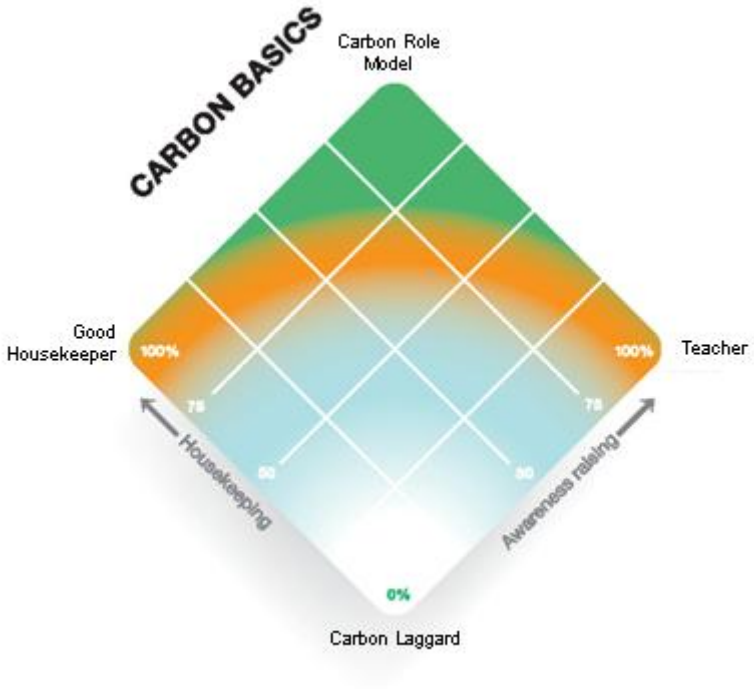
The scores from the remaining three sections (carbon basics, carbon delivery and carbon champions) are depicted in diamond graphs reflecting the two main axes, as described in the sections above, with scales from zero to 100%. Each of the four corners of the graph is labeled to represent the significant aspects of the section (see below). The placement of a given provider within the graph represents the balance between the main axes and the internal and external aspects of the dimensions. Usually, the best position for a provider will be in the middle on the horizontal axis, and high up in the graph in the vertical axis — that is, near the top center of the diamond. This position represents an organization that is actively working toward and promoting a low-carbon future, taking a very balanced approach — for example, in terms of balancing doing the internal housekeeping and raising awareness. A skew left or right suggests a lack of balance in one way or another; if this is part of a strategy, this could be positive, but if not, it will mean, for example, that a company is in danger of being seen as greenwashing or that it is not using its capacity in an efficient way.

Carbon Basics: The objective is to assess the extent that companies have undertaken some basic steps as part of a climate change strategy. This is divided into two axes: an internal part that assesses the housekeeping aspects and an external part that assesses awareness raising among key stakeholders.

In the graph (see Figure 2) where companies are plotted, the four corners are:

- Carbon laggard: Indicating no or little action at all in terms of a climate change program
- Teacher: Indicating a leaning toward communication vs. attending to the housekeeping activities — that is, more talk than action
- Good Housekeeper: Indicating a leaning toward housekeeping vs. external communication
- Carbon Role Model: Indicating significant action with regard to both housekeeping and communication

Figure 2. Carbon Basics Diamond Graph



Source: Gartner and WWF

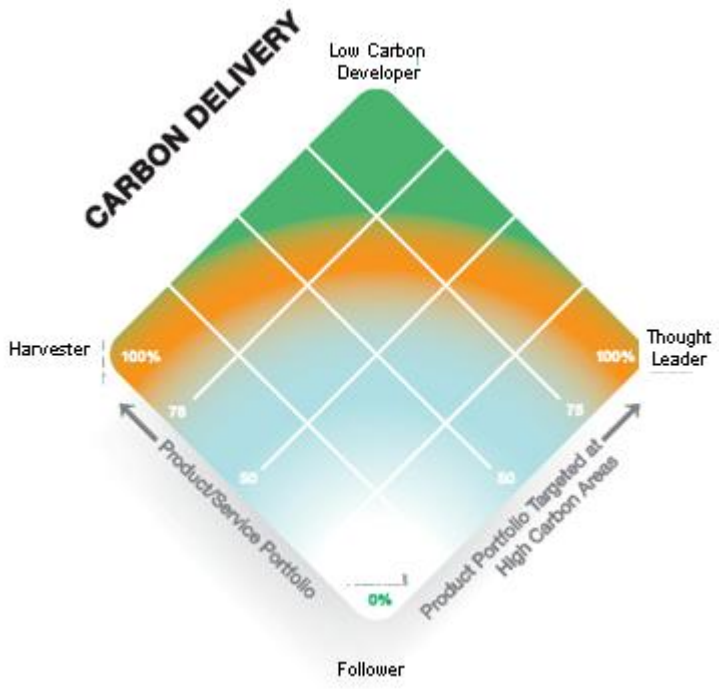
Carbon Delivery: The objective is to assess the extent to which the solutions companies are offering to customers support a low-carbon development path. This is divided into an internal part that assesses the company's overall product/service portfolio and a part that assesses the product portfolio that it provides that is used in high-carbon areas.

In the graph (see Figure 3) where companies are plotted, the four corners are:

- Follower: Indicating no or little action at all in this area

- Harvester: Indicating an integrated approach to deliver GHG emission reductions through the existing product/service portfolio
- Thought leader: Indicating a strategic approach to deliver ICT solutions that can help customers to reduce GHG emissions in high-carbon areas (such as buildings, transportation and heavy industry)
- Low-carbon developer: Indicating significant action with regard to both delivering GHG emission reductions through the existing product/service portfolio and ICT solutions that can help customers to reduce CO_2 emissions in high-carbon areas

Figure 3. Carbon Delivery Diamond Graph



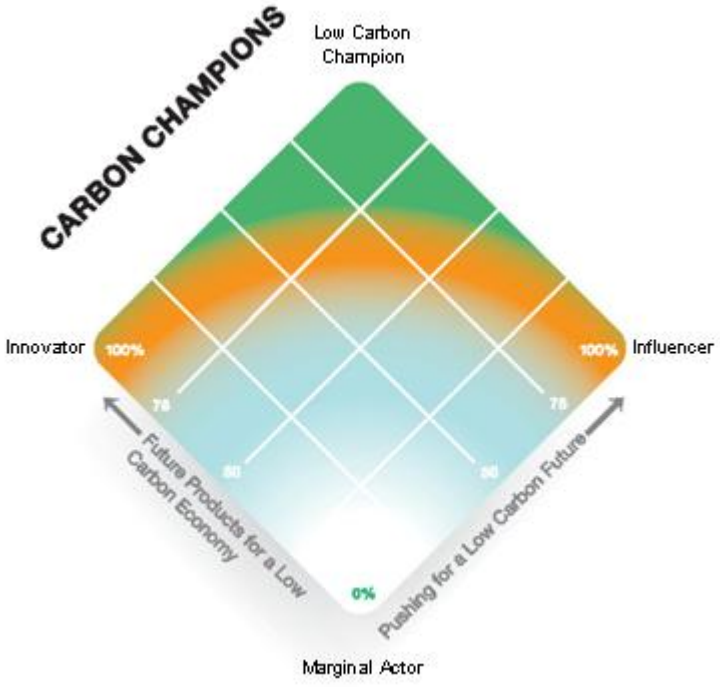
Source: Gartner and WWF

Carbon Champions: The objective is to assess the extent to which companies have found ways to treat the need to reduce GHG emissions in society as a strategic opportunity. This is divided into an internal part that assesses future products for a low-carbon economy and an external part that assesses how companies push for a low-carbon future.

In the graph (see Figure 4) where companies are plotted, the four corners are:

- Marginal actor: Indicating no or little action at all in this area
- Innovator: Indicating significant efforts by companies to deliver future products for a low-carbon economy
- Influencer: Indicating significant activity where companies push for a low-carbon future in different ways
- Low-carbon champion: Indicating significant action with regard to future products for a low-carbon economy and pushing for a low-carbon future in different ways

Figure 4. Carbon Champions Diamond Graph



Source: Gartner and WWF

Being positioned high up and central in the green areas is the best place to be from a climate point of view. It's not necessarily bad being skewed but it tends to show a lack of balance in the responses.

We have placed a line on the chart to connect the dots in the triangles and diamonds simply as a visual aid. Good would be a perfect "W" with high central positions on each chart.

5.0 Interpreting the Results

5.1 How to Use the Results

Participation in the assessment in and of itself is a very important sign, and we absolutely give credit to those organizations that did participate and did respond. Even those with a weak score are sufficiently aware and concerned to have taken the time and effort to complete the instrument. We have been impressed by the openness and level of engagement in this process by all the respondents.

Use the results to compare an individual provider's progress and commitment to reducing the environmental impact of its business operations, its products, its services and to tackling climate change.

It is fair to compare and contrast similar organizations — that is, organizations in the same sector, such as hardware, services or software. However, it is not sensible to directly compare organizations that are in different sectors. Directly comparing a hardware company with a software company would be like trying to compare an insurance company with an automotive manufacturer. We have treated large complex providers like HP, IBM and Fujitsu as single

organizations and given them one score despite this effectively hiding some of the differences we know exists between their internal sectors and geographies.

Different enterprises might choose to put their emphasis on different parts of the framework based on their priorities in terms of what they expect from a provider. Providers focused only on more energy efficient equipment (that is, the 2%), a perfectly respectable choice, will struggle to be a leader in "Product Portfolio Targeted at High-Carbon Areas." Similarly, providers choosing not to influence the regulatory and policy framework of the future will struggle to be leaders in "Pushing for a Low-Carbon Future." If the issues covered by an aspect of the framework are not important to your enterprise, then don't focus on that part of the framework.

Increasingly, enterprises want to include environmental and climate change criteria as part of their decision making in choosing strategic partners. This framework provides an objective assessment of the providers that can be used to help inform that decision. It gives real insight into which providers are strategically engaging with tackling the risks and opportunities associated with climate change.

We would encourage you to use the results to start a discussion with your providers about their strengths, challenges and opportunities to improve.

5.2 How Not to Use the Results

- Do not attempt to directly compare providers in different sectors — that is, hardware, software and services. There is no weighting in the scoring to reflect varying risks and opportunities between different sectors, so the fact that SAP scores poorly on supply chain does not necessarily mean that it puts them in a higher-risk category than IBM.
- Do not use it in isolation. To make a choice between providers or particular products and services, we would encourage you to use other information as well and, of course, to talk to the providers about specific issues — particularly issues that we have not addressed, such as the energy efficiency of equipment under consideration, and the substance and materials policies (for example, use of brominated flame retardants, PVC and so on — see the Greenpeace Guide to Greener Electronics).
- Do not aggregate the scores. Aggregating the scores is not going to provide any great insight and somewhat oversimplifies the issues.
- Do ignore small scoring differences.

5.3 Interpreting Nonresponses

Responding to the instrument in and of itself is a very positive sign and we appreciate those organizations that did participate and did respond. In particular, providers such as China Mobile, Lenovo and Wipro that knew that their likely results would not place them in a leadership position. These organizations have recognized the importance of transparency, and based on the feedback we have from them, we anticipate rapid and significant improvements.

Nine of the twenty-four providers invited to participate chose not to. Our analysis of them is based on their publicly available information, on the interactions we have had with them outside of this assessment and on feedback from their clients. With the exception of Deutche Telekom, we believe that had they chosen to participate they would not have been positioned well. The companies that chose not to participate are:

- Accenture
- Acer

- AT&T
- Deutsche Telekom: It has been active in the space, for example by contributing to several studies from the Global e-Sustainability Initiative (GeSI) and European Telecommunications Network Operators' Association (ETNO). We believe that it would have scored above average, but enterprises should ask it why it did not participate, and ask it to provide tangible evidence of its development of low-carbon solutions
- EDS: We anticipate HP driving some improvements, but that will take time
- Microsoft
- Oracle
- Sun
- TCS

In our opinion most of the nonresponders would not have been positioned well because their programs either do not exist, are mostly marketing led, are immature or have significant gaps in them.

Any enterprise that wishes to consider environmental management and climate change programs as part of its assessment criteria in selecting suppliers or strategic partners should ask them why they chose not to respond, and ask for extensive evidence of a credible program and capability.

6.0 Results

6.1 Key Findings

The ICT sector has started to move itself into a unique position since the beginning of 2008. It is probably the first major industry sector that has begun to establish itself as a "winner in a low-carbon economy." Until now, this has only been something that relatively small companies in the field of renewable energy have spoken about. As the main challenge in the climate and energy field is on the demand side (consumption of energy) and not the supply side (production of energy), this development in the ICT sector is very important.

The development in this area is in the very early days, and we anticipate a lot of change and development during the next two years at least. The assessment findings below should be viewed from this perspective. Although the assessment focuses on a number of areas where improvement is needed and where providers need to change to deliver and be credible, the fact that we are just starting to see a shift from a focus on internal emissions toward the potential contributions through provisions of low-carbon solutions is a very interesting one. This could be an important contribution to the global efforts to reduce GHG emissions, and, as a user of ICT, it is important to know how this can be supported, given that the users are interested in reduced GHG emissions and are less vulnerable to increased energy costs (beyond the ICT equipment).

6.1.1 Rapidly Moving Area

Why Should You Care About This? As new initiatives take off and new regulations are implemented, the winners and losers in the ICT sector will change. Compared with other issues affecting the ICT industry, this is an area where significant opportunities and risks with a substantial impact on the providers in the industry will materialize during the coming years.

The issues around the environmental sustainability of ICT (green IT) are a rapidly moving area. From being almost absent in the sector two years ago, these issues have now moved to center

stage. As different companies are choosing very different approaches, as discussed below, with numerous projects under way, this is a field where rapid changes can be expected during the next few years. We already anticipate that, in 2009, we can expect a number of changes when it comes to the companies that are in the lead.

During the assessment, several of the providers launched a number of initiatives. Many of these new initiatives relate to how the companies can provide low-carbon solutions, not by providing energy-efficient products, but by delivering services like flexible working, virtual meetings and smart grid applications. Two of the most comprehensive and maybe surprising projects came from companies in emerging economies.

- Wipro launched Eco Eye in early June. It is a program that aims to increase ecological sustainability in all its operations and areas of influence. Wipro wants all stakeholders — employees, partners, suppliers, customers and immediate communities — to be involved in this initiative.
- China Mobile has begun to implement its Green Action Plan (see Note 4) with a target to increase the energy efficiency (per unit of telecommunications traffic) by 40% in 2010 compared with 2005 and also save 8.0 billion kilowatt-hours of electricity consumption compared with 2005. This would save 6.94 million tons of CO_2. The Green Action Plan also includes measures that aim to "assist the customers to decrease energy consumption and reduce emissions," hence also addressing the "98% window of opportunity" (see Note 5).

Other initiatives that happened during the assessment project include:

- Cisco extended its Connected Urban Development (CUD) project in early 2008 (see Note 6).
- HP announced its sustainability lab in June 2008, where at least one of the three priority areas focuses on helping customers reduce their CO_2 emissions with smart ICT solutions (see Note 7). HP also published a guide that identifies the potential to reduce CO_2 emissions by using existing HP solutions (see Note 8).
- IBM has strengthened its Project Big Green; for example, it announced "Software for a Greener World," which includes new and existing offerings that help organizations optimize their infrastructure, workloads and people for energy efficiency (see Note 9). And similarly, it has launched a number of initiatives (see Note 10) specifically targeting the 98%.
- Microsoft started to fill positions around that of the new chief environmental strategist (see Note 11).
- Cisco and Lenovo announced a GHG target, and we expect Nortel, SAP, Nokia and Ericsson to do the same.
- Dell achieved its carbon-neutral status five months ahead of its plan, and had its GHG emissions verified by an independent third party.
- A number of providers started reporting Scope 3 emissions such as business travel (for example, Dell), and HP is the first to report an estimate of its supply-chain-related emissions.

Many of these new initiatives are targeting the applications of ICT — what we will refer to as the 98%, because they target 98% of global GHG emissions — rather than ICT itself — referred to as

"the 2%," because ICT itself accounts for approximately 2% of global GHG emissions. With this focus, it is safe to say that we will see some surprises in the near future.

During the past 12 months, the industry has moved a long way. Earlier "green IT" initiatives were often more focused on PR and not linked to finding new markets. Many of the earlier PR-led or "philanthropic" motivated initiatives, while raising awareness, were never serious attempts to address the issues. Initiatives like "Plant a Tree for Me" that Dell launched for customers in January 2007 would probably not be launched by anyone claiming leadership today (see Note 12). Similarly, Nokia would probably not put its efficiency in mobile chargers very high up on the agenda if it was launched today (see Note 13). Although these might be important communication vehicles toward individual end consumers, it is hard to see these as strategic engagements that will position the companies in a way where they can tap into the new revenue streams that a transition toward a low-carbon economy will provide.

This is the nature of the challenge and opportunity that lies ahead for the ICT industry.

Bottom Line: Expect to see rapid change. Favor ICT providers that can demonstrate an understanding of a low-carbon economy and know how they can deliver relevant solutions. Look at the providers that have scored well in all three carbon categories. Vague or purely aspirational statements are no longer enough to be considered serious; a leader should be able to provide you with concrete numbers and CO_2 savings amounts to support the business case for solutions.

6.1.2 A Myopic View on a "Problem"

Why Should You Care About This? The programs inside the providers that have scored lowest on the carbon categories are typically held together by a small group of people lacking support from the rest of the organization (the same will be true for many of the nonrespondents). These providers can usually put someone in front of a customer able to talk intelligently about the issue. But obviously, this does not render them the most appropriate partner. One of the risks in this situation is that the low-carbon solutions are not really an integrated part of the provider's strategy, leaving the enterprise either with a solution that's not really low carbon or without any real support.

Up to 2008, the industry has treated the issues of environmental sustainability and climate change mostly as a risk and, at best, a tactical opportunity, rather than as a strategic discontinuity with significant opportunity. Hence, we see the center of gravity for managing these issues still sitting within groups with responsibility for outward communication, such as corporate social responsibility (CSR), public relations and product marketing. We see evidence of small groups within the providers that see the opportunities of a low-carbon economy, and they are struggling to overcome the sheer momentum of the machine that wants to perpetuate business as usual.

This myopic behavior has been caused by the dominant provider decision makers simply reacting to what clients are asking about and doing linear "forecasting" or planning. In other words, they are defining the "problem" of "green" (and to a lesser extent the "opportunity") based on what is right under their noses. This is due in large part to the U.S.-centric nature of the industry. Although most of the providers have small groups that have a vision about the longer-term implications, they have been, and in many cases remain, isolated and have not been influencing company actions in any material way. Our opinion is that this is where many of the nonrespondents sit. This is certainly where Cisco was 18 months ago, but we have seen a significant improvement in the past 12 months.

Looking at most of the strategies and product and service portfolios as they stand today, the conclusion would be that most of the industry is still convinced that climate change is not much more than a fashion requiring a tactical response because it, like other fashions, will eventually go away.

Hence, the center of the discussion and messaging from providers (and the media) is about who has the most energy-efficient equipment. This is an important issue, but it is a narrow and short-term definition of the issue that individual product marketing teams will naturally focus on. This approach is fine as part of a wider strategy and a wider definition of the issue, but it is these latter two aspects that are generally missing.

Bottom Line: IBM, HP, BT, SAP, Fujitsu and, to some extent, Cisco show some evidence of starting to do some serious thinking along these lines, even if it has not yet translated into real solution strategies. In terms of those participating in this assessment, it is these providers that are most likely to innovate at the moment.

6.1.3 2% or 98%, Different Companies and Different Approaches

Why Should You Care About This? Gartner has estimated that ICT is responsible for approximately 2% of global GHG emissions, everything else obviously accounting for 98%. ICT providers can focus their own climate change strategies on fixing ICT — that is, "the 2%" (more-efficient servers, better power supplies and so on) — and/or they can focus on addressing the other sources of GHG emissions — that is, "the 98%" (for example, building solutions that reduce the need for travel or transportation). Or they can target both.

As we move into a low-carbon economy, enterprises will need partners that can help them analyze, manage and improve their environmental footprint and even develop new business models. That is not to suggest that those providers focused on the 2% don't have a contribution to make in tackling ICT's own footprint, but real innovation will come from those looking at the wider, 98% solutions. Enterprises that have ICT providers helping them become winners in a low-carbon economy will be at a significant advantage.

One major difference between the providers is the way in which they approach the challenge of climate change. Some focus on their own direct and indirect GHG emissions. Dell and Lenovo are good examples of companies that are focusing on the 2% — ICT's own impact. They can be contrasted with BT, HP, Fujitsu and IBM, for example, which are starting to focus on both the 2% and the 98%.

Probably the most interesting contrast is Nortel vs. Cisco. Nortel is primarily focused on the 2%, competing against Cisco on the basis of the energy efficiency of their equipment. Although at this stage more by accident than design, Cisco is in a strong position, and actively moving to strengthen that position, to tackle the 98%. Both approaches have merit, but we believe that in the long term, Cisco's strategy will pay dividends.

When it comes to the work with 2% and 98% China Mobile is an interesting company. It has been focused on energy efficiency in some areas, but a climate focus is new. Since early in 2008, it has started to move on the climate side and on tackling the 98%. We anticipate that it will move quickly on both the 2% (see Note 14) and the 98% areas in parallel. Its approach is comprehensive, where it will address the direct impacts and encourage sustainable use of ICT services.

In the software and services sector, there are companies like SAP that largely ignore the 2% and only mostly focus on how they will help customers reduce CO_2 emissions with smart ICT solutions. Whether this is a successful approach depends on how customers, the media and regulators judge this behavior. However enterprises are starting to look for serious solutions and are asking fairly detailed questions about how the solution providers are conducting themselves. At this time, a just about satisfactory performance will not be differentiated greatly from an outstanding performance in this space, but poor performance could easily result in loss of business. However, our view is that during the next five years, contract adjudication criteria around this issue will get significantly higher weightings.

Fujitsu has put in place its Green Policy Innovation program, which is a leading example of how ICT vendors and service providers should be thinking about their role in tackling climate change (see Note 15). The program has set itself a goal of reducing customer emissions by 7 million tons — of which its methodology suggests 0.76 million tons will come from the improved performance of the ICT infrastructure and 6.3 million tons will come from the business solutions through greater efficiency in the business. It is a good approach in that it is targeting both the 2% and the 98% and there is a measurement methodology.

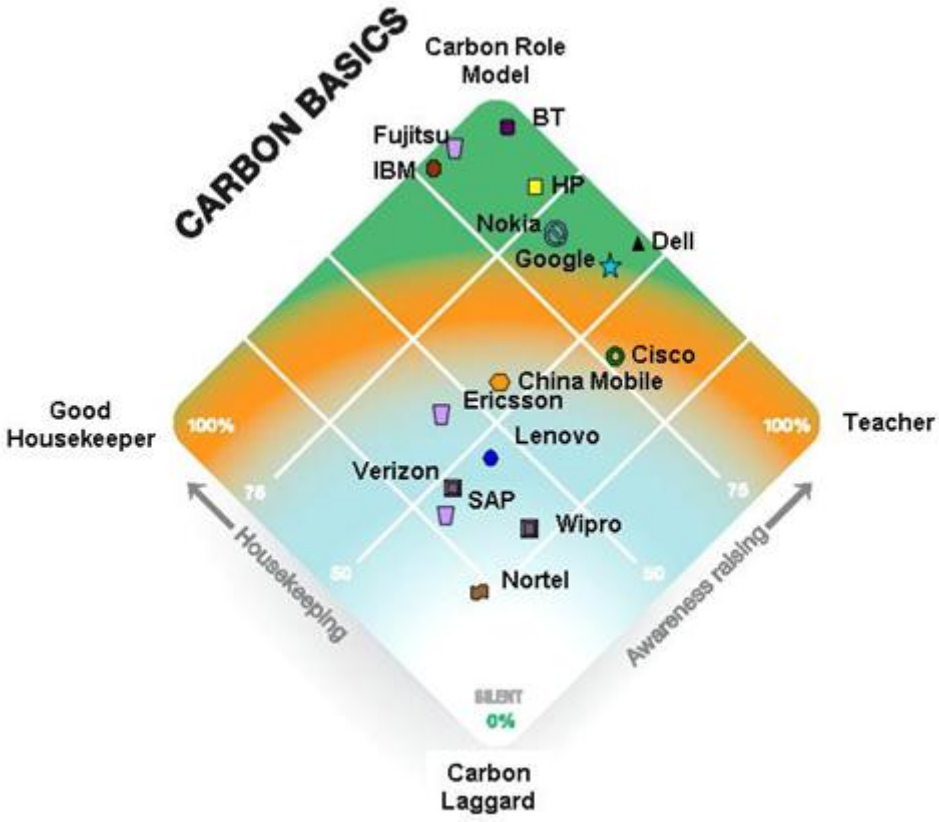
Bottom Line: If you are looking for business solutions, look for strategic partnerships with ICT providers that are developing business solutions that tackle the enterprise's high-carbon areas. Leaders today are BT, Fujitsu, HP and IBM, and Cisco is starting to show promise.

6.1.4 Talking the Talk and Walking the Walk

Why Should You Care About This? The industry is awash with green noise and it is sometimes difficult to hear the voices of those who are taking effective and material action among those shouting above the crowd.

One of the most striking results of the assessment is the difference between providers in relation to their communications around climate change and what they have actually done to get their own house in order (see Figure 5).

Figure 5. Talking About or Doing Housekeeping



Source: Gartner and WWF

Enterprises should be particularly skeptical of providers that have communicated a lot about climate change and yet have chosen not to be transparent. If any enterprise is not being transparent, one should assume that there might be few resources, little support or little strategic focus from the senior management for sustainability work. A company only needs skilled communicators and a few enthusiastic individuals to sound convincing. Within the context of this assessment, we cannot be certain about the nonrespondents for obvious reasons, but we would be especially concerned about their balance between talking and housekeeping.

Some companies are quite unbalanced between talk and housekeeping. Dell, Cisco, Google and, to a lesser extent, Nokia are four of the companies that have the most leaning toward more talking than housekeeping (more than a 15% disparity between "housekeeping" and "raising awareness" under Carbon Basics). However, none of the respondents to the assessment have crossed the line into greenwashing — because all four have reasonable programs in place even if there is room for improvement.

For Google, the situation is more complicated. On the one hand, Google is exploring some innovative ways to reduce GHG, but it is very much related to server power consumption and data center efficiency. In terms of innovative use of ICT services, there is very little that Google has today. Some basic tools for more optimal transportation and Google Earth applications are pretty much the range of what it offers. Google recently announced a partnership with GE for smart metering that might produce some interesting results, but even that seemed to focus on lobbying. As Google is seen as an innovative company that is on the forefront of thinking and action, its lack of anything more substantial could be a liability the day a competitor with a more comprehensive sustainability/low-carbon approach emerges.

On the other hand, IBM and Ericsson seem to have done more housekeeping and thinking in terms of low-carbon solutions than they communicate and turn into business. If they do not provide a coherent package they might be wrongly seen as laggards in this field.

Bottom Line: Enterprises should not confuse communication, visibility and big aspirations with material action on climate change. We recommend that enterprises favor providers that are transparent and look for evidence of good practice as well as a road map for improvement. While the basic carbon data does not tell the full story, the data in Figure 22 in Appendix 1 forms a foundation against which to measure whether a provider's talk represents material action or greenwashing. From a greenwashing perspective, we have no major concerns about any of the respondents in this assessment so far, but we would recommend that enterprises take a much closer look at all providers, including the nonrespondents to this assessment.

The respondents that are walking the walk are BT, IBM, HP, Nokia, Ericsson and Fujitsu, some of which are being overly modest in their talk.

6.1.5 Changing the Rules of the Game

Why Should You Care About This? The ICT industry has an important role to play in tackling climate change. It is important that it has a voice that influences, for example, national, regional and international policy, fiscal measures, and regulation — that is, the rules of the game. One could be cynical and suggest that doing so is self-serving, and there is an element of truth to that. However, this is such a nascent area, where policymakers really don't have the information or experience they need to make informed decisions, we believe ICT industry involvement is imperative and justified. That involvement needs to be both direct and indirect through the auspices of industry bodies. Enterprises looking for partners who are influencing the regulatory frameworks for a low carbon economy should look for providers scoring well under "pushing for a low-carbon future." Because this is a rapidly developing field, those engaging in the rules of the game are also more likely to be able to capture emerging opportunities and be prepared for new rules and regulations that can change the business environment.

Few companies have any proactive strategy for changing the rules of the game. Two companies do close to nothing in this field: China Mobile and Wipro. Although no one scored particularly highly in this area, HP, Dell, BT and Google scored highest, with Cisco and IBM right behind.

Two companies that are interesting to compare are Nokia and Dell. Both have a tendency toward more talking than action. Nokia has some products and services that address the needs of a low-carbon economy, but it does little to push for a low-carbon framework. Instead, it focuses more on targeting communications toward consumers. Dell, on the other hand, does not have much in the way of products or services to address the 98%, but is pushing much more strongly for a low-carbon framework. This could be seen as a willingness to contribute to a dialogue that will potentially challenge Dell's product and services portfolio.

Nokia gets high scoring for providing low-carbon solutions because the current version of the assessment does not really differentiate the relative merits of the low-carbon solutions. (There is no measure as to the potential carbon reduction capacity.) Nokia has identified its chargers as a major source of emissions related to its products. This is obviously true from the perspective of the immediate and direct impact of the products. However, compared with, for example, transport solutions, smart grids and buildings that companies like BT, IBM, Cisco, HP and others are starting to target, it is quite a myopic response to the needs of a low-carbon economy.

SAP is an interesting company in this field. It scores very high when it comes to providing low-carbon solutions and has some interesting services in this field. But beyond signing various collective commitments to action, it is taking little direct action in the area of influencing relevant policy.

Bottom Line: Enterprises looking for partners that are influencing the regulatory frameworks for a low-carbon economy and that are well-prepared for new changes should look for providers scoring well under "pushing for a low-carbon future." This would include HP, Dell, BT, Google and maybe IBM.

6.1.6 Environmental Burden Assessment

Why Should You Care About This? Defining what is green and what is not is hard without a framework for guidance. An environmental burden assessment along the lines that Fujitsu is using provides real insight.

For most vendors and service providers, the definition of what is green is based on the subjective judgment of a marketing team (who, incidentally, usually have no real competence to do so). Therefore, the greenness (even if well-intentioned) is usually very superficial and highly selective, resulting in the greenwashing pervading the industry today.

Fujitsu has created a framework and process for the environmental burden assessment of products and services throughout their life cycle and has laid down criteria for what thresholds need to be crossed, such as a 15% reduction in GHG emissions, in order for a product to be categorized as a "Super Green Product" or the service as an "Environmentally Conscious Solution."

This kind of approach sets a standard for the whole industry and would cut through the greenwash that pervades the marketing of most of the providers today.

Anyone interested in looking at some of Fujitsu's documentation can find it on the Web (see Note 16).

Bottom Line: All ICT providers should define a similar framework and justify the positioning of their products and services against such an assessment. Doing so would significantly help their own internal design and marketing teams. Enterprises can use this approach to assess the extent

to which their providers are looking for the superficial vs. a more balanced and detailed approach in which a product or service is looked at more holistically.

6.1.7 World-Class Examples of Employee Engagement in Environmental Issues and Climate Change

Why Should You Care About This? The biggest major challenge in moving an organization forward strategically to address climate change and environmental sustainability is convincing employees and associates that this is something the organization is serious about and something they should care about in their professional lives.

BT, Nokia and Google provide excellent examples of educating and engaging employees. Examples of their approaches include:

- Environmental road shows, annual "environment weeks" and "alternative transportation" days
- Global, regional and virtual environmental forums for senior management and other staff to discuss environmental strategy
- External speakers invited to bring their perspectives in open forums, including NGOs
- Competitions encouraging and rewarding environmental innovations
- Awards and recognition for environmental innovation
- E-learning modules covering a wide spectrum of issues, including environmental decision making and business case development
- Internal environmental Web site
- Environmental topics embedded in most training materials for management of other disciplines
- Internal recycling and energy-saving campaigns addressing the work and home environment
- Employee commute and flexible working programs
- Appointing people into roles such as "energy champions" and "carbon busters"
- Web site with real-time data reporting kilowatt-hours of on-site renewable generation

Even these three companies, with their exemplary approaches to engagement, do not, like many others, have a clear idea about how many of their employees are actually engaging. They tend to focus on awareness — a good-enough starting position, but not sufficient to drive real change. We believe that employee engagement in these kinds of programs is a good barometer of the organizations' "state of mind" and so for management purposes is worth measuring.

Bottom Line: These are best practices for any enterprise and provide some valuable insights for improving employee awareness and engagement. Ask vendors what they are doing to engage employees and, more importantly, ask them how many employees are engaging. It is easy to create awareness programs, but much harder to get employees to contribute — that is the real test. Our assessment showed HP, BT, Google and Fujitsu having the highest levels of employee engagement.

6.1.8 A Well-Structured, Balanced Long-Term Environmental Strategy

Why Should You Care About This? If there is no coherent road map with goals, metrics and milestones, you should assume the provider is being reactive rather than being proactive, which is symptomatic of a low-maturity environmental program. ISO 14001 certification is nowhere near enough.

A good example of a best practice comes from Fujitsu and its Environmental Protection Program — Stage V (see Note 17). It is focused, specific and, for the most part, measurable with targets. This includes an internal certification and targets for all global offices and factories.

When confronted with any provider claiming to have an environmental strategy, enterprises should baseline it against this program to see how well articulated it is.

IBM's Project Big Green is a worthy attempt at bringing together many of its disparate initiatives under one marketing umbrella (see Note 18). This is a very different approach from that of Fujitsu. IBM's is to some extent an after-the-fact marketing-led integration of what is happening around IBM, but it does demonstrate a level of commitment across the enterprise. HP is in a similar position to that of IBM.

Bottom Line: Look for a strategy and a coherent road map detailing where, how and when environmental performance of operations, supply chain, products and services will be improved.

6.1.9 Dedicated Service Providers at an Immature State of Development

Why Should You Care About This? It is in the services area that low-carbon solutions are going to be created. A lack of awareness and innovation here means that enterprises are going to struggle to find partners with a strategic engagement in solutions for a low-carbon economy.

Most service providers have been slow to respond to the risks and opportunities associated with environmental sustainability and climate change. This is mostly an historical issue since the ICT services industry has no tradition of managing environmental risks because their impact, risks and opportunities, relative to hardware manufacturing, for example, are very low.

Most have been slow to recognize their changing market circumstances and the changing risks and opportunities. Many have created energy and carbon assessments to opportunistically exploit the immediate market demand, but few have really thought through the implications for their own operations or the potential opportunities of a low-carbon economy.

Of the four dedicated service organizations we have invited to participate so far, Accenture, EDS, Wipro and TCS, only one has chosen to a participate. We believe this reflects on their relatively immature position.

Bottom Line: Enterprises should be skeptical about the depth of commitment and capability from service providers in developing low-carbon solutions. If such solutions are important to the enterprises, they need to look for providers able to demonstrate senior management engagement, investment in solutions and a commitment to their own housekeeping. In the absence of these characteristics, enterprises should assume, at the very least, that they are dealing with a small team, lacking real support. This is probably an area where we will see leaders emerge soon.

6.1.10 Lack of Life Cycle Assessments

Why Should You Care About This? If you are concerned primarily about the energy efficiency of the next box to use — then you should not care. If, however, you want to understand and

reduce the environmental burden of products and services throughout their life, then you should care because life cycle assessments (LCAs) are the only way to gain that understanding.

An LCA is a systematic procedure for measuring the material and energy inputs, outputs and associated environmental impacts, throughout the life cycle of a product or service. It provides the necessary insight into where a product's and service's environmental impact could be improved, and where in the value chain that needs to happen.

With a few notable exceptions, we have been disappointed, but not surprised, to see a real lack of significant LCA work in the ICT industry. There is no doubt that the industry has one of the most complex supply chains relative to any industry. That makes LCAs more time consuming and costly. But there are sufficient examples from organizations like Ericsson, Nokia and Fujitsu that show it can be done.

LCAs are important because they help a product or service provider to understand the many and varied environmental effects, in absolute or relative terms, of the product or service throughout its life cycle. They highlight the obvious and the not-so-obvious impacts. Getting the analysis done demonstrates a commitment to really tackling environmental impacts and seeking opportunities for improvement rather than just going for the obvious and grabbing headlines.

Gathering carbon emissions data from the supply chain is a worthwhile action to take for many reasons, but it is not the basis for or a substitute for an LCA, as has been suggested by a couple of the providers.

We will see more LCA work during the next three years and beyond. But what the industry desperately needs is a standard approach and methodology for LCAs.

Bottom Line: Conducting and using LCAs demonstrates a systematic approach to reducing the environmental impacts of a product or service. It demonstrates an environmental and engineering-led approach to tackling the issues. Enterprises should favor providers able to demonstrate the outcomes of their LCA work and explain how it is affecting R&D and product or service design. Good examples from respondents came from Nokia, Ericsson and Fujitsu.

6.1.11 A Lack of Interindustry Partnerships for Innovation

Why Should You Care About This? To develop reduced and low-carbon-feedback (see Note 19) solutions, the ICT industry has to work with a wide range of partners, such as those in energy, transportation, automotive, logistics, facilities management and local government services. Lack of partnerships limits innovation and the provider's capability to profit from a low-carbon economy.

There are some partnership examples such as SAP's partnerships with the power generation industry, Cisco's Connected Urban Development program and BT's work around transportation. However, the providers and industry are obviously very early in their maturing process in identifying and developing ICT-enabled solutions to tackle climate change. We would expect to see partnerships with companies that need low-carbon solutions (construction, city planning, transport and retailing as well as sectors that are key to implementing them, such as the finance sector).

Bottom Line: This situation will change rapidly during the next 12 months and beyond. Although the ICT providers have been slow so far, particularly on the service/solution side, enterprises wanting to innovate will find much more enlightened and willing partners among the ICT providers from here on.

6.1.12 Environmental Policies

Why Should You Care About This? Environmental policy statements provide good insight into the maturity of the environmental program and the commitment of the provider to tackling the issue.

A good policy statement will be specific and commit the enterprise to do something about specific, named issues and be linked to key performance indicators (KPIs) and targets. We have seen a full spectrum in the responses received — from Google simply having no policy, through Nortel's and Cisco's policies, which are bland and noncommittal, to BT's policy, which is specific and challenging and linked to its KPIs.

Bottom Line: If the policy statement is bland, is noncommittal and does not link to publicly available KPIs and targets in their CSR or sustainability report, the enterprise should assume that fairly reflects the provider's or service provider's program, unless the provider can prove otherwise. The best example we have seen is from BT.

6.1.13 Including Climate Change Programs in Contract Adjudication

Why Should You Care About This? We believe that actually including an assessment of a potential supplier's climate change program as part of the criteria used to adjudicate contracts will be an increasingly important differentiator between providers' commitments to tackling climate change. It is important because it actually drives change down the supply chain.

Most providers are asking for transparency about GHG emissions from their suppliers, and some are demanding improvements from their suppliers. But very few are actually including an assessment of climate change programs, the exceptions being BT and Nokia.

Bottom Line: Only BT, Nokia and, to some extent, Dell are doing this today.

6.1.14 We Are Just Looking at the Tip of the Supply Chain

Why Should You Care About This? The ICT industry has long, complex supply chains, making managing the environmental practices, risks and impacts of that supply chain a tough challenge. But it is in the supply chain that the largest environmental impacts occur. Choosing providers who are most effective at reducing that impact and actively exerting influence down that chain will make a big difference in terms of the enterprise's indirect impacts.

Managing a supply chain, particularly for hardware providers, is hard and requires a serious commitment. As such, it is a good test of how a provider is doing in its environmental management program and shows some real differentiation.

Although SAP scored the lowest, given that the environmental supply chain risks of a software company are low, that is not overly concerning — although it clearly has room for some improvement.

The more surprising results came from providers who really should be doing better given the risks with their supply chain.

Google in particular was a surprise. It aspires to be a leader in environmental issues, but it is really not paying as much attention to its supply chain as it could. This is a particular concern, given that it is a large manufacturer of servers and has extensive data center facilities both internally and externally sourced.

Cisco, China Mobile, Lenovo and Dell all scored relatively poorly against our assessment. The assessment does not show whether the supply chain is good, bad or indifferent from an environmental point of view, it just looks at the provider's visibility and assurance into it. We are

not suggesting that their supply chains are necessarily a problem, but that they do not have the level of visibility and assurance of good practice that we would expect, and they fall well short of the leaders.

Beyond the requirements of the European Union Restriction of Hazardous Substances Directive (ROHS), the vendors have focused primarily on their Tier 1 providers (their direct providers). Very few have done any work directly on assessing or improving the Tier 2 providers ("subtier" or subcontractors or the suppliers of their direct suppliers) and beyond. Most will have requirements that their Tier 1 providers in turn check their suppliers, but few of the providers in the assessment have done any assessments or audits themselves. The only exceptions in our respondents were IBM and BT, which have both done significant work on their second-tier suppliers.

Enterprises should not delude themselves as to how far down the supply chain ICT providers have gone. Given that most of the providers have outsourced manufacturing, what enterprises are seeing in looking at the performance of their immediate providers is just the tip of the iceberg.

The exception to this is in e-waste, where the better vendors, such as Dell, track the materials to ensure that they are dealt with appropriately.

Bottom Line: Even if it is sometimes difficult to differentiate between the providers, there are significant differences in how they manage the environmental performance of their supply chains. Ask providers about how they influence, control and manage the environmental performance and practices of their first- and second-tier suppliers. The leaders in the industry are IBM, BT and Nokia.

6.1.15 The Industry Is Not Yet Bothered by Whether It Is Actually Having a Positive Impact or Not

Why Should You Care About This? At the moment, most enterprises are dealing with climate change at a very tactical level, which in the context of the ICT organization means mostly buying more-energy-efficient equipment. However, as the reality of a low-carbon economy kicks in, the winners in a low-carbon economy will be those that have figured out which products and services actually have a material and observable effect on carbon emissions and those that actually create low-carbon feedback.

Although there are some interesting collective initiatives, such as Smart 2020 (www.smart2020.org), which are starting to address the issue, at this stage the individual providers and the industry as a whole are not concerned with demonstrating whether they are actually having a positive impact in terms of reducing GHG emissions, or any other measure of environmental performance — at least, not beyond marketing-led, piecemeal, anecdotal illustrations, where the analysis has such narrow boundaries of what gets included and what does not. If the industry is to credibly position itself as part of the toolbox for tackling climate change and to influence policymakers, it will need to be much more serious about measuring the net impact of its solutions with a much wider system boundary than the power drawn by the equipment. This is why fairly consistently the "product/service portfolio" within Carbon Delivery was one of the lowest-scoring areas for most providers. The one exception to this comment would be Fujitsu — see previous comments about its Green Policy Innovation.

To take a leadership role also requires companies to identify their negative contributions. Helping companies to explore more fossil fuel and provide solutions that encourage more transportation are only two examples of solutions that ICT companies are providing today that are hard to see being part of a progressive company's portfolio without a discussion.

We are absolutely convinced that ICT has a positive role to play in helping the enterprise reduce its overall carbon footprint and to help society tackle climate change. However, it is not enough to

simply sell more ICT stuff, and hope that will have the desired effect. The providers are going to need to build solutions with a range of cross-industry partners and demonstrably show a net reduction in GHG emissions in the context of a macroeconomic scale system boundary. This will be the central challenge for the industry during the next two to three years.

Bottom Line: Enterprises that themselves want to reduce their overall impact on climate change, and want to partner with innovators who are similarly motivated should look for providers attempting to measure the wider systemic impacts of their product and services portfolios and solutions.

6.1.16 "Goodness" Through Association

Why Should You Care About This? Enterprises put too much credence in industry associations and bodies.

Endemic in the industry is the provider's propensity to join "clubs" and sign "communiques." Most of the respondents cited examples of their membership in industry associations, bodies and forums such as the Information Technology Industry Council, Climate Savers Computing Initiative, Green Grid or GeSI as illustrations of their good works. Although all of these bodies are well-intentioned, and some even produce meaningful results, simply being a member and paying the modest membership fee is not anything close to sufficient evidence of greenness. Most providers contribute very little to these bodies. Single individuals can use these forums to make important contributions, but a serious company will have to work to link them to its core business.

Enterprises should be skeptical of providers that present club memberships as a key part of their environmental credentials. The memberships and "signing" ceremonies are fine, but look for actions linked to their core business, not memberships.

However, the industry forums can play a dual role for providers. They are used as excuses for lack of individual actions. They are, however, also a place where progressive people from different companies can meet and attempt to drive change. Inevitably, most forums have both parts. The forums and associations would be much more credible if they challenged the member companies to show actual leadership and/or meet certain standards.

The World Economic Forum seems to be one example where leadership is encouraged and where ICT companies have focused on the business opportunities that low-carbon ICT solutions can provide. Davos 2009 will show if any concrete result will be delivered.

Bottom Line: Memberships (founding or otherwise) are significantly devalued by cynical attempts to achieve goodness through association. Thus, enterprises should ignore memberships as evidence of good deeds, unless the provider can provide specific details of how it has contributed or what it changed as a result of membership.

6.1.17 Goodness Through Isolated Examples

Why Should You Care About This? Goodness through examples is great, but usually they are very isolated examples.

The ICT providers habitually present isolated examples of good environmental activities or products as sufficient evidence of their green credentials. "Rogue" and ill-informed product marketing groups eager to exploit the fashion of green regularly create surprising statements. The marketing and public relations departments in large providers are difficult to constrain when they latch onto such a "fashion." This is the very essence of greenwashing (the selective disclosure of the positive, and often superficial, environmental aspects of the provider or its products and services).

Even if some of the claims have some merit, doing green things and being green are not necessarily the same thing.

In this assessment, we have looked for structural, governance, procedural and cultural approaches to improving environmental performance of both the business and its products and/or services — rather than looking at the merits of any particular products or services. Those respondents with high scores we believe reflect those elements and are far more likely to run a business with a lower environmental footprint and deliver products and services that will demonstrably reduce the footprint of the client — Fujitsu, Nokia, BT and Ericsson being good examples. We believe this was a contributing factor in the decision of several of the nonrespondents not to participate.

Bottom Line: Enterprises need to take a much more holistic view of a provider's portfolio and look at how it conducts its business. When presented with isolated examples, challenge the provider to explain how the principles it has applied in the cited example pervade its portfolio and its business operations.

6.1.18 Renewable Energy

Why Should You Care About This? Purchase of renewable energy is often a key pillar in the housekeeping part of a climate change strategy, but you need to look at the numbers to provide context for what a provider is doing. Providers will increasingly need to pay close attention to the cost of electricity, but too many providers make a lot of noise about the latest renewables contract they just signed and forget to mention that they just built a new data center supplied by low-cost, high-carbon electricity.

Many providers are buying renewable energy — Table 2 summarizes the key activities of the providers in the assessment, and helps to contextualize comparisons between the providers. Semiconductor fabrication is very energy- and GHG-intensive. Large data centers are intensive, but less so than semiconductor fabrication. Light assembly operations are much less energy- and GHG-intensive than data centers, and much closer to the profile of an office. Claims by providers to be more carbon-efficient than their competitors need to be considered in the context of the scope and nature of their operations. Figure 22 shows the provider GHG emissions and electricity data.

When done properly that is certainly a very important part of a carbon reduction program. Also, although renewable-energy tariffs vary hugely around the world, it is usually not an inexpensive option. Even though it is not a hard thing to do, when it forms a significant part of the electricity mix and exceeds 10% of the total electricity consumption, then it can be seen as an indication of a serious commitment. However, it should never be considered in isolation of other parts of the program.

The reality today is that there is more demand for renewable energy than there is supply. The linkage between buying more renewable energy and increasing market capacity is actually a fairly weak link today. As a result, claims by providers, such as HP, that their purchase of renewables is driving increased capacity are fairly weak. Not all renewable tariffs are equal in terms of their carbon content. It is important not simply to take the renewables mix at face value.

Enterprises could ask about the provider's renewables strategy and ask some questions about the guidance it used to report its numbers. But the bottom line is that enterprises need to look at the providers annual Scope 2 GHG emissions, and look at the trend relative to business activity (that is, revenue) by assessing the carbon intensity of their electricity consumption (see Figure 22).

In contrast to most, BT not only has a major commitment to buying renewables from the grid, but additionally has taken a very innovative approach by planning to directly invest in a large wind farm capacity (250 MW), which will result in a net increase in renewables capacity. On its own, this would meet approximately 25% of BT's total electricity needs. Nokia is currently sourcing 25% (approximately 130 GWh) of its electricity needs from renewable sources and has set itself an aggressive goal of increasing its purchase of renewables to cover 50% (which would be approx 260 GWh based on today's energy consumption) of its electricity consumption. Although Google's separate philanthropic organization (google.org) is investing in an R&D program called "RE<C" with the aspiration of producing renewable energy at a lower cost than coal, we don't believe Google itself is buying or using very much in the way of renewables. It is building a 1.6 MW photovoltaic array in Mountain View, but relative to Google's power consumption, that is a very small capacity.

Bottom Line: Look at the carbon intensity of the provider's electricity and the percentage of its total electricity consumption coming from renewables, together with its direct investment in renewable capacity, to gauge the real commitment. Good examples for a point of contrast are BT and Nokia.

If a provider does not disclose this data and explain its renewables strategy, then enterprises should skeptical about that strategy.

6.1.19 Market Awareness

Why Should You Care About This? Once a provider starts measuring a market size, it is a sure sign it is serious about it.

The leading indicator that environmentally friendly and low-carbon solutions are a new field is that no one has an estimation of the value of the market for their low-carbon solutions. With one exception, none of the respondents even had a definition of what constitutes an environmentally friendly or low-carbon solution. For most, it is an arbitrary marketing issue as to whether some aspect of the product or service can be spun as green, most commonly around energy efficiency. In Nokia's case, it believes that all its products rate as environmentally friendly by virtue of them being mobile communications combined with Nokia's work on energy and material efficiency. We hope this simplistic perspective will soon disappear.

The one company this project revealed as a market leader is Fujitsu. Only Fujitsu has a clear definition, and a methodology for measuring as outlined above, of what constitutes an environmentally friendly product or service. It at least identified and set a target for 7 million tons. This is the most advanced, but still far from the potential of the sector.

Looking at other areas, we now see a competition in this area. Siemens released numbers in June where it said that it had revenue of €17 billion ($31 billion) from environmentally friendly products. This was a response to GE's claim that it had $14 billion related to its Ecoimagination program. None of the companies has very clear definitions, and many of the products would probably not be accepted by environmental NGOs or investors as environmental friendly. Still, it is interesting to see how other sectors are now starting to look at sustainability as a driver for new revenues and put concrete numbers on these revenues.

6.1.20 Self-Professed "Leaders" Lack GHG Targets

Why Should You Care About This? GHG targets are the most basic requirement of a climate change program; without them, enterprises should be skeptical about a provider's overall climate change program. Energy efficiency targets are important, but not the same and not enough.

A GHG target is a fundamental and basic requirement for any climate change program. Lack of a target indicates the organization is not focusing management time on reduction of GHG

emissions. Many of the participating organizations replied to our questions about GHG targets with energy efficiency or energy reduction targets. Such targets are important because, for the majority of ICT organizations, power consumption (Scope 2) represents the larger source of GHG emissions relative to their internal direct emissions (Scope 1). However, it is important to include a GHG target in addition to energy efficiency targets. The issue with climate change is not energy consumption, it is GHG emissions. The absence of a GHG target allows management to make decisions that may increase their carbon intensity or efficiency — for example, decisions related to energy sources, facility locations and use of carbon offsets. In other words, you can have energy efficiency measures yet still increase GHG emissions by, for example, choosing a high-carbon and probably inexpensive energy source. If an enterprise wants to engage in a climate discussion about low-carbon solutions, it should look for a provider that also measures its impact and contribution in CO_2.

Enterprises without GHG targets at the time of the survey included Nokia, Ericsson, Google, Nortel, Cisco, SAP, Wipro and China Mobile. Lenovo and Cisco have very recently set themselves a target, and we anticipate SAP, Nortel, Nokia and Ericsson doing the same soon.

Given the high profile that organizations like Nokia, Ericsson and Google in particular have taken, it is surprising that they did not have targets at the time of the assessment, and this demonstrates a certain lack of candor. This significantly weakens their programs and their position on the subject. In Nokia's and Ericsson's case, their position is that an energy target is sufficient — we strongly disagree. Google's position is that as a growing business it cannot set itself a target. For an organization taking such a high-profile position on tackling climate change, we find that position inadequate, and it significantly weakens Google's claim to a leadership position.

Bottom Line: If the provider is not publicly reporting credible and comprehensive GHG emissions numbers and has not publicly announced GHG targets, enterprises should be skeptical of the providers program.

6.1.21 Transparency

Why Should You Care About This? With regard to providers' environmental performance, transparency is vitally important. Without transparency, it is difficult for any external stakeholder to make any kind of informed judgment as to how the provider is performing. Beyond feeling that being transparent about some aspect of performance would be damaging to shareholder value, there are very few good reasons to be anything less than completely transparent. Enterprises that want to engage with providers with strong programs should insist on transparency.

Out of 24 technology providers invited to participate, 15 responded. With the obvious exception of the nine nonrespondents and, to some extent, Google, we have been very impressed with the openness and transparency of the respondents. Transparency in this area is absolutely vital, and enterprises should be skeptical of any organizations not willing to be open.

We were pleased with Google's participation and it was very open about many areas of its business, but it does not publish any data related to its GHG emissions or electricity consumption, which seriously undermines its claims to be a leader.

Bottom Line: Enterprises partnering with or considering any of the nonrespondents should look very closely at the providers' environmental programs. Anything less than complete openness and any lack of ability to respond quickly and concisely to questions should be considered to be symptomatic of a relatively weak program. Our view is that, with the possible exception of Deutsche Telekom, all have weak programs at this stage.

6.2 Individual Provider Results

Figure 6 summarizes the results from the assessment. Note that for each of the Carbon categories there is a result for the category itself, as well as a result for each dimension within the category.

Figure 6. Individual Provider Results Summary

	BT	China Mobile	Cisco	Dell	Ericsson	Fujitsu	Google	HP	IBM	Lenovo	Nokia	Nortel	SAP	Verizon	Wipro
Environmental Basics	79%	39%	47%	63%	82%	80%	35%	76%	89%	59%	71%	55%	17%	28%	31%
Supply Chain Basics	84%	23%	36%	20%	67%	60%	13%	71%	76%	48%	95%	63%	13%	15%	5%
Carbon Basics	*98%*	*58%*	*52%*	*69%*	*58%*	*94%*	*69%*	*84%*	*94%*	*44%*	*75%*	*27%*	*38%*	*41%*	*32%*
- Housekeeping	98%	59%	42%	56%	64%	99%	60%	82%	99%	43%	70%	29%	41%	45%	30%
- Raising Awareness	100%	55%	76%	100%	44%	82%	91%	91%	80%	45%	87%	22%	29%	31%	39%
Carbon Delivery	*51%*	*38%*	*49%*	*27%*	*74%*	*75%*	*63%*	*62%*	*51%*	*20%*	*47%*	*25%*	*51%*	*35%*	*21%*
-Product/Service Portfolio	42%	22%	39%	18%	69%	61%	61%	59%	41%	22%	25%	20%	41%	20%	18%
- Portfolio Targeted at High-Carbon Areas	67%	67%	67%	43%	83%	100%	67%	67%	67%	17%	83%	33%	67%	60%	27%
Carbon Champions	*73%*	*10%*	*57%*	*51%*	*67%*	*67%*	*33%*	*69%*	*51%*	*35%*	*56%*	*36%*	*46%*	*33%*	*21%*
-Future Products for a Low-Carbon Economy	76%	14%	52%	18%	80%	100%	30%	66%	58%	44%	82%	36%	80%	32%	36%
-Pushing for a Low-Carbon Future	71%	7%	60%	74%	57%	43%	36%	71%	46%	29%	37%	36%	21%	34%	10%

Source: Gartner and WWF

6.3 Top Performers

6.3.1 Top 5 by Category

Environmental Basics

- IBM
- Ericsson
- Fujitsu
- BT
- HP

Supply Chain Basics

- Nokia
- BT
- IBM
- HP
- Ericsson

Carbon Basics

- BT
- IBM
- Fujitsu
- HP
- Nokia

Carbon Delivery

- Fujitsu
- Ericsson
- Google
- HP
- BT

Carbon Champions

- BT
- HP
- Fujitsu

- Ericsson
- Cisco

6.3.2 By Internals and Carbon Leadership

Internals

This ranks the performers based on their performance on those elements of the assessment focused on how they manage the business operations. That includes Environmental Basics, Supply Chain Basics and housekeeping (from Carbon Basics). We are excluding software companies from this ranking because the software sector is very different to the other sectors and we do not have enough software companies to give a sectorial specific view.

- IBM
- Fujitsu
- BT
- HP
- Ericsson
- Nokia
- Dell
- China Mobile
- Google
- Lenovo
- Cisco
- Nortel
- Verizon
- Wipro

Carbon Leadership

This ranks the participants based on their performance on those elements of the assessment focused on carbon leadership. That includes raising awareness (from Carbon Basics), Carbon Delivery and Carbon Champions. We are including all respondents, including software companies, because we feel this is a more level playing field for them.

- Fujitsu
- BT
- HP
- Ericsson
- Nokia

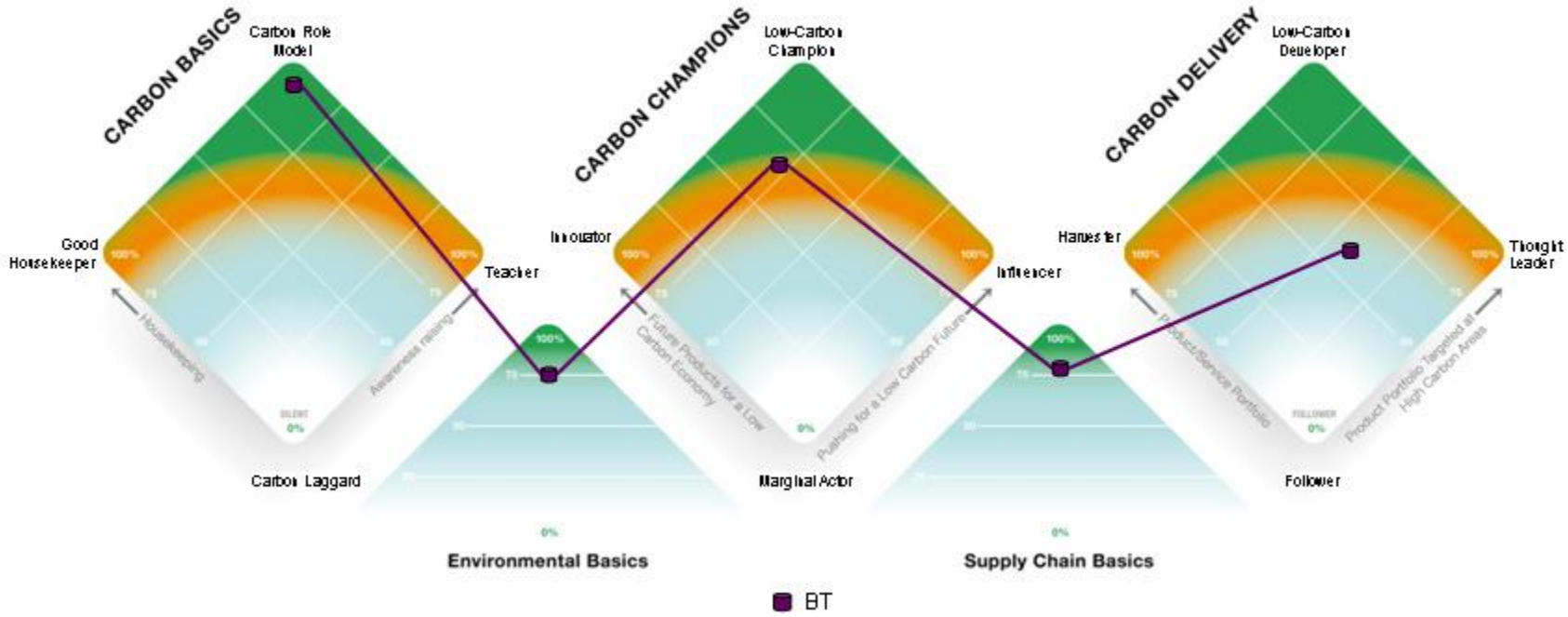
- Cisco
- IBM
- Google
- Dell
- SAP
- Verizon
- China Mobile
- Lenovo
- Nortel
- Wipro

6.4 Individual Providers

Figures 7 through 21 show the results for the 15 responding providers.

6.4.1 BT

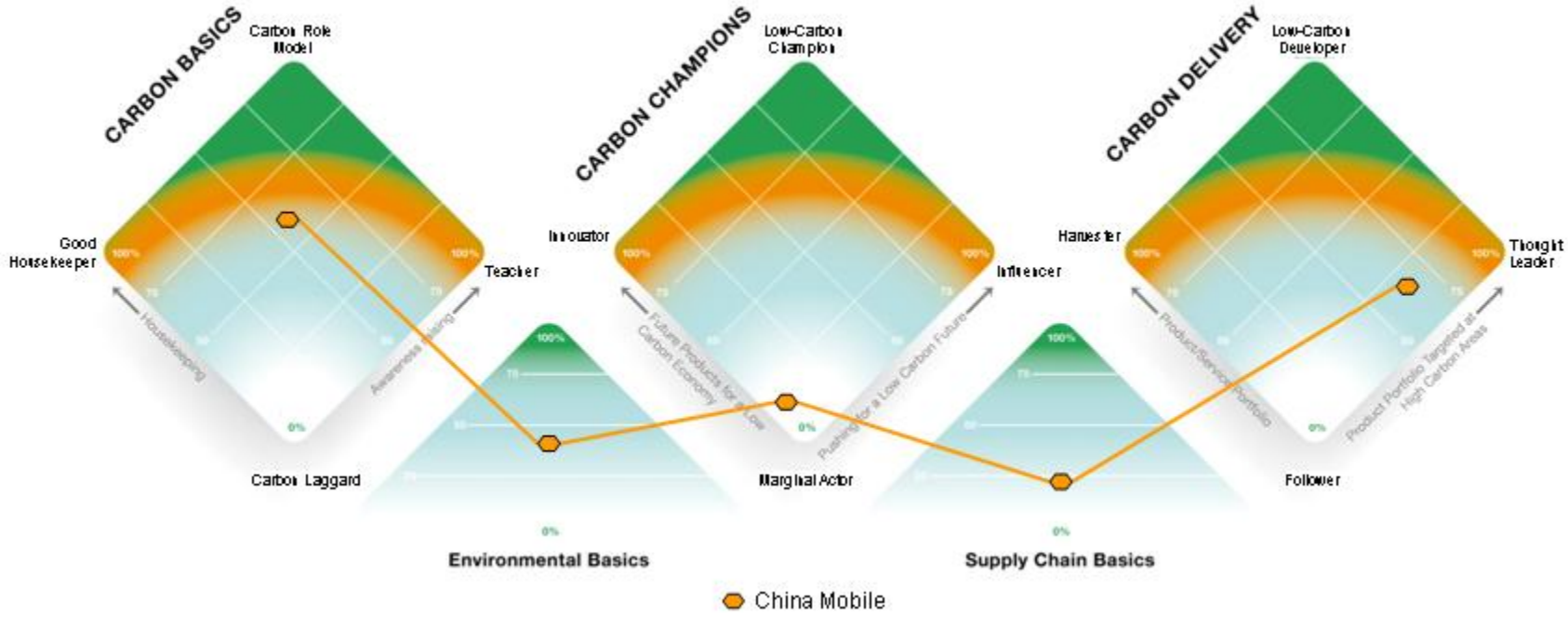
Figure 7. BT Results



Source: Gartner and WWF

6.4.2 China Mobile

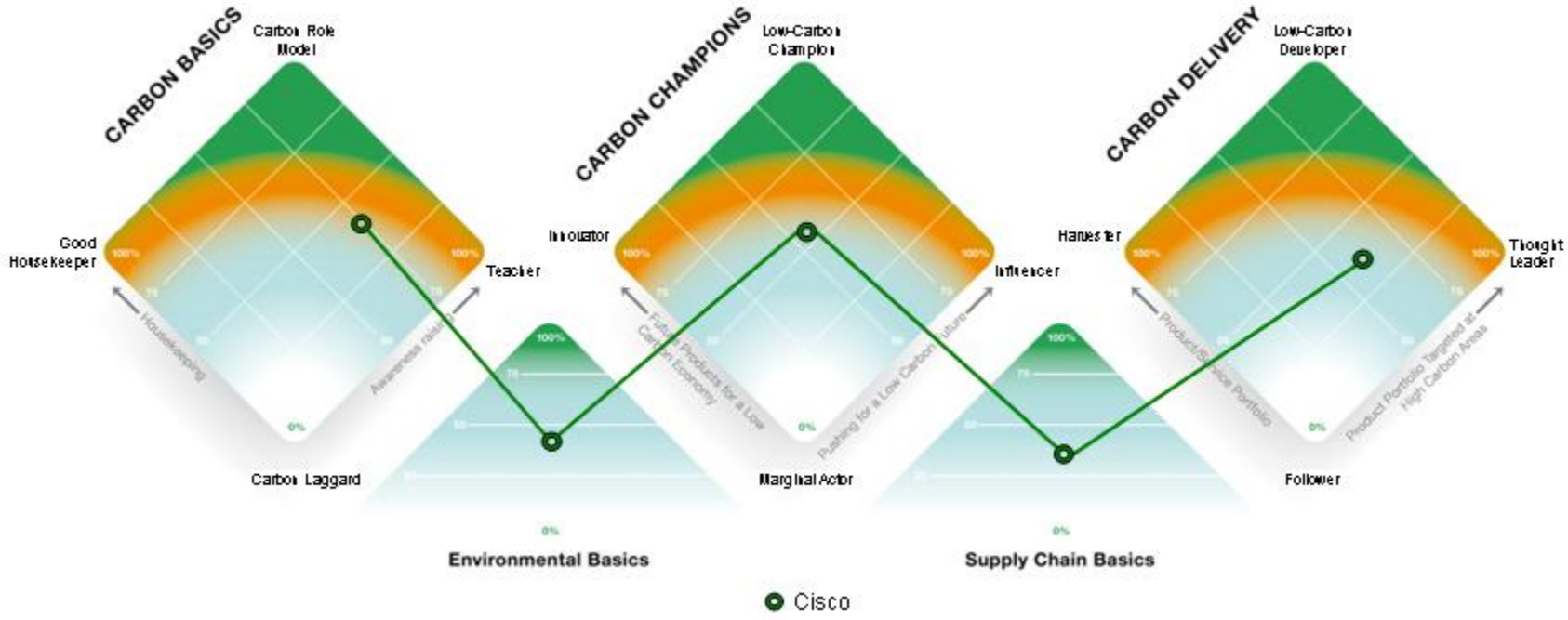
Figure 8. China Mobile Results



Source: Gartner and WWF

6.4.3 Cisco

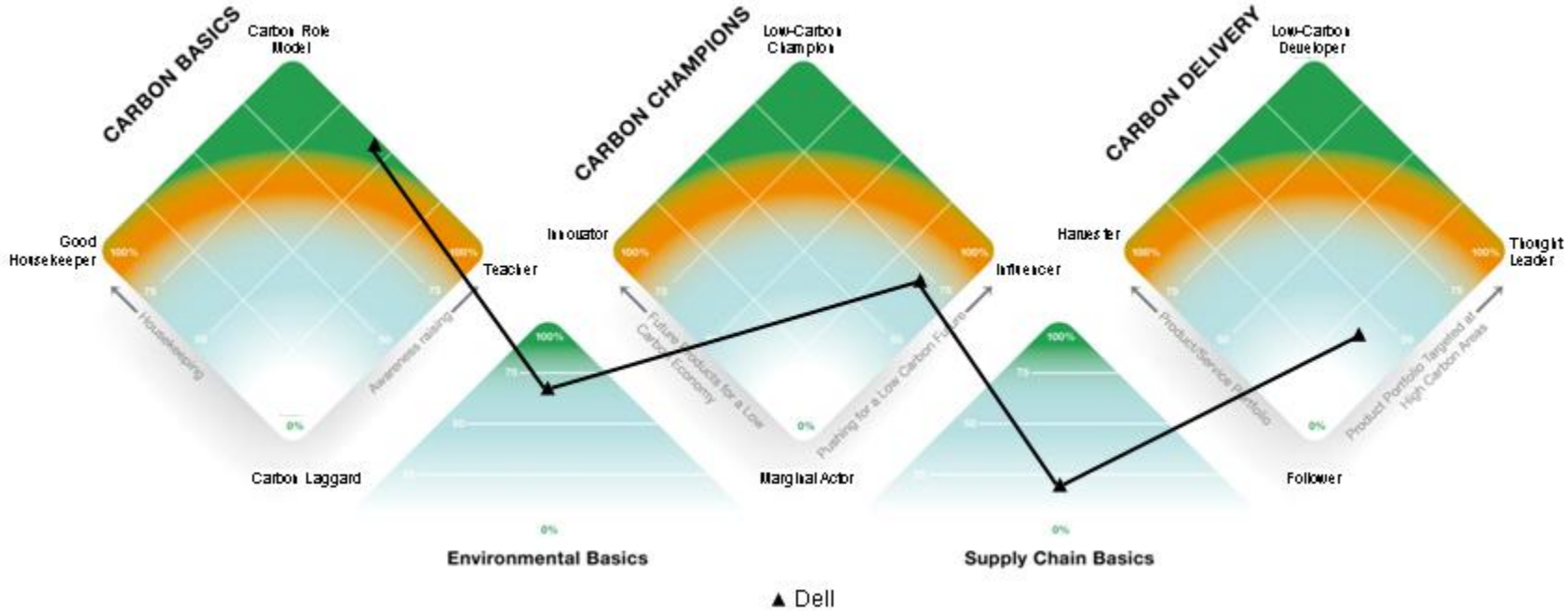
Figure 9. Cisco Results



Source: Gartner and WWF

6.4.4 Dell

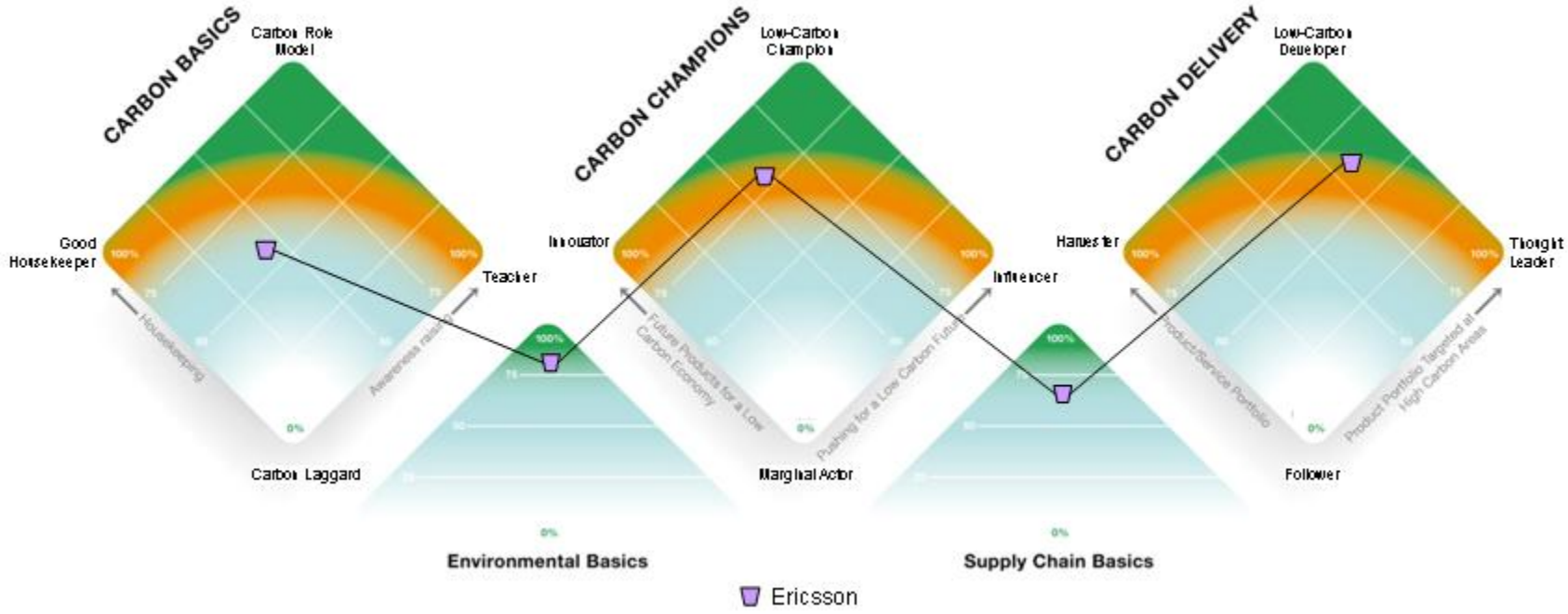
Figure 10. Dell Results



Source: Gartner and WWF

6.4.5 Ericsson

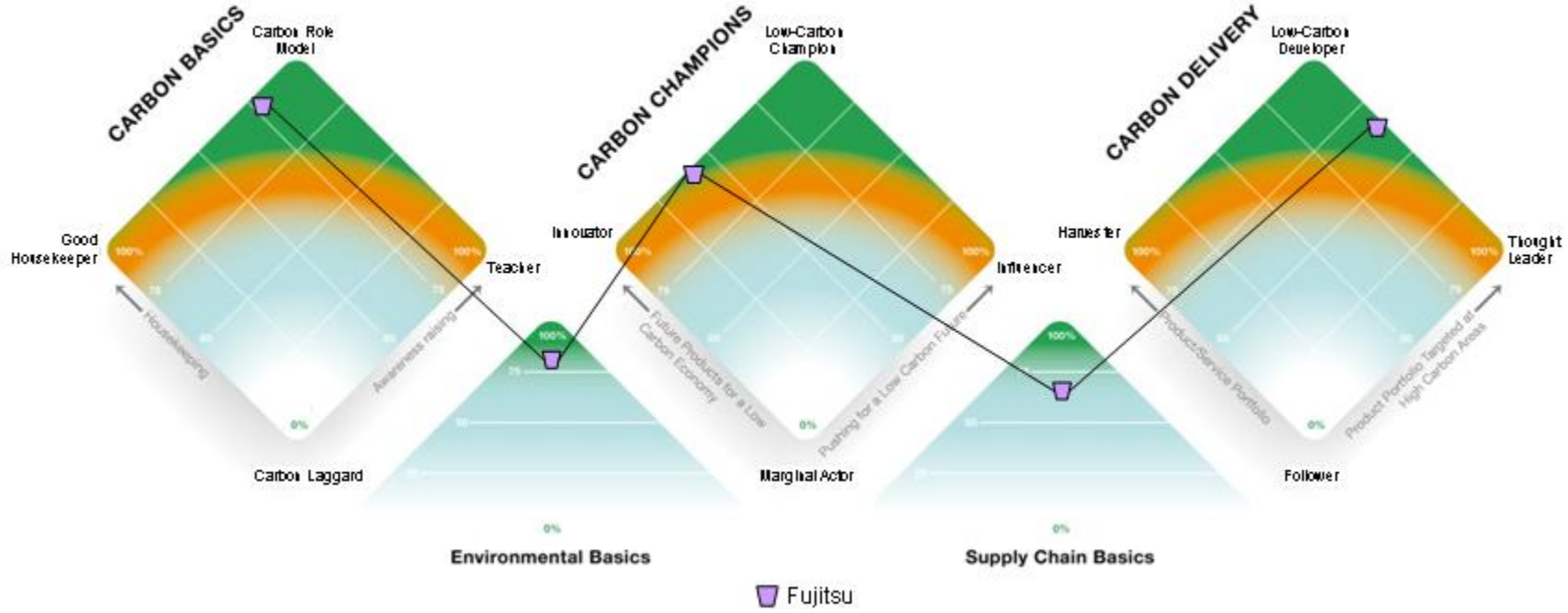
Figure 11. Ericsson Results



Source: Gartner and WWF

6.4.6 Fujitsu

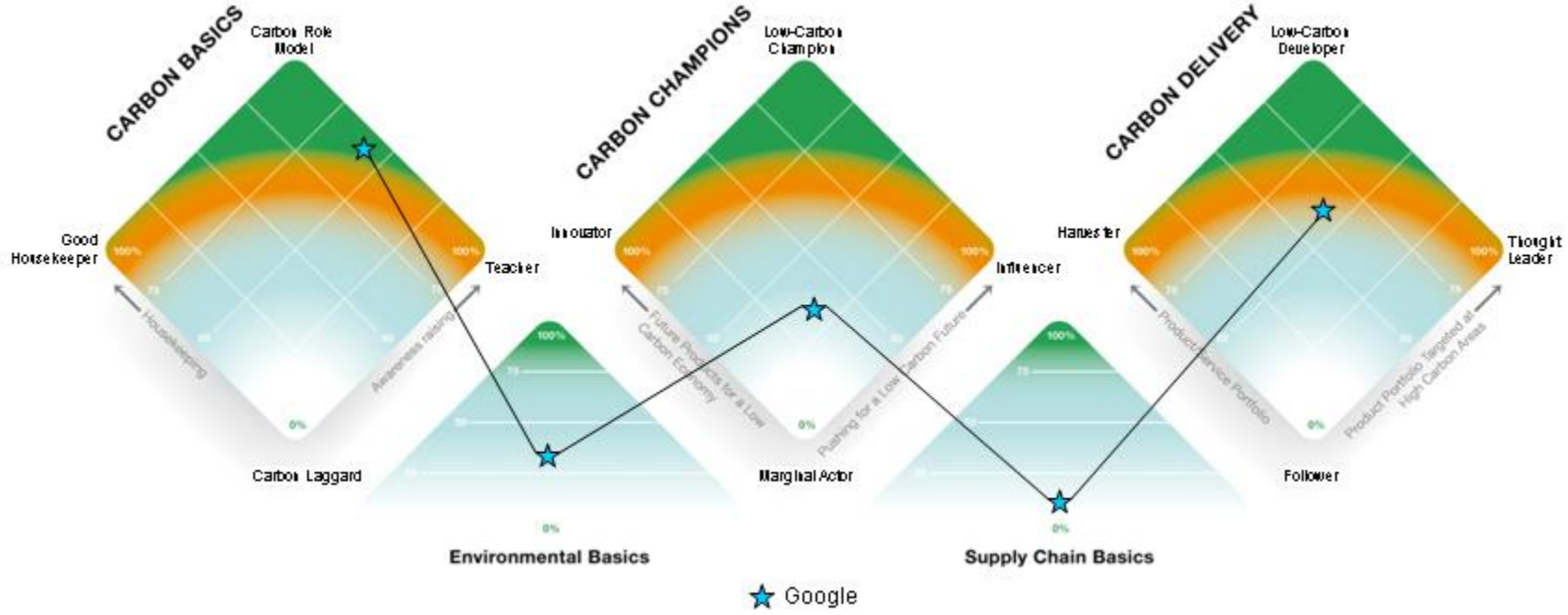
Figure 12. Fujitsu Results



Source: Gartner and WWF

6.4.7 Google

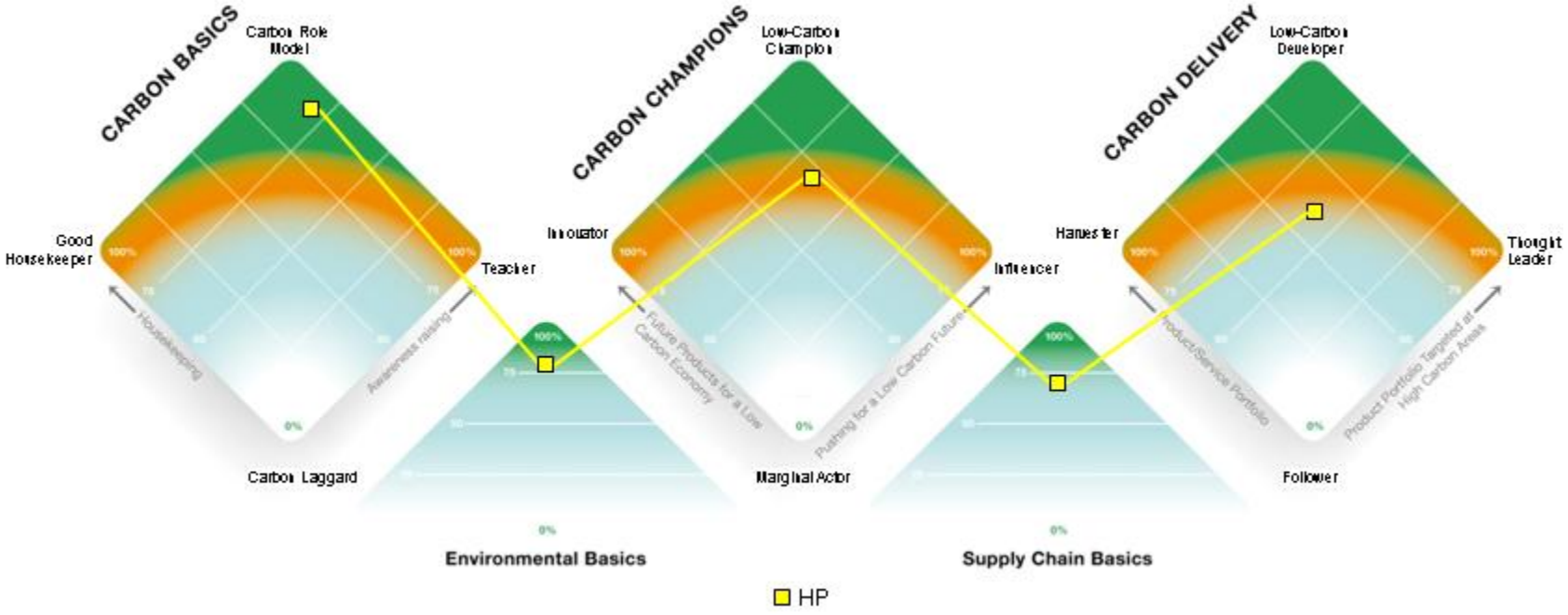
Figure 13. Google Results



Source: Gartner and WWF

6.4.8 HP

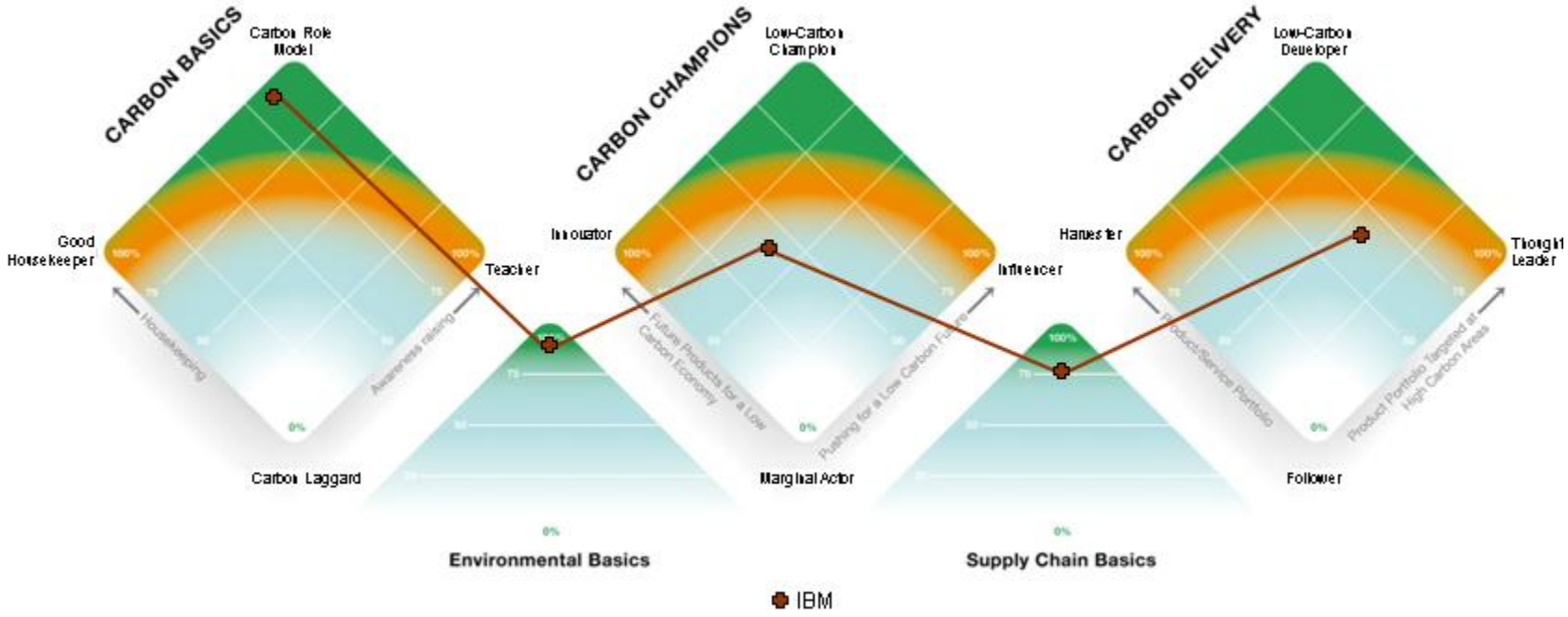
Figure 14. HP Results



Source: Gartner and WWF

6.4.9 IBM

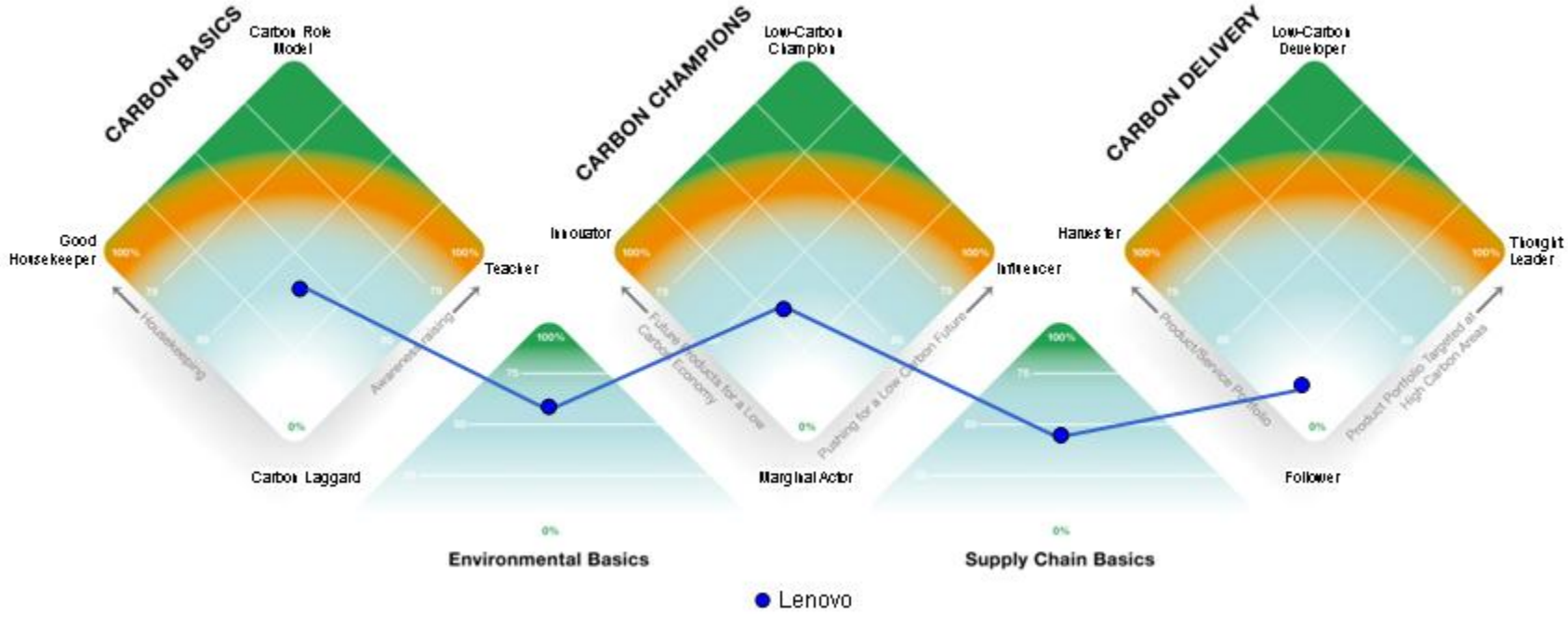
Figure 15. IBM Results



Source: Gartner and WWF

6.4.10 Lenovo

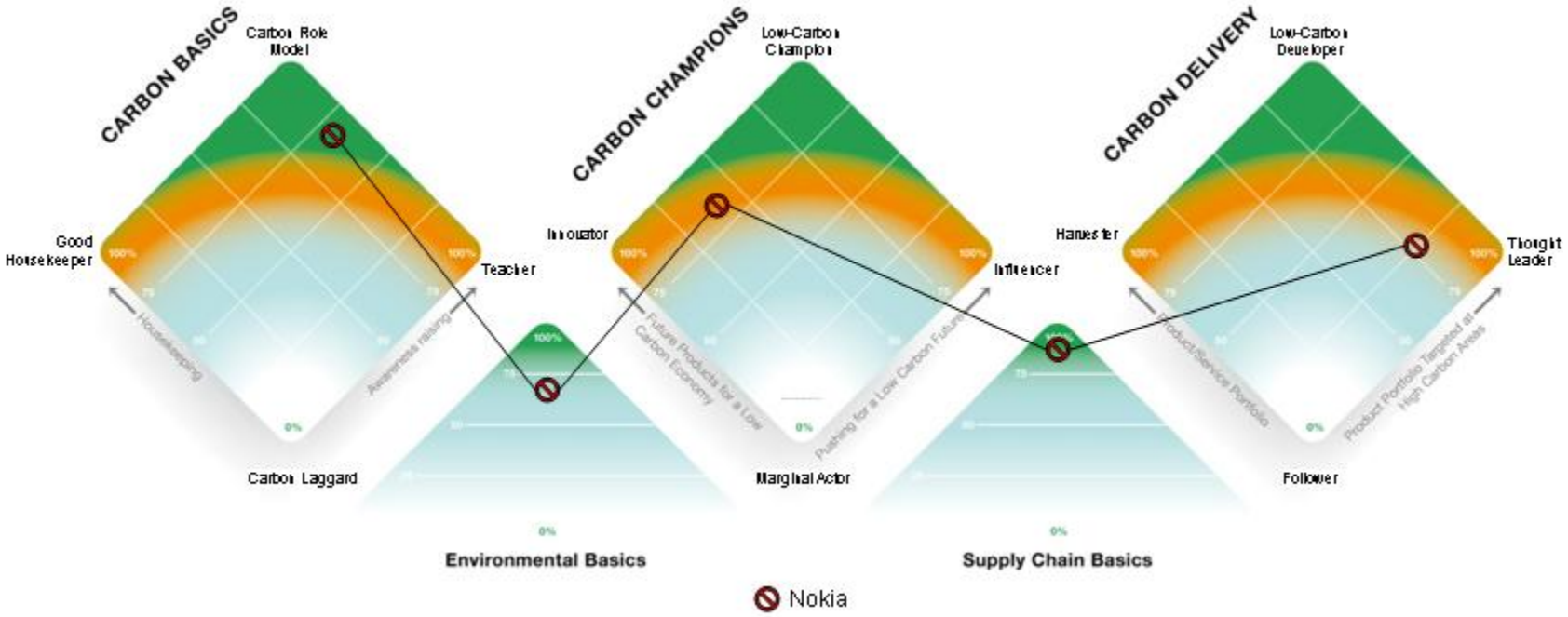
Figure 16. Lenovo Results



Source: Gartner and WWF

6.4.11 Nokia

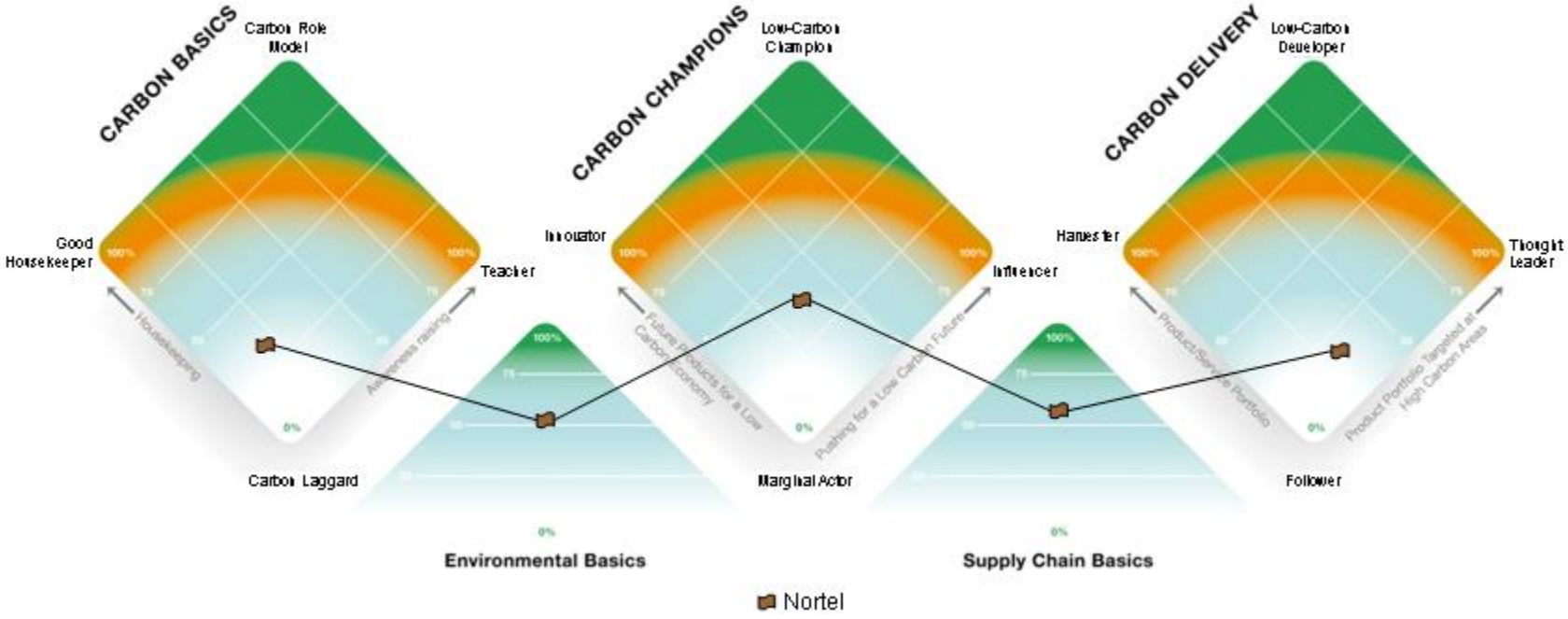
Figure 17. Nokia Results



Source: Gartner and WWF

6.4.12 Nortel

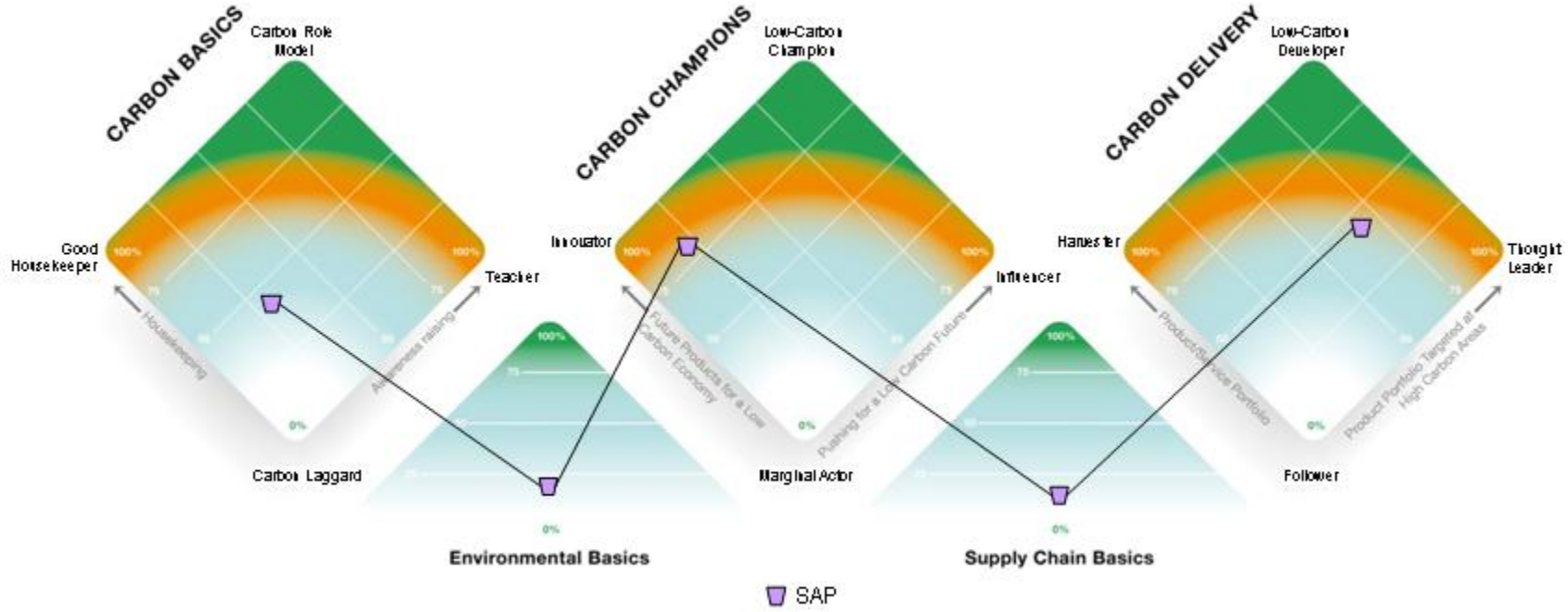
Figure 18. Nortel Results



Source: Gartner and WWF

6.4.13 SAP

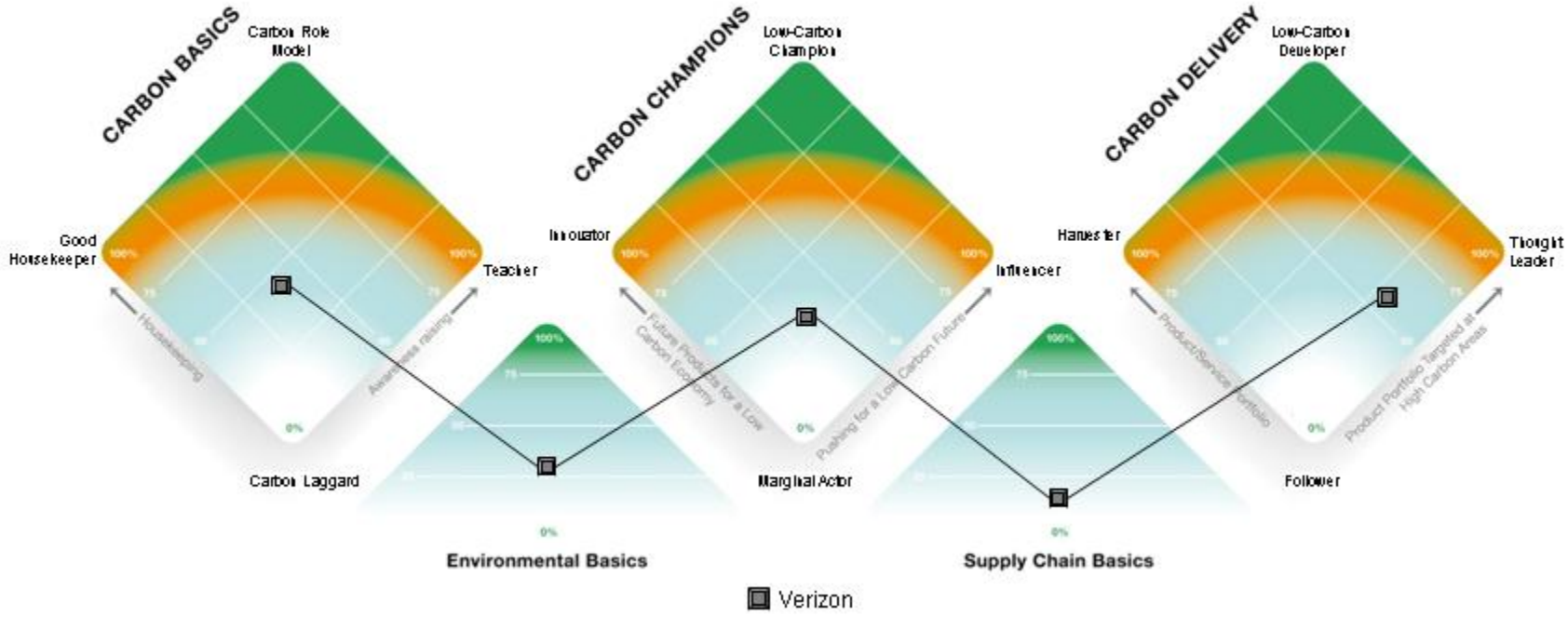
Figure 19. SAP Results



Source: Gartner and WWF

6.4.14 Verizon

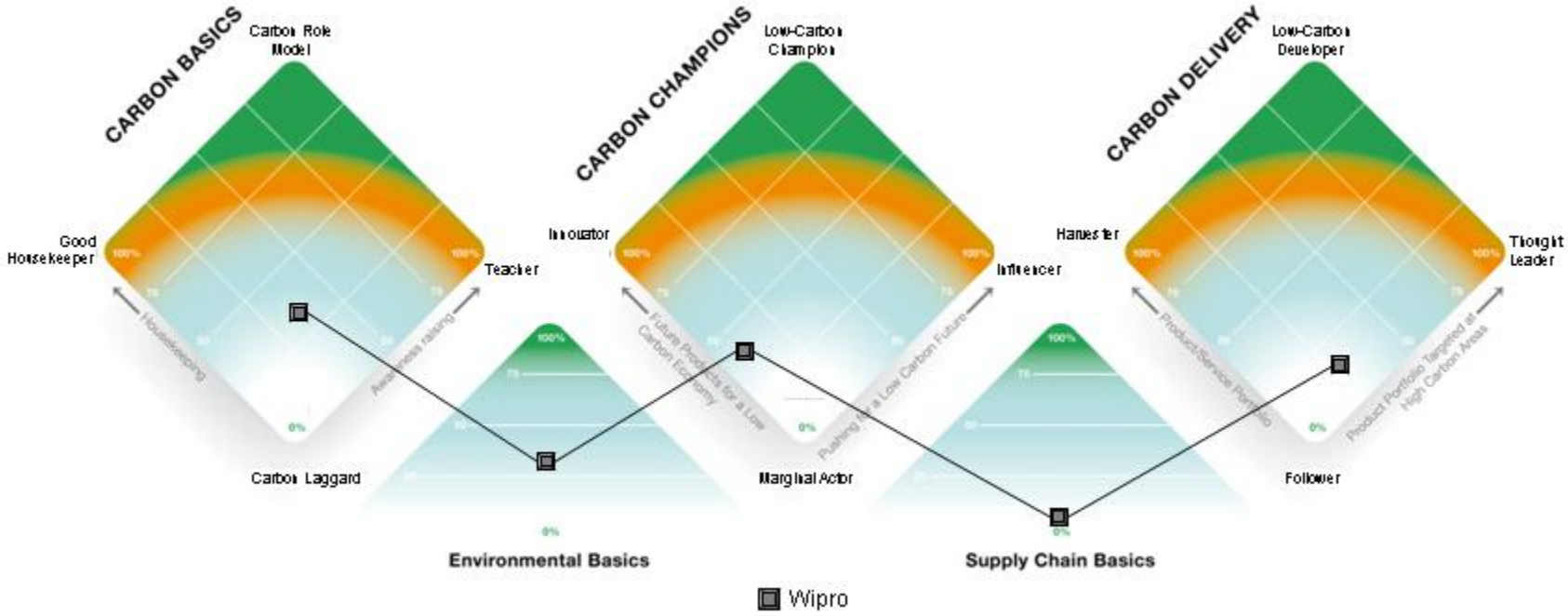
Figure 20. Verizon Results



Source: Gartner and WWF

6.4.15 Wipro

Figure 21. Wipro Results



Source: Gartner and WWF

7.0 Appendix

7.1 GHG and Electricity Data

Table 2 summarizes the key activities of the providers in the assessment, and helps to contextualize comparisons between the providers. Semiconductor fabrication is very energy- and GHG-intensive. Large data centers are intensive, but less so than semiconductor fabrication. Light assembly operations are much less energy- and GHG-intensive than data centers, and much closer to the profile of an office. Claims by providers to be more carbon-efficient than their competitors need to be considered in the context of the scope and nature of their operations. Figure 22 shows the provider GHG emissions and electricity data.

Figure 22 provides the GHG emissions and electricity data for all the providers covered by this assessment, including nonrespondents.

Table 2. Categorization

Categorization Company	Cell Phone Base Station Network	Semiconductor Fabrication	Large Data or Network Center Capacity	Middling Data Center Capacity	Light Assembly	Offices	Business Travel	Significant Vehicle Fleet	High-Impact Supply Chain
AT&T	X		X			X	X	X	X
BT			X			X	X	X	X
China Mobile	X		X			X	X	X	X
Deutsche Telekom	X		X			X	X	X	X
Verizon	X		X			X	X	X	X
Acer				X	X	X	X		X
Dell				X	X	X	X		X
Fujitsu		X	X		X	X	X		X
HP		X	X		X	X	X		X
IBM		X	X		X	X	X		X
Lenovo					X	X	X		X
Sun				X	X	X	X		X
Ericsson				X	X	X	X		X
Nokia				X	X	X	X		X
Cisco				X	X	X	X		X
Nortel				X	X	X	X		X
Google			X		X	X	X		X
Microsoft			X		X	X	X		X
Oracle				X		X	X		
SAP				X		X	X		
Accenture			X			X	X		
EDS			X			X	X		

Categorization Company	Cell Phone Base Station Network	Semiconductor Fabrication	Large Data or Network Center Capacity	Middling Data Center Capacity	Light Assembly	Offices	Business Travel	Significant Vehicle Fleet	High-Impact Supply Chain
TCS			X			X	X		
Wipro			X		X	X	X		X

Source: Gartner (October 2008)

7.1.1 What Does This Data Tell You

The information in the table provides a lot of insight into each provider's overall climate related performance as it relates to their internal operations. Most insight will come in tracking this data over time — in most cases, looking for reductions in total emissions, and in all cases, looking for reductions of carbon intensity (that is, carbon efficiency).

Electricity consumption represents the biggest GHG source for most ICT providers. The carbon intensity of electricity depends on the original fuel source and the conversion efficiency of the generating plant. Therefore, choices made by providers related to use of renewables — either contracted from the grid or generated themselves — as well as choice of physical location have a big impact on their GHG emissions.

Renewable Energy: Judge the renewable energy strategies of the providers by looking at the percentage of electricity from renewables combined with the carbon intensity of their electricity. The higher the carbon intensity of the electricity, the more work they have to do through use of renewables, and choices must be made, such as where to locate their operations to get the carbon content down. Contrast BT vs. Lenovo — you can see the impact of BT's substantial renewables program combined with a lower-carbon energy source in the U.K. (strongly influenced by gas), vs. Lenovo with operations in China and the U.S. (strongly influenced by coal — with a much higher carbon content) and a very small renewables program.

Choice of Location: Choice of physical location and power source has a major impact on carbon intensity. Because electricity is a big expense for most ICT companies and is the largest source of Scope 1 and 2 carbon (it varies but is usually in the 75% to 90% range), they are increasingly locating where electricity is inexpensive. Inexpensive electricity rarely comes from low-carbon sources — the exception being regions fed by hydro, nuclear or extensive geothermal schemes, such as the Pacific Northwest in U.S., Norway and Iceland.

So the metrics in Figure 22 provide real insight into how effective the energy strategies are relative to other choices the business may make. For example, HP's recent choice of locations for its new data centers was clearly not strongly influenced by the carbon content of the electricity. Although it has made publicity from their procurement of renewable energy, if you compare its numbers with BT, which consumes a similar amount of electricity, you can see that HP's efforts are really quite modest.

Google being one of the most energy-intensive organizations in the industry is conspicuous by its lack of transparency — it publishes no data. Its public relations message around its renewables strategy needs to be considered in the context of no data.

Carbon Intensity: We have included four measures of carbon intensity. Combined, they tell you a lot about the business and represent good data points for tracking the business performance over time.

7.1.2 Comparing Providers

It is overly simplistic to directly compare providers without understanding something more about the nature of their business and how they run the business — see Table 2. There are a number of contributing factors to why even seemingly very similar businesses might have different performance:

- Most ICT providers outsource many activities to varying degrees, particularly manufacturing and logistics. Many of these activities are energy- and carbon-intensive.

- Operations in different geographies have different carbon implications due to having to provide coverage over a much larger area, for example, or due to the energy sources available and so forth.
- Although most providers are using the GHG protocol (www.ghgprotocol.org) to report their emissions, there is a lot of room for interpretation, and thus you need to read the detail of what has been included where to be sure you are looking at equivalent numbers.
- The rules about what gets measured, how it is measured and how it is reported are not as detailed and specific as financial reporting guidelines. So there is a lot of room for differences to occur.
- GHG emissions reporting is not a statutory requirement for any of the providers other than as a result of participation in voluntary schemes such as Climate Savers or the U.S. Environmental Protection Agency. Although some providers have had independent verification of those emissions and the reporting of those emissions, not all have (see Table 3).

Table 3. Verification

Independent Verification	No Independent Verification	Do Not Report Any GHG Emissions
BT	China Mobile	Accenture
Ericsson	Cisco	Acer
Fujitsu		AT&T
Google	Lenovo	EDS
HP	Nortel	Oracle
IBM	SAP	TCS
Nokia	Sun	Wipro
Dell	Verizon	

Source: Gartner (October 2008)

Although not all verifications are equal, independent verification matters because it adds a much-needed level of credibility to the numbers. You should assume that those providers that have not yet had an independent verification have not done so because they are not sufficiently confident in the completeness and accuracy of their data-gathering and verification processes. Therefore, without further investigation, you should assume the numbers are not of the same quality as those of providers that have had verification.

7.1.3 What's the Implication of "No Info"?

You will notice in Figure 22 that, in some places, there is "No Info." This means that the provider has chosen not to make this data publicly available. That is usually a sign of immaturity in collecting the data and managing the issue. Transparency is important in this area to measure the real impact of the environmental decisions the enterprise is making. Without the data, enterprises should be skeptical of any claims to a strong internal climate change program.

7.1.4 Assumptions Under Renewables

Where providers do not provide data related to use of renewable energy, we have suggested the assumption you should make about how much renewable energy the provider is using until it states otherwise.

7.1.5 GHG-Intensive Activities

Table 2 summarizes the key activities of the providers in the assessment, and helps to contextualize comparisons between the providers. Semiconductor fabrication is very energy- and GHG-intensive. Large data centers are intensive, but less so than semiconductor fabrication. Light assembly operations are much less energy- and GHG-intensive than data centers, and much closer to the profile of an office. Claims by providers to be more carbon-efficient than their competitors need to be considered in the context of the scope and nature of their operations. Figure 22 shows the provider GHG emissions and electricity data.

Figure 22. Provider GHG Emissions and Electricity Data

Company	Rev. (USD)	Employees	Real Estate (m2)	Scope 2 Emissions (tonnes)	Total Scope 1 & 2 GHG Emissions (tonnes)	Scope 3: Business Travel	Total Electricity (GWh)	GWh of Directly Contracted Renewables	% of Total Electricity From Renewables	Carbon Intensity of Electricity (kg/kWh)	Carbon Intensity Scope 1 & 2 CO2e (kg)/m$ Rev.	Carbon Intensity Scope 1 & 2 CO2e (kg)/ Employee	Carbon Intensity Scope 1 & 2 CO2e (kg)/m2	Travel Carbon Intensity CO2e (kg)/ Employees
AT&T	63.05	302,770	No Info	No Info	No Info		No Info	No Info	Assume 0%	-	-	-	-	0
BT	40.36	106,200	6,890,407	589,632	831,860	70,126	2,618	1130	43.0%	0.23	20610	7833	121	660
China Mobile	48.87	111,998	No Info	7,000,000	7,000,000	No Info	7,890	No Info	Assume < 1%	0.89	143225	62501	-	-
Deutsche Telekom	85.70	241,400	9,811,124	2,355,824	2,550,745	No Info	5,376	2374	44.2%	0.44	29764	10566	260	-
Verizon	93.50	233,000	14,500,000	6,700,000	7,200,000	No Info	9429	No Info	Assume 0%	0.71	77005	30901	497	-
Acer	14.07	5,000	No Info	No Info	No Info	No Info	9,430	No Info	Assume 0%	-	-	-	-	-
Dell	61.10	88,200	1,560,440	389,678	424,806	51,747	645	23	3.6%	0.60	6953	4816	272	587
Fujitsu	45.52	160,977	6,518,010	838,000	1,530,000	No Info	2,052	No Info	Assume 0%	0.41	33608	9504	235	-
HP	104.30	172,000	5,704,641	1,416,224	1,516,300	464,000	2,704	60	2.0%	0.52	14538	8816	266	2698
IBM	98.80	386,558	No Info	2,265,648	3,015,365	No Info	5343	455	8.5%	0.42	30520	7801	-	-
Lenovo	16.30	23,100	No Info	58,109	59,748	13,818	83	0.8	1.0%	0.70	3666	2586	-	598
Sun	13.90	38,000	No Info	254,322	267,254	84,899	483	9.66	2.0%	0.53	19227	7033	-	2234
Ericsson	29.42	74,000	2,000,000	168,000	177,000	125,000	605	182	25.0%	0.28	6015	2392	89	1689
Nokia	56.29	53,939	1,498,179	223,053	236,087	187,000	541	133	25.0%	0.41	4194	4377	173	3467
Cisco	34.90	61,535	1,727,180	479,202	310,000	205,704	900	117	13.0%	0.53	8883	5038	179	3343
Nortel	10.95	32,550	1,161,250	291,136	314,286	38,928	563	45	8.0%	0.52	28702	9655	271	1196
Google	16.59	16,805	No Info	No Info	No Info	No Info	No Info	No Info	Assume <1%	-	-	-	-	-
Microsoft	58.00	91,259	No Info	152,480	558,964	255,370	664	Assume 0%	Assume 0%	0.23	9637	6125	-	2798
Oracle	22.40	85,188	No Info	No Info	No Info	No Info	236	No Info	Assume 0%	-	-	-	-	-
SAP	14.63	44,023	1,010,216	92,610	207,367	190,830	295	48.1	16.0%	0.31	14175	4710	205	4335
Accenture	19.70	180,000	No Info	No Info	No Info	No Info	No Info	No Info	Assume 0%	-	-	-	-	-
EDS	21.30	139,000	2,401,301	520,211	583,759	88,465	878	0	0.0%	0.59	27407	4200	243	636
TCS	5.70	111,000	No Info	No Info	No Info	No Info	No Info	No Info	Assume 0%	-	-	-	-	-
Wipro	4.41	85,169	838,011	167,077	198,252	60,808	25	0.5	2.0%	6.67	44983	2328	237	714

Source: Gartner (October 2008)

RECOMMENDED READING

Gartner Sources:

"Green IT: The New Industry Shock Wave"

External Sources:

"Greenpeace Guide to Greener Electronics"

http://www.panda.org/news_facts/publications/ict/index.cfm

Acronym Key and Glossary Terms

CDP	Carbon Disclosure Project
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
CSR	corporate social responsibility
DJSI	Dow Jones Sustainability Index
EMAS	Eco-Management and Audit Scheme (EU program)
ETNO	European Telecommunications Network Operators' Association
EU	European Union
GeSI	Global e-Sustainability Initiative
GHG	greenhouse gas
GWh	gigawatt-hour (1 million kilowatt-hours)
ICT	information and communication technology
ISO 14001 certification	The international specification for an environmental management system. It specifies requirements for establishing an environmental policy, determining environmental aspects and impacts of products/activities/services, planning environmental objectives and measurable targets, implementation and operation of programs to meet objectives and targets, checking and corrective action, and management review.
KPI	key performance indicator
kWh	kilowatt hour (a unit of energy)
LCA	life cycle assessment
MW	megawatt
NGO	nongovernment organization
OECD	Organisation for Economic Co-operation and Development
ROHS	European Union Restriction of Hazardous Substances Directive

WEF	World Economic Forum
WWF	World Wide Fund For Nature (also known as World Wildlife Fund)

Note 1
IT's Role in the Spotlight

www.oecd.org/document/15/0,3343,en_2649_34223_40472783_1_1_1_1,00.html

www.itu.int/ITU-T/worksem/climatechange/

www.weforum.org/en/ip/ittc/keyissues/index.htm

http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/733

Note 2
Government's Focus on IT's Role in a Low-Carbon Economy

For example, see the Gartner report "EC Announcement on 'Green IT' Lacks Detail," May 2008.

Note 3
GHG Emissions Reporting: The Greenhouse Gas Protocol

www.ghgprotocol.org

Note 4
China Mobile's Green Action Plan

www.chinamobileltd.com/about.php?menu=5

Note 5
China Mobile Targeting the 98%

www.chinamobileltd.com/about.php?menu=5

Note 6
Cisco's Connected Urban Development

www.connectedurbandevelopment.org/

Note 7
HP's Sustainability Labs

www.hp.com/hpinfo/newsroom/press/2008/080604xa.html

Note 8
HP's Low-Carbon Solutions Guide

www.hp.com/hpinfo/newsroom/press/2008/080619b.html

Note 9
IBM's Software for a Greener World

www-03.ibm.com/press/us/en/pressrelease/24200.wss

Note 10
IBM Targeting the 98%

www-03.ibm.com/press/us/en/pressrelease/25202.wss

www-03.ibm.com/press/us/en/pressrelease/25201.wss

Note 11
Microsoft Environmental Roles

http://blog.seattletimes.nwsource.com/techtracks/2007/11/microsoft_creates_new_chief_environmental_strategi.html

Note 12
Dell's Plant a Tree

www.dell.com/content/topics/global.aspx/about_dell/values/environment/tree?c=us&l=en&s=corp&redirect=1

Note 13
Nokia's Charger Efficiency

The initiative is of course not bad and should be done, but it is not really something that a leading company would communicate. www.nokia.com/A41041084

Note 14
China Mobile Targeting the 2%

They have a target on their Green Action Plan which is to increase the energy efficiency (per unit of telecommunications traffic) by 40% in 2010 compared with 2005 to save 6.94m tons of CO_2 emission.

Note 15
Fujitsu's Green Policy Innovation

www.fujitsu.com/global/news/pr/archives/month/2007/20071210-01.html

Note 16
Fujitsu's Environmental Burden Assessment

www.fujitsu.com/downloads/ECO/rep2007/2007report42-e.pdf

www.fujitsu.com/downloads/ECO/rep2007/2007report39-41-e.pdf

http://jp.fujitsu.com/group/labs/downloads/en/business/activities/activities-3/fujitsu-labs-envtech-002-en.pdf

Note 17
Fujitsu's Environmental Protection Program

www.fujitsu.com/global/about/environment/program/stage5.html

Note 18
IBM's Project Big Green

www-03.ibm.com/press/us/en/pressrelease/24200.wss

Note 19
Low-Carbon Feedback

Low-Carbon Feedback: The use of a product or service has three impacts — direct, indirect and systemic. The direct effects of mobile services would, for example, be the power used by a cell phone and the supporting base stations. The indirect effects might include reduced emissions from travel as a result of live updates to route planning based on road conditions or cancellations. The systemic effects are the impacts on societal behaviors and consumption patterns, such as mobile communications and data access, allowing people to live and work anywhere and thus affecting travel and consumption patterns. Low-carbon feedback means that the net effect across the three areas is a reduction of carbon. High-carbon feedback is a net increase.

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