CHAPTER 1.9

Measuring the Environmental Impact of Travel: Business Intelligence for Informed Travel Choice

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> When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.
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> —*Lord Kelvin (1883)*

It is common wisdom in business that you do what you measure. Benchmark data provide the foundation for well-designed goals and objectives, and regular measurement against those objectives tells you just how much you have achieved. It's all about generating greater business insight and intelligence.

When businesses venture into the realm of science—as they do when they seek to assess their impact on the environment—measurement becomes especially critical. Data lead to information, information leads to knowledge, and knowledge leads to action—or at least to the context for action.

One of the big challenges for businesses and consumers today is to gather more data and business intelligence about their impact on the environment, and especially—at a time when climate change has become the world's most urgent environmental issue—about their carbon footprint.

Measurement usually starts with direct emissions of carbon and other greenhouse gases—from energy use, manufacturing processes, and company-owned vehicles and aircraft, to name a few. But more and more companies, along with a growing number of consumers, want better information about the indirect emissions for which they are responsible, particularly the carbon emissions related to business and personal travel.

This desire for information has the potential to reshape the travel policies companies set and the choices companies and consumers make across a broad range of decisions: how they travel; when and where they travel; what airlines, hotels, and rental car companies they use; where they hold meetings and events—even *whether* they travel at all.

Companies are already demanding more data and greater transparency on the environmental impact of their travel from their suppliers and travel management companies. Many of them need that information for corporate reporting on greenhouse gas emissions as well as to evaluate the impact of specific travel practices, patterns, and policies.

Cost and convenience are still the key factors in travel decisions, but the environmental impact of travel—which will carry increasing costs of its own if carbon taxes and other levies proliferate—is becoming an important third factor for companies and individuals alike.

It's an equally large challenge for the Travel & Tourism (T&T) industry. The industry cannot advance environmentally sustainable travel without a detailed understanding of its impact on the environment today—

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particularly the impact of air travel. And it cannot serve its customers without providing the data and the measurement and business intelligence tools they need to make informed travel choices.

The stakes are high both for the industry and the many countries that depend heavily on the economic benefits of Travel & Tourism. The United Nations World Tourism Organization (UNWTO) estimated that there were nearly 900 million international arrivals in 2007, and predicted that arrivals will grow to 1.5 billion by 2020. Worldwide receipts from international tourism reached US$733 billion in 2006, according to the UNWTO, and approximately 75 countries earned at least US$1 billion from international tourism.[1]

At the Second International Conference on Climate Change and Tourism in October 2007, sponsored by the UNWTO and other organizations, delegates agreed that "the tourism sector must rapidly respond to climate change, within the evolving UN framework and progressively reduce its Greenhouse Gas (GHG) contribution if it is to grow in a sustainable manner. This will require action to:

- mitigate its GHG emissions, derived especially from transport and accommodation activities;
- adapt tourism businesses and destinations to changing climate conditions;
- apply existing and new technology to improve energy efficiency;
- secure financial resources to help poor regions and countries."[2]

Effective action to reduce GHG emissions has to start with accurate measurement.

Demand for information

Demand is growing from businesses and travel management companies around the world for tools to help them measure their carbon emissions that result from travel—and for good reason. On average, business travel accounts for 15 to 20 percent of a company's total emissions; for services companies this can reach as high as 80 percent. Companies increasingly recognize that environmental sustainability is good for business, and they need accurate data gathering, calculation, and reporting to help them manage their carbon footprint.

The importance of this information was evident in a survey of corporate travel managers conducted in 2007 by Galileo, a leading global distribution system owned by Travelport. The survey found that:

- 78 percent of corporations say their company will have a formal environmental policy for business travel by 2009,
- 84 percent say their organization will be measuring its business travel carbon footprint by 2009, and

- over the next few years, corporations will give greater consideration to the carbon implications of choosing suppliers.

In part, these findings recognize the growing pressure from government and the public to reduce GHG emissions. "At the moment, unless you're a very large industrial manufacturer, you're not necessarily regulated on the amount of emissions you can deliver in the course of a year," says Hugo Kimber, CEO of the Carbon Consultancy in the United Kingdom. "But that's changing, and everybody has an eye on legislation in this area."

At the same time, more businesses are putting pressure on their suppliers. "More forward-thinking international companies are going to start buying and informing their purchasing choices not just on quality and price but also on carbon," says Kimber, whose organization is working with Travelport on a carbon-reporting tool. The most aggressive companies, he says, are telling their travel management companies to provide carbon reporting or lose their business.

Public opinion plays a role as well. A recent Carbon Consultancy report for the International Institute for Environment and Development cited a 2006 YouGov poll conducted by the British Air Transport Associate on attitudes toward aviation and the environment. The poll found that "56 percent of respondents were concerned about the impact of their flying on the environment, whilst 82 percent were prepared to pay the environmental cost of flying, preferably through an international scheme to control aviation emissions."[3]

The baseline

Governments, nongovernmental organizations (NGOs), online travel sites such as Expedia and Orbitz, and many other groups now make carbon calculators available to help consumers figure out their carbon footprint and to provide advice on how to reduce their emissions or where to purchase carbon offsets. To make them easy to use, the calculators understandably limit the number of variables involved.

That approach may work for individuals and households, but companies need more sophisticated business intelligence to accurately measure and report their emissions—not only from air travel but also from the hotels they book, the resorts they use for meetings and events, and the cars they rent.

Aviation

Several international organizations have developed estimates of the scale of aviation emissions. The Intergovernmental Panel on Climate Change (IPCC) estimated in 1999 that aviation produced 1.6 percent of total world greenhouse gas emissions.[4] Carbon dioxide is the largest component of these emissions, which also

include water vapor, nitrous oxide, and sulfur dioxide. The International Air Transport Association (IATA) estimates that today aviation produces 2 percent of the world's carbon emissions. That compares to 23 percent for the transportation sector as a whole.

These numbers are higher in individual countries that have the highest levels of air travel. According to the US Environmental Protection Agency, aviation accounted for 3 percent of carbon emissions in the United States in 2005.[5] The UK Department of Environment, Food and Rural Affairs (Defra) reported that aviation represented 6.3 percent of UK GHG emissions in 2005.[6]

Although these numbers are small compared with the emissions from power-generating facilities and vehicles, the rapid growth of travel means that aviation is a growing contributor to GHG emissions. The IPCC estimates that aircraft fuel efficiency is growing about 1 to 2 percent a year, while annual air traffic is growing at 5 percent. This results in growth of 3 to 4 percent a year in CO_2 emissions.[7]

Adding to the complexity of measuring aviation emissions is a factor known as *radiative forcing*, which takes into account the fact that aircraft emissions take place at higher altitudes and therefore have a greater impact. The IPCC estimates the multiplier effect at 1.9 to 4.0. But the effect of radiative forcing is not well understood, so it is currently left out of most calculations of aviation emissions.

One important factor in aviation emissions today is inefficiency in air traffic control systems. Europe, for example, has 35 different air traffic control organizations, making it difficult to optimize air routing and to reduce the number of aircraft forced into holding patterns, a practice that leads to more fuel consumption and increased carbon emissions. In the United States, new air traffic control technology is needed to support more efficient routing, spacing, and landing of aircraft. The IATA predicts that carbon emissions from aircraft could be reduced by 12 percent with more efficient air traffic control.

There are two leading standards for measuring aircraft emissions: Defra for the United Kingdom, and the GHG Protocol Corporate Accounting and Reporting Standard, which is widely used internationally. The annexes to the *Defra Company Reporting Guidelines* were originally issued in 2005 and revised in 2007. The GHG Protocol Initiative is a partnership of businesses, NGOs, governments, and other groups convened by the World Resources Institute and the World Business Council for Sustainable Development. Its standards were first published in 2001 and were updated in 2004.

Both organizations provide emissions factors for air travel and other forms of transportation based on a range of distances, the most commonly used aircraft on those routes, and typical load factors. Defra, for example, provides the number of grams of CO_2 per passenger kilometer for domestic flights, short-haul international flights (less than 2,000 nautical miles), and long-haul international flights (more than 2,000 nautical miles). The GHG protocol provides similar calculations for short, medium, and long flights.

Carbon calculators based on these standards provide reliable guidance to users. But, according to a report by the Carbon Consultancy, a large number of carbon offset companies offer calculators using their own datasets, and some employ radiative forcing. "Calculations from carbon calculators have been found to show variances of 300% between the lowest and highest values," the Consultancy reports. "Such a variance in results does not facilitate assessment of emissions and damages consumer/user confidence."[8]

Other transportation

The Defra standards and GHG protocols also provide guidelines and calculators for automobiles based on engine type (gasoline, diesel, and hybrid) and vehicle size, as well as for rail and bus transportation. That may suffice when setting broad, national standards, but more detailed information will be needed by companies who want to know the carbon emissions of the cars they rent or lease.

Hotels

There are no standards today for rating the carbon emissions of hotels. A wide variety of groups—from Audubon International to hotel associations and online travel sites such as Expedia and Orbitz—are beginning to assess and identify eco-friendly hotels. Orbitz, for example, is now researching hotels with eco-friendly policies based on whether they:

- use a natural source of energy (i.e., wind, water, solar, bio-fuel);
- use environmentally friendly and safe products;
- contribute money from each hotel reservation to an environmental organization; and
- use energy-conserving devices.

And Audubon International's Green Leaf Eco-Rating Program takes into account energy efficiency, resource conservation, pollution prevention, and environmental management.

While many of these criteria affect carbon emissions—the use of recycled paper and plastic versus new products, or local sourcing of foods and materials versus long-distance sourcing—there is little information today on the actual carbon emissions of hotels and resorts. "If you look at a major hotel group for example, they may have 40 different environmental pledges," says Kimber, "but in many cases they're aspirational because there are no measurements or carbon values attached to them to demonstrate achievement."

Companies and consumers need to have more confidence in these ratings, and that means more accurate

and transparent measurement of carbon emissions. And hotels need better and more transparent measurement to compete for the growing number of guests who are making environmental sustainability a key factor in their hotel choices.

Improving the measurement and accuracy of carbon reporting

Standard measurement tools such as those provided by Defra and the GHG Protocols are good and getting better. But standards, by their very nature, build on averages. Individual companies need more detailed and accurate data to measure the carbon footprint from their business travel.

Global Distribution Systems (GDS) are ideally situated to provide that kind of tool. The three largest GDS companies process over a billion flight bookings and tens of millions of hotel reservations and car rental bookings annually around the world. They power all of the major online travel agencies, the major corporate travel management companies, and the self-booking tools used by many corporations.

"Travel agencies and corporations use the GDS for a wide array of information that enables them to make informed choices about their travel, including schedules, fares and rates as well as the facilities offered by travel suppliers as part of the booking process," says Gordon Wilson, CEO of Travelport GDS. "Adding data on the carbon emissions of various travel options is a relatively simple and straightforward exercise, but also one that is highly valuable."

With that information available prior to booking, travelers would be able to select airline A over airline B, for example, based on the relative carbon emissions of each option. The emissions will vary based on the route taken, aircraft and engine type, and flying time (which would generally make a direct flight more carbon efficient than a flight with connections), as well as other factors.

"Corporations need this data not only to calculate their own carbon footprint but to influence individual traveler behavior at the point of booking," says Wilson. "This would significantly benefit every party involved in the process by enabling informed travel choice not only about routes and fares but about environmental impact as well."

Travelport GDS—which operates both the Galileo and Worldspan brands—has been working with senior industry leaders in the field of carbon management on a carbon emission–reporting tool that could be easily integrated into the existing GDS systems. To meet the demands of corporate travel managers, the core data and calculation logic must be robust, proven, and reliable—and the tool must interface with a variety of carbon-offset schemes deployed around the world.

Such GDS-based tools will serve the demand for post-trip reporting, and will also show emissions data at the point of sale, when demand from travelers is stronger. The goal will be not only to focus on air travel, but also to measure automobile, railroad, and hotel emissions.

Companies would have the option to receive Defra or GHG Protocol Initiative values, which are based on national averages, for corporate reporting. The more detailed, refined values would be based upon a greater number of datasets than the national averages, enabling companies to receive more "real world" emissions data. For cars, the emissions would be based on each individual vehicle type rather than an average for engine sizes and fuel types.

The formula used to calculate emissions should provide detailed air segment calculations, including distance, airline, seating configurations, class, aircraft type, and load factor. These factors help calculate emissions per flown seat based on airline- and aircraft-specific data. It will also be important to show comparison emissions data for both rail and auto on appropriate routes to help customers determine the "carbon opportunity cost" of their travel choices. For one traveler, for example, a single flight from London Heathrow to Edinburgh might produce 87 kilograms of CO_2 while the same trip by rail would have produced 33 kilograms, and by car 115 kilograms. (This comparison is based on current Defra values.) Where two people are traveling together, the car would be more efficient than the aircraft, while rail would be the optimal carbon choice in both cases.

A carbon-reporting tool with that level of detail would allow customers to drill down on post-trip reporting to produce reports on carbon emissions by company, division, traveler, route, and airline.

"More and more companies also want pre-trip reporting, which could be enabled via a GDS. With that information, they can make more informed choices about routes, airlines, and aircraft and adapt their travel policies to balance cost, convenience, and carbon emissions," says Nigel Couzens, Marketing Manager for Global Markets, Travelport.

High-quality calculations and the introduction of additional variables will give companies the information they need to make their travel policies even more effective. A company could set a policy, for example, that prevents employees from traveling between New York and Boston by air. And it could choose locations for meetings and events based on the aggregate CO_2 emissions of all the attendees flying to the event.

"Ultimately, it's up to companies to decide what to do with the data," says Couzens, "but more accurate and more transparent carbon-reporting tools will provide them with far more options than they have today and a foundation for making more informed choices about environmentally sustainable travel."

The future of measurement

The Holy Grail of measurement will be the ability to get accurate data on carbon values per airline seat, hotel room, meeting room, rail seat, and auto. That will take more data than are currently available.

Kimber says that achieving that kind of precision in aviation emissions requires knowledge of an aircraft's exact fuel use under actual operating conditions. "If the airlines were to report the amount of fuel they use on certain routes and flights, all the questions of fuel consumption methodology would go out the window. When you know the fuel use, you can get precise emissions calculations." Baggage, cargo, and passenger load also have an impact on fuel use, so it will be difficult to calculate emissions down to the last gram.

More and more companies are beginning to ask this question: If carbon emissions are important, do I need to work with more environmentally efficient suppliers—newer fleets, higher load factors, more seats per plane—in order the reduce my carbon footprint per passenger?

"In all areas of emissions reduction, including aviation, behavioral change is a key element in achieving objectives," the Carbon Consultancy reports. "Consumers are currently faced with a choice of flying or not flying as a response to environmental concerns. The absence of reliable and industrywide information on carbon emissions values deprives consumers of the opportunity to influence supply by focusing demand on the most carbon efficient suppliers."[9]

Work is underway by the Carbon Consultancy and others to create hotel carbon values based on Scope 1 and Scope 2 emissions. These are emissions over which businesses have direct control. *Scope 1* emissions refer to the direct combustion of fuel for boilers and vehicles. *Scope 2* emissions are those from purchased electricity, steam, or heat. The goal is to calculate an emissions value per lodging room and meeting room by subtype. With that kind of information, hotels could be rated on the emissions per room as well as the emission reduction initiatives they have in place.

Travelers would also benefit from knowing the carbon values for the individual makes and models in a car rental fleet in order to make the most informed and efficient choices. It is no coincidence that more rental car companies are marketing the availability of hybrid cars.

Business intelligence

Integrating carbon-reporting tools with booking information from the GDS is just one example of the kind of business intelligence that is becoming more and more important to the travel industry. Travelport's Shepherd Business Intelligence, for example, assists airlines and travel agents around the world with data processing and analytical tools that help them improve their fleet planning strategies, pricing policies, distribution, and sales and commercial relationships.

"It's an extremely competitive market, and airlines have very thin margins," says Chris Colaco, Shepherd's senior vice president. "They can't afford to make bad decisions, and that means they need more information at their fingertips."

Recent data, for example, show that the growth in traffic flows is strongest in emerging markets in Africa, the Middle East, Latin America, and Asia. Growth is particularly strong in the BRIC nations—Brazil, Russia, India, and China. Dig a little deeper into travel data on those four countries and you find significant growth in routes between China and Africa, between India and the European Union, and between Russia and the Middle East.

The more data airlines and travel consumers have—whether they are route information or carbon emissions—the more informed decisions they can make.

Measurement and action

Measurement, of course, is just a means to an end. Data do not change anything; action based on data does.

The risk for the industry—airlines, hoteliers, car rental companies, tour operators, and travel agents alike—is that people will begin to regard travel as a major discretionary emissions source. There are already calls for people and companies to cut back on flying, for governments to halt construction and expansion of airports, and for tourists to stay closer to home. In the absence of alternatives, those voices will only grow louder.

It is up to the industry to demonstrate its commitment to environmentally sustainable Travel & Tourism, and to communicate the importance of tourism to economic development, cultural understanding, and peace among nations. Environmental sustainability is as much an opportunity as it is a challenge. As more and more people make purchasing decisions that incorporate environmental concerns, carbon efficiency has the potential to be a competitive advantage for suppliers at all levels of the T&T industry.

The Travel & Tourism industry is nearing a tipping point where the combination of sophisticated measurement and reporting tools and growing customer demand for more sustainable travel choices are going to accelerate the industry's progress toward reducing carbon and other GHG emissions. That's good for the planet, good for the industry, and good for travelers.

Notes

1 UNWTO 2007a.

2 UNWTO 2007b.

3 Kimber 2007.

4 IPCC 1999.

5 US EPA 200.

6 Defra 2007.

7 IPCC 2007.

8 Kimber 2007.

9 Kimber 2007.

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