Special Feature

Assessing the Environmental Impact of ICT Solutions at NTT DATA

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Abstract

NTT DATA is in the business of marketing and developing ICT (information and communications technology) solutions. As part of this business, it attempts to quantitatively assess how these solutions reduce the environmental load (CO_2 emissions) through reductions in physical things, manpower, and movement. This article outlines the history behind this effort, introduces the assessment method, and presents measures that NTT DATA has adopted in the assessment process.

1. Toward environmentally friendly ICT solutions

The era of environmentally friendly information technology (IT) has truly arrived. These days, environmental impact is being assessed as a social responsibility by those that provide information and communications technology (ICT) solutions to customers. If concern for the environment continues to grow throughout society, we can expect customers themselves to reject the deployment of solutions that do not meet environmentally sound standards.

The NTT DATA Group has been conducting ISO 14001 certification activities since 1999 and has been actively involved in various environmental protection activities. The foundation of these activities is the NTT DATA Group Environmental Policy (**Fig. 1**), which advocates the development of environmentally friendly systems in the group's main business of marketing and developing ICT solutions. In conformance with this policy, the NTT DATA Group endeavors in all processes of system development to incorporate ideas that will enable the environmental load generated by the customer's business to be reduced by the introduction of ICT solutions. This way of thinking about the development of environmentally friendly systems goes back to NTT DATA's initial acquisition of ISO 14001 certification in 1999 and has come to include active efforts to foster environmental aware-

ness in employees [1].

To facilitate this effort, since January 2006 the NTT DATA Group has been using an environmental impact assessment system for ICT services developed by NTT Laboratories [2]. This system, called Kankyo Shiro, provides the user with a tool for cal-
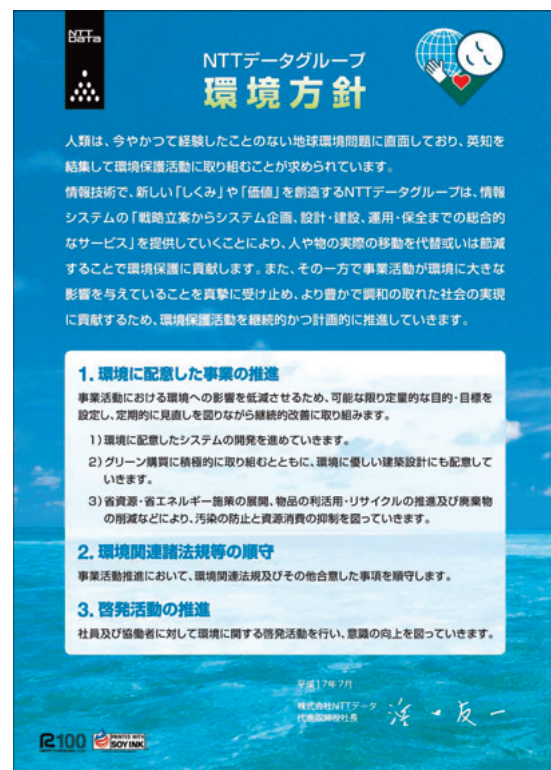

Fig. 1.   Poster of NTT DATA Group Environmental Policy.

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culating the reduction effect of ICT solutions from the viewpoint of life cycle assessment (LCA). This tool can be used by various departments. For example, the sales department can use it to propose an environmentally friendly ICT solution to a prospective customer by quantitatively showing the environmental contributions that can be achieved by its deployment. Kankyo Shiro can also be used in the system-development process as a basis for judging the environmental load reduction effect of new designs. NTT DATA is working to spread this way of thinking about the development of environmentally friendly systems throughout the entire NTT DATA Group and to achieve widespread use of the Kankyo Shiro tool among employees.

2. Overview of Kankyo Shiro

When offering an ICT solution to a customer, we compare the customer's business before and after deployment. This entails making a survey of how the ICT solution might reduce the movement of people and physical things, the use of physical things, and manpower. It also involves a survey of the size, number, and other attributes of new pieces of hardware. A new system requires the installation of new hardware, which increases the environmental load. But when an existing system is upgraded, such as from large, power-hungry servers to small, power-efficient ones, the environmental load can be reduced. Taking information about the environmental load before and after system deployment as its input, Kankyo Shiro calculates the difference in load and displays the results.

3. Actual assessment process

This section explains the assessment procedure using as an example an ICT solution called Koufuri-kun provided by the NTT DATA Group. The Koufu-ri-kun service enables customers to make payments for utility bills by automatic bank transfer while also receiving advance notification of billing details [3]. Paying utility bills by automatic bank transfer has long been a common practice by individuals in Japan, but corporations and government bodies have been reluctant to follow suit. They complain that using such a procedure would make the traditional work of filling in payment forms and making payments based on invoices very complicated. They say that the procedure would prevent advanced approval for payments from being made, make it difficult to determine which department should pay and to which accounting item the payment should be assigned, and require a special step for entering the payment into the accounting system after the automatic transfer has taken place.

The Koufuri-kun service eliminates the bother of making payments at the bank based on payment statements and the associated work of filling in payment forms. The bank provides the customer with charges and related information before payments are due arranged by type of utility contract. This enables payments for the amounts indicated to be approved beforehand using a Koufuri-kun terminal system and for accounting data to be correctly prepared.

As shown in **Fig. 2**, the assessment process begins by preparing input items. These include data about
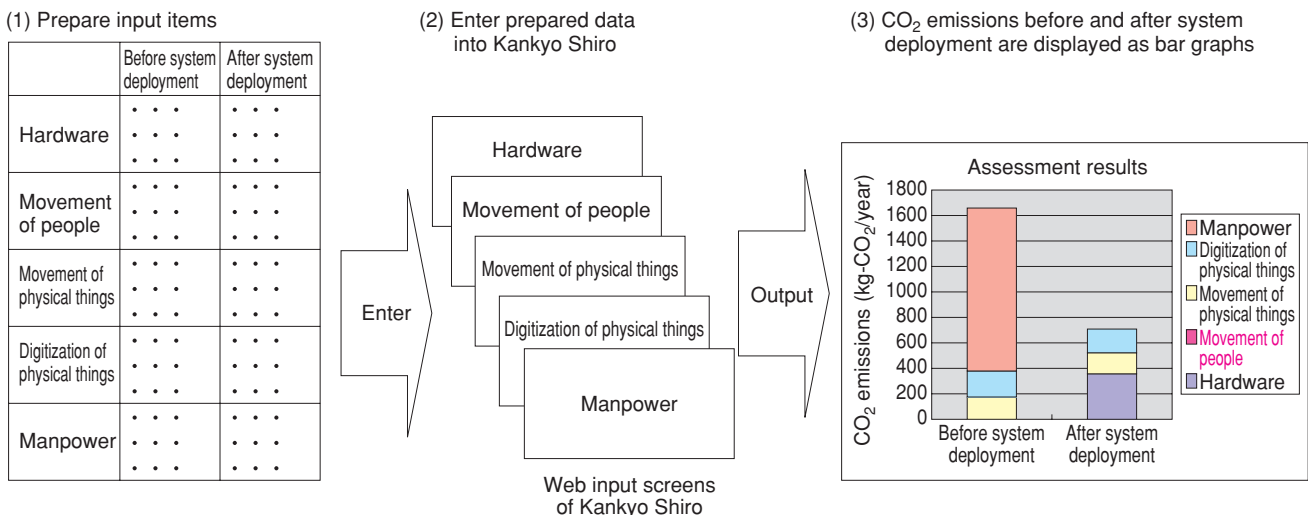

Fig. 2.   Flow of assessment by Kankyo Shiro.

the hardware to be deployed by the Koufuri-kun system (size, number of units, etc.) and the manpower required. The manpower in particular is expected to be greatly reduced by system deployment. Next, the user inputs numerical values on input screens corresponding to each of the above items. Once this has been done, Kankyo Shiro displays the difference in environmental load before and after system deployment in the form of bar graphs. These enable us to see that the increase in environmental load caused by system deployment related to the power consumed by newly installed hardware and other factors is far less than the reduction in environmental load due to a decrease in manpower. Specifically, it achieves an environmental-load reduction effect in the form of a 57.5% reduction in CO_2 emissions (about 950 tons of CO_2).

4.   Innovations in assessment options

Programs for assessing the environmental impact of an ICT solution for sales-promotion purposes have already begun at other companies. These involve the introduction of a system for assessing packaged products and approving deployed systems that have achieved company-defined standards as environmental-contribution solutions (for example, Fujitsu's "Environmental Contribution Solution Certification System"). However, most of the ICT solutions provided by the NTT DATA Group are constructed in response to user needs, that is, they are order-made systems, which implies a wide range of system scale. Consequently, the introduction of an environmental-impact assessment tool has been considered difficult unless it can handle systems of any size.

Kankyo Shiro, which is a Web-based system, can freely arrange the method for assessing an ICT solution. With this in mind, we investigated what type of service options would be best for assessing general-purpose ICT solutions while taking into account ease of input.

To create a general-purpose assessment method, we first looked at solutions that were already being provided to customers by the NTT DATA Group and selected several with different system characteristics and scales as solution models. We then attempted to assess the change in environmental load before and after system deployment through desktop calculations.

Just how a customer's business might change after system deployment was surveyed from various angles. We found that, for most solutions, the items

that changed could be narrowed down to just a few, such as manpower and digitization of physical things. For this reason, we decided that from among all the model solutions we would use as input items only those items that shared the common trait of changing after system deployment. We also made sure that the user would need to input only a numerical value for each item and that Kankyo Shiro would do the rest, i.e., perform the calculations and display results.

Moreover, mindful that many types of diverse hardware could be used depending on the system's scale and characteristics, we first divided hardware information into categories such as servers, tape drives, and printers and then subdivided those categories into large, medium, and small to simplify data entry. Consequently, if average values of equipment characteristics belonging to each subdivision are calculated and the unit environmental load for each subdivision has been prepared, the environmental load for all hardware can be obtained simply if one knows the number of units of equipment in those categories. The input items obtained as a result of this investigation are listed in **Table 1**.

5.   Innovations in raising employee awareness

To advance the development of environmentally friendly systems throughout the NTT DATA Group, environmental-impact assessments of ICT solutions must be carried out not only by departments in charge of environmental matters but also by system development and sales departments. To this end, the NTT DATA Group has created a user manual for performing environmental-impact assessments using the Web-based system Kankyo Shiro. This manual assumes that the user performing the assessment is not an environmental expert, so it uses as few specialized environmental terms as possible.

Special measures are also being taken to help sales personnel. Considering that ICT solutions may be proposed to systems managers who are not knowledgeable about environmental matters and have little interest in the environment, a sales person may doubt the effectiveness of Kankyo Shiro as a sales tool or wonder how it should be used to best effect in such a case. For this reason, we interviewed a number of sales persons to collect information about effective techniques for such a situation, and we are now in the process of disseminating this information at Kankyo Shiro briefing sessions (**Photo 1**).

Table 1. Input items in Kankyo Shiro.

Assessment category	Item	Sub-item	Before system deployment	After system deployment	Unit
Hardware	Server	UNIX server			Units
		Windows server			Units
	Storage equipment	Large			Units
		Medium			Units
		Small			Units
	Tape drives	Large			Units
		Medium			Units
		Small			Units
	Printer	Large			Units
		Medium			Units
		Small			Units
	Router				Units
	HUB				Units
	Management terminals				Units
Movement of people		No. of round trips			—
		Round-trip distance			km
Movement of physical things		No. of home-delivery shipments			—
		No. of postal-delivery mailings			—
Digitization of physical things		No. of sheets of paper used			—
		No. of CD-ROMs used			—
Manpower		Working hours			Hours

CD-ROM: compact disc read only memory, a popular medium for storing and transporting data.

6. Problems discovered in actual use

To perform an environmental-impact assessment by Kankyo Shiro, it is first necessary to collect numerical values that show how the movement of people and things and other characteristics differ before and after system deployment. This, however, requires asking a customer to provide data about the old system before deployment of the new system. If that process were under NTT DATA's control, then preparations for environmental impact assessments by Kankyo Shiro would, of course, proceed smoothly. Since it is not, we found that collecting such data could be very difficult.

Another problem relates to the screens used for entering data into Kankyo Shiro. While the range of system options that we have prepared can be used to assess any kind of ICT solution, the number of items to be entered for some solutions may be too large, which results in the user having to decide which items should be entered. Some users have complained that the system is difficult to use until one becomes accustomed to it.

Photo 1. Kankyo Shiro briefing session.

7. Future issues

Assessments by Kankyo Shiro should be made even simpler. To this end, we plan to divide ICT solutions into several patterns based on the results that we

are obtaining from assessing order-made systems and to create templates that further narrow down the input items shown in Table 1. We believe that the use of templates should enable environmental-impact assessments to be performed with minimal input.

Furthermore, in addition to simply assessing environmental impact, we plan to expand our work in this area to include the establishment of standards for environmentally sound systems to facilitate the promotion of environmentally sound solutions overseas. With these standards, a newly designed system found to be environmentally weak could be reevaluated and modified as needed before the customer is provided with an ICT solution.

References

[1] "Social Environment Report 2005," NTT DATA, 2005 (in Japanese).
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