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## **Nortel: Shared savings for chemicals and waste reduction**

**Conventional business relationships encourage suppliers to maximise sales to their customers. The environment and the customer are often the losers. A "shared savings" business model in which both supplier and customer have financial incentives to minimise resource consumption and waste has been applied successfully by the North American car industry - and telecommunications giant Nortel is now testing its application to waste minimisation in Britain and chemical use reduction in Canada.**

Manufacturing companies are rarely slow to complain that they are being distracted from their core businesses when some new regulation requires them to invest in and operate environmental technologies in which they have limited expertise. But fewer have yet to appreciate that there is another side to the coin: that management of some of the products and services which they buy in, and of the environmental burdens that come with them, might best be left to external specialists from a cost, productivity and environmental perspective.

In traditional business practice, manufacturers buy energy, raw materials and waste management services from suppliers who compete on price, with the contract going to the lowest bid that is consistent with the customer's wider objectives. The full costs - both financial and environmental - of these transactions are rarely brought to light by normal accounting practices.

### **Greening supply chains**

Over the last few years, the pioneering efforts of some manufacturing businesses towards "greening" their supply chains have begun to reveal how large these hidden costs can be - and have begun to stimulate new ways of thinking about how they might be reduced to yield a "double dividend" of cost reduction and lesser environmental impacts.

One of the most active sectors in environmental management of suppliers is the electronics industry. Leading companies in the sector have worked with their suppliers to simplify components and materials in order to enhance the upgradability and recyclability of their products, and to redesign packaging as part of their waste reduction programmes.

Among these businesses is Nortel, the Canadian telecommunications giant which is active in 90 countries, employs more than 60,000 people, and had a turnover of US\$10.7 billion in 1995. In 1992, Nortel launched a Product Life Cycle Management (PLCM) programme which committed it to rooting out inefficiency and waste in the design, delivery and use of its products - and its relationships with suppliers are seen as fundamental to the success of that programme.

### **Going lead-free**

The expertise and commitment of suppliers will, for example, be valuable in achieving Nortel's objectives to phase out the use of lead from its manufacturing processes and products and brominated flame retardants from plastics. For example, several suppliers have lately been "absolutely fantastic" in finding alternatives to lead-coated components, according to Rahool Watchmaker, a member of the group's Business Developments in Environmental Affairs group in Canada.

These developments have complemented Nortel's own efforts to develop lead-free soldering technology for printed circuit boards. The successful demonstration of a new solder based on copper and tin in the circuitry of two types of office telephone was announced by the group in January - a world first which may pave the way to a phase-out of lead solder in the electronics industry, and prevent the dispersal of more than 15,000 tonnes of the metal annually in discarded products. Nortel also expects the innovation to add value by reducing hazardous waste disposal and occupational health costs.

Innovation in Nortel's relationships with its suppliers and customers is also a priority of the PLCM programme. "We are actively seeking out new business models - new ways of doing business between the units in our value chain - which produce both financial and environmental benefits to the company," says Mr Watchmaker.

One such model is that of "shared savings", in which the relationship between supplier and customer is structured so as to provide both with financial incentives to curb resource consumption and waste - a major departure from the conventional model in which the supplier aims to increase his returns by maximising sales to the customer.

### **Sharing savings in energy and water**

The shared savings model is not new. In the field of contract energy management in particular, it has become increasingly common for the service provider to win a share of the value of the energy savings he achieves for the customer. Similar deals have been made between consultants and manufacturing firms in one or two of the UK's newer regional waste minimisation clubs. But the most striking recent advance in the shared savings approach has come in the North American automotive industry, where three major manufacturers have applied it to good effect to reduce their chemical consumption.

In the UK, Nortel's first application of the concept was done on an *ad hoc* basis early in 1995. The firm's plant in Monkstown, Northern Ireland, which makes public network telecommunications equipment, contracted with a consultant to help reduce its water consumption, with the savings to be split evenly between them. By the end of the year, a series of mostly simple measures - such as the installation of low-flush toilets and low-flow taps - had cut the plant's water consumption by 46%.

Nortel is now extending the shared savings approach in two bigger projects. One will cover waste management for all of its sites in the British Isles. The second, at one of the group's plants in Canada, is testing the application of the concept to chemicals management.

On the waste management front, Nortel is badly in need of effective minimisation and recycling initiatives. In 1994, it set itself four environmental targets for the year 2000. One of these - to reduce energy consumption by 10% from a 1993 baseline - was surpassed by nine percentage points last year, and a new target is to be set this year. The group is also on track to reduce its pollutant releases by 50% and its paper purchases by 30% by 2000, again from a 1993 baseline.

On waste, however, the trend has been all the wrong way. In 1993, Nortel disposed of 8,851 tonnes of solid waste to landfill. Its target is to cut this by 50% by 2000. But by 1996 landfill disposals had jumped by 80% to 15,892 tonnes.

At least part of this increase is due to improved monitoring of wastes, according to Emma Prentis, Environment Manager in Nortel's European operations. In addition, some sites only began reporting their waste statistics in the past two years, but Nortel has not adjusted its 1993 baseline figure for this.

The pressure is clearly on for Nortel's sites to reduce their disposals to landfill. The group's operation in the British Isles recently responded by inviting bids from waste management businesses for a shared savings contract.

Participation in the contract will be voluntary, but it is likely to cover all seven of Nortel's manufacturing and R&D facilities in the UK and Eire, along with some 10 office locations. These produce a wide spectrum of wastes, including solvents and other hazardous wastes, large quantities of packaging, and general office and canteen waste. Until now, each site has had its own waste management contractor, although some have independently employed the same company, albeit on varying terms.

Nortel's new priorities are to provide additional incentives for waste minimisation and recycling and to develop a more consistent approach to waste management across its sites. These stem from a number of pressures.

One is the target to halve disposal to landfill by 2000. All sites in the UK and Eire have improved their recycling record in the past three years, says Emma Prentis - but, as with the

global picture, disposals to landfill have shown an apparent increase due largely to better monitoring of waste streams.

Secondly, all Nortel sites must now submit quarterly reports to headquarters on the parameters covered by the group's targets, requiring consistent data-gathering and record-keeping practices instead of the diverse arrangements established independently by sites. And third, Nortel will not be joining a collective scheme, such as Valpak, to meet its obligations under the new British packaging waste regulations, and believes that a single contractor will be best placed to help it comply on its own.

A key requirement of the new contract will be for a knowledgeable individual to be present on each site for half a day per week. Initially, says Ms Prentis, their task will be "to get the whole process under control" by understanding the origins of waste, improving data collection as necessary, and ensuring compliance with waste legislation. Subsequently, they will assume responsibility for driving waste minimisation and arranging for necessary training of site employees.

### **Waste industry's weaknesses**

Nortel's invitation to tender elicited a "disappointing" response, according to Emma Prentis. Only three firms are still in the running for the contract.

The lack of credible bidders reflects weaknesses in the waste industry which will be an obstacle to any company looking to implement a shared savings approach. Since UK Waste and Biffa began offering an integrated waste management service broadly of the kind sought by Nortel two years ago, few - if any - others have spotted this as a market opportunity. This may cause difficulties for prospective customers in obtaining competitive prices.

As with North American car manufacturers' experience, preparing a shared savings contract is proving a time-consuming exercise for both parties, involving intensive data gathering to provide a basis for costings. Indeed, none of the short-listed waste businesses felt that they had enough experience of a shared savings approach to give detailed costings in their initial bids, and will have to survey all of Nortel's waste streams before they are in a position to do so.

Once this is done, the final hurdle will be to negotiate how savings in waste management costs should be divided between Nortel and its contractor, and how the contract should be structured to ensure that both have a cash incentive to play an active role in the waste reduction effort. The automotive industry's experience suggests that long-term commitments from both parties are needed to wring the maximum benefits from a shared savings approach, and later this year Nortel hopes to reward the successful bidder with a contract of up to three years.

Meanwhile, a Nortel manufacturing facility in Corkstown, Ottawa, is investigating the scope for implementing a shared savings approach to its chemicals management. The company's objectives were spelled out in its latest environmental report.

**Commitment on chemicals** "Traditionally," the report says, "chemical suppliers are financially motivated to sell more product to Nortel. Under a 'shared savings' relationship our supplier will be awarded a long-term, fixed-fee contract which will include incentives to reduce chemical use. The contract will also provide for services which can help Nortel find alternatives to hazardous chemical use or use chemicals more efficiently. By helping Nortel meet our environmental objectives, our supplier will enhance their own bottom line and contribute to the improved health and safety of Nortel employees."

The Corkstown project has its origins in the US automotive industry's experience. The sector's successes in applying the shared savings model attracted the attention of the Pew Charitable Trusts, the largest private sector sponsor of environmental work in the USA, which commissioned a study of how the model might be applied in another sector.

The study came up with the electronics industry as a prime candidate - mainly because it is a significant consumer of chemicals, had recently achieved a rapid phase-out of ozone-depleting chemicals, and is interested in the use of novel business tools such as total cost accounting in its pollution and waste reduction programmes.

### **Private sector partnership**

In June 1996, Pew formed a Chemical Strategies Partnership (CSP) with two electronics businesses, Nortel and Hughes Electronics, to test the shared savings model. The programme is being co-ordinated by a consultancy, California Environmental Associates, with technical and financial support from the Tellus Institute.

The Corkstown site manufactures integrated circuits, as well as assembly and packaging operations. Its chemical consumption is relatively modest but diverse, consisting of small amounts of high-purity speciality chemicals such as acids, caustic compounds and photosensitive organic chemicals used in transferring patterns onto circuit boards.

According to Robert Broe, Environment, Health, Safety and Security Manager for the semi-conductor operation, the main environmental issues for the site are disposal of organic chemicals and control of acid gas emissions. The plant also uses small quantities of sulphur hexafluoride and hexafluoroethane, both highly potent greenhouse gases.

### **Accounting for hidden costs**

The first stage of the CSP project at Corkstown is now almost complete. A materials and cost accounting exercise has been carried out on the photolithography process. One component of this was a mass balance study to track the use and fate of chemicals through the process. The second has evaluated the costs associated with chemical consumption - not only the direct costs of the chemicals themselves, but also indirect costs incurred by Nortel in waste disposal, permitting and documentation, and expenses normally pooled in overhead accounts such as those associated with occupational hygiene, safety and emergency response measures.

The preparatory work has been resource-intensive, involving Nortel production, procurement, financial and environmental personnel as well as the external co-ordinators. But Christina Smith of California Environmental Associates believes that this up-front investment is essential. In the car industry, she says, baselines of chemical consumption and the associated costs were often not established with rigour, making it difficult to quantify accurately the success of the shared savings approach or to set valid performance objectives.

Nortel will shortly receive the final report on the material and cost accounting exercise, although it already knows that the consultants are confident that they have identified opportunities for chemical use reduction. No commitment has yet been made on how far or how fast the operation should go towards the shared savings approach. But its current chemicals management arrangements appear to provide a good springboard for a shared savings contract.

The Corkstown works is unusual in that it already has a services contract with Olin Chemicals Management. Olin has its own staff on the site who manage all of its chemical logistics, stock control and distribution. The arrangement has proved of "great benefit" to Nortel, according to Robert Broe. Gains have included improved on-time delivery and a more forceful quality control programme for chemicals, and Olin has also helped to implement packaging modifications, such as returnable chemical containers.

However, one of the crucial features distinguishing this contract from a shared savings model is that Nortel has kept control of procurement and pricing with all its chemicals suppliers, of which Olin is only one. The lynchpin of a shared savings approach - the shift away from a financial incentive for suppliers to maximise their chemicals sales - is still missing.

For the moment, Nortel staff are emphasising that there is a wide spectrum of possible contractual arrangements to provide incentives for chemical use reductions short of the shared savings ideal. But whatever the outcome of the Corkstown project, shared savings appears likely to play a much more prominent role in Nortel's relationships with suppliers in the coming years. "It's a great model," says Rahool Watchmaker, "not just for chemicals but for supply management in general."

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