

# Spread

## The Word

**Abhishek Agarwal and Peter Strachan** ask if industrial symbiosis is only a concept for developed countries

Industrial symbiosis (IS) strategies have been practised by businesses for centuries. However, until recently, such efforts were seldom planned or co-ordinated. IS is about the sharing of information, services, utility and by-product resources among industrial actors in order to add value, reduce costs and improve the environment. Examples of initiatives based on this concept can be seen throughout the world, but are more prominent in developed countries. The reasons for this are:

- the greater interest of businesses to reduce costs and/or improve image
- the increased cost of waste management due to their governments policies of diverting waste from landfill
- the availability of funding for business support/environmental programmes to provide awareness and advice to businesses
- the need for developed countries to achieve specific environmental targets due to international pressure (eg the Kyoto Protocol).

The most well known and established IS network was developed gradually over a number of years in Kalundborg, Denmark. The National Industrial Symbiosis Programme (NISP) in the UK, however, is the first national initiative to be based on this emerging concept. NISP, as understood by businesses in the UK, is about identifying a home (a business) for a by-product resource (waste) of another business. The

success of NISP in recent years, based on government targets expected to be achieved, has been a remarkable one. Its achievements for 2005/06 and 2006/07 are outlined in Table 1.

There are other examples of similar initiatives in Australia, Europe and the US, which are either in the early stages of development or have been launched on a smaller scale, which leads to the question: is the IS approach only fit for developed countries or does it have the potential and relevance to work and be used in developing countries too?

Some developed countries have introduced a landfill tax in recent years. This has made businesses think about reducing, re-using and recycling their by-products/waste before sending it to landfill. Landfill tax has not only

provided an incentive to businesses in terms of cost savings when their waste is diverted from landfill, but has also enabled governments to fund business support and/or environmental programmes to provide awareness and advice to businesses. The price of resources (including water and energy) in developing countries does not reflect their true value and the relatively low costs dissuade businesses from optimising resource use. In addition, there is no provision of landfill tax in developing countries. As a result, it appears to make little sense for businesses to engage in any sort of symbiotic relationships to optimise resource use. While landfill tax has appeared to be a useful approach, it gives rise to illegal waste

<b>Brew Outputs</b>	<b>2005/06</b>	<b>2006/07</b>
<b>Landfill diverted (t)</b>	<b>530 474</b>	<b>669 535</b>
<b>Carbon reduction (CO<sub>2</sub>e)</b>	<b>279 820</b>	<b>1 157 390</b>
<b>Additional sales for industry (£)</b>	<b>14 164 287</b>	<b>71 743 892</b>
<b>Reduction in the use of potable water (t)</b>	<b>132 238</b>	<b>2 181 540</b>
<b>Cost savings to industry (£)</b>	<b>31 585 613</b>	<b>21 906 316</b>
<b>Hazardous waste eliminated (t)</b>	<b>100 394</b>	<b>144 801</b>
<b>Virgin materials saved (t)</b>	<b>820 268</b>	<b>3 359 821</b>
<b>Other Associated Outputs</b>		
<b>Jobs created</b>	<b>187</b>	<b>335</b>
<b>Jobs saved</b>	<b>238</b>	<b>431</b>
<b>People trained per year</b>	<b>874</b>	<b>1 188</b>
<b>Private investment stimulated (£)</b>	<b>22 553 400</b>	<b>44 163 000</b>

**Table 1: outputs originated from NISP activities (adapted from NISP outputs report submitted to BERR and independently verified by Databuild Limited)**

activities in the absence of appropriate legal frameworks.

According to the Kyoto Protocol only developed countries are required to reduce greenhouse gas emissions; developing countries need only monitor and report emissions. Since governments in developed countries are concerned about achieving their Kyoto targets, they are funding several initiatives to support this. In developing countries the governments' focus remains on poverty, unemployment and starvation; environmental issues cannot be the focus until there is international pressure and appropriate incentives.

In terms of IS, there are a number of ad-hoc initiatives in existence in developing countries. For example, bagasse (the fibrous residue left after crushing sugarcane) was considered a waste product or was only used as a boiler fuel in India in the past. Its present uses include power generation, a tree-free alternative to make recyclable paper and preparation of nutritious animal feed. These are excellent examples of IS where businesses are co-operating to make use of by-products/waste.

In addition, any household or business waste in developing countries often gets re-used and recycled before it reaches landfill. For example, in China and India, some individuals buy waste directly from houses and businesses. Similar materials are grouped and sold to businesses in waste markets. According to Dr Ramesh Ramaswamy of the Resource Optimisation Initiative in Bangalore, India, this happens because of the strong culture of re-use and recycling, driven by poverty. So it is clear that IS is one of the characteristics of the developing countries. However, it is difficult to plan, develop and co-ordinate large-scale IS initiatives there.

The IS concept is more relevant to developed countries; most businesses send their by-products/waste to landfill without even thinking about their usefulness. In the UK NISP assists by helping them understand how the materials sent to landfill could be a useful cost-saving resource, capable even of generating profit if launched in a developing country. IS may lead to better resource efficiency, although thousands of individuals earning a



**National Grid Property is set to make cost savings on work at the Beckton Gas Works site as a direct result of involvement with NISP**

living by collecting, buying and selling by-products/waste would be unable to do so any longer to the same extent, perhaps even leading to further unemployment and poverty.

The argument so far does show that IS does exist in developing countries, although not always consciously. A planned and co-ordinated approach is needed and many issues need to be resolved before developing countries embark on such initiatives, such as the need to educate businesses; the need to fund business support programmes; the need to provide more awareness of the benefits of the approach; the need to reconsider the price of resources to businesses; the need to create, and provide awareness of, associated incentives; the need to modify existing policies and legislation, and create new ones to allow the IS approach to be used effectively; the need to develop environmental technology capability; the need to implement strong law enforcement; the need for international pressure to achieve specific

environmental targets; and the need for financial and technical assistance from international support organisations.

The success and effectiveness of the IS approach is possible in developing countries when businesses adopt it as part of their business strategy, when government's encourage the development and management of IS networks through appropriate policy, and when international environmental targets are imposed, along with some financial and technical assistance. I hope that the concept will eventually prove to be of value to businesses and policymakers alike, to assist in environmental protection and economic growth of developing countries. **CIWM**

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