



A Natural Step Case Study ICI PAINTS



FOCUS ON SUSTAINABILITY

ICI Paints is an international organization that specializes in decorative paint and packaging coatings for food and beverage cans. In 2008, the company became part of Akzo Nobel, the biggest global coatings manufacturer in the world and a major supplier of specialty chemicals.

ICI headquarters are located in Slough, United Kingdom, but most of its major manufacturing facilities are found throughout the United States, Europe, China, India, Brazil and Argentina. ICI employs close to 15,000 people worldwide; while Akzo Nobel employs an additional 45,000. An estimated 50 million households around the world use ICI paints every year.¹



In 2005, an innovative collaboration between ICI Paints and [Forum for the Future](#) (the UK license holder for The Natural Step activities) led to the creation of a user-friendly life cycle assessment tool that can be used early in the product design process to capture 80 per cent of a product's potential sustainability impacts. The results are presented in a visual format, providing decision makers with the necessary information to decide how they can most effectively move toward sustainability and how their choices will affect the proposed project.

Sustainability began to take root at ICI more than 15 years ago with a program called 'the SHE challenge' which brought safety, health and environment (SHE) to the fore of product development, manufacturing and management. At the time, the focus was on preventing environmentally-damaging incidents and improving the company's health and safety record.

By the early 2000s, stakeholder sustainability concerns were growing, and the company realised it was at risk of falling behind if tougher legislation was introduced in the paint industry. In order to broaden their agenda beyond the original SHE issues, ICI published its first formal sustainability policy in 2002, encompassing product stewardship across their supply chain and relationships with all their stakeholders.

¹ Data retrieved from ICI Paints and Akzo Nobel website. Accessed February 2009. Available: www.icipaints.com/info/index.jsp

RESPONDING TO THE VOC CHALLENGE

One of the most urgent concerns facing the paint industry at the time was the health and environmental implications of the vapour from solvent-based paints. Most conventional solvent-based paints contain Volatile Organic Compounds (VOCs), a family of substances that easily evaporate into the air to form invisible vapours. VOCs react with oxygen in the presence of sunlight to form ozone at ground level, where it can cause nose, eye and throat irritations and lead to serious respiratory problems. In addition, methane gas released from VOC vapour is a greenhouse gas and contributes to global warming.

“There was external pressure, but there was also an internal desire to be one of the world’s leading sustainable paint companies, because we recognized that it was the right direction to go in. We’re doing this because it’s the correct thing to do.”

PHILIP TAYLOR
SENIOR RESEARCH ASSOCIATE, ICI
PAINTS

In 2004, the European Union passed legislation on VOCs, pushing the entire paint industry towards the significant reduction of the compounds from the production process. By the time the new rules came into force in 2007, ICI Paints had already been meeting the standards for a year - as a result of their early commitment toward environmental responsibility. ICI is currently on track to meet even stricter standards.

FORUM FOR THE FUTURE AND ICI PAINTS

By 2005, ICI’s sustainability initiatives had made significant progress, but senior research associate Philip Taylor wanted the company to develop a more comprehensive strategy.

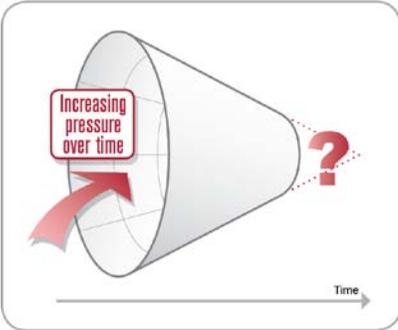


“We were tackling small aspects of the environmental issue in a very dedicated way, because we recognized it was important,” Taylor explains. “But those were sort of separate initiatives. We were making some progress, but we didn’t have a way of understanding how that affected the big picture.”

In May 2005, Taylor met with Peter Price-Thomas, an Associate with the UK sustainable development organization Forum for the Future and The Natural Step, and the pair discussed some of Taylor’s concerns about how to best to implement sustainability. Based on Price-Thomas’ advice, ICI Paints applied for and won a major grant from the Technology Programme of the Department of Trade and Industry in the UK to undertake a feasibility study to develop paints that generate less waste in their production, use and end of life (disposal).

The goal of the six-month study was to build a tool that would allow decision-makers at Dulux Paints and other subsidiaries to see the most unsustainable impacts of their paints and move strategically towards more sustainable products.

Forum for the Future began by introducing the team to [The Natural Step \(TNS\) Framework for Strategic Sustainable Development](#), a comprehensive model for sustainability planning in complex systems. The Framework uses the metaphor of a funnel to show that economic, social and environmental pressures will inevitably impinge on society as natural resources continue to diminish and the global population grows. The Natural Step system conditions for sustainability lay out the minimum requirements for a sustainable society based on scientific consensus. Finally, The Natural Step Framework provides a guide for organizations to implement sustainability strategically in their everyday operations².



[The Natural Step System Conditions for Sustainability](#)

Scientists agree that three basic conditions must be met in order to maintain the essential natural resources, structures and functions that sustain human society. Recognizing that human action is the primary cause of the rapid change we see in nature today, they included a fourth system condition that focuses on the social and economic considerations that drive unsustainable actions and on the capacity of human beings to meet their basic needs.

- In a sustainable society, nature is not subject to systematically increasing...
-  ...concentrations of substances extracted from the Earth's crust,
 -  ...concentrations of substances produced by society,
 -  ...degradation by physical means,
- and, in that society...
-  ...people are not subject to conditions that systematically undermine their capacity to meet their needs.

BACKGROUND: STRATEGIC DECISION-MAKING AND THE LCA

ICI had previous experience working with life cycle assessment approach, which evaluates the environmental impacts of materials and products throughout the product life cycle, from raw material and extraction through to use and eventual disposal. ICI Paints and Forum for the Future decided to combine the life cycle assessment tool with The Natural Step conditions for sustainability to help provide a more comprehensive and streamlined understanding of a product's sustainability impacts.

Assessing product sustainability in all its dimensions (social, ecological, economic) is a significant challenge. Life Cycle Assessment is one of the most robust and widely used approaches, among many, for assessing environmental sustainability. Yet, the process usually involves undertaking detailed quantitative studies that tend to have large data requirements, take many months and incur high costs.

A research team involving The Natural Step and Blekinge Institute of Technology, Sweden and others has also concluded that "LCAs often lack a sustainability perspective and bring about difficult trade-offs between specificity and depth, on the one hand, and comprehension and applicability, on the other". A

² For more information, visit <http://www.thenaturalstep.org/en/our-approach>

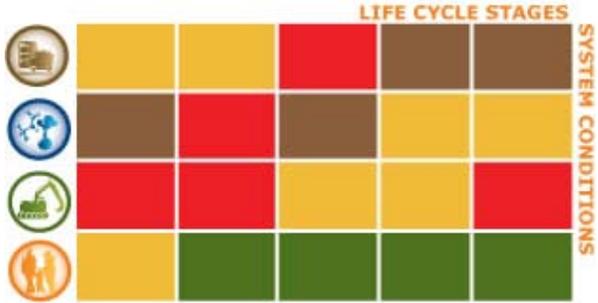
further challenge with traditional LCA is a lack of take-up of LCA results within strategic business planning, for a number of reasons.³

As a strategic decision-making framework that can be applied at any scale, The Natural Step Framework introduces a new way of looking at the sustainability challenge. What if the strength of LCA in monitoring environmental improvements from today's perspective could be combined with a strategic perspective where pathways towards full sustainability could be explored at a product level to inform company decision-making? The development of a *Sustainability LCA (SLCA)* sought to address these challenges by introducing a qualitative product assessment using principles for sustainability across the full product life cycle.

BUILDING THE SLCA TOOL

The TNS Sustainability Life Cycle Assessment (SLCA) matrix was developed with the conventional life cycle assessment tool's five life cycle stages on the x axis and The Natural Step system conditions along the y axis. Questions were developed for each square relating to each life cycle stage and the system condition. To ensure there was no inadvertent weighting to any square, five questions were developed for each. Like traditional life cycle analyses, these were all created to necessitate a yes or no answer, with the 'Yes' indicating the more sustainable answer and 'No' indicating the less sustainable answer.

Usually, life cycle assessment matrices use numbers or scores for each question. The team was concerned that a numbered scoring system could lead people to see the tool as quantitative when it was meant to show more qualitative information, so they chose to use the ratio of yes/no answers to determine a colour to fill the square. The more yes responses, the closer to a square came to green (relatively sustainable), and the more no responses, the closer the square was to red (very unsustainable). The colour-coded approach was preferred because it made communication easier by helping others intuitively understand the relative sustainability of different products and at different life cycle stages.



Initially, the groups were split into pairs to test the questions posed by the matrix and ensure that each was clear. This led to the creation of a glossary of terms to ensure that all participants were referring to the same things. It also revealed that the scope of the life cycle assessment had to be more rigorously defined. For the purposes of the initial project, the analysis was limited to direct impacts: for example, the team included the impacts of all of ICI Paints' suppliers and the equipment they used to make products ICI bought, but not the impact of the machinery used to make the machinery suppliers used.

Experts from ICI who were familiar with the production and distribution of paint came together in the same room as project managers and procurement specialists from ICI customer Carillion, who were experts on the impact of paint during and after its use. They used the new Sustainability Life Cycle

³ Ny, H., MacDonald, J.P., Broman, G., Yamamoto, R. and Robert K.-H. 2006. Sustainability Constraints as System Boundaries. An Approach to Making Life-Cycle Management Strategic. *Journal of Industrial Ecology*, Vol. 10, Issue 1-2, pp 61-77.

Assessment tool to initiate a conversation about the unsustainable effects of paint production, use, and disposal.

“The SLCA enabled ICI to carry out a ‘quick and dirty’ life cycle assessment, highlighting the major sustainability challenges for their product,” explains Peter Price-Thomas, Associate with Forum for the Future and The Natural Step. “Unlike a full-blown LCA, it is qualitative and takes a fraction of the time and funding that a full LCA would take. It also communicates the results graphically making it readily understandable even if the reader had not even been involved in the project.”

After a three month process and peer review, the team decided that the approach had been sufficiently tested that a group of informed individuals would come up with the same results as any other group for a given product. The group went through the matrix square by square to complete it for a can of white Dulux Paint. The analysis revealed which parts of the paint life cycle were particularly problematic, which could be improved, and which were relatively sustainable.

As Philip Taylor recalls, “We got some red squares where we clearly had problems, some brown, some yellow, where it would be nice to tackle things, some green squares where we actually weren’t too bad and there wasn’t much that was threatening our business.”

	RAW MATERIALS	PRODUCTION	PACKAGING AND DISTRIBUTION	USE AND PERIPHERALS	END-OF-LFE
SC1: Scarce materials taken from the earth	Brown	Red	Brown	Red	Yellow
SC2: Man-made persistent materials	Brown	Yellow	Yellow	Yellow	Yellow
SC3: Degradation of nature	Red	Red	Brown	Red	Blue
SC4: Meeting people's needs	Blue	Green	Blue	Green	Yellow

Key

Good	Quite Good	OK	Quite Bad	Bad	Don't Know
All answers positive. System condition met.	Mostly positive responses. System condition mostly met.	Some positive responses. System condition on the way to being met.	Mostly negative responses. System condition mostly not met.	All answers negative. System condition not met.	Insufficient knowledge to make reasonable judgment.

An example of what the TNS Sustainability Life Cycle Assessment might look like when applied to a given product.

USING THE TOOL

By combining the life cycle assessment tool with The Natural Step system conditions for sustainability, the team was able to identify problem areas in their current operations as clarifying long-term goals. “We thought about where we want to be in the future,” Taylor explained. “In an ideal world, we want to be all green [on the matrix].”

By comparing ICI Paints' current reality with their desired future, the team was able to make more strategic decisions about which initiatives would best move them towards sustainability. They began by identifying nine strategic projects ranging from VOC reduction, to paint recycling, to improving and further developing the SLCA. At this point, ICI Paints and Forum for the Future returned to their government funder to explain the results of the work. The department was impressed enough to give the team additional money to put their ideas into practice.

Among the proposed projects was the plan to use Forum for the Future as a platform to help encourage other companies to use the SLCA tool themselves. Both Carillion and ICI have shared the tool with their suppliers.

"Some of the painting equipment we sell is made in China," Taylor explained. "We ran through this SLCA model with the supplier, and that teased out all sorts of issues for him. And getting the answers involved him going and asking the awkward questions that lead to improvements in the way the company operates."

The tool was so successful in creating sustainability thinking among the participants that it was integrated into the innovation process to be used as a screen. Two products have already been created using the new SLCA tool: an EcoSure brand of paint and a paint cleaning machine that uses much less water than its traditional counterparts.

The new Ecosure brand offers Matt, Gloss and Undercoat formulations, all of which are water-based and meet stringent performance criteria. In creating the brand, ICI Paints used the SLCA to focus their efforts on reducing their emissions of carbon and VOC by analyzing the product's impacts from extraction to the point in the supply chain where the product is packaged and ready for distribution. Overall carbon reductions are estimated at 30 per cent as compared to ICI's other paint products.

The Trade Environmental Wash System focuses on the latter lifecycle stages of paint by helping decorators and contractors achieve best practices in their waste management. The system converts water-borne washings into clear water and solid waste to allow for easier control and disposal.



LAST WORDS

The TNS SLCA tool has won four ICI Group awards since its introduction, and the company continues to carry out regular assessments of products and activities throughout their life cycles. For each raw material, the company's scientists assess the risks to human health and the environment, decide on a

detailed policy or target for whether they will continue to use it or plan for its replacement, and agree on any actions required to achieve this.

The company has set ambitious targets for reducing its waste, water and energy use levels, among other sustainability indicators. Between 2000 and 2005, the company successfully reduced hazardous non-product output by 27 per cent, reduced energy use per tonne of production by 13 per cent, and reduced greenhouse gas output by 18 per cent. Complete data are available in ICI Paints' 2007 [sustainability report](#).

Since the ICI Group was bought by Akzo Nobel, the company's focus on sustainability has remained strong. Akzo Nobel was ranked at the top of the Chemicals supersector in the 2007 Dow Jones Sustainability Index for the 2007/2008 ranking, and maintained a high position in 2008/2009, only one percentage point behind new sector leaders BASF. According to a 2008 report, 18 per cent of Akzo Nobel's revenue is made up of sales from products that are produced using more sustainable practices, a number the company aims to increase to 30 per cent by 2015.

"Sustainability is a precondition for economic success nowadays. Companies that are able to contribute to economic growth at a lower input of raw materials and energy are the winners of the future," Akzo Nobel's Director of Sustainability Andre Veneman told RedOrbit magazine⁴.

[The TNS Sustainability Life Cycle Assessment tool](#) has been further developed and used by other companies, including chemical manufacturer [Rohm and Haas](#) and UK-based sandwich chain [Pret A Manger](#).

ADDITIONAL INFORMATION

Learn more about Akzo Nobel's commitment to sustainability: www.akzonobel.com/sustainability/

Download ICI Paints' 2007 Sustainability Report: www.icipaints.com/news/pr-sustainability.jsp

Learn more about Forum for the Future, the UK license holder for The Natural Step activities: www.forumforthefuture.org/

Learn more about The Natural Step's Sustainability Life Cycle Assessment Tool here: <http://www.thenaturalstep.org/en/sustainability-life-cycle-assessment-slca>

⁴ http://www.redorbit.com/news/science/1540441/paint_maker_ups_sales_of_green_products/

This case study was written and researched by Brendan Moore and Kim Mackrael for The Natural Step (2009) and is based in part on previous case studies developed by Forum for the Future and through publicly available information provided by ICI Paints. Creative Commons Copyright 2009. Some rights reserved.