

# Life cycle approach at the planning stage

– Energy efficiency identified through life cycle assessment

This example is taken from Telia Company. Telia adopted a life cycle perspective to systematically investigate the options for energy savings, which included carrying out its own life cycle studies. These resulted in changes to working methods and in a change of focus, provided access to valuable data ahead of future investment projects and in particular saved a great deal of energy and money.

Telia has, among other things, established a completely new way of building, operating and using technology facilities and data centres which led to the development of their own cooling system, called the Telia Green Room Concept.

Telia Company provides the infrastructure for telephony and communications via the internet with a series of different technical solutions and systems. The company has operations in 15 countries, and the management in each country is responsible for operational activities there. The regions and group functions work closely with local management, providing advice and assistance on long-term sustainable operations. Telia Company is a listed company with 21,000 employees. Its headquarters are based in Stockholm.<sup>2</sup> Telia Company has identified energy, greenhouse gas emissions and electronic waste as its greatest challenges in the environmental field. But there is also the issue of how to get customers to use IT and telecommunications to reduce their own footprint. The agreed strategic objective is to 'minimise the negative and maximise the positive environmental impacts throughout the value chain'.<sup>3</sup> In such a large organisation, which is also technology driven and constantly evolving, it can be difficult to gain an overview of the company's direct and indirect environmental impact.

Dag Lundén works as environmental manager in Technology in Sweden and has answered some questions about their experiences with the life cycle perspective.

## How long have you been applying the life cycle perspective?

- Since 1997, when I and three other colleagues went on a ten-day course in life cycle assessment at Chalmers. We then carried out our first life cycle assessment on a videoconference system (CRT-screen based). CITEK (Chalmers Industrial Technology) carried out the study, but we were in the reference group and helped to collect the data. In the course of this we gained the theoretical training and tools to enable us to experiment a bit ourselves. This was actually when it really took off and it has been cruising along ever since.

## What do you consider to be the biggest motivators for intensifying the life cycle approach in your organisation?

- Energy is the biggest motivator, it's extremely impor-

tant. But one thing that has surprised me is that the choice of materials when building for example a cooling system using aluminium or copper, also affects your overall footprint. What you choose and what you get your suppliers to choose and how it impacts the overall footprint. This then determines the way in which you recycle. Developing a means of setting the requirements for the choice of materials is an area I would like to investigate further.

The motivator for implementing energy-saving measures is strengthened as a result of the pure financial gains that can be associated with these. But implementing similar changes among end users is much more difficult, because the customer does not always prioritise the energy aspect, but may choose products more for their user interface or other features such as those available on a mobile phone. The customer often has a different set of requirements

*“Short-term thinking muddles up the management signals sent out in the organisation.”*

## And what do you regard as the main obstacles?

- My personal view is that the Swedish Companies Act and in particular its link to requirements for short-term returns is the biggest obstacle. Short-term thinking as to what owners expect in the form of returns muddles up the management signals sent out in the organisation.

## Do you think the life cycle perspective permeates the organisation? Is it easy to get proposals implemented?

- If we're talking about our own network and how you build and operate it, I would say that we usually push through energy-motivated investments, because we can show that they will result in cost savings. So it's quite well anchored on the network side. However, customers are more concerned about market issues and requirements. I would have liked to see a greater awareness of energy saving among our consumers. Business custo-

1. Telia, 2016: <http://www.teliacompany.com/en/about-the-company/our-operations/>

2. Telia 2016: <http://www.teliacompany.com/en/...company/telia-company-in-brief/telia-company-in-brief/>

3. Telia 2016: <http://www.teliacompany.com/en/sustainability/responsible-business/environmental-responsibility/>

mers set requirements, but residential customers often set none at all. At the same time, we are already setting tough requirements for our suppliers of the equipment installed in our customers' homes (such as routers) to offer energy-efficient alternatives. According to research we carried out ourselves, approximately 60% of the energy consumption comes from end users and 20% is from data centres, while 10% is from our own network.

### **What specific changes have you made as a result of applying a life cycle perspective?**

- We know from previous life cycle studies that data centre cooling consumes a lot of energy. We have therefore focused on this area internally. We have set up a completely new way of building and cooling data centres, which is known as the Telia Green Room Concept. Cooling generation accounts for 30-70% of the energy consumed in a data centre.

### **Why is this an inspiring example?**

- Partly because it was a good study but also because it took a proactive approach. The life cycle approach made us think proactively so that we included all steps in the chain. By taking overall responsibility for the design of the data hall, we could also enter into a dialogue with the different contractors involved in the project and in doing so ensure that the optimum solution was devised. This holistic approach was crucial to the success of the project.

*“Life cycle assessments produce knowledge.”*

### **Did you call upon in-house or external expertise?**

- The expertise we have available 'in-house' enabled us to operate as a competent buyer. But the studies themselves were carried out with assistance from the academic by four master thesis students. One advantage of this approach is access to up-to-date tools and an up-to-date knowledge base.

### **Have there been any challenges with the work?**

- We tried to make a comparison between this data centre and other similar external facilities, but couldn't obtain any information that we could use. This was despite having extended the project period considerably.

### **Which target group do you think could learn from the example?**

- Anyone with cooling requirements can make use of our concept. But whatever you do, you need to take a proactive approach. Life cycle assessments produce knowledge. Sometimes it is not possible to make a complete assessment but you can obtain a great deal of

information by studying parts of a solution.

### **What results have been achieved in the organisation?**

- We have succeeded in reducing our energy consumption significantly. Nowadays a data hall has an average PUE (power usage effectiveness) of 1.8 globally, but Telia's PUE is about 1.4. According to our own calculations the Green Room Concept can achieve a PUE factor of 1.06. The system is not only energy-efficient but is also capable of cooling extremely high output levels. The system is tested up to 55 kW per rack. The cooling capacity is also linear with the cooling production. By implementing experiences from the Green Room in Telia to other technology facilities and combining it with other measures, we calculate that we can achieve a 30% reduction in our energy consumption by 2017. And maybe as much as 50% by the 2020s.

### **How has the life cycle perspective advanced your environmental issues?**

- We have gained the knowledge and information required to identify other possible areas to focus on. It determines the approach we take and what signals we send to the organisation. By finding the main energy consumers we have been able to focus our efforts on reducing consumption there, because life cycle assessment allowed us to find the phases in a process that we needed to take action on. We carried out a life cycle assessment to determine the Green Room's environmental performance and the results showed that it was probably the most efficient data centre cooling solution in the world. The studies carried out therefore provide a knowledge base showing what the environmental impact actually looks like and how it is distributed. This has affected the work we do internally, since we consider not only the initial cost when making a purchase but also look at the overall cost throughout its life cycle. This has long been part of the costing process when making investment decisions. Life cycle assessment is thus used to provide knowledge. The results were good and major energy savings could be made.

### **What tips would you give to others who want to launch or further develop their own efforts to apply a life cycle perspective?**

- One piece of advice for anyone wanting to start carrying out life cycle studies or taking a life cycle approach is to first decide whether you want to acquire the knowledge in-house or to engage external experts. But even if you rely on your in-house life cycle expertise, you can also benefit by calling upon the expertise available in universities, for example. But you will not avoid the need for in-house expertise. You need to be a competent buyer.

Carry out industry-wide studies if you wish to make sure that you get the whole picture. Make use of somebody who knows how to do this. Don't try to reinvent the

wheel yourself. You need a certain body of knowledge in order to carry out a life cycle assessment correctly.

The biggest single motivator within an organisation is often money, and energy consumption costs money. The ability to make potential financial savings is a motivator for engaging in environmental work. Sometimes you can combine several different environmental measures into a package that you want to implement and by making financial savings at one end, finance the investments that you would not have made if you had put these forward one by one because the profitability was too poor. A holistic approach is preferable.

## Contact

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