Environmental Product Declaration – a corporate communication tool

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ABSTRACT

In 1993, Vattenfall Generation Nordic Countries decided to start working with life cycle inventories (LCI). The objective was in-house capacity building, in order to be prepared for society's budding interest regarding life-cycle approaches. The inventories were focussed on Vattenfall's own assets in the fields of hydropower, nuclear power, bio-fuelled combined heat and power, oil-based reserve power, a planned natural gas-fired plant, and coal power. The work was carried out in co-operation with universities and other recognised experts in the field of LCI. As the corporate awareness about the LCI methodology and results grew, a commitment to communicating these to the public was accompanied by a growing expression of public interest in this kind of information. Thus, in 1996 Vattenfall published its first official LCI report.

Soon, the need for a more standardised way of communicating these rather complicated issues was realised, and Vattenfall initiated methodology development based on *ISO TR 14025 Type III Environmental Declarations*, together with competitors and *ELFORSK, the Swedish Electrical Utilities' R&D Company*. It was decided to include not just LCI results regarding the studied power plants, but also information on environmental risks, radiology and impacts on biodiversity into an Environmental Product Declaration (EPD) on electricity. In 1999 Vattenfall's and the world's first ISO-based, third party-certified Environmental Product Declaration was published. Now, in early 2004, Vattenfall has six EPDs that are being updated continuously.

In this paper Vattenfall's motives and incentives for working with Environmental Product Declarations are illuminated and elaborated.

Vattenfall – an electricity supplier in Northern Europe

Vattenfall is one of the largest energy groups in Northern Europe. Vattenfall produces, distributes and sells electricity, heat and other kinds of energy services and solutions mainly on the Swedish, German, Finnish and Polish markets. The company also conducts lignite-mining in Germany. Vattenfall accounts for about 20 % of electricity production in its markets and is the largest electricity supplier in Sweden and among the three largest in Finland, Germany and Poland. The Group has grown considerably during the last five years and now has some 30 000 employees.

Electricity generation within the Group amounts to around 170 TWh per year, about 25 % hydropower, 35 % nuclear power, 40 % fossil power, and about 0.5 % wind power and combustible renewables. Heat is mainly produced with fossil fuels but also with municipal and industrial waste and biofuels.

Research and development with a focus on sustainable energy solutions is a prioritised area, and most units within the Group have environmental management systems. Life Cycle Inventories (LCI) have - in the Swedish part of the Group - been employed since 1993, and the company has accumulated a large methodological competence and experience as well as an extensive database. Vattenfall was the first utility in Europe to publish the results of its LCI studies and to carry out Environmental Product Declarations (EPD®) for electricity from different power technologies.

Why deal with LCA (Life Cycle Assessment) on electricity

Society is very dependent on electricity but still that same electricity generation is questioned due to environmental impacts and risks leading to impacts on human health and ecosystems.

Society demands a constant delivery of electricity at a low and predictable cost. A diverse system of a variety of power-generating technologies optimised for local conditions is a prerequisite to fulfil the commitment to society. A mix of base and peak capacity is necessary, and temporary power systems might complete the system. But every technology is associated with environmental impact of some kind.

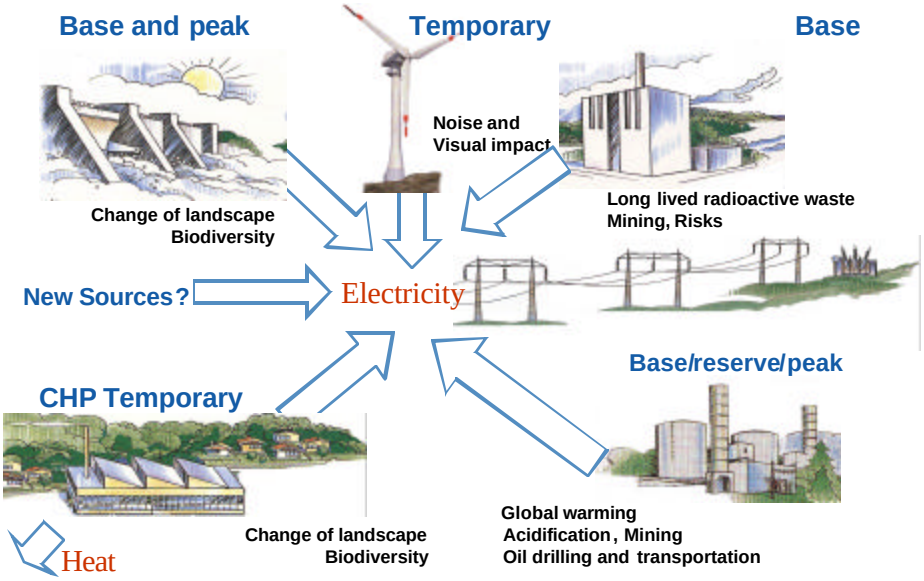

Figure 1 Electricity - a system perspective with connected environmental impacts

For some power technologies, the main environmental impact occurs in the operational phase of the plant, whereas the construction phase or the fuel-processing chain is most important for others.

Today, companies have to keep track of their own environmental issues. This is statutory but also public expectations and demands. But sometimes, environmental product information from a single step in a complex production chain is not trustworthy as information, if a substantial share of the overall impact arises during another step in the chain. To find the environmental hotspots of a product, the life-cycle perspective is necessary. This is valid also

for electricity. It is not sincere to talk about the low impact of a nuclear plant without talking about the uranium-processing fuel chain, and the radioactive waste-handling system.

From LCA to EPD® within Vattenfall in Sweden - a historical review

Capacity building

In the early nineties a couple of methodological approaches within the environmental area were developing in Europe. Some were pushed by national legislation, like EIA in Sweden and other countries, and others, like EMS (Environmental Management Systems), and LCA through voluntary initiatives via ISO (the International Standardisation Organisation), and similar organisations. However, there were no established standards for LCA until November, 1997. There was a growing interest for life-cycle approaches, primarily within universities, but also among opinion-makers. Life-cycle thinking trickled into Vattenfall on different levels, through new employees, fresh from the universities, and via R&D-projects, traditionally conducted together with universities.

In 1993, Vattenfall decided to conduct life-cycle studies, first on a planned natural gas-fired plant, and later on hydro and nuclear power plants – the two major power technologies in Sweden. Own assets were studied, the Lule river with several plants, and the nuclear power plant at Forsmark, with three reactors. The objective was in-house capacity building, in order to be prepared for coming internal and external questions, demands and decisions. The first studies were soon followed by studies on bio-fuelled combined heat and power, oil-based reserve power, and wind power. Next came coal-based condensing power in Denmark, and a study on a Vattenfall-owned stationary phosphoric acid fuel cell, a literature-based study on photo voltaics adapted for Swedish conditions, and an LCI of heat-generating facilities, fuel-based as well as solar. From the beginning, recognised experts within the LCA field from universities and institutes were involved to give advise on methodological issues regarding calculations and documentation, and for scrutinising the results.

During this period Vattenfall, together with several other companies from different sectors, was engaged in a project on product-related environmental information at Chalmers Technical University in Gothenburg. Representatives from other sectors and universities urged Vattenfall to publish the LCI-results on electricity, in order to enabling them to use these in their own studies. In December 1996, a first summary report on LCA for Vattenfall's electricity generation was published.

Soon Vattenfall's largest Swedish competitor Sydkraft started with LCI for their assets, and Vattenfall shared its methodological experiences. Their LCI results coincided well with Vattenfall's results; differences found were due to technological differences of studied systems. This proved the importance of methodological harmonisation.

Communication of results

Vattenfall was recognised for its open and transparent behaviour, which stimulated to further communication. Since life-cycle information is quite complex, the published report was only useful for LCA-practitioners and experts. A shorter brochure, even used in schools as complementary study material, was published and soon Vattenfall realised the need for harmonisation within the energy sector, both on scope of the LCI and calculation rules, but also on how to communicate the results. Otherwise, comparisons between studies would not be relevant, comparisons Vattenfall knew would be done.

Hence, in 1998, Vattenfall together with a competitor, Sydkraft, initiated further methodological development within the emerging national program for EPD, Environmental Product Declaration[1] based on *ISO TR 14025* [2]. Together with many other producers in the power industry under the umbrella of *ELFORSK (the Swedish Electrical Utilities' R&D Company)*, Product Specific Requirements (PSR) for preparing an EPD for electricity and district heat generation was developed according to the EPD program's principle on stakeholder involvement.

The EPD-system is open for all products. The LCI part is based on the ISO 14040ff standards series. Certified EPDs are supposed to allow for comparisons within the same product group. It is also possible to add up EPDs from your suppliers to create your EPD together with own data.

The PSR established the functional unit, system boundaries, cut-off rules, data quality requirements and requirements on the resulting declaration. It was decided to include not just LCI results supported by the characterisation of a number of given categories of environmental impact, but also information on environmental risks, radiology and impacts on biodiversity into an EPD on energy systems. LCI or LCA does not cover every environmental aspect of an energy system. For example, it is not credible to talk about the small LCI impacts of hydropower without describing the impacts on biodiversity.

A revised version of the PSR has now (early 2004) been accepted at a European level through a process involving European stakeholders.

During the process of PSR development, Vattenfall's first EPD on hydropower was prepared. In 1999, Vattenfall's, and the world's, first ISO-based, third party-certified EPD was published. Now, in early 2004, Vattenfall has six EPDs that are being updated continuously[3].

Business case

General

Vattenfall's environmental policy[4] expresses the ambition to "achieve sustainable development"…" performance in environmental matters shall create the right conditions for sound business development". Responsibility, openness, dialogue, continuous improvement and environmental evaluation of prospective suppliers, contractors and business partners are some of the catchwords in the policy.

This means that the concept of sustainable development is seen as a possibility of development instead of an impossible, costly problem. The responsibility for environmental issues is not confined to an isolated department, but an integrated part of everyday activities through implemented environmental management systems. Continuous improvement, which means recurrent questioning of the existing situation, is seen as a stimulus for innovation, which might lead to competitive advantages or cost savings.

In the following two sections some examples are listed describing the business case for Vattenfall for working with LCI and EPD. Vattenfall sees advantages within the company and on the market.

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[1] Further information is found at www.environdec.com .
[2] In 2004 in the process of becoming a standard, ISO 14025 on Type III Declarations
[3] Vattenfall's EPDs are found at www.environdec.com
[4] www.vattenfall.com

Within the company

EPD is a tool which interacts with the environmental management system, since input data to the LCI is taken from follow-ups of the EMS, and the results are used to identify environmental hotspots in the own business, and also in the supply chain and waste management systems. The EPDs are excellent tools to monitor and show changing environmental performance in a standardised way. The EPDs, with their very precise reporting scope, can provide the environmental pillar of sustainability reporting.

Vattenfall has a list of requirements on its subcontractors in the uranium supply chain. The detailed results of the LCIs have improved this list, and helped the auditors to focus on the environmental hotspots of the subcontractors.

Environmental legislation often follows the PPP; the polluter pays principle. Taxes and fees are designed to favour more environmentally sustainable activities and counter unpaid, externalised environmental impacts. This means that studies on an activity's environmental aspects is one important input for decisions on investments or refurbishments. Through the continuous LCIs done as bases for the EPDs, such studies are facilitated.

To keep track of your environmental burdens and risks is an assurance against unpleasant business surprises. The systematic inventories of environmental risks, which are done as a part of the EPD, gives valuable information about probabilities and consequences, which are then used to protect against these kinds of events. Environmental knowledge, combined with knowledge about developing national legislation and European Union Directives in the environmental area, makes it possible to prepare for coming requirements.

In the legal permit process needed for establishing or changing an energy system, several studies must be conducted. One of them is an EIA. When conducting this EIA, an existing LCI is a great help, and vice versa.

Electricity Disclosure for all delivered electricity is a mandatory requirement of the EU Directive on deregulation of the electricity market. The directive states that electricity suppliers have to provide the customer with information on the electricity-generation mix of power technologies, and on the accompanying emissions of carbon dioxide and generation of highly radioactive waste. It is not farfetched to believe that the extent of requirements in the directive will increase with time. With the EPDs, Vattenfall Nordic Generation is well prepared for existing and future requirements.

Energy EPDs contain internationally compatible information on CO_2 emissions for emission-trading purposes.

Being a part of the ISO 14000 system, the EPDs assist in maintaining order and control, which in turn leads to avoidance of costs. An EMS needs to be reactivated and used continuously in order to improve in a profitable way. In Vattenfall's EPDs systematic risk assessments are included, and the information from that endeavour is used for the identification of mishaps that might happen. Risk awareness is the first step in order to avoid serious mistakes, and for keeping the impact low if mistakes occur, in spite of the precautions. Even a minor environmental incident in a power plant can be very costly due to the loss of generation.

The ISO 14001 deals with how we work, and the ISO 14025 / EPD tells us how we produce (and the effects of this production), and that is a natural further step for Vattenfall. For a company like Vattenfall, it is not a question of one or the other, it is beneficial to have both, they complement each other.

On the market

Most persons would agree that life-cycle inventory is a learning process, which might be useful, but why communicate the results?

Communication through EPDs is a way to show that Vattenfall is aware of the impacts throughout the life cycle of electricity generation, and that it has nothing to hide. The third-party certification makes the information credible. EPDs can be used for every product, in contrast to labels of Type I[5], and has higher credibility than a statement - a self declaration of Type II, due to the strict rule system and requirement for third-party verification for Type III (EPD). Also, more controversial products like electricity from nuclear power, or heat based on waste incineration, that are not generally seen as ”green”, can be described. This openness in a questioned sector is strengthening the Vattenfall brand. It is a pronounced competitive advantage, and might lead to an enlarged market share.

Vattenfall does not have the ambition to be just a low-price generator and supplier. “Vattenfall's mission is to enhance customers' competitiveness, environment and quality of life through efficient energy solutions and world-class service”. The EPDs is one way of showing that this is more than just talk.

Customers seeking long term relationships with a supplier expect honesty and responsibility, and EPD is a good way to provide the customer with sound, verified information.

[5] ISO 14020 about general principles for environmental labelling and declarations