When we build, let us think
that we build for ever

Sustainable Lifts

thru circular economy

Hydroware

We build for ever

Sustainable Lifts thru Circular Economy

Sustainable future

Earth Overshoot Day, the date of the year when humanity has exhausted nature's budget for the year. For the rest of the year, we will maintain our ecological deficit by drawing down local resource stocks and accumulating carbon dioxide in the atmosphere. [1]

In 1986 the Earth Overshoot Day occurred on the 31st of December. In 2014 it had moved to August 19th. That is more than 4 months in less than 30 years.

Ecological overshoot is possible only for a limited time before ecosystems begin to degrade and possibly collapse. Some dramatic changes need to be done now and all stake holders within the lift industry have to contribute.

We must accept death

Why are we then moving so slow in getting more sustainable?

The key reason lies in the way we are thinking about life. Most of us live on this planet as if it was created the day we were born and will collapse the day after we die.

"In a sustainable society we must adjust our thinking and accept death and rather work for the coming generations than ourselves", says Stina Oscarson.[2]

A British poet, John Ruskin wrote over 150 years ago: "Men cannot benefit those that are with them as they can benefit those who come after them". [3]

He was probably one of the first human beings talking about sustainability and it is a pity we did not understand already at that time how right he was but hopefully there is still time for salvation.

[1] http://www.footprintnetwork.org/en/index.php/GFN/page/earth_overshoot_day/
[2] http://www.aftonbladet.se/kultur/article19186850.ab
[3] http://www.victorianweb.org/authors/ruskin/luchette.html
Picture of the frontpage: Kalmar Slott, Sweden / Photo: Elisabet Sverlander

Life Cycle Assessment (LCA)

During the last decades much focus have been spent on energy efficiency of products. It is good but unfortunately very few have been thinking of resource efficiency. Although we knew already 30 years ago that we were consuming more resources than allowed for a planet in balance.

However, in the recent years we have awakened and tools have been designed for evaluating how resource efficient our products are.

The methodology is called Life Cycle Assessment. The method addresses the environmental aspects and potential environmental impacts throughout a product's life cycle from raw material acquisition through production, usage, end-of-life treatment, recycling and final disposal.

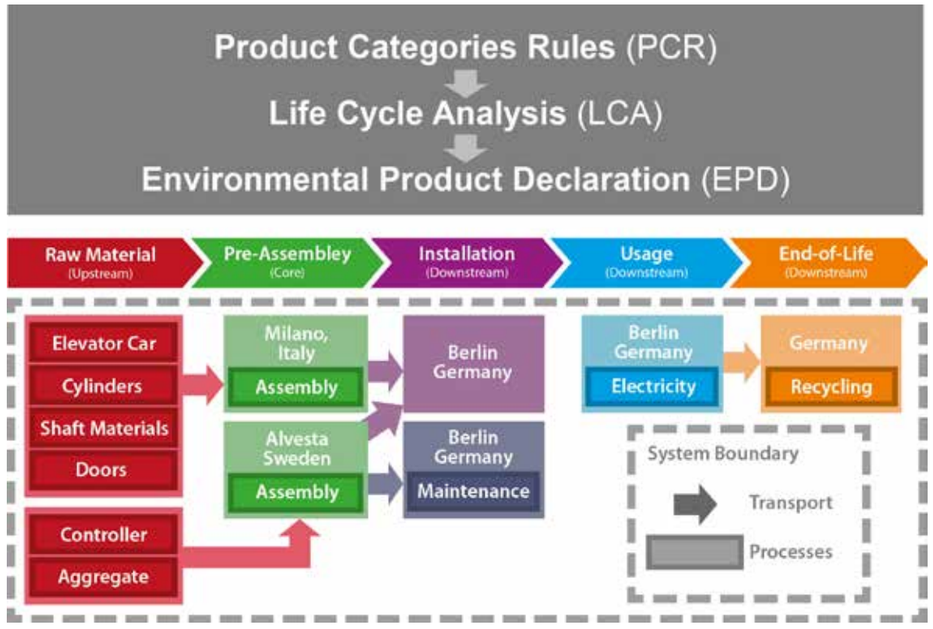


Figure 1. LCA process model

Product Category Rules (PCR)

In 2013 European Lift Association, ELA, initiated a project to create a document called Product Category Rules, PCR. This document is a guide line how to perform life cycle assessments for lifts.

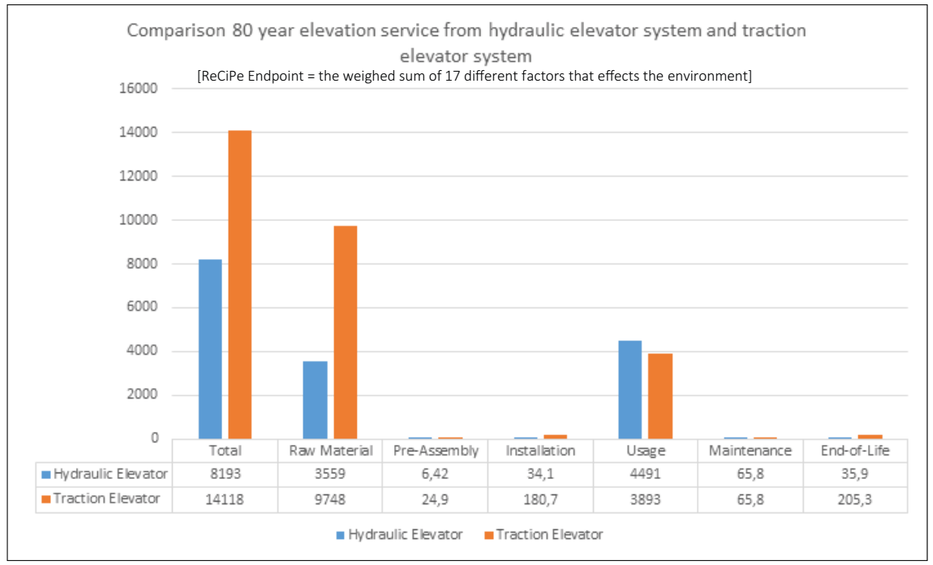
The LCA is a prerequisite for issuing Environmental Product Declaration, EPD, values for lifts and lift components. [4]

By presenting EPD values we are not only focusing on energy efficiency any longer but also on resource efficiency.

[4] http://environdec.com/en/PCR/Detail/?Pcr=9211#.VY04s4sw8is

Life Cycle Assessment for lifts

A life cycle assessment for a 4 stop 1000kg lift in a residential building clearly shows that the material to produce the lift has a higher impact on the environment than the usage energy during the life time of the building. In this example both systems are installed in a new residential building in Berlin. The hydraulic lift is thereafter modernised 3 times every 20 year and the lift with counterweight is fully replaced with the same interval.



	Total	Raw Material	Pre-Assembly	Installation	Usage	Maintenance	End-of-Life
Hydraulic Elevator	8193	3559	6,42	34,1	4491	65,8	35,9
Traction Elevator	14118	9748	24,9	180,7	3893	65,8	205,3

Figure 2: Total result for 80 year in service using ReCiPe Endpoint

For most people in the lift industry the result of this LCA is surprising. Until now most focus has been spent on energy efficiency during usage and many producers have made fantastic improvements in this field. However, it is time now to concentrate on the impact caused by the material used.

This LCA shows clearly that for low rise and low usage lift applications the solution without counterweight has by far the least impact on the environment. If we assume that the life time of a residential building is 80 years and the life time of the lift is 20 years, the additional impact on the environment for a lift with counterweight measured in carbon dioxide pollution is 37 000 kg which corresponds to driving a normal passenger car, which meets EURO 5 emissions standard, for 115 000 km or 71 500 miles. In other words: 3 times around the globe!

Selection criteria for lifts

The result of LCA's will now give us the input for making a selection criteria for lifts in order to ensure that the lift with the least impact on the environment is used for every application.

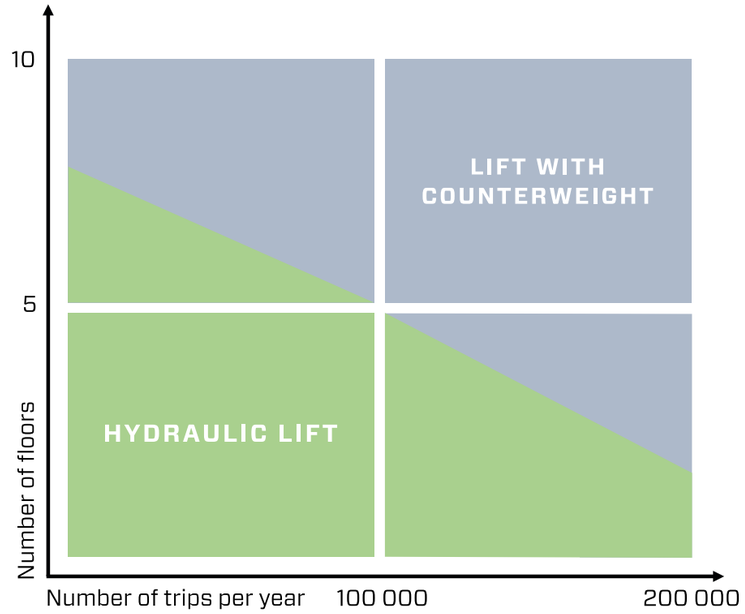


Figure 3: Selection criteria

Circular Economy

After sailing around the world alone in 2004, Ellen MacArthur said: "I had become acutely aware of the true meaning of word finite, and when I applied it to resources in the global economy, I realised there were some big challenges ahead". [5]

In 2010 Ellen MacArthur launched the Ellen MacArthur Foundation and since then she travels the world to spread the circular economy principles.

The circular economy principle is inspired by the nature and aims in designing out waste. A European citizen consumes about seven times too much resources every year and the linear model we have today only works if the resources on our planet are unlimited.

[5] http://www.ellenmacarthurfoundation.org/

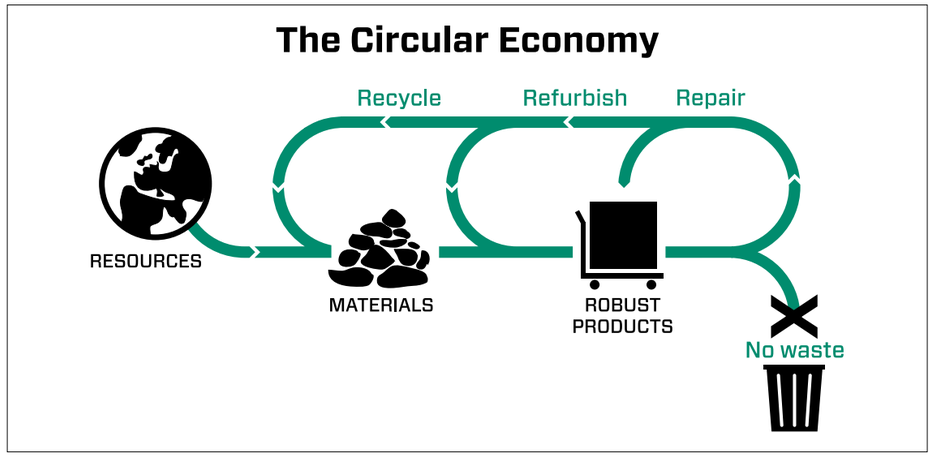


Figure 4: Circular Economy

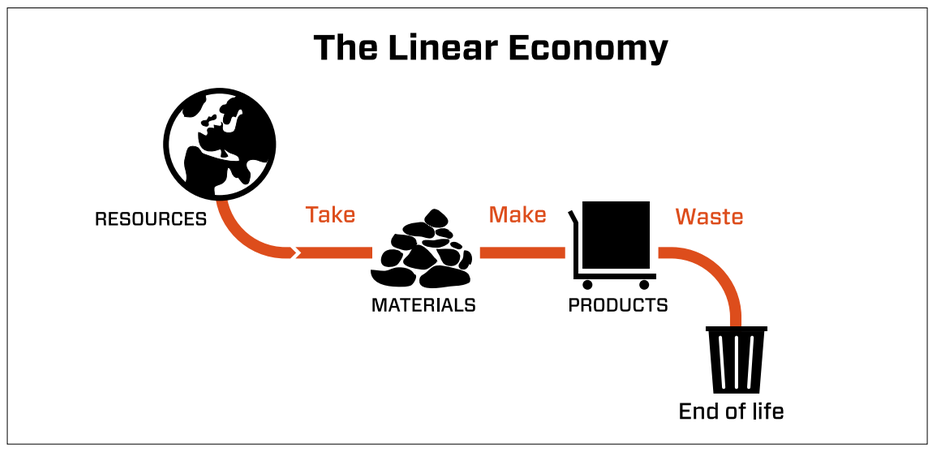


Figure 5: Linear Economy

Circular Economy for lifts

With the LCA for lifts in hand we realised that within our industry we can start to follow the circular model immediately.

A lift contains a wide variety of different components with a huge diversity in life time span. We have a product that is used indoors so the influence of the ambient environment is very limited. Components that are not wear and tear parts will last almost forever, e.g. guide rails, car sling, cabin and landing door panels.

According to the circular economy these components shall remain in use for the entire life time of the building.

Figure 6: Circular economy for lifts

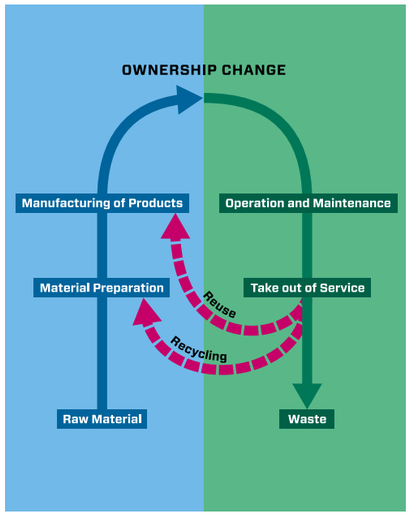


Figure 7: Ownership change

Even if it seems obvious that our industry suites perfectly into the circular model there are some major obstacles to overcome.

If the circular model shall be possible at all the politicians have to take their responsibility and use the toolbox available, e.g. tax swapping from labour tax to tax on material. The most economical solutions must be the ones created according to the circular model.

Another challenge is that in todays linear model most products change ownership before they are ready for use. In a circular model it is more likely that one shall pay a fee for the service provided and the product responsibility stays with the producer for the whole life time of the product.

In such a model the producer will take back a product when the user do not need it anymore. After a modernisation of the product where all wear and tear parts are changed, the product is ready to provide a new service to another customer.

Conclusion

During the last 20 years the majority of producers within the lift industry have moved in a direction to design lifts that are not as modular as they used to be and therefore they are not really aimed for modernisation. It is obvious that for environmental reasons we must switch back and design robust lifts that can be modernised module by module.

Life Cycle Assessments shows us that especially for low rise and low usage applications it is very important to take the use of material into consideration and not only energy efficiency during usage phase.

Life without industry is guilt,
industry without art is brutality.

John Ruskin 1819-1900

FOTO ELISABET SVERLANDER

If you would like any further information or would like to have the full report of our Life Cycle Assessment, do not hesitate to contact:

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Hydroware
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