

Energy Efficiency – Good, or Just Well Intentioned?

More insight into sustainability and environmental impact

When thinking about buying that new car, think about this as well: we won't start to improve the CO₂ balance until we have driven 300,000 kilometres (about 190,000 miles) – and then only when the new car uses at least 1 litre less fuel per 100 km (gives at least 8 mpg more) than the old one. That's in real-world driving, not just in the sales brochure! A very similar situation exists with elevators.

Widening the perspective – from energy to resources

At present, a company's energy consumption is often used as the sole criterion for its energy efficiency. The reality is much more complex, however, and behind this limited viewpoint lies a potential for environmental optimisation that is very far from exhausted. To assess a product's environmental sustainability, we need to consider its entire life cycle and also deal with the subject of 'grey energy'. Grey energy is the total amount of non-renewable primary energy consumed by all upstream and downstream processes. A large, often unconsidered part of our energy consumption is [hiding] in this area. On the other hand, the ongoing energy costs for operation are often regarded as being of little importance when looking at the bigger picture. To reduce overall energy consumption by a significant amount, however, it is important to recognise and exploit the enormous potential in using raw materials efficiently and extending the service life of products.

Resource Efficiency

- The careful and efficient handling of natural raw materials (i.e. reducing consumption of energy, materials and water)
- 'Make more from less'
- The ratio of a particular benefit or result to the resources used to produce it
- Describes our global dealings with all resources

Grey Energy

- The total amount of non-renewable primary energy consumed by all the upstream and downstream processes (manufacture, transport, storage, sale and disposal) in the making of a product
- All precursors up to raw-material extraction are also taken into account, and the energy consumption of all production processes used is included



Sustainability and environmental footprint – modernisation instead of the throw-away culture

Companies that are committed to environmental responsibility need to recognise that the pursuit of energy efficiency is only a small part of a higher-level strategy for resource efficiency. In the case of apartment buildings, owner-occupied as well as rented, the life expectancy is assumed to be between 60 and 85 years, whereas the corresponding figure for an elevator is only 15 to 20 years. To assess the resource efficiency or sustainability, the entire life cycle of a building should therefore be taken into account, and not just the lifespan of the elevator installation.

But to be energy-efficient during operation as well, it is important to identify the right drive for the particular application in the early planning phase. Bucher Hydraulics offers customers the necessary support at all stages of planning and development. The advisory services range from the important first step – the thorough analysis of the system data – through the presentation of the various possible solutions up to the use of appropriate tools for visualising the energy requirement. The parameters essential for energy efficiency in the operation phase are the energy consumption during travel and the energy consumption in standby mode. Many years of experience and technical expertise on the part of the elevator partner are the key to individual modernisation packages.

Product life cycle of an elevator



Figure 1: Depiction of the small impact of modernization on the environmental footprint: a modernization is more ecological than a replacement.

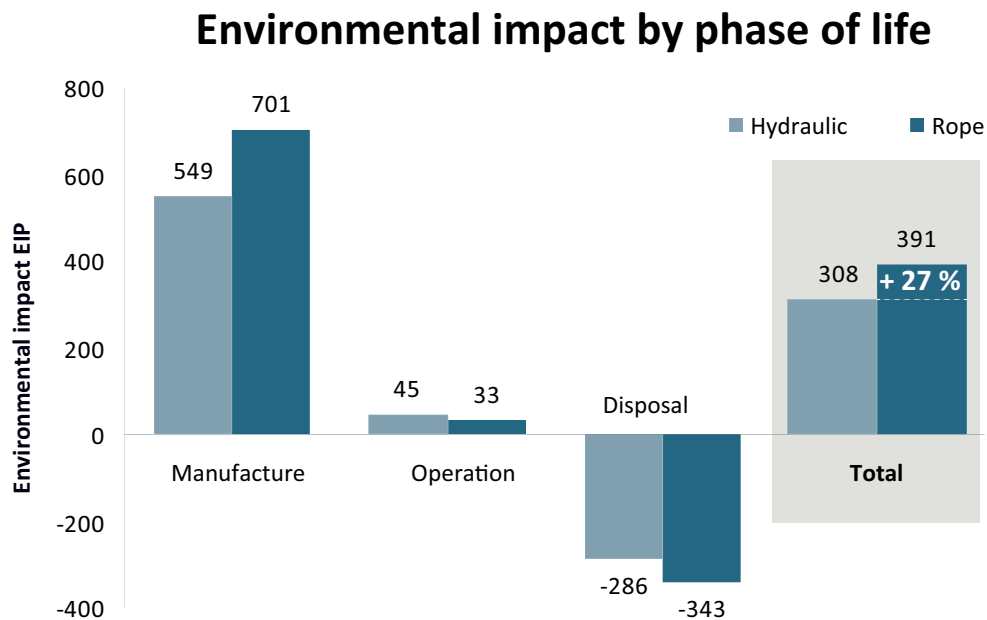
Environmental Footprint

- One of the most successful indicators worldwide of environmental sustainability
- Depicts the CO₂ balance quantitatively, and the area requirement qualitatively
- Pictorial representation of resource consumption
- The world population currently consumes one and a half times as much resources as the Earth can provide

Clearly superior to the rope elevator – more sustainable with hydraulics

When sustainability is made the decisive criterion in the planning of the elevator system – in other words, not simply the energy efficiency during operation – all roads will inevitably lead to a hydraulic solution. Thanks to easily implemented modernisations, which can be carried out several times during the lifetime of the building, we can make a decisive contribution to the reduction of the environmental footprint.

Figure 2 clearly shows that, when the whole life cycle is considered, the hydraulic elevator has a significantly smaller impact on the environment than the rope elevator.



Standard passenger elevator for 8 people in an apartment building,
1 m/s with a travel height of 15 m, Usage Category 1 (VDI 4707), service life: 20 years

Figure 2: Distribution of the environmental impact over the whole life cycle – hydraulic drive system compared with the rope drive system.

Eco-Indicator (EIP)

- Methodology that is used to assess the damage-oriented impact of environmental influences over the whole life cycle of a product

In summary, for a standard passenger lift in an apartment building, and under the conditions shown in the illustration, we can say that:

- The manufacture of an elevator system has a significantly greater impact on its environmental footprint than the total operating time
- Due to the high material intensity and high consumption of grey energy, a complete renewal is significantly less sustainable than a modernisation

Conclusion: the complete replacement of a hydraulic elevator by a rope elevator from the perspective of the operation phase on its own is well intentioned, but from the environmental viewpoint cannot in any way be justified.

With easily implemented modernisations of hydraulic elevators, which can be carried out several times during the lifetime of the building, we can make a decisive contribution to the reduction of the environmental footprint. Bucher Hydraulics is setting standards for sustainability in this area and offers customised modernisations for hydraulic drives – modernisations that are perfectly tailored to the requirements of each customer.

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