



A more sustainable business model for the elevator industry

How KPMG assessed the true value of leasing vs ownership

Elevator manufacturers have traditionally supplied elevators to the construction industry on a product sale and ownership model.

Under this model, customers make a significant initial investment to buy the elevator and must continue to invest in ongoing maintenance support for the lifetime of the product.

This model is arguably flawed from a sustainability perspective because the supplier's revenue is linked to ongoing maintenance needs. There is no incentive for the manufacturer to ensure the long-term resilience and durability of the product or to minimize product failures and maintenance needs.

This situation could change if customers leased elevators rather than buying them and made their investment decisions based on long-term rather than short-term price considerations.

Under a leasing model, elevator suppliers would be incentivized to minimize maintenance needs and build elevators for long-term durability. This more sustainable approach would likely deliver environmental and social pay-offs to society as well as financial benefits for the suppliers and customers.

In order to test this theory, Dutch property developer Delta Development Group (DDG) and Mitsubishi Elevator Europe (MEE) teamed up with professionals from KPMG in the Netherlands. They used KPMG's True Value methodology, which quantifies environmental and social impacts in financial terms, and applied it to Mitsubishi's newly developed elevator leasing concept, M-use ®.

The results showed that leasing rather than owning elevators makes sense from both a financial and societal value perspective.

The location: Park 20|20, Netherlands

Park 20|20 is an office park close to Amsterdam's Schiphol airport. It is the first full service commercial development in the Netherlands to be designed to Cradle-to-Cradle principles which strive to create closed cycles for materials, energy, water and waste.

Mitsubishi Elevator Europe has installed two of its flagship elevators in the NOW building at Park 20|20 on a lease agreement and data from the performance of these elevators was used in the KPMG True Value analysis.



About Mitsubishi Elevator Europe (MEE)

With more than 60 years experience, MEE is the authority in the BeNeLux in the area of high-quality reliable elevators and escalators, elevator maintenance and elevator renovations. MEE is part of Mitsubishi Electric Group, which is part of the Japanese Mitsubishi conglomerate. The main office is based in Veenendaal, Netherlands. MEE's vision is to deliver the most sustainable and optimal vertical mobility solutions. The company's strategy is focused on delivering solutions that will enhance the value throughout the whole value chain while also contributing to a greener tomorrow.

"By quantifying the social and environmental value created by leasing elevators, we aim to transform traditional ownership models in the construction sector and ultimately create closed-loop vertical mobility in buildings."



Evert Visser
Managing Director
Mitsubishi
Elevator Europe

About Delta Development Group

DDG is an independent, privately-owned real estate development and investment company, founded in the Netherlands in 1988. The company now also has offices in Germany, France and Italy and a strong base in the commercial real estate market with its current portfolio standing at around US\$900 million (€800 million). The company's vision is to create sustainable buildings of quality that will retain their value indefinitely whether a new development, a redevelopment or an upgrade of an existing building. By focusing on projects that improve and contribute positively to their surroundings, DDG aims to create value for society and environment while creating financial value as a business.

"The Delta/Mitsubishi elevator lease project is the world's first example of successfully applying a service instead of product strategy to a structural building part."



Coert Zachariasse
Owner Delta
Development
Group

The approach: Calculating the true cost of elevator usage

KPMG professionals, together with MEE and DDG, set out to analyze how the total cost of leasing an elevator compares with that of owning an elevator when all the relevant financial, social and environmental impacts are taken into account.

The study compared a leased Mitsubishi elevator with a typical office elevator (6 floors, Usage category 4) in the Netherlands over a 30 year period.

The project team developed an approach called True Total Cost of Usage (TrueTCU), using valuation techniques from KPMG's True Value methodology which quantifies socio-economic and environmental impacts in financial terms (find out more at: www.kpmg.com/truevalue)

TrueTCU is based on the established Total Cost of Ownership (TCO) management accounting process that

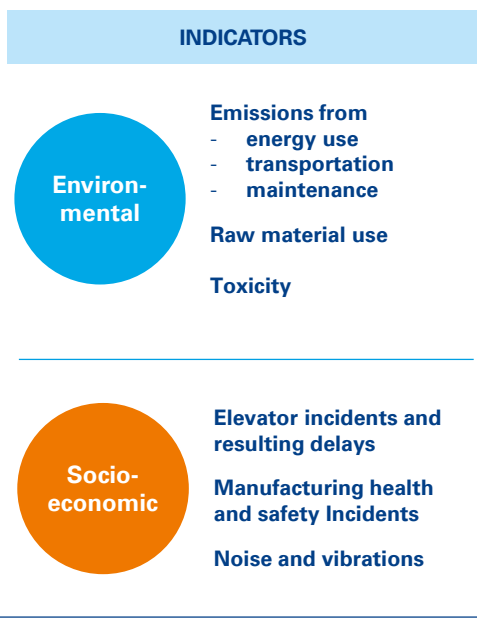
estimates the total cost of acquiring and operating an asset across the entire period of ownership.

In the case of an elevator, the TCO typically includes the initial purchase price, yearly maintenance and testing fee, renovation fees and energy costs.

TrueTCU, however, includes not only financial data related to leasing rather than ownership, but also provides a broader picture because it brings the socio-economic and environmental costs and benefits into the analysis.

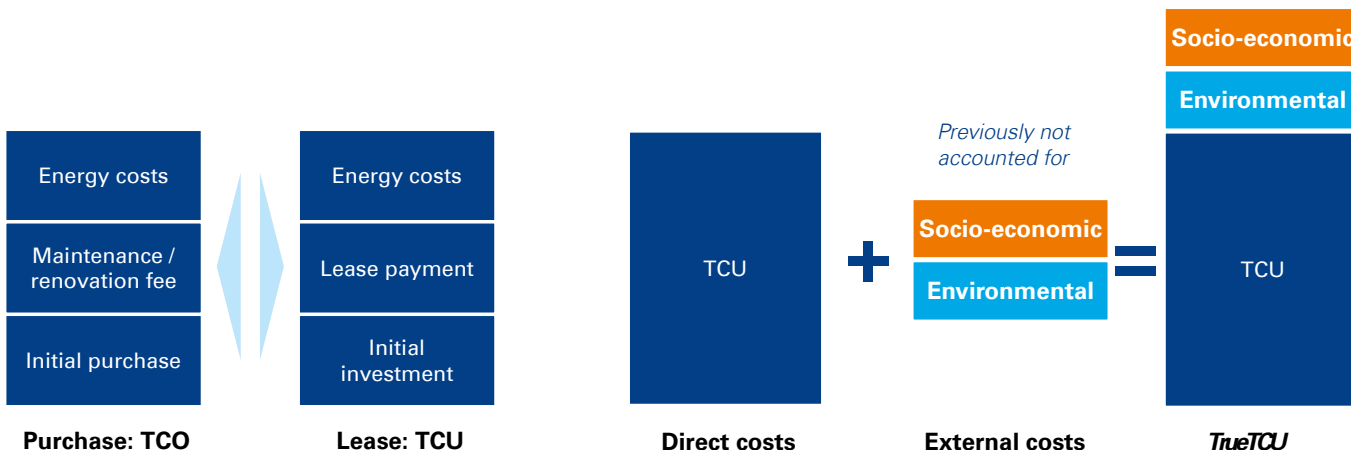
For example, the analysis of the TrueTCU of elevators also includes negative socio-economic effects such as the loss of productivity caused by elevator failures.

A comprehensive materiality analysis identified the following socio-economic and environmental impacts to be quantified in financial terms in the TrueTCU analysis:



Objective 1: identify the financial differences between purchasing and leasing an elevator

Objective 2: identify socio-economic and environmental benefits of a Mitsubishi elevator by applying the TrueTCU concept



Challenge 1: how do we compare a leased elevator with a purchased elevator?

In the Netherlands there are some 90,000 elevators in operation, around 25 percent of which are in office buildings. Almost all of them are purchased.

The financial cost of owning an elevator includes the initial purchase price, as well as ongoing testing and maintenance fees, energy costs and, over the longer term, potentially a renovation fee.

Maintenance fees can vary significantly and depend on the type of maintenance contract chosen by the owner of the elevator. Simple maintenance contracts are cheaper, but include less service

and can result in higher unforeseen costs. More comprehensive maintenance contracts are more expensive although the exact level of service covered can still differ significantly between different contracts.

The cost structure of leasing an elevator rather than purchasing one is different. On a long-term lease (typically 20-40 years), the initial investment is often lower and is supplemented with annual lease charges that include all necessary maintenance, testing, replacement parts and software upgrades.

In order to compare a leased elevator with a purchased one, the analysis compared the total cost of leasing with the total cost of purchasing an elevator over a period of 30 years with an all-inclusive maintenance contract. The 30 year time horizon takes into account costs such as renovation fees that are likely later in the lifecycle of the elevator.

Much of the data used in the analysis was sourced from Dutch elevator advisory organizations DLR Adviesgroep and Eurlicon, Dutch airport operator Schiphol and independent certification organization Liftinstituut.

Challenge 2: how to build socio-economic and environmental impacts into the analysis?

The project team applied KPMG's True Value methodology to analyze and monetize the environmental and socio-economic impacts of a leased elevator vs a purchased elevator.

Although it can be challenging to identify robust and credible data to monetize what are traditionally perceived as non-financial impacts, such data sources are increasingly available.

Much of it is not yet as reliable as data used for financial reporting, but the process provides a useful means to draw comparisons of scale between socio-economic and environmental impacts and to identify those that are most important both to the business and to society.

The data used to monetize socio-economic and environmental impacts in this analysis was primarily based on Dutch numbers.

Examples of monetization data used in the analysis

IMPACT	VALUATION
Greenhouse gases	€112 per ton of CO ₂ . Based on 2007 EPA data adjusted for inflation to 2015 levels
Incidents	Average value used from Dutch government, to indicate size of societal costs. Includes health and safety incidents at the assembly stage, not in the value chain
Resource use	Various according to type of material used in elevator. Includes impact of initial materials and maintenance on components. Based on Idemat 2015 Database
Travel time	A value of time of approximately €9,25 per hour per passenger was used based on data sourced from Dutch government

The results: leasing versus ownership what did we learn?

Leasing a Mitsubishi elevator is more cost-effective than purchasing an industry average elevator

The analysis showed that leasing a Mitsubishi elevator is likely to cost around US\$14,500 (€13,000) less than purchasing an industry standard elevator over a 30 year period.

If all office buildings in the Netherlands leased Mitsubishi elevators, Dutch

businesses could save almost US\$11 million (€10 million) per year.

The graph below demonstrates the difference in costs which is largely due to the superior reliability of the Mitsubishi elevator and the optimized Mitsubishi maintenance model, which results in lower maintenance costs.

Leasing incentivizes the supplier to minimize product failures and includes financial penalties for the supplier if the failure rate exceeds agreed performance indicators. The long-term leasing contracts also provide greater cost and revenue predictability for customers and suppliers than the ownership model.

The financial case is also supported by savings in energy costs for operating the elevator because the Mitsubishi is more energy efficient than the industry average elevator.

The residual value of the elevator was not included in this analysis because, currently, the customer takes ownership of the elevator at the end of the lease agreement as well as under the ownership model. However, MEE is exploring options for lease models under which the supplier retains ownership of the elevator throughout the contract.

Comparison of buying an industry average elevator and leasing a Mitsubishi elevator, for a 30 year period, in the Netherlands (customer perspective). Numbers expressed in present value.

BUYING more cost-effective	LEASING more cost-effective	NOTE
	Initial purchase	€ - 5.000,-
	Maintenance costs / Lease payment	€ - 7.404,-
	Energy costs	€ - 723,-
	Residual value	Residual value would be included to complete comparison if ownership of elevator would stay at producer side. Since this is not the case, this element is excluded from this analysis.
	MORE COST-EFFECTIVE TO LEASE:	€ - 13.127,-
		For a 30 year period, it is EUR 13,127 more cost-effective to lease an elevator from Mitsubishi compared with buying an industry average elevator.*

** for a 6 floor elevator in an office building, usage category 4 (VDI 4707 part 1).

The results: social, environmental impacts what did we learn?

Greater reliability and improved maintenance brings significant societal value

The True TCU analysis valued the societal benefits of leasing a Mitsubishi elevator (versus purchasing an industry standard elevator) at almost €2,000 over a 30 year period.

If all office elevators in the Netherlands were leased Mitsubishi elevators, this could bring a total societal benefit valued at around US\$1.7 million (€1.5 million) per annum.

The bulk of this societal benefit comes from the reliability of the Mitsubishi elevators which results in less passenger time being wasted when elevators are out of order.

The Mitsubishi elevators are more reliable partly due to the quality of the technology itself and partly due to the improved maintenance support that comes with the leasing model.

Furthermore, an environmental benefit comes from the superior energy efficiency of the Mitsubishi elevator which results in reduced carbon emissions.

The balanced analysis also showed that the Mitsubishi elevator has higher socio-economic and environmental costs than the industry average due to the higher usage of raw materials and transportation distances prior to assembly. Other negative elements include manufacturing-related incidents during assembly, which are higher per Mitsubishi elevator than competitors.

Societal benefits occur from improved reliability, fewer delays and therefore less lost productivity.

Comparison of the socio-economic and environmental impacts of the industry average elevator in the Netherlands and a Mitsubishi elevator (30 year period). Numbers expressed in present value.

COMPETITOR better for society	MITSUBISHI better for society	NOTE
	Energy impact € - 217,-	Mitsubishi Elevator is overall more energy efficient during operation resulting in reduced emissions in the value chain.
	Raw material impact € + 968,-	Higher build quality results in an increase of raw materials, therefore higher environmental impact.
	Transportation impact € + 288,-	Longer transportation distances result in more air emissions during transport which have a negative environmental impact.
	Assembly and maintenance emission impact € + 23,-	Emissions during assembly and maintenance are almost negligible.
	Manufacturing incident cost € + 208,-	Lower safety performance of Mitsubishi results in societal health related costs.
	Incident cost € - 3.201,-	The higher build quality of Mitsubishi elevators reduces the number of incidents / delays resulting in a positive socio-economic impact.
	Noise and vibrations*	Societal impact of noise and vibrations should be included to complete TrueTCU® analysis, however due to data limitations, this has not been included.
	LESS SOCIETAL IMPACT: € -1.931,-	Significant societal impact of lower incident rate / delays of Mitsubishi elevators, results in an overall societal impact of EUR 1.931 during full lifecycle.

Environmental Socio-economic

TrueTCU helps to build the business case for long term leasing

By applying KPMG's True Value methodology, Mitsubishi Elevator Europe and DDG have been able to show that when long-term lease concepts are applied to elevators, there are not only financial benefits for the customer but also benefits for society. With these insights, both organizations aim to contribute to the global development goals¹.

GAININGS FOR SOCIETY

If all office elevators in The Netherlands were leased from Mitsubishi, it would save society per year



UN GLOBAL GOALS

Mitsubishi and Delta Development Group contribute to the UN global goals for sustainable development by leasing the elevators.



What's next? How will Mitsubishi Elevator Europe and Delta Development Group use the analysis?

The analysis has highlighted opportunities for Mitsubishi Elevator Europe to improve the environmental and social performance of its elevators by:

- addressing the long transportation distance that is currently a feature of its supply chain. This could be improved by recycling the elevator (major raw materials and driving component parts) at the end-of-life stage
- developing the design of the product to reduce the amount of raw materials required in manufacture
- reducing health and safety incidents at the assembly stage.

Furthermore, Mitsubishi Elevator Europe will use the analysis to further its efforts to develop a cradle-to-cradle model or elevators compatible with the concept of a Circular Economy. It has commenced multiple projects to adapt the design of its elevators so they can be easily disassembled at the end of their lifecycle and the key components recycled and reused.

Delta Development Group will use the results to provide valuable insights to its stakeholders on the impact of long-term leasing concepts, in order to stimulate demand for leased elevators and to deliver the financial and socio-economic benefits that leasing brings.

1) www.globalgoals.org

To find out more about this publication on the True Value of leasing elevators, contact:

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