
STILL
Mission: Zero Emission
Innovative STILL forklift trucks:
Powerful, efficient, eco-friendly.
www.still-zero-emission.com
first in intralogistics

Environmentally responsible logistics that pays off for you!

Environmental responsibility plays an ever more important role in our society.

The role environmental responsibility plays becomes evident by the rapidly growing megatrends such as the spreading of renewable energies and e-mobility as well as in ever more strict emission standards being in place for vehicles with engines. The overarching goal is to avoid emissions that are harmful to the climate.
In combination with the issue of energy efficiency, reducing emissions is at the top of the agenda. With respect to means of transport, both topics are closely associated with both types of drives (motors and engines) and therefore also play a major role in intralogistics.

In intralogistics, both truck types with motors and engines are widely spread and both have seen major technological developments over the past years.

Still there are differences, especially with respect to the suitability for certain applications. While diesel and LPG trucks provide that little bit more power, electric trucks convince with completely emission free operation and low energy and service costs.

So the crucial question when purchasing a forklift truck is: “Electric motor or engine?“

To cut a long story short: there is no straightforward answer to this question. It always depends on where and how the trucks are used. Are you looking for a counterbalance truck to use in a closed hall in the paper industry? Here a completely emission free and virtually noiseless truck could be the right solution. Is the truck for rough outdoor application in a steel mill? Then a strong diesel truck could be the best choice. However, it is not always clear at first sight which truck is best for which use.

Over the recent years the different applications have started to blur. On one hand, modern exhaust gas cleaning technologies substantially reduce the emissions from trucks with engines, while electric trucks have become powerful enough for applications that used to be dominated by engine trucks on the other hand.

We offer you answers to the questions for the strengths and the optimum conditions regarding what drive type you should choose?

This brochure shows how you can take ecological responsibility with electric as well as with engine trucks and even profit from it. After all, there is one thing you can always depend on whatever the drive type: all RX counter balance trucks from STILL are unbeatably powerful, efficient and eco-friendly – and on top of that convince by their uniform control concept, independent of the drive type.

Changing intralogistics – Europe becomes electric

Market development: Electric forklift trucks are more in demand than ever

The figures speak for themselves: since 2009 all across Europe the demand for electric trucks was greater than for IC trucks. The reasons for this trend are manifold. One of the reasons for the declining demand for engine trucks surely is the continuously rising price of fuel. And there is no doubt that this trend will continue, since fossil fuels are a finite resource which will be used up once and for all at some point in time.

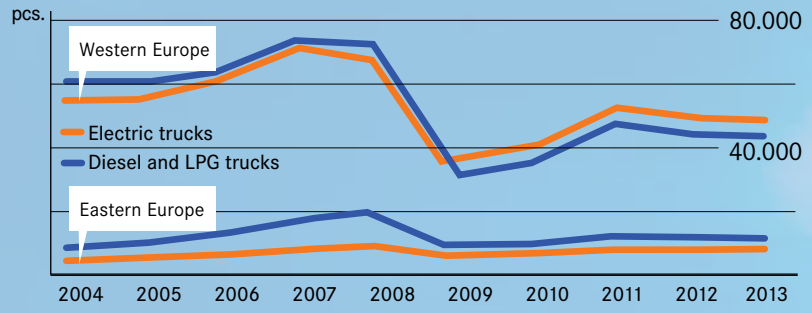
Although IC trucks tend to be a little less expensive to purchase than electric trucks, in the long run the latter clearly convince with substantially lower energy and service costs which quickly compensate the higher purchase price.

Further more it must be noted, that the purchase price for IC trucks is constantly rising as ever stricter emission standards require the deployment of more elaborate technologies to reduce emissions. If one looks at the Total Cost of Ownership (TCO) the long term advantages electric counterbalance trucks provide emerge clearly (see figure on the right). Of course, despite all the advantages, there are still application profiles for which IC trucks are without alternative. Which applications these are and why the IC forklift trucks of the RX 70 series from STILL are best for these applications will be illustrated on the next two pages.

Development of sales figures – electric and diesel trucks

The market development of electric and diesel/LPG trucks sold in Europe shows a distinctive trend towards electric mobility in internal logistics. Since 2009 more electric than diesel trucks are being purchased in the European Union. Amongst others, the reason for this is the low energy and maintenance costs as well as the emission free operation of electric trucks.

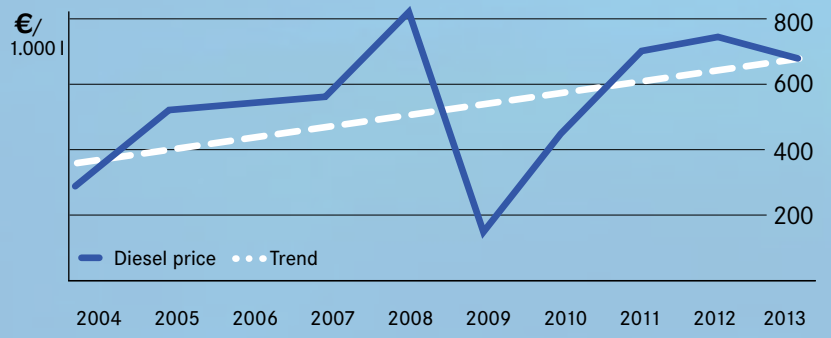
Market development in Europe[1]



Rising oil prices affect the markets

Diesel fuel is becoming ever more expensive. Except from a short term drop during the economic crisis, the prices for fossil fuel are constantly climbing up. During the past ten years the average price for diesel fuel has virtually doubled. In the face of scarcer and scarcer resources this price trend is surely going to carry on. Anyone purchasing a forklift today should also consider tomorrow's energy costs.

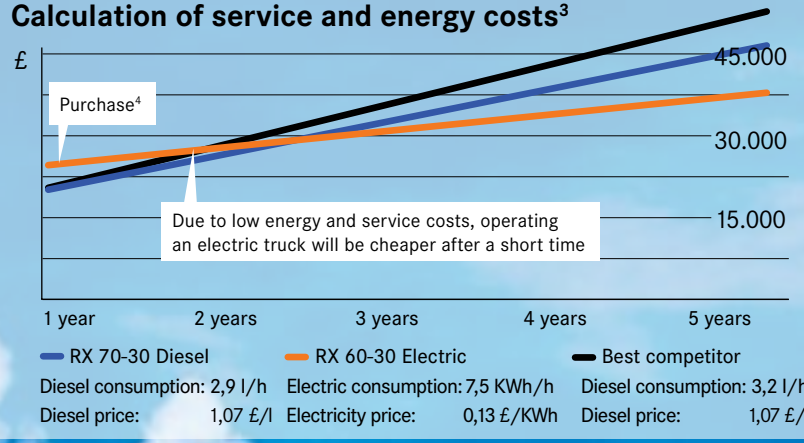
Diesel prices in Europe[2]



TCO – Total Cost of Ownership

Whether a forklift truck is expensive or not only measured by the purchase price. After the purchase, costs for energy and service will have to be incurred. Look at the problem considering the Total-Cost-of-Ownership (TCO) and think ahead and wholistically. TCO considers the costs for the truck over its complete lifecycle. And it shows that the somewhat higher purchase price of a STILL electric truck caused by the battery (years of fuel bought upfront) in the truck pays off after a relatively short time - saving your cash!

Calculation of service and energy costs[3]



1 In accordance with order intake WITS (World Industrial Truck Statistics) **2** European commission: net prices without tax **3** In accordance with VDI 2695, medium application 1100 hours/year, diesel net price 1,07 £/l (incl. VAT 1,34 £/l) , electricity net price 0,13 £/KWh (incl. VAT 0,16 £/KWh) **4** E-truck incl. battery and charger

The application profile makes the difference

Moving, stacking, towing and delivering – the range of tasks completed by counterbalance trucks is very broad.

It is especially their all-round talent that makes counter balanced trucks so popular. They are the jack-of-all-trades in logistics that can be applied to many tasks in the internal flow of materials. The differentiation between engine trucks and electric trucks has been made for nearly as long as forklift trucks have been used. In the past the question which truck matches which application was easy to answer: electric trucks indoors and engine trucks outdoors. But meanwhile these limits have started to become unclear. While electric trucks are becoming more and more powerful and can also be used outdoors, new technologies have reduced the emissions of engine trucks. But even with electric trucks being powerful enough to replace engine trucks in many areas, there are still application profiles that make engine trucks indispensable.

In such cases the new engine counterbalance trucks of the RX 70 series from STILL can play all their strong cards: They are not only the trucks with the lowest fuel consumption in the industry, but also the spearhead of low emissions. The engine-electric drive of the RX 70 models makes them outstandingly energy efficient despite all of their power. On average, the fuel consumption of STILL forklift trucks of the RX 70 series is 17 per cent below the fuel consumption of their BEST competitors.

Lower fuel consumption also means fewer emissions such as carbon dioxide (CO_2). The LPG versions of the RX 70 models are even suitable for completely emission-free indoor operation.

This means that you can rely on optimum energy efficiency with STILL independently of the drive type. Beyond this you will benefit from additional advantages all trucks of the RX series provide for you. All RX trucks, for example, are fitted with a uniform cabin and control concept and, on request, also with uniform equipment features. Especially for mixed fleets this is an advantage, because every driver will feel equally familiar with any truck of the fleet right from the start.

	STILL Electric trucks	STILL Diesel trucks
Indoor	+++	+
Outdoor	+++	+++
Bumpy grounds	+	+++
Gradients/ramps	++	+++
Multi-shift operation	+++	+++
Precise load handling	+++	+++
Low emission	+++	+
Low noise	+++	+
Turnover performance	++	+++
Range per refuelling/recharging	++	+++
Visibility	+++	+++
Total Cost Of Ownership	+++	++

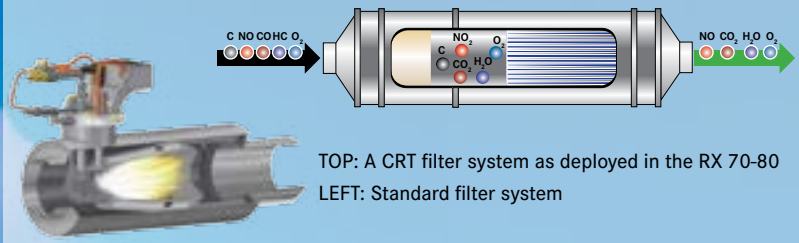
The intelligent answer to emission standards

Using IC trucks is still recommended for a number of application profiles. Such applications demand the major share of diesel trucks sold to the market.

In the frame of a growing environmental awareness ever more strict standards apply to regulate permitted emissions. For example, the European Parliament and the European Council have decided on a legal act to reduce emissions of diesel engines in mobile machinery step by step for the whole of the European Union. Many manufacturers opted for diesel particulate filters in order to meet the standards.

These components remove a large part of the diesel soot particulate which is created by the internal combustion of the fuel from the exhaust gas before it leaves the exhaust. However, it is even better to root out the cause of emissions in the first place rather than filtering out harmful particles later on.

This is why the top priority of STILL product development is to use diesel particulate filters only if the exhaust gases cannot be reduced in any other way. And this is why only the strongest RX 70s with capacities from 6 to 8 tons is fitted with a filter as standard. And, it is not fitted with just any type of filter. It is fitted with a high-quality CRT-Filter (Continuously Regenerating Trap Filter) system. Compared to the particulate filters with a burner system which are often used elsewhere, CRT filters have a crucial benefit: The truck does not need to be taken out of service for about 30 minutes after every eight to ten hours of work in order to burn the filter for cleaning. CRT filters continuously auto-clean during operation.



TOP: A CRT filter system as deployed in the RX 70-80
LEFT: Standard filter system

With IC trucks from STILL you therefore benefit from best possible availability as well as from emission values that stay clearly below the legal emission standards.

For more information about applicable emission standards and the function principles of the different types of particulate filters, please go to: **www.still-zero-emission.com**

STILL RX 70 series – efficiency champion thanks to the engine-electric drive

Looking for an explanation why all STILL RX 70 forklift trucks emit substantially fewer emissions than permitted by the standards leads to the hybrid technology used in the trucks in the form of the engine-electric drive. This technology is a core reason for outstanding efficiency of all RX 70 models and it works as follows: A engine drives an generator which in turn provides the truck with electric energy. This allows the engine to operate at optimal speed at all times leading to very low fuel consumption and correspondingly to very few emissions.

Depending on the model, a number of additional technologies are used to make the RX 70 true efficiency champions. For example, the intelligent drive control: after the truck has fully accelerated, it shifts the transmission ratio – it shifts gear, so to say – to reduce engine speed and by this also reduces fuel consumption substantially without slowing the truck down.

Especially innovative is the RX 70 Hybrid with a load capacity of 3.0 to 3.5 tons. Thanks to its electric energy storage, the ultracaps, the IFOY awarded truck* can operate with a relatively small diesel engine and still provide maximum performance in service. On demand, the electric energy storage can provide as much as 8 kW additional power for the truck to accelerate or lift and achieve top marks in goods handling. This makes the RX 70 Hybrid the most efficient forklift truck in its class.

Also the RX 70-40/50 is a unique model in its kind. It is the only truck with a load capacity of 4.0 to 5.0 tons that underscores the legally required emission values without the use of a soot particulate filter.**

* International forklift truck of the year, www.ifoy.org ** All RX 70 models are optionally available with an additional soot particulate filter to further reduce emissions.

Innovations that pay off

Tough applications: High ground clearance and robust design of the series makes all RX 70 models fit for rough outdoor applications to move goods fast and safely also on bumpy grounds.

Individual driving programs: Five adjustable driving programs guarantee that the power of high-quality industrial ecological engines is used effectively.

Blue-Q: The intelligent auto-pilot to economy and ecologic responsibility saves up to 10% of energy in the engine trucks – just by pressing a button. Energy is saved where it is currently not needed and the feature intelligently switches off electric components, when they are not in use. Auxiliary electric components can make up to 35% of the energy consumption of the truck.

HYBRID
TECHNOLOGY

engine-electric drive: An engine drives a generator which provides electric power to the truck. Due to this, the engine always runs at optimal speed.

Fuel tank and range: No one goes further. Thanks to state-of-the-art engine technology and engine-electric drive, the RX 70 models stand out with the longest range per filling.

Encapsulated three-phase generator and motor drive: High performance and maintenance free operation, even in rough conditions like high humidity or dust.

Encapsulated wet-disk brakes have a longer service life than disc or drum brakes and ensure virtually maintenance free performance.

Hybrid

Hybrid: The ultracaps of the RX 70 Hybrid store the kinetic energy released during braking and provide a power boost of 8 kW when needed. This makes the RX 70 Hybrid the most economic truck of its class.

Intelligent drive control: Engine speed of the accelerated truck is reduced by 25 % without impacting the driving speed of the truck. You profit from lower fuel consumption.

Our eco-friendly engine-electric power packs.

Load capacity (tons)	STILL Diesel forklift trucks (Reference model per class)	Engine Power (kW)	Emissions (g/kWh)	Soot particulate emission (g/kWh)	CO_2 emission (kg/h)	Consumption (l/h)
1 - 2 to	 RX 70-18	28 kW	CO: 5,5 / 2,4 — HC+NO_x: 7,5 / 6,5 — up to 55% better*	0,6 / 0,1 — Without particulate filter 83% better*	5,3 kg/h	2,0 l/h — up to 17% savings**
2 - 3 to	 RX 70-25	30 kW	CO: 5,5 / 2,4 — HC+NO_x: 7,5 / 6,5 — up to 55% better*	0,6 / 0,1 — Without particulate filter 83% better*	6,3 kg/h	2,4 l/h — up to 5% savings**
3 - 4 to	 RX 70-35 H	30 kW + 8 kW Ultracaps	CO: 5,5 / 2,4 — HC+NO_x: 7,5 / 6,5 — up to 55% better*	0,6 / 0,1 — Without particulate filter 83% better*	7,7 kg/h	2,9 l/h — up to 17% savings**
4 - 5 to	 RX 70-40	54 kW	CO: 5,0 / 0,003 — HC+NO_x: 4,7 / 3,7 — up to 97% better*	0,025 / 0,014 — Without particulate filter 44% better*	10,3 kg/h	3,9 l/h — up to 7% savings**
6 - 8 to	 RX 70-60	80 kW	CO: 5,0 / 0,05 — HC+NO_x: 4,7 / 1,6 — up to 97% better*	0,025 / 0,006 — With particulate filter 76% better*	17,7 kg/h	6,7 l/h — up to 17% savings**

* Improvement in per cent compared to the applicable standard values

** Savings in per cent compared to the BEST competitor in accordance with technical data sheets. STILL consumption is based upon energy-saving program Blue-Q

Legal standard Measured emission

Electric mobility keeps the world going round

E-mobility is spreading more and more into our everyday life. Experts agree that the future belongs to these emission free means of transport with electric motors.

Already today the pulse of movement of our modern society would flatten out without electric drives. Electric means of mobility that have been established many years ago, such as trams and subway trains, are currently being joined with electric cars, busses, lorries and bicycles as we are approaching the next milestone in e-mobility. Against the background of ever scarcer and more expensive fossil fuels, estimates are that this trend will accelerate in the future.
The future of mobility is electric.

STILL – competence in electric mobility grown over 90 years. Already in the beginning of STILL's history one of the major topics was electric efficiency.

The company attained its first major success with electric generators. The expert knowledge and experience gained in this area was later transferred to innovative transport vehicles propelled by electric motors.

Already back in 1946 the electric cart EK 2000 reliably moved up to 2 tons of load for renowned customers such as the German railway. Only a little while later in 1949, the first electric counterbalance truck, the STILL EGS 1000 moved the growing flow of materials into the right direction. Since then STILL has been one of the most sought-after experts for electric mobility in logistics. Innovations by STILL covering the whole industry have made the electric counterbalance trucks more and more attractive over the years.

Meanwhile electric counterbalance trucks have grown powerful enough to replace engine trucks with ease even in heavy applications, for example, in the beverage industry. Beyond this, STILL is already working on e-mobility issues for the future and amongst others was one of the first companies worldwide to deliver a fully functional fuel cell truck to its European customers.

Electrifying excellence!

Efficiency champions: STILL electric forklift trucks

Starting with the smart RX 50 with a load capacity of 1.0 ton right through to the 8.0 ton capacity RX 60-80 incorporating all the power of electric mobility - the STILL electric forklift trucks of the RX 50, RX 20 and RX 60 series are intelligent champions in efficiency. Their benefits are evident: an emission free drive combined with energy and maintenance costs that are substantially lower than that of trucks with Diesel and LPG engines. The slightly higher purchase price caused by the battery pays off quickly to save your cash. Due to lateral battery change invented by STILL the electric trucks stand out with excellent availability at all times even in multi-shift operation. Similar to the refuelling of a diesel or LPG tank, it only takes a few moments to exchange the battery.

A true space saver is the RX 50. For load weight ranges from 1.0 to 1.6 tons it scores amongst others with the most compact dimensions of its class. The RX 20 is the best selling truck of the RX family. No wonder, as it sets standards in emission free turnover of loads from 1.4 to 2.0 tons. For example, with a sprint mode, available on pressing a button, the driving speed can be increased if top performance is needed. At the same time, the intelligent energy meter shows at a glance how much energy is currently being consumed and for how long the battery will last.

The RX 60 series is the most impressive proof of the power modern electric counterbalance trucks can have. This strength has by now made them a serious alternative for transport jobs that had to be completed with diesel forklift trucks in the past.

With a load capacity of up to 8.0 tons the RX 60-80 is the biggest electric truck from STILL. It is big enough to easily move a total of six pallets with nearly 300 crates of beverages at a time.

Zero emission for your fleet

Head to head with engine trucks: High driving speeds and fast lifting make the electric all-round trucks an eco-friendly alternative with high turnover performance.

Sprint mode: Optimises the turnover in all driving programs, if the application demands higher dynamics for a certain time.

Blue-Q: The intelligent auto-pilot for economy and environmental responsibility saves up to 20% of power by pressing a button. Blue-Q saves energy where it is currently not needed for the work in progress and intelligently switches off electric components when not required. Auxiliary electric components can make up as much as 35% of the energy consumption of the truck.

Energy indicator: Makes energy consumption transparent and allows optimised planning of charging cycles by indicating the average consumption and remaining service time of the battery.

Lateral battery charge: The fast change of the battery only takes a few moments without a crane but with additional work safety in continuous multi-shift operation.

Encapsulated three-phase generator and motor drive: High performance and maintenance free operation, even in rough conditions like high humidity or dust.

Encapsulated wet-disk brakes have a longer service life than disc or drum brakes and ensure virtually maintenance free performance.

Minimised service costs: Electric vehicles have much fewer moving parts than engine propelled trucks. This reduces repairs due to wear and make changes of oil and air filters as well as glow ans spark plugs superfluous.

Saving energy costs: Lower prices for electricity compared to diesel fuel lead to cost savings. In addition, electric energy can be used more efficiently.

Our eco-friendly electric power packs.

Load capacity (tons)	STILL Electric forklift trucks (Reference model per class)	Energy costs* per hour	Service costs** per hour	CO_2 emission*** (kg/h)
1 - 2 to	 RX 20-16	E-Truck **0,98 £** — 54% Saving — Premium Diesel truck **2,14 £**	E-Truck — 25% Saving — Premium Diesel truck	E-Truck **3,62 kg/h** — 31% Saving — Premium Diesel truck **5,28 kg/h**
2 - 3 to	 RX 60-25	E-Truck **1,60 £** — 40% Saving — Premium Diesel truck **2,68 £**	E-Truck — 24% Saving — Premium Diesel truck	E-Truck **5,92kg/h** — 10% Saving — Premium Diesel truck **6,60 kg/h**
3 - 4 to	 RX 60-35	E-Truck **1,91 £** — 42% Saving — Premium Diesel truck **3,32 £**	E-Truck — 19% Saving — Premium Diesel truck	E-Truck **7,07 kg/h** — 14% Saving — Premium Diesel truck **8,18 kg/h**
4 - 5 to	 RX 60-50	E-Truck **2,56 £** — 48% Saving — Premium Diesel truck **4,92 £**	E-Truck — 27% Saving — Premium Diesel truck	E-Truck **9,46 kg/h** — 22% Saving — Premium Diesel truck **12,14 kg/h**
6 - 8 to	 RX 60-80	E-Truck **3,94 £** — 50% Saving — Premium Diesel truck **7,92 £**	E-Truck — 15% Saving — Premium Diesel truck	E-Truck **14,56 kg/h** — 25% Saving — Premium Diesel truck **19,48 kg/h**

* In accordance with VDI guideline 2695 - assumed energy costs: 6 year average net price for diesel 1,07 £/l (incl. VAT 1,34 £/l) , electricity net price 0,13 £/KWh (incl. VAT 0,16 £/KWh)

** Examples of standard full service instalments on the market. Individual service instalments may vary.

*** Electric trucks free of CO_2 at place of operation. According to the Warwick University Carbon Footprint Project Group "After taking into account the different methods of electricity generation in the UK, the 'average' CO_2 emission per kWh is 0.47 kg

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STILL is certified in the following areas: Quality management, occupational safety, environmental protection and energy management.

GL Systems Certification
ISO 9001
ISO 14001
OHSAS 18001
ISO 50001

first in intralogistics