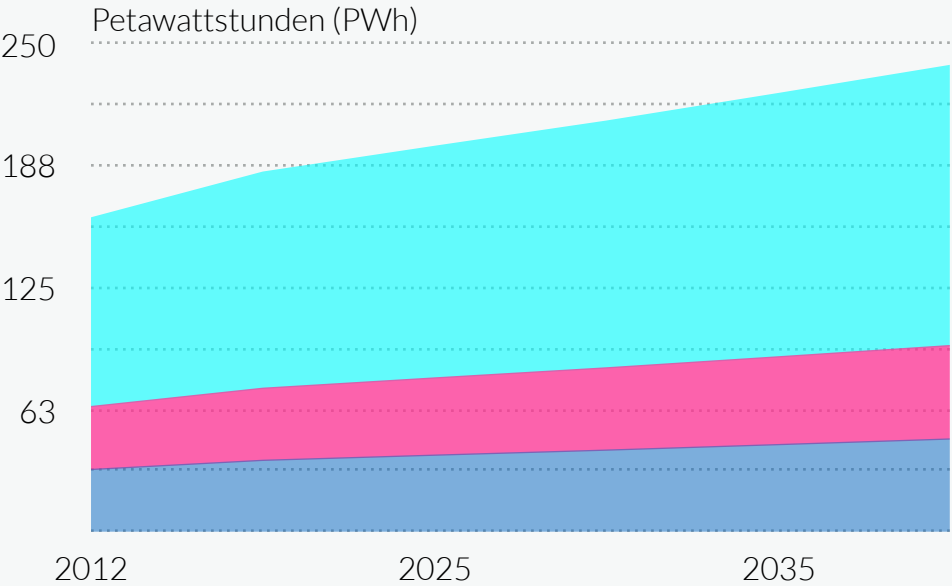


The background of the slide is a photograph of a modern industrial factory. In the foreground, there are several orange robotic arms (SCARA type) working on a production line. The background shows a complex network of conveyor belts, structural steel, and various industrial equipment. Overlaid on the left side of the image is a network diagram consisting of a series of blue dots connected by thin lines, suggesting a digital or data network. The right side of the image features a large, stylized hexagonal graphic that frames the text.

Gerotor[®]

A Hidden Champion
for **Energy Efficiency**
in the Worldwide
Industry 4.0

Increasing Global Consumption

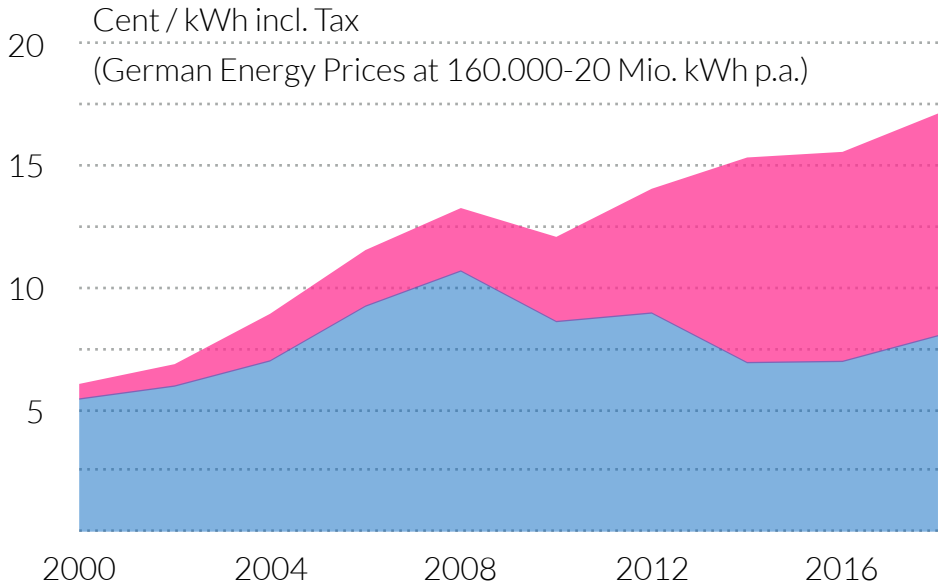


Energy Consumption in Industry Sector

50% more Demand by 2040

Machinery Total Industry Total

Increasing Prices



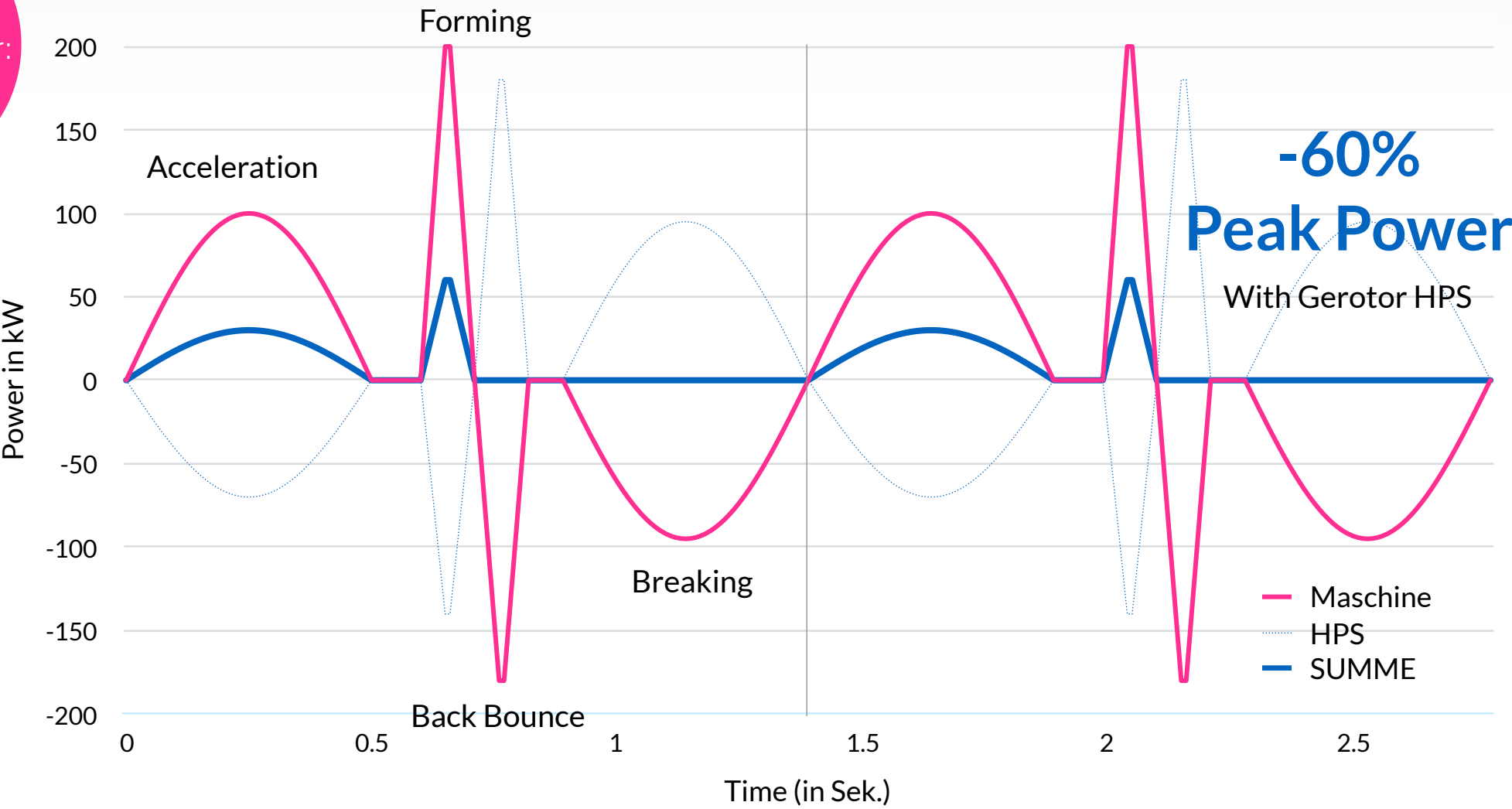
Electricity Price for Industry

6.31% CAGR

Procurement EEG surcharge & Co.

Identify and Eliminate Energy Leaks

Avg.
Costs per kW
connecting power:
~80 EUR



Gerotor Reduces Electricity Consumption

High Power Storage

High-end Flywheel Technology

High performance

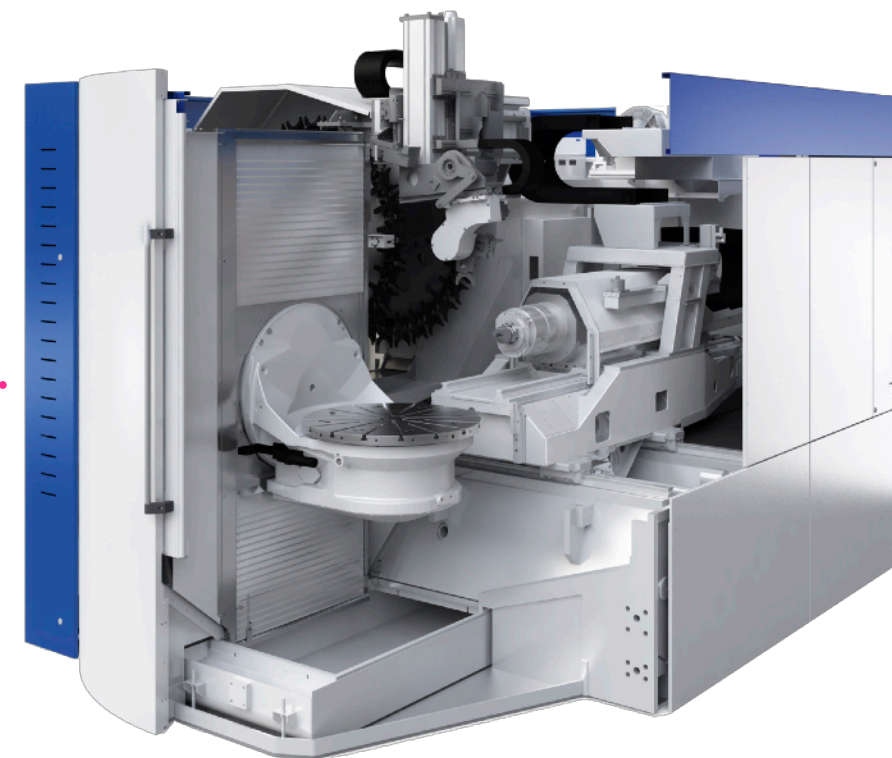
50.000 RPM / 50kW
($E \sim \omega^2$, $P \sim \omega$)

Compact design

Ø 220 x 200 mm, 18 kg

Cycle stability

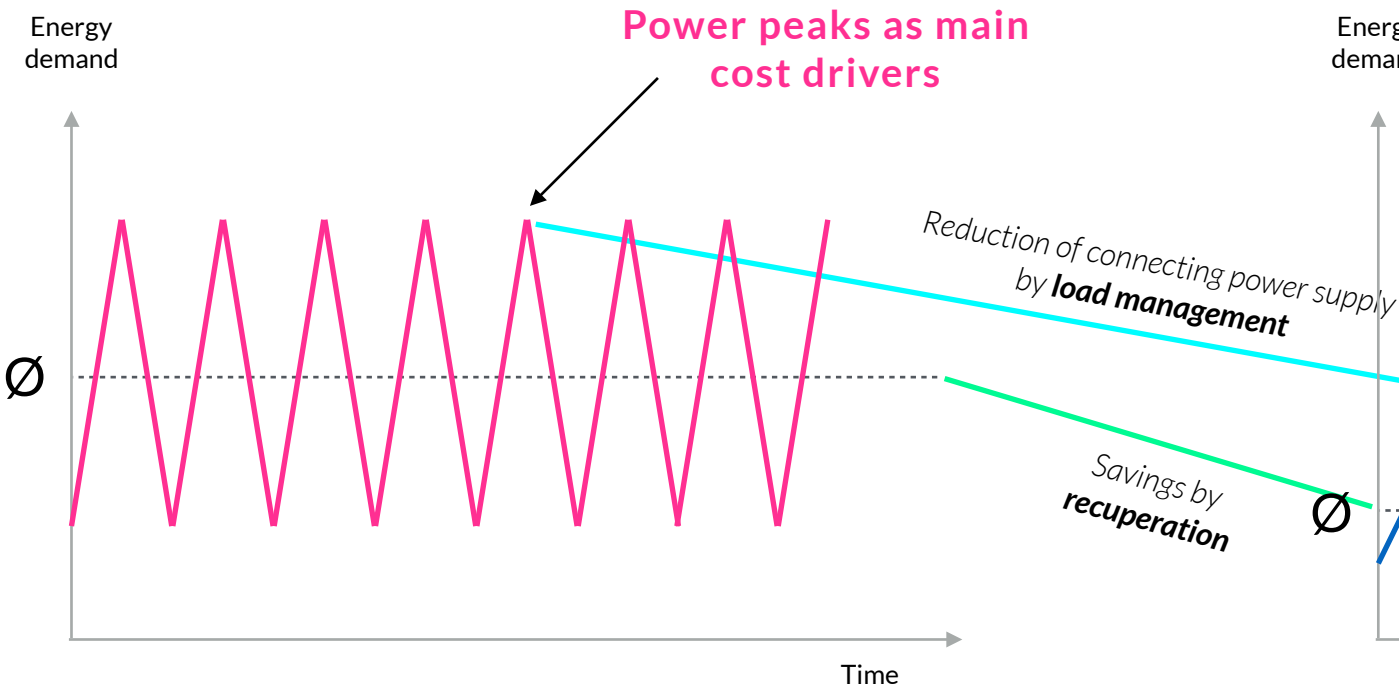
>10.000.000



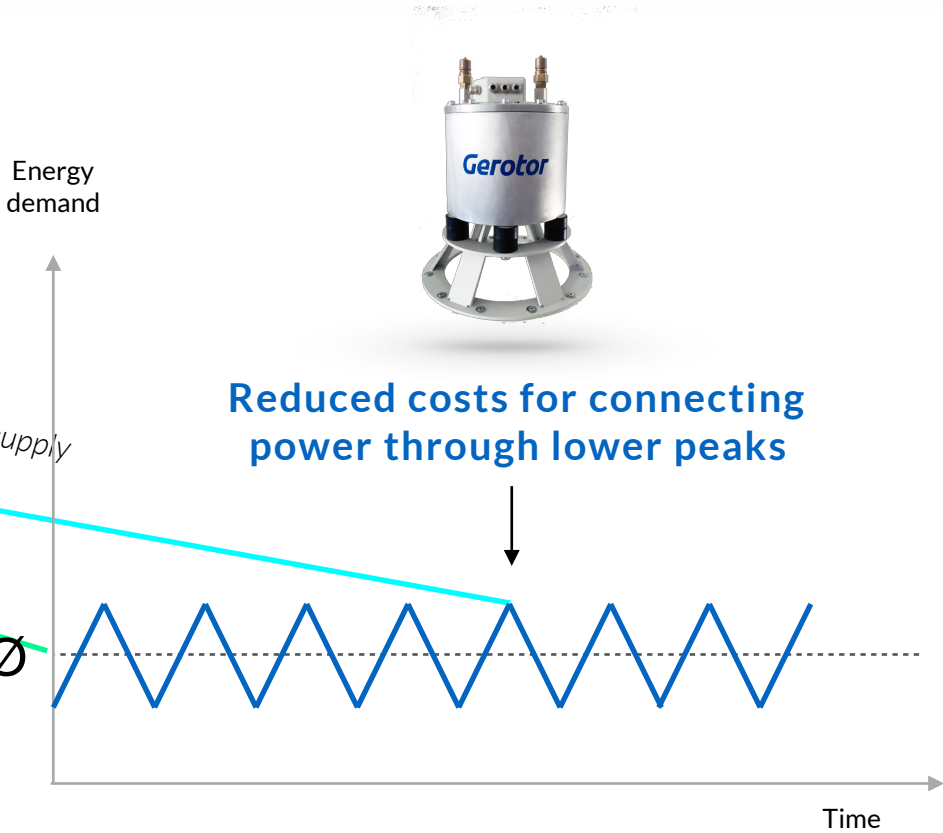
Active Energy Management

The Smart Way to Increase
Energy Efficiency

Situation without energy management



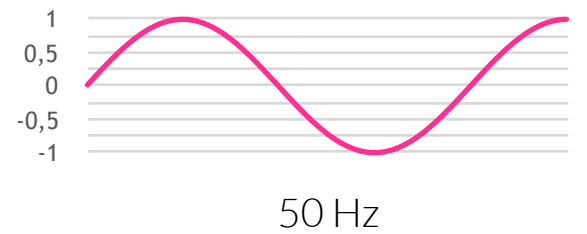
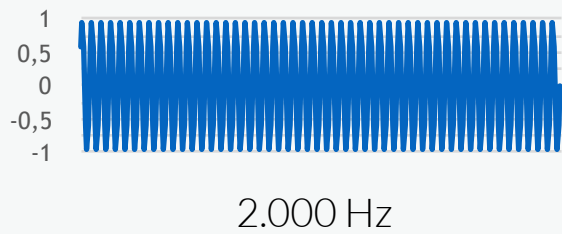
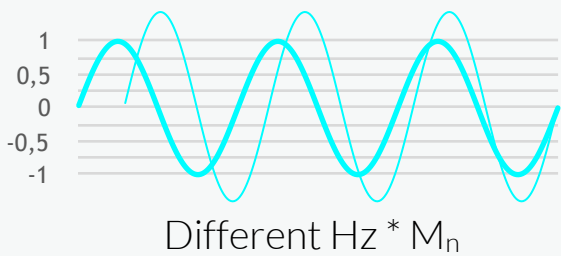
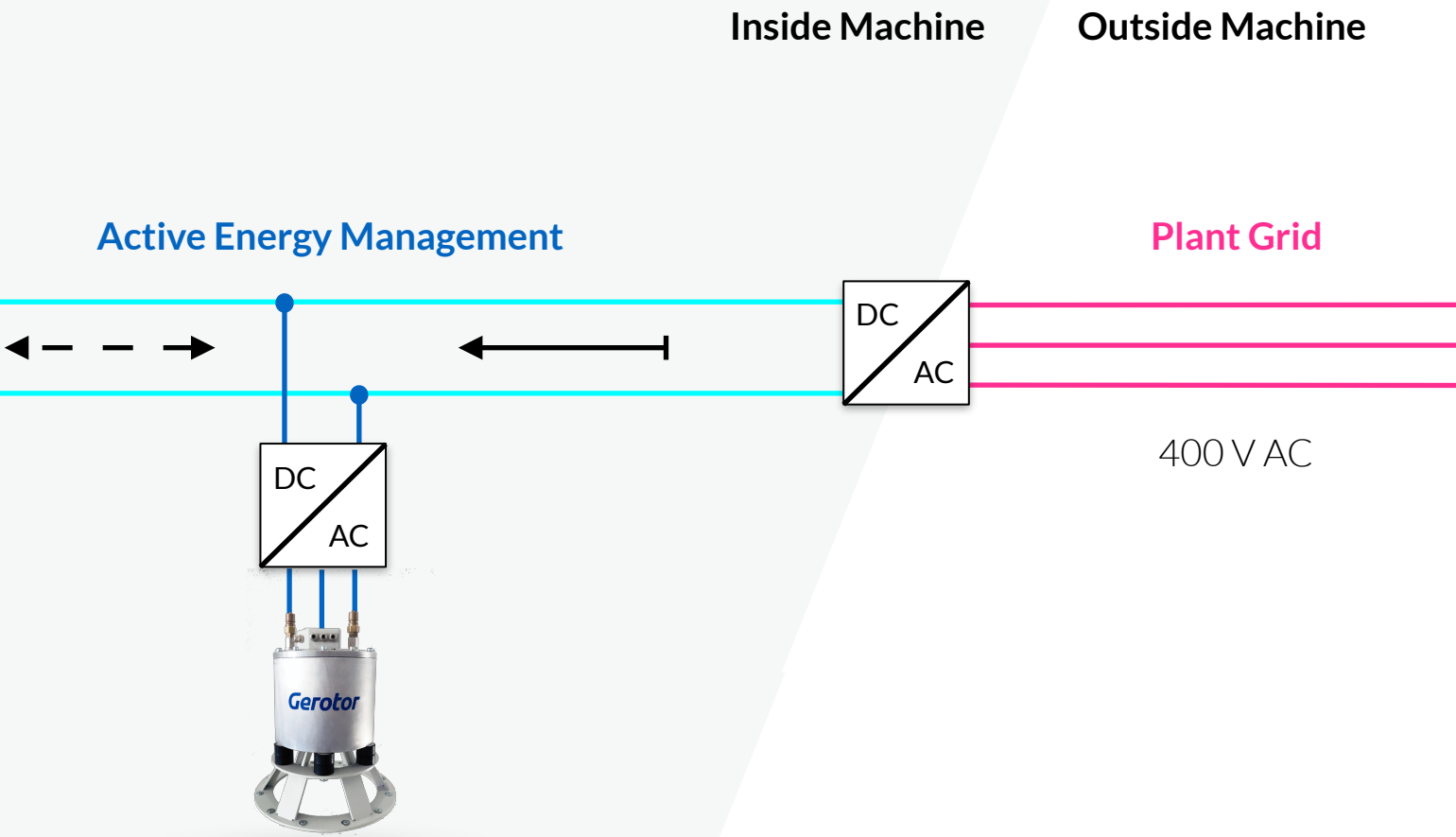
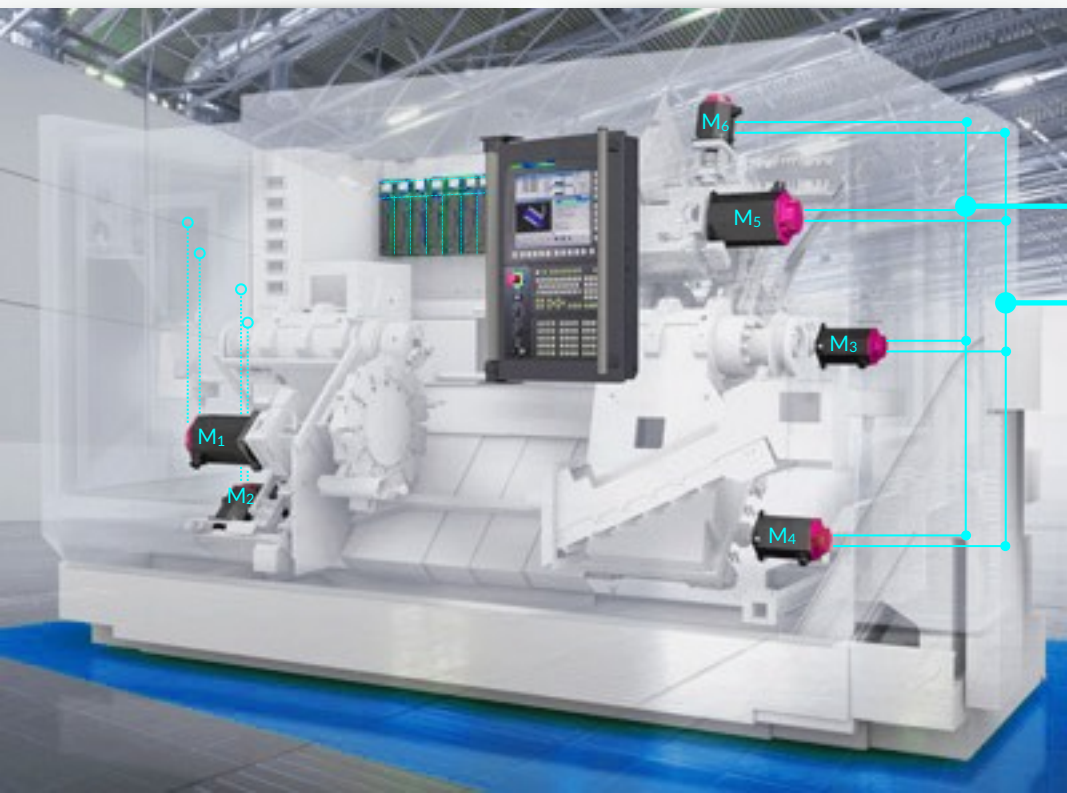
Impact of higher energy efficiency with Active Energy Management by HPS



Circuit Diagram Machine with Integrated Gerotor HPS



Several Engines in DC-Circuit (e.g. 650 V DC)



Scalability High Power According to Customer Demand

Gerotor[®]

DC Power Module
for Single Machines



DC Power Rack
for Machines Clusters



AC Power Container^{exp.}
for Industry Plants



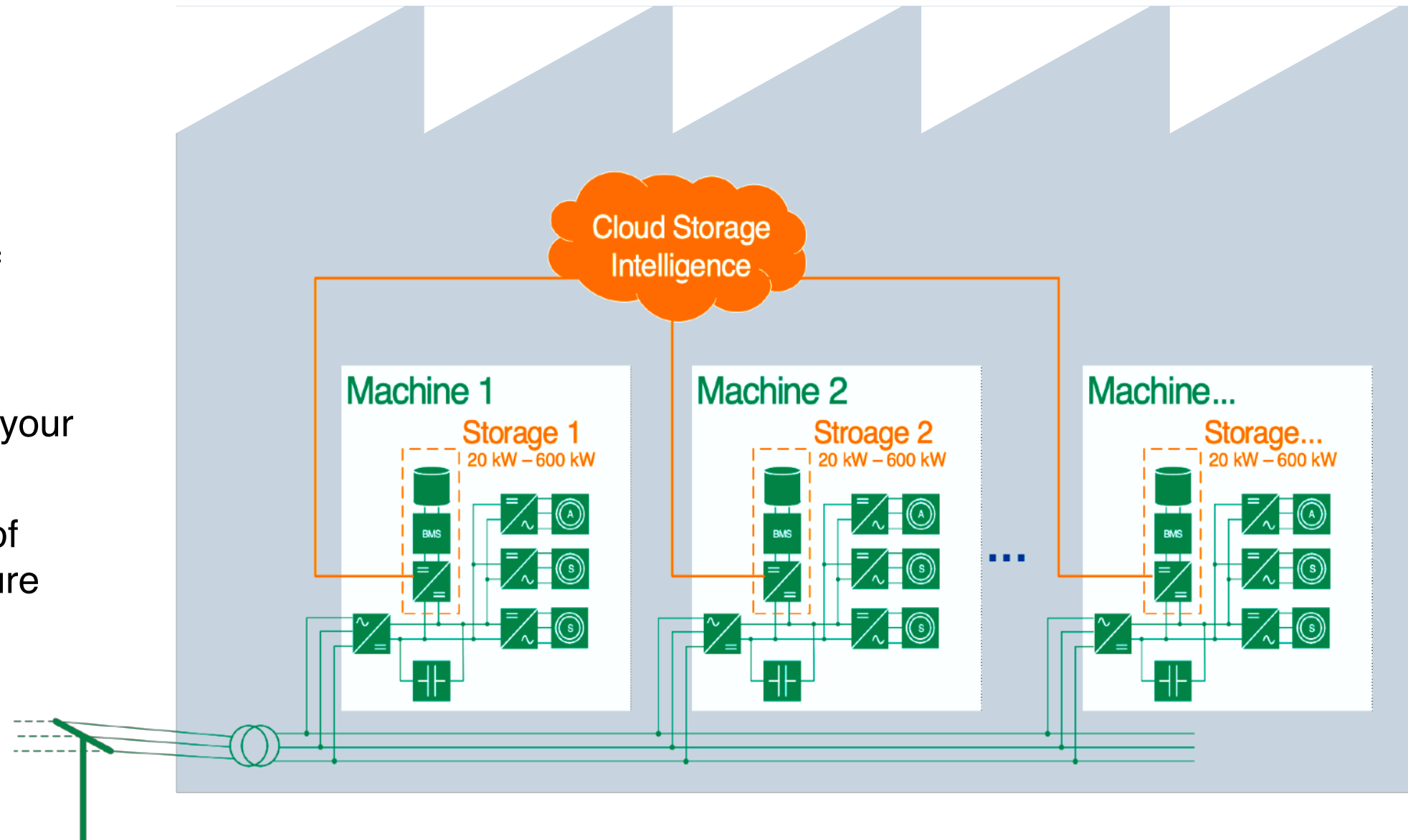
Scalable from 50 kW pro System to 5 MW in the Power Container



Applications of Energy Storages

Energy Storages secures & optimizes the production

- Secure the supply of critical processes
- Use existing storage capacity to optimize your energy consumption
- Improve the quality of supply of infrastructure plants



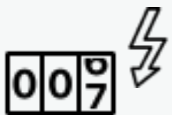
Markets Current and future Applications

Gerotor[®]



Industrial Energy Efficiency for Global Markets

Why Customers Need Gerotor?



Lower Costs & Higher Efficiency

Up to 50% Reduction of Energy Consumption



More Power Availability

Up to 75% Reduction of Connecting Power



Digital Transparency

Artificial Intelligence for Smart Data & Predictive Maintenance



Environmental Sustainability

Improved Ecological Footprint, Tax savings & Subsidy Benefits

Gerotor vs. Competing Technologies

	Batteries	Supercaps	RecoveryM	Gerotor
Energy Storage	✓	✓	✗	✓
High Energy*	✓	✗	✗	✗
High Power	✗	✓	✓	✓
Cycle Stability	✗	✗	✓	✓
Long Durability	✗	✗	✓	✓
Payback Period	✗	✗	✗	✓

Ø 1 - 3 Year(s) Payback Period

*In most Industrial Applications Energy Density is not an Required Feature.

Climate (needs) Protection!

The worldwide potential of servo-electric forming presses was set in one our of our development projects with approximately 2.000 new press lines per annum. Due to the measures in another project with the University of Stuttgart and the Fraunhofer IPA, the applicability in the field of mechanical engineering is expanding to over 200.000 new machines per year and several million existing systems worldwide. On average, about 26% of the power consumption and more than 30% of the connected load can be reduced on each of these systems. According to the Federal Environment Agency, the total electricity consumption of German industry in 2017 was around 226 TWh. Machinery and engines accounted for about a quarter, i.e. about 50 TWh p.a.

It can be assumed that every third machine could be economically equipped with the Gerotor HPS and thus there is a saving potential of more than 4 TWh of electricity per year in Germany alone. (According to the German electricity mirror 2017, this corresponds to 1 mio. households or ~3 mio. tons of CO2 savings p.a.). The theoretical global potential is correspondingly much higher.

Illustrated: If the connected load is reduced by approx. 10 kW per HPS system, 1 mio. existing and new machines will reduce the required total connected load by approx. 10 GW. For comparison, the largest German nuclear power plant Isar 2 has a nominal capacity of 1.4 GW.

Gerotor CO₂ Reduction Example*:

Servo Press Savings

380.000 kWh,
202t CO₂



1x Servo Press + 6x Gerotor HPS = - 10x Cars

*Assumptions:
20a Lifetime Servo Press & HPS, German Energy Mix 500g CO₂/kWh,
Consumption Car 120 g CO₂/km, Lifetime Car 150.000km

Innovation Unique in the Industrial World

Gerotor

World Premier

We are the only supplier of modern flywheel storage systems for the manufacturing industry.

Highly Economical

The HPS was designed to cost. It offers the highest power density and ensures a quick return on investment.

Gerotor GmbH as the proud Winner of the new Industrial Energy Efficiency Award
Hannover Messe 2019 - the home of Industrial Pioneers



More Power for More Business

Gerotor

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Michael Hein, Dominik Weigl (Managing Directors)
Prof. Dr. Kunerth (Chairman of the Supervisory Board)

The Federal Government of Germany:

"The cheapest and most environmentally friendly kilowatt-hour is the one you don't use."

Supported by



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