

DEUTZWORLD

ISSUE 3 2019



GLOBAL EMISSIONS

DEUTZ is ready

JOINT VENTURE DEUTZ AND SANY

China relies on drive
technology from Germany

AN AWARD FOR INNOVATIONS

Nicolaus August Otto Award
for Dr. Günther Schuh

The engine company.



CONTENT

04 DEUTZNEWS

NEWS FROM THE GROUP

From the new acquisition of Futavis to DEUTZ Sustainability Vision 2023



06 DEUTZWORLDWIDE

NEW JOINT VENTURE IN CHINA

DEUTZ and SANY set up high-performance engine assembly plant



08 DEUTZAWARD

INNOVATION AWARD

Electric pioneer Dr. Günther Schuh receives Nicolaus August Otto Award

“It’s better to be first than to wait and see” – Interview with award winner Dr. Günther Schuh

DEUTZFOCUS

INTEGRATION OF ELECTRIC DRIVES

Scaled precisely with DEUTZ Advanced Configurator

12



14 DEUTZINTERVIEW

“THE KEY TO SUCCESS LIES IN NEW TECHNOLOGIES”

VDMA President Carl Martin Welcker on innovative drive solutions

IMPRINT

DEUTZWorld, Customer Magazine
Publisher: DEUTZ AG,
Ottostraße 1, 51149 Cologne
Person in charge: Leslie Isabelle Iltgen
Communications & Investor Relations

Project management: Janina Decker
Ph.: +49 (0)221 822 24 93
Fax: +49 (0)221 822 15 24 93
Email: janina.decker@deutz.com
Editorial staff: Janina Decker, Michael Ziegler

Design: Palmer Hargreaves
Print: Druckerei Engelhardt
Picture credits:
DEUTZ AG, iStock.com,
Adobe Stock

Note: To simplify readability, gender-specific differentiation is omitted.
Corresponding terms generally imply equal treatment for all genders.

15 DEUTZTECHNOLOGY

GLOBAL EMISSIONS

Intelligent Heat Management

16 DEUTZPRODUCTS

ELECTRIC DAYS IN MONACO

Torqueado focuses on emission-free drives



SERIES: AVAILABLE ANYWHERE IN THE WORLD

From the excavation pit to the farm: In our series, we show where DEUTZ engines are in demand

Part 2: Machine-operated olive harvesting

20 DEUTZENGINEERING

NATURAL GAS AS AN ENERGY SOURCE

CO₂-neutral mobility thanks to power-to-gas technology

21 DEUTZSERVICE

DEUTZ OIL CHECK

Preventing repair measures

XCHANGE PARTS

Economical alternative to new purchases

DEUTZ POWER CENTER GREAT LAKES

Increased presence in the USA

DEAR READERS,

Eventful months have passed. As part of the ground-breaking ceremonies at the production site in Changsha, a contract for the construction of a joint high-performance engine assembly plant was signed between China's largest construction machinery manufacturer SANY and DEUTZ. It was a great event, which was also attended by representatives of the local government of Changsha – after all, the province of Hunan is supporting the joint venture with a mid double-digit million USD amount. A great honor for us, as it illustrates perfectly that China relies on drive technology “Made in Germany” (page 6).

In order to score internationally, it takes courage and a pioneering spirit of innovation. The winner of our first Nicolaus August Otto Award was the

perfect proof. With Dr. Günther Schuh, we were able to honor a visionary who has made a name for himself as an electric pioneer and who is making a significant contribution to the electrification of drive technology in Germany. In an interview with us, he talks about the development of e-mobility (page 10).

We all know that several factors have to be taken into account for proper selection of the right drive system. With the Advanced Configurator, we offer our customers a modular system that focuses on their individual requirements and facilitates quick and flexible reaction to technological developments (page 12). This is also important in light of the different

requirements of the international markets. Our drive systems with state-of-the-art exhaust gas after-treatment already ensure that our customers are ready for the ongoing emission regulations worldwide (page 15) – we are ready today for the requirements of tomorrow.

I hope you find this issue of our magazine inspiring.

Sincerely,

Dr. Frank Hiller

NEWS

HONORED!

This is the ninth year in a row the Cologne Chamber of Commerce and Industry honored the DEUTZ Training Center for its outstanding achievements in vocational training. Five DEUTZ apprentices were honored with the certificate "The Best" at a ceremony recognizing that they are the best in their respective professions.

DEUTZ was also pleased to receive another award.

The city of Cologne honored the company with the certificate "Companies with Vision" for the exploration of occupational opportunities as part of the state initiative "No degree without connection – transition from school to occupation in North Rhine-Westphalia (NRW)".



RESPONSIBLE CONDUCT

As part of its new sustainability strategy, DEUTZ has set various targets for the year 2023, e.g. with regard to reducing emissions from its plants or checking suppliers for compliance with certain environmental, labor, and social standards. The "DEUTZ Sustainability Vision 2023" represents the totality of the objectives.

DEUTZ's aspiration to achieve economic success in line with the assumption of corporate, social, and ecological responsibility is not only reflected in its sustainability strategy, but also in its recently revised Code of Conduct. In order to ensure that sustainability aspects are considered in day-to-day work, the Code of Conduct has been

supplemented with provisions on labor and social standards, respect for human rights, health and safety, and protection of the environment.

Additional information can be found here:



BATTERY SPECIALIST FUTAVIS ACQUIRED

DEUTZ complements its electrification strategy with the important core component "battery in the high-voltage range". To that end, the company has acquired Futavis GmbH, based in Alsdorf near Aachen, a development service provider of battery management hardware and software.

Futavis offers extensive technical expertise in the fields of electronics, software, battery technology, and battery testing as well as in the safeguarding of functional safety. Torqueedo's systems expertise in the field of electric drives is thus expanded to include battery technology for high-voltage applications.



Futavis has already developed and implemented numerous systems for well-known customers in the automotive and commercial vehicle sectors. The company employs around 30 people and aspires to achieve annual sales of over five million euros in 2019.

"Battery technology is an important core element of our E-DEUTZ strategy, which we are further expanding with the acquisition of Futavis. With Futavis we complement the strong systems expertise of our development teams at DEUTZ and Torqueedo and take another important step towards CO₂-free off-highway mobility," says Dr. Frank Hiller, CEO of DEUTZ AG.

NEW PRODUCTION SITE FOR GEN-SETS IN MOROCCO

The Moroccan DEUTZ subsidiary Magideutz is relocating its Gen-Set production and has set up a new manufacturing facility in Sapino. Sapino will thus become the central production site for high-performance gensets for the North African market. The plant's production processes have been completely realigned and set new standards in terms of quality, productivity and occupational safety. The new site offers modern equipment for the production of high-quality DEUTZ gensets on a floor space of approximately 3,420 square meters. They are in great demand as decentralized energy sources in the region.

Bernd Breves, General Manager at Magideutz, explains: "With our new production unit we have significantly increased our production



capacity. Compared to the current volume of 1,000 units per year, we now have a target capacity of 3,000 units. This enables us to supply our local customers with our proven product assortment even faster."

CHINA RELIES ON DRIVE TECHNOLOGY “MADE IN GERMANY”

DEUTZ AND CHINA'S LARGEST CONSTRUCTION MACHINERY MANUFACTURER SANY ARE BUILDING A HIGH-PERFORMANCE ENGINE ASSEMBLY PLANT IN THE HUNAN PROVINCE.



China is the world's largest single market for construction machinery. The application range is correspondingly large in order to make a significant contribution to environmental and climate protection with clean engine technology. Chinese legislation is already making rapid progress in the area of emissions regulation. What is often missing, however, are highly developed drives that can meet the new standards.

With China IV, the nitrogen oxide and particulate mass limit values are being significantly reduced compared to China III. Moreover, a new limit value for the number of particles will be introduced that requires the technological use of a diesel particulate filter – similar to EU Stage V legislation. In addition, the new China VI Stage (which largely complies with EU Stage Euro VI) will be introduced in the heavy-duty onroad sector, initially for urban commercial vehicles and later nationwide.

These official figures represent an enormous challenge, especially since the Chinese provisions are rapidly catching up to the European

standards. Conversely, this also opens up attractive opportunities for experienced manufacturers to capture market share as technology partners in China and simultaneously promote clean and sustainable mobility locally to relieve the climate and the environment.

China's largest construction machinery manufacturer SANY, for example, relies on engine expertise from Cologne. As part of a joint venture in which DEUTZ holds 51 percent, a new production site is currently being built in Changsha, which is expected to supply up to 75,000 engines for SANY by 2022. For comparison DEUTZ currently supplies a total of around 10,000 engines to China. There is still more growth potential in terms of unit sales. Dr. Frank Hiller, CEO of DEUTZ AG, explains: "We assume that demand in China will continue to rise. We can also serve other customers locally through our joint venture. The Chinese government is consistently



Liang Wengen,
CEO of SANY Group

SANY relies on engine know-how from Cologne



Contract signed between SANY and DEUTZ with representatives of the local government of Changsha

Dr. Frank Hiller,
CEO of DEUTZ AG

pushing enhancement of diesel engines and alternative drive concepts such as electrification, sustainable fuels, and hydrogen drives. At DEUTZ, we're open to technology in all these areas, which means we're perfectly equipped for the Chinese market."

Such a broad range of technologies is in great demand in the up-and-coming Middle Kingdom and opens many a door. The joint venture between DEUTZ and SANY is part of SANY's "Intelligent Heavy Truck" project, a major project within the framework of SANY's digitalization strategy. This means that,

in addition to various non-road applications, DEUTZ will take over engine production for SANY in the heavy trucks sector.

"China is focusing on sustainable mobility – and companies like SANY rely on experienced partners such as DEUTZ. We provide the best possible support for this path with highly developed drives in line with local and global sustainability. This is a real win-win situation for us, as growth and a positive impact on the environment and climate can be perfectly fused here," says Dr. Frank Hiller.



The contract was signed as part of the ground-breaking ceremonies at the production site

AN AWARD FOR INNOVATIONS

THIS IS THE FIRST YEAR DEUTZ AG PRESENTED THE **NICOLAUS AUGUST OTTO AWARD**. IN A FESTIVE SETTING IN COLOGNE'S FAMOUS OBSERVATION TOWER "COLOGNE TRIANGLE", THE AWARD WAS PRESENTED TO ONE OF GERMANY'S BEST-KNOWN INNOVATORS: ELECTRIC PIONEER DR. GÜNTHER SCHUH.



Even from a distance, the highlight of today's event, the bronze-colored sculpture, could be seen on the 28th floor of the Cologne Triangle: the Nicolaus August Otto Award. The name of the innovation award refers back to the founder of DEUTZ AG. In 1876, Otto realized the first operational four-stroke engine and thus created the foundation for world motorization. In this spirit, the Nicolaus August Otto Award honors new visionaries of the future and promotes innovative ideas in the fields of alternative drives, mobility, energy efficiency, innovative technology, and futurology with prize money in the amount of 30,000 euros.

ELECTROMOBILITY FOR THE GENERAL PUBLIC

In the presence of the sponsor of the event, Dr. Andreas Pinkwart, Minister for Economic Affairs, Innovation, Digitalization, and Energy of the State of North Rhine-Westphalia, and the Mayor of Cologne, Henriette Reker, the award this year was presented to Dr. Günther Schuh, holder of the Chair for Production Systems at RWTH Aachen Technical University, co-founder of the electric vehicle manufacturer StreetScooter, and CEO of e.GO Mobile. The renowned engineer, who was born in Cologne, is a scientist and entrepreneur and a true electric pioneer who is making a significant contribution to the electrification of drive technology in Germany (see interview on the page after the next).

The award ceremony took place on the 28th floor of the "Cologne Triangle"



The event was presented as a symposium

SIGNIFICANT CONTRIBUTION TO CO₂-NEUTRAL MOBILITY

Dr. Andreas Pinkwart praised Schuh's pioneering spirit: "Dr. Günther Schuh is one of Germany's most important, and perhaps even our most important, guides on the road to mobility in the future. [...] His life's work in research, development, and business would already be enough for several generations."

Cologne's Mayor Henriette Reker was also pleased with the selection of the award winner. "We need people like you who have visions of getting cities ready for the future and who are passionately convinced of their projects."

DEUTZ CEO Dr. Frank Hiller explained at the award ceremony: "In Dr. Schuh, we're honoring a man who has rendered outstanding services to the development of mobility of the future. By demonstrating that affordable electromobility works with today's battery technology, he makes a contribution to CO₂-neutral mobility in inner cities that cannot be overestimated."

SYMPOSIUM ACCOMPANIES AWARD CEREMONY

The award ceremony was presented in a thematically coordinated symposium, hosted by TV presenter Annette Eimermacher. In a panel discussion, DEUTZ CSO Michael Wellenzohn, award winner Dr. Günther Schuh,

Carl Martin Welcker (Managing Director of Alfred H. Schütte GmbH & Co. KG and President of the German Engineering Federation VDMA), Thomas Bitter (SVP of Technology, Volvo Construction Equipment) and Dr. Markus Müller (SVP Product Development & Technical Customer Support) spoke about the latest developments in electromobility. Dr. David Bosshart, CEO of the Gottlieb Duttweiler Institute for Economics and Society and expert for interdisciplinary trend research, gave a lecture on the future of consumption, artificial and human intelligence, as well as social change. The event ended with a discussion between DEUTZ CEO Dr. Frank Hiller and presenter and actor Harald Schmidt, philosophizing in a relaxed atmosphere about issues relating to electromobility.



Dr. Frank Hiller and entertainer Harald Schmidt in casual dialog

A PIONEER OF E-MOBILITY

DR. GÜNTHER SCHUH IS THE FIRST RECIPIENT OF THE **NICOLAUS AUGUST OTTO AWARD**. WITH THIS AWARD, DEUTZ AG HONORS A MAN WHO HAS RENDERED OUTSTANDING SERVICES TO INNOVATION AS A TRUE PIONEER OF ELECTRONICS. WITH A SPIRIT OF INNOVATION AND COMMITMENT, THE GRADUATE ENGINEER HAS MADE A SIGNIFICANT CONTRIBUTION TO THE ELECTRIFICATION OF DRIVE TECHNOLOGY IN GERMANY.

Dr. Schuh, you are the first recipient of the Nicolaus August Otto Award. What does this award mean to you?

Dr. Schuh: I consider this an incredible honor for my team and me. I am being honored for my life's work, which is not finished yet. In this respect, it was also a big risk for the jury – who knows what else will happen. The comparison with Nicolaus August Otto is very ambitious. Nevertheless, I am very happy.

What major challenges does e-mobility currently face?

Dr. Schuh: It is not so hard to design an e-car anymore, but it is very hard to design an affordable e-car. Even if we get better at it in the future, customers will still have to become much more innovative. In other words, they have to change their vehicle usage somewhat and accept a slightly higher purchase price. They should want to be the first to have an e-car in the neighborhood instead of waiting to see how their neighbors respond to electric vehicle purchases.



Where do you see the greatest potential?

Dr. Schuh: We must emphasize the attributes of electromobility that motivate people to buy combustion vehicles as well. Driving an electric car is also a lot of fun. That is the message we have to get across so that typical new car buyers choose electric cars or plug-in hybrids. Because the plug-in hybrid is not just an interim solution – it is the future. In rebate-oriented Germany, an increased eco-rebate is of course very helpful.

How do you foresee the development over the next few years?

Dr. Schuh: If, for some reason, the demand for e-cars only increases slowly, I hope that this time the car manufacturers will maintain their supply of e-cars, or rather expand it and give the market some time to catch up.



The Mayor of Cologne, Henriette Reker, also praised the innovative spirit of the award winner

Some of his students accompanied the laureate to Cologne



DR. GÜNTHER SCHUH

As co-founder of the electric vehicle manufacturer StreetScooter and managing director of the electric vehicle manufacturer e.GO Mobile AG, Dr. Schuh is pursuing the ambitious goal of making this drive technology accessible to the general public. By demonstrating that affordable electromobility works with today's battery technology, he makes a decisive contribution to emission-free mobility in inner cities and thus to a more energy-efficient future. Günther Schuh is taking this approach unerringly and with great strides. In addition to electric cars, he will also design mini-buses in the future in cooperation with automotive supplier ZF Friedrichshafen AG – an airplane is also already in the planning stage.



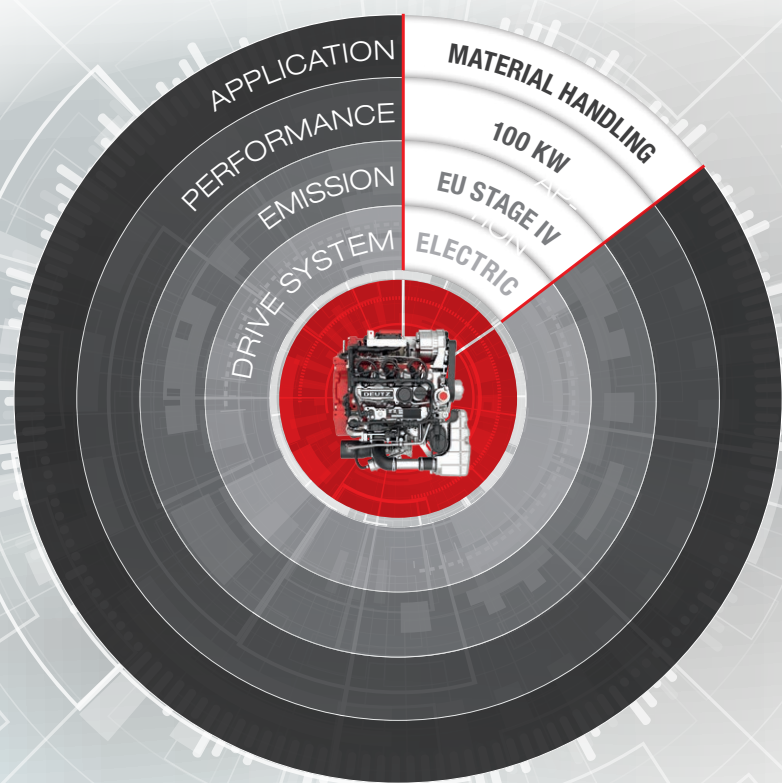
INTEGRATION

Many factors have to be taken into account for proper selection of the right drive system. When it comes to electric motors, design engineers are faced with the particular challenge of adapting individual components precisely to the requirements of the respective machine. Assembly space, weight, load profile, temperature, and mechanical stress vary greatly, especially in off-highway applications. For example, the operating conditions in applications are fundamentally different for excavators, forklifts, and tractors. This requires in-depth development expertise in order to integrate the drive system. In addition to the drive itself, DEUTZ also offers its customers development services related to system integration.

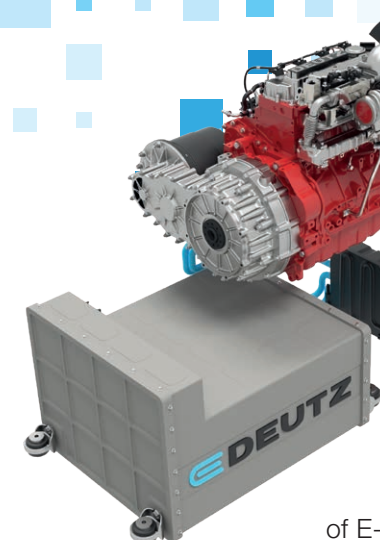
It is based on the DEUTZ Advanced Configurator modular system. The design of the overall system is not based on a specific engine, but on customer requirements – starting with the respective machine, the desired engine power, and the emission standard to be met. This results in a selection from the modular system: Diesel, gas, hybrid, or all-electric. Additional components can then be scaled to fit exactly. In particular, the capacity and geometry of the battery must be precisely matched to the application. In order to map even extreme operating conditions, so-called kits supplement the configuration process. Refrigeration kits, dust kits, as well as specific kits for agricultural engineering applications are currently being planned.

A benefit of the modular concept is that only the relevant components or modules that are subject to further technological development are adapted – not the entire system. This enables DEUTZ to respond quickly and flexibly to technological developments, which also significantly shortens the time to market.

The basis for integration of E-DEUTZ drives is the DEUTZ Advanced Configurator modular system

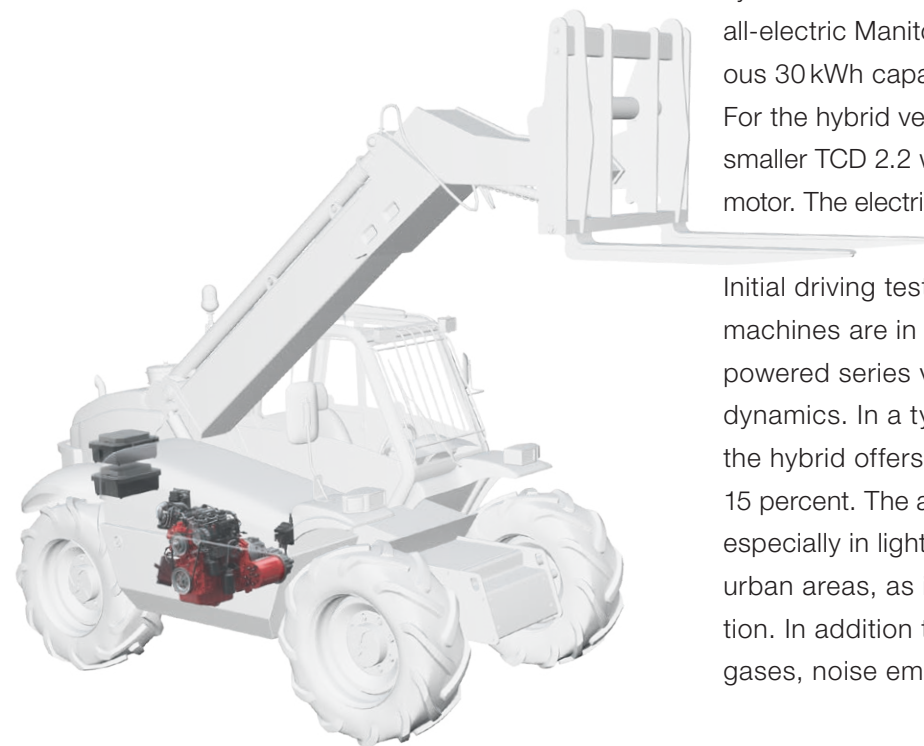


The individual E-DEUTZ components must be adapted precisely to the requirements of the respective machine – especially to the capacity and geometry of the battery



TELESCOPIC HANDLER: DIESEL, GAS, HYBRID, OR ALL-ELECTRIC.

A customer example for successful integration of E-DEUTZ systems is Manitou. The world's leading OEM in the field of all-terrain telescopic handlers was the first E-DEUTZ customer to start electrifying the drive train. The Manitou MT 1335 telescopic handler routinely features a 75kW DEUTZ TCD 3.6 diesel engine. Within only six months, E-DEUTZ engineers equipped two prototype models – each with a hybrid and a fully electric drive. A 360-volt on-board electrical system and a 60kW electric motor are used for the all-electric Manitou MT 1135. The battery with a generous 30kWh capacity provides the necessary energy. For the hybrid version, the TCD 3.6 was replaced by a smaller TCD 2.2 with 55kW output plus a 20kW electric motor. The electrical system runs on a voltage of 48 volts.



Initial driving tests have shown that the E-DEUTZ machines are in no way inferior to the purely diesel-powered series version in terms of performance and dynamics. In a typical telescopic loader application the hybrid offers a consumption advantage of up to 15 percent. The all-electric version offers great potential, especially in light of the air purity problem in congested urban areas, as it enables local emission-free operation. In addition to the complete avoidance of exhaust gases, noise emissions are also significantly reduced.

DEUTZ has proven that integration of electric drives in construction machinery is possible – quickly and effectively. DEUTZ advises its customers on all aspects of electrification, from the initial concept to series production. The modular Advanced Configurator ensures maximum flexibility and tailor-made solutions.

Within only six months, E-DEUTZ engineers equipped two telescopic handler prototypes – each with a hybrid and a fully electric drive

NEW TECHNOLOGIES ARE THE KEY

MORE THAN 3,200 COMPANIES ARE REPRESENTED IN THE VDMA, THE GERMAN ENGINEERING FEDERATION. IT IS HELMED BY CARL MARTIN WELCKER, AN ENTREPRENEUR FROM COLOGNE, WHO NEVER MINCES HIS WORDS, FOR EXAMPLE WHEN IT COMES TO THE PRICING OF CO₂. DEUTZWORLD DISCUSSED CURRENT TOPICS WITH HIM.

Mr. Welcker, what do the member companies of the VDMA think of your proposal to raise a price for carbon dioxide?

The VDMA has long advocated reasonable pricing for greenhouse gases. The idea behind it is that the best way to deal with climate change is through market-based methods. The price has to be set high enough to effect a change in direction, which ultimately leads to the avoidance of CO₂. To this end, we solicited an expert report which determined that, if we redistribute the taxes and levies on the various energy sources such as electricity, heating oil, or gasoline and diesel based on what causes CO₂ emissions in a revenue-neutral manner, one metric ton of CO₂ would cost 110 euros. Electricity would be cheaper, gasoline and diesel a little more expensive, and fuel oil considerably more expensive. The total load for the consumers does not change.

How would CO₂ pricing affect the industry in your opinion?

The effects of CO₂ pricing have an indirect impact on mechanical engineering via our consumer segments. Only a small amount of CO₂ is emitted in mechanical engineering. Naturally, depending on the product, the CO₂ footprint of the individual machine manufacturers varies greatly. Our calculations show that pricing according to our expert report leads to relief for many companies.

How do you assess innovative drive solutions such as electromobility or alternative fuels against the background of the EU's climate targets for 2030?

New technologies are the key to efficient climate protection. The Paris 2050 climate targets cannot be

achieved without new solutions. The 2030 climate targets set by the EU are very ambitious and require enormous financial efforts. The taxpayer can expect politicians to use the limited budget resources where they have the greatest impact.

Hydrogen-based drives, e-fuels, and even electric drives are currently still very expensive and not yet competitive in many applications. For electric mobility in particular, there is a risk that this type of drive, which is particularly outstanding for inner-city traffic, will be introduced prematurely, namely before there is a proper infrastructure and before the electricity mix even allows a noticeable reduction in CO₂ emissions by electric vehicles. There is a great risk that social acceptance will be lost as a result. We need a market-based approach to transport without limitation to specific technologies. In this respect, policies should be limited to setting reasonable framework conditions and otherwise leave it to the public to decide what the best solution is for them. This is where the circle closes again for reasonable pricing of greenhouse gases.

About the person

Carl Martin Welcker initially completed an apprenticeship as a machinist. Then he studied industrial engineering. After completing his studies, he worked for machine tool manufacturer Klingelberg Söhne and an American knife and saw manufacturer. Since 1993, he has been managing partner of Alfred H. Schütte GmbH & Co. KG, Cologne. Carl Martin Welcker is involved in various honorary positions and has been President of the VDMA since November 2016.



GLOBAL EMISSIONS: DEUTZ IS READY

Emission guidelines are, to a certain extent, the impulse generator in engine development. In Europe, EU Stage V currently applies the strictest regulations for the off-highway sector. In order to meet this requirement, mobile machines such as excavators, tractors, and forklifts require highly developed drive systems with state-of-the-art exhaust gas after-treatment in the EU. The use of so-called SCR systems and diesel particulate filters (DPF) requires in-depth knowledge of drive systems and the respective applications.

The traditional Cologne-based company was the first manufacturer in the world to meet the EU Stage V requirements. Therefore DEUTZ is already prepared for progressive emission regulations in international markets. In South Korea or Japan, for example, emissions legislation can be expected to be aligned with EU Stage V. In India, Stage V will be introduced on April 1, 2024 and China will introduce the China IV Non-Road Emission Legislation. In particular, the nitrogen oxide and particulate mass limit values will be significantly reduced. The introduction of an additional limit value for the number of particles also requires the use of a diesel particulate filter (DPF).

Reliable operation of a DPF in the overall system requires sound integration expertise and an understanding of the respective application. Depending on the device in which the engine is used, completely different load profiles form the basis. For example, a tractor typically operates at high full load operation, which is relatively uncritical for DPF applications since the exhaust gas temperature is high enough to allow continuous regen-

eration of the filter. By contrast, the load profile of a forklift truck, for example, is much more demanding. It is often only operated at low speeds at shorter intervals or with high idling ratios. As a result, the exhaust gas temperature usually remains below 250 °C (482 °F), which is why the soot particles collected in the DPF do not burn. Intelligent heat management is required to solve this problem. DEUTZ has therefore developed a so-called "Heat Mode" to increase the exhaust gas temperature in a targeted manner, which ensures safe machine operation. DEUTZ already has extensive experience in the field of exhaust gas after-treatment in series production. DEUTZ customers worldwide now benefit from it when they introduce new technologies.



SETTING SAIL

WITH ELECTRICITY!

ELECTROMOBILITY IS CHANGING THE MARITIME ECONOMY. ALTERNATIVE AND INNOVATIVE PROPULSION SYSTEMS ARE ALSO GAINING GROUND IN THE MARINE SECTOR. IN JULY, THE LATEST EMISSION-FREE HIGH-TECH BOAT DRIVES WERE PRESENTED AT THE SOLAR AND ENERGY BOAT CHALLENGE IN MONTE CARLO.

The Principality of Monaco is a center for the development of sustainable yacht technologies. Recently, the world's first network of fast chargers for electric boats was put into operation here and the Monegasque harbor boat fleet is being converted to fully electric operation.

At the Solar and Energy Boat Challenge, 34 teams of students from 14 countries raced with self-built, solar-powered and emission-free boats. Torqeedo, part of the DEUTZ Group since 2017, worked with the Yacht Club de Monaco to ensure that all boats participating in the competition are 100 percent emission-free and electrically powered. As the official technical sponsor of the boat challenge,

Torqeedo was also a co-organizer of the "Electric Days" press event, where international journalists had an opportunity to experience electric boating for themselves.

In addition to electromobility on water, Torqeedo's technology is also helping to build the cities of the future. It is estimated that the world's population will grow to 10 billion by 2050, with 75 percent of the world's population living in cities. Considering this dynamic population growth and the resulting traffic congestion on land, urban planners are increasingly relying on waterways that cross many of the world's major cities to reduce traffic on the roads and improve urban air quality.

Torqeedo focuses on segments where zero-emission and hybrid drives are already competitive today and uses its expertise to develop the products that will

drive a climate-friendly future. Torqeedo estimates that electric boats currently account for approximately 1.3 percent of the global market. Compared to the proportion of electric cars in the total automotive market of about two percent, the boat industry is on the right track. Some boat segments have already turned the corner. On protected lakes, electric drives account for most of the market because the use of combustion engines is restricted or prohibited.

Electric drives are also competitive in segments where these restrictions do not exist. Larger yachts now usually have a hybrid drive, and many inflatable and sailing boats have already switched from internal combustion engines to electric drives. Ferries and motorboats, especially through urban areas, are now also electrically powered in order to avoid local emissions and thus reduce the overall CO₂ balance.



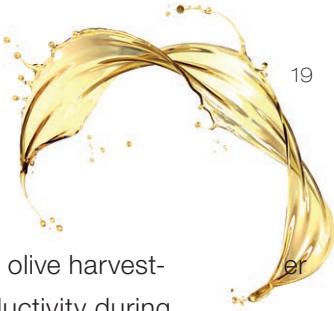


SHAKEN, NOT PICKED

IT IS ONE OF THE MOST POPULAR INGREDIENTS IN MEDITERRANEAN CUISINE: THE OLIVE. THE POPULAR ALL-ROUNDER THAT MANY GERMAN HOUSEHOLDS SIMPLY CANNOT DO WITHOUT. HOWEVER, VERY FEW PEOPLE KNOW HOW THE STONE FRUIT GETS FROM THE TREE TO THE PROCESSING PLANT AND THAT DEUTZ ENGINES PLAY A KEY ROLE.

The Olive is an international star – and has been for more than 7,000 years. Even then the Cretans knew about the versatility of the fruit. By now it has spread throughout the whole Mediterranean region and is used internationally for cooking, roasting, or baking. An olive tree can yield around 30 kilograms (66 pounds). To achieve this, the ripe fruit must first be shaken out of the branches – in the truest sense of the word. How this happens is demonstrated by equipment from agricultural machinery manufacturer Moresil.

Moresil, based in Posadas, Spain, can look back on more than 60 years of experience. It offers three product lines; Harvesting machines for olive and fruit trees, harvesting attachments for combine harvesters and machines for cleaning crops.



A tree shaker for olives and an olive harvest- can significantly increase productivity during harvesting. They help avoid a large amount of heavy physical work in contrast to the traditional harvesting method. They also save a lot of time so that all olive trees can be successfully harvested even in a very short window for harvesting.

The three-wheeled Moresil BM 300 buggy is equipped with the latest technology. Its movements and shaking of the olive or fruit trees can be controlled electronically. The buggy uses a DEUTZ TCD3.6L4 engine with 120 hp and an electronic control system. With this engine, the power input is always adapted to the requirements of the respective operation. It allows the basic consumption to be reduced by more than 30 percent compared to standard use. A specific program that is particularly suitable for the local terrain or the respective driver can always be selected from several different movement programs. The shaking function can be adjusted individually for each tree species. There are also several different shaking programs to choose from, allowing optimal adaptation to different types of olive groves.

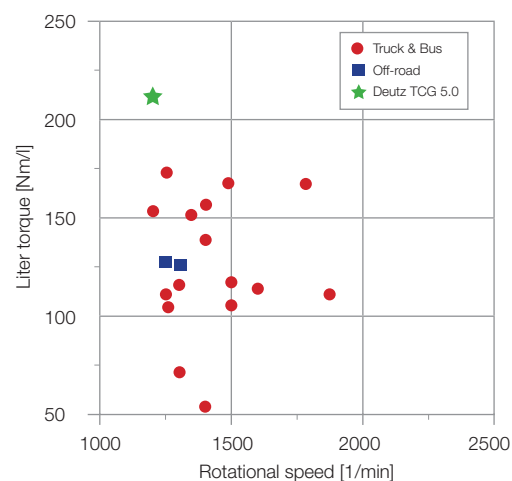
The shaking mechanism can also be individually reconfigured using various tools and accessories so that different trees can be shaken at the right intensity. The falling olives are caught by a large umbrella, which is extended under the tree before the shaking process. The buggy is designed to work under the branches of the olive trees – a very low back makes it easy to move back and forth between the trees.

The Buggy is very popular on the market – not only with numerous customers from Mediterranean countries, but also in other international markets such as Argentina.



POWERFUL PERFORMANCE

AS PART OF A FUNDED PROJECT, DEUTZ AG IS CURRENTLY DEVELOPING AN INDUSTRIAL ENGINE POWERED BY NATURAL GAS WITH THE OBJECTIVE OF DEMONSTRATING SPECIFIC PEAK PERFORMANCE.



Natural gas as an energy source for commercial engines offers great potential in two regards. Its world market price has dropped by approx. 70 percent in the last ten years and is expected to continue to develop positively in the coming years. In addition, natural gas can be produced relatively easily from electricity and thus regeneratively using power-to-gas. This offers the option of completely CO₂-neutral mobility.

The DEUTZ TCG 5.0 monovalent high-performance natural gas engine unleashes its maximum output of 185 kW at 2500 rpm from four cylinders with a displacement of five liters. The maximum torque of 1050 Nm (equivalent to 26.5 bar effective medium pressure) is already available at 1250 rpm. These values are in the range of comparable standard

market engines in the absolute top segment.

An optimal cylinder head for the combustion of natural gas has been specially developed for this engine. Two overhead camshafts are powered by gearwheels and ventilate the engine with four valves per cylinder. The TCG 5.0 is supercharged with up to three bar boost pressure via an exhaust gas turbocharger with variable turbine geometry (VTG). By using a three-way catalytic converter optimized for operation with natural gas, all current emission limits for on- and off-road applications are met. With the development of the TCG 5.0 HoLeGaMo (high-performance gas engine), DEUTZ AG is taking another important step in diversifying its product portfolio.

FITNESS CHECK FOR THE ENGINE



Often the only way to get information about the status of a machine is to take a look inside. This is why DEUTZ successfully introduced the DEUTZ Oil Check Kit at the beginning of the year. This kit makes it possible for oil samples to be collected and analyzed quickly and easily.

Lube oil diagnosis provides early indications of increased wear of engine components and imminent equipment failures – long before they interfere with proper operation. In addition to diagnosing the various wear elements, the proportion of soot, water, and fuel in the lubricating oil is also examined.

In order to obtain a personal engine diagnosis, 100 ml of lubricating oil is filled into the supplied sample vessel and sent to the analysis laboratory mentioned above. The analysis results are then sent to the customer to the email address specified above or can be viewed online on the web portal at www.eoilreports.com. Access via a corresponding app is also possible. This allows you to quickly and easily obtain information about the condition of your engine and, if necessary, intervene immediately.

THE BENEFITS OF THE DEUTZ OIL CHECK AT A GLANCE:

- Prevention of repair measures through early identification of increased wear and tear
- Avoidance of costly consequential damage and equipment failures
- Extension of the lubricating oil change interval to up to 1,000 operating hours

The practical DEUTZ Oil Check Kit with TN 0109 1254 can be purchased from your local DEUTZ partner for only EUR 55 MSRP.



SUSTAINABLE MANAGEMENT

REPAIRING INSTEAD OF BUYING NEW: XCHANGE PARTS SAVE ENVIRONMENT AND RESOURCES.



DEUTZ-refurbished Xchange parts and engines are an economical alternative to new purchases. The systematic reconditioning of old parts makes it possible to pass on significant cost savings to the customer – up to 30 percent price reduction compared to a new product. No compromises are made in terms of quality, DEUTZ Xchange products are functional, as good as new, and offer the same warranty as the new product. All wear parts are replaced by new parts and flawless functionality is ensured by a complete quality control system. A particularly positive side-effect of the refurbishment is the fact that every component is upgraded to the latest technical standards. Therefore, customers benefit from the continuous development and improvement of the products.

HIGH RESOURCE EFFICIENCY

Recycling components comes with clear benefits – not just for individual consumers, but also from a macro-economic and ecological perspective. A recent study by the EU Commission of the ERN (European Remanufacturing Network), titled

the “Remanufacturing Market Study”, puts the total annual savings from refurbished products in Europe at 2.3 million metric tons of material and 8.3 million metric tons of CO₂. The latter corresponds to the annual CO₂ emissions of all cars in Belgium. DEUTZ’s main sector “Heavy Duty & Off Highway Equipment” accounts for an impressive 855,000 metric tons of material and a disproportionately high 3.5 million metric tons of CO₂ savings. The figures derived from a recent analysis by the VDI Center for Resource Efficiency also speak for themselves. The analysis of various components of a diesel engine – from the starter to the complete engine – revealed a saving of emissions and material of up to 90 percent and a reduction in energy consumption of up to 56 percent compared to new production.

Xchange components make a significant contribution to environmental protection – and save money at the same time. Interested readers can read the EU study at

www.remanufacturing.eu/assets/pdfs/remanufacturing-market-study.pdf.



FROM ILLINOIS TO MICHIGAN



DEUTZ POWER CENTER GREAT LAKES: UNDER A NEW NAME, DEUTZ EXPANDS ITS PRESENCE IN THE MIDWEST OF THE USA.

The DEUTZ Service Center Chicago becomes the DEUTZ Power Center Great Lakes. The center for the north and middle east of Illinois and northern Indiana, which was established in 2017, will extend its area of responsibility to Wisconsin and the upper peninsula of the state of Michigan.

PERFECTLY POSITIONED

Wolter Power, previously an authorized sales partner for Wisconsin and the Upper Peninsula of Michigan, will act as an authorized dealer for DEUTZ with the support of the DEUTZ Power Center Great Lakes.




Our employees in the Chicago area are very excited to meet our new customers from the expanded area,

says Dominick A. “Nick” Vermet, Director of the DEUTZ Power Center. “By combining our DEUTZ-focused expertise with an inventory of DEUTZ spare parts worth nearly \$1 million, we’re in an excellent position to better support our dealers and help our end customers increase their productivity. All of our services revolve around DEUTZ and we’re very focused on providing the best operations and service in the region.”



As a DEUTZ Power Center, the site will now offer its own application engineering services and technical sales resources to OEMs using DEUTZ products. Manufacturers across the entire area of responsibility,

including Wisconsin and the Upper Peninsula of Michigan, can now access customized, value-added manufacturing and assembly services to find the best possible DEUTZ solution for their engine specification and design needs. Customers of the Power Center can also purchase new diesel and natural gas engines from DEUTZ. They can also exchange engines through the DEUTZ Xchange program. “We’re looking forward to working with all the market segments that are so important to DEUTZ and providing new engine sales and aftermarket services to our OEMs, dealers, and end customers,” explains Sal Mangialomini, Branch Manager of the DEUTZ Service Center in Chicago.



VISIT US AT
CONEXPO 2020

SOUTH HALL 4, 85231
BRONZE LOT, 9101

REVOLUTIONIZING POWER

HIGH-PERFORMANCE ADVANCED DRIVE SYSTEMS.

Discover a world full of new opportunities: with revolutionary modular drive systems that are made to meet your needs. Whether hybrid or full electric engines, EU stage V diesel drive systems of state-of-the-art gas engines, regardless of the size of operation site – we provide tailor-made solutions for every requirement. Welcome to a new era of power. conexpo.deutz.com | www.deutz.com

The engine company.

