DIESEL
INTERNATIONAL

Mr Off ROAD

Diesel of the year 2020 - Perkins&Hybrids - Comparison:

2.8-3 liters - Logset & Danfoss - Agritechnica: FPT and MAN play

their cards right - PG Cummins - Marine: Cannes, Genoa and METS

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Matt Coleman, product director at Perkins
«There isn't one solution that fits all machines. Perkins is establishing itself as an integrator with multiple hybrid and electric power technologies»

WHO'S NEXT?

FOCUS ON INNOVATION

SUSTAINABLE POWERTRAIN

Electric drive has started speaking strongly to engine manufacturers, too. The rush starts with mild hybrid and continues towards full electric (preparing the shift to hydrogen?) zigzagging among the so-called alternative fuels, with sustainability as a common denominator – the Nikola/Iveco partnership, covered more in depth in the next pages, shows how gas could be one of the bridges to hydrogen, the true philosopher's stone. Vado e Torno Edizioni has included the topic of sustainability in its mission. In this issue's pages you'll find it tackled in its agricultural (Sustainable tractor of the year: Agritechnica) and freight transport applications (Sustainable truck of the year: Ecomondo). The array of awards coordinated by our publishing house also includes Sustainable bus of the year. The winners for 2019 were Mercedes eCitaro, Iveco Crossway NP Normal Floor and VDL Futura Fhd2. The busmaker with the star emblem won because of autonomy, too – about 170 km in city operations (SORT2) with a maximum capacity of 292 kWh- while Iveco has to thank its Cursor 9 CNG by FPT Industrial. As for the Dutch coach, it is fitted with an optimized version of historic diesel MX-11, 331 kW (450 HP) at 1,600 rpm, with 2305 Nm, featuring a newly designed engine block and turbocharger and increased compression ratio, reaching 18:5. The future sustainability curve might even encompass off-road and leisure boating propulsion systems. A scenario whose drivers would be pretty much the same as in Diesel of the year: innovation.

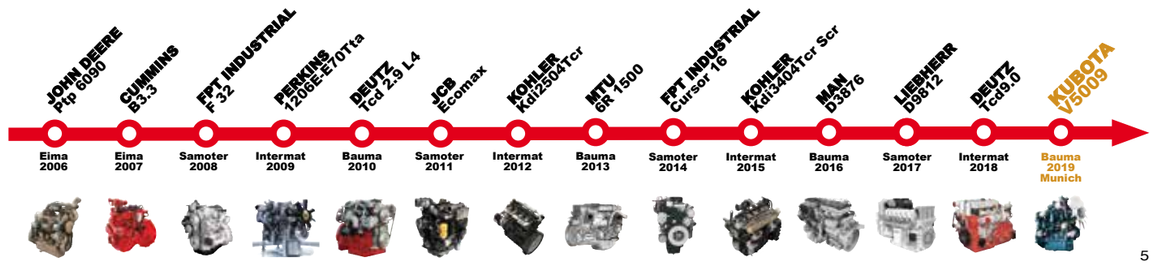
Power density, specific torque, mean effective pressure, modularity, operating costs, system efficiency, TCO. These, and others, are the keys that have been unlocking Diesel of the year's treasure chest since 2006. Diesel's present and future will be increasingly reliant on its integration into the powertrain as a whole and on the use of plant-based vs synthetic fuels. Diesel engines are being targeted heavily; they are scheduled to be banned from a lot of city areas by 2025 and as of late 2021, the European Investment Bank – EIB - will turn off the financing tap to energy generated from fossil fuel. After all, «*Climate is the top issue on the political agenda of our time» said EIB President Werner Hoye, and the goal is «to support a climate neutral European economy by 2050*». However, diesel is not stepping back worldwide, at least in industrial applications, in the light of the so called emerging economies' hunger for energy, mechanized agriculture and infrastructures.

The award keeps being innovation driven. Faced with the decarbonization challenge, however, internal combustion engines must prove capable of a faster response to reaffirm their efficiency, especially in industrial applications

While waiting for the China VI standard, the chances to get soot-free exhaust depends on regulatory harmonization with UE and EPA standards, rather than on a mass migration to the 'decarbonized heaven'. So, it looks like the diesel cycle is still in demand, and Diesel of the year will continue to keep an eye on the engines devised in the months preceding the award ceremony, holding firmly to the customary pillars of its assessment: innovation criteria.

Kubota V5009 is Diesel of the year 2019. Enlightening comments from the Osaka managers stated that «*Kubota's core philosophy is to strike the perfect balance among performance, quality and cost*». These words will long remain etched on the award's pillars; however, diesel's innovation and efficiency will have to find new ways to reconcile with each other to be able to meet OEM's needs and be acknowledged as an answer to problems, rather than being blamed as the culprit.

But what about the main highlights from 2019 exhibitions? Caterpillar's C4.4 was certified to Stage V, Cummins made its 4-cylinder fit for the needs of agricultural applications, Deutz added a 5.2 L to its product portfolio, FPT Industrial unveiled its 2.8 L, a cylinder block available in a diesel and a natural gas version. Hatz went electronic with its E1 injection technology designed for single-cylinder diesel, Kohler expanded the use of its hybrid module to the KDI2504TCR, MAN announced its high-performance 16.3 L, first available in a CE, followed by an AG version; Perkins completed its Syncro range with a 2.2 L, Yanmar relaunched its 3.8 L and 4.6 L already unveiled at Intermat. The electric got into real action, with Perkins putting a range of hybrid formats on the front line, Deutz enhancing its synergy with Torqeedo, FPT revealing its E-Flywheel and E-Turbocharger, Kubota choosing a V2400/lithium-ion batteries combo on a forklift. John Deere drew on the expertise of the Group to implement its electric versions, including, amongst others, with the Electric Pump Drive and IPM (Internal Permanent Magnet). So what will the Diesel of the year 2020 winner look like? You'll discover on the next issue of Diesel International.



INTER AIRPORT EUROPE

BECAUSE PLANES MATTER

What will be the trend of OEMs involved in airport mobile applications? Are they willing to follow the main road or rather to rely on pioneering innovations related to the world of electric motors?

The twenty-second edition of the biennial international exhibition Inter Airport Europe, the trade fair dedicated to equipment, technology, design and airport services held at the futuristic exhibition district of Munich from 5 to 8 October, saw the record participation (+8% compared to the 2017 edition) of 14,392 visitors from 108 different countries.

The 659 exhibitors represented 40 different countries: the flags that have been flying higher are the 'usual' European colors of Italy, France and Germany that, playing at home, marked more than a quarter of the area, followed by that of the People's Republic of China.

The trends of the year – promptly indicated by Ulika Tosner, head of organization – indicate many 'likes' on smart topics such as digitization and automation of airport logistics. So, along with the fever of the race for a better service for the 4.0 passenger, the 'evergreen' issue is about emissions reduction, for a sector that is traditionally thirsty for fossil fuel.

But just in the week in which the three fathers who conceived the lithium-ion battery back in 1991 were awarded the Nobel Prize for Chemistry in Stockholm, what did it happen – in terms of energy – among the stands of the Bavarian exhibition? Our curiosity was in fact attracted by the proliferation of the most varied electrical applications that the airport manufacturing sector is offering to handlers.

Nevertheless, there is no shortage of machinery that uses conventional energy sources: the diesel cycle engine in all its power variations resists and relaunches. Cummins presented engines from 75 kilowatts called 'Stage V ultra' tending to 'NOx-zero'. Deutz is very present on small machinery; the Cologne-based company presented a new EGR valve for its 2.9-litre engine: lower temperatures on gas recirculation mean lower emissions.

A few words but a lot of concreteness from the British Perkins team, which still equips a large number of small GSE (Ground Support Equipment) mobile machinery.

So, what will be the trend of mobile application manufacturers in the coming months? Are they willing to follow the main road by adopting technologically advanced solutions in pursuit of near-zero emissions or rather to rely on pioneering innovations related to the world of electric motors but which are also supported by the criticism and guidance of the legislator? Only time will tell…

Carlo Gualdi

SAMOTER 2020 AND THE TRENDS IN CE

Almost everything is ready for SaMoTer 2020, scheduled from 21 to 25 March 2020 in Verona. An interesting research was presented during the traditional SaMoTer day. According to such study, the fleet of CE machines in use in Italy is still very far from the years before the crisis, even though in the first nine months of the last year the market trend is growing in terms of exports (+1,9%) and imports (+12,3%) compared to the same period in the previous year.

AUTOMATED WAREHOUSE

BIMOTOR, TURIN: EFFICIENT AND INNOVATIVE ENGINE STORAGE

The Bimotor automated warehouse represents the infrastructural synthesis of the evolution of Italian company, FPT Industrial dealer in dialectical relationship with the parent company for a century now. A relationship that has extended from Northern Italy to Slovenia and Croatia and, following the natural vocation of Piedmont, to France. Recently the 'Iberian tiles', Spain and Portugal, have been added to the mosaic. There are about 7,000 engines a year, half of which are customized. The logistics centre stems from the need to rationalise space and storage procedures and from the emergence of stock pilling. An example of rationalization? On the warehouse's identity card, the dimensional coordinates are as follows: width 50 metres, depth 11 metres, height 20 metres. The space where the engines are stored, if it were stored horizontally, would have required at least 3 thousand square meters. Note: due to the size and the characteristics of the warehouse we find here all the engines, from the smallest, the S8000, to the NEF family, excluding the Cursor.

Conexpo and IFPE are nearly upon us

The co-located Conexpo-Con/Agg and IFPE 2020 exhibitions are two of North America's premiere events for the construction industries and the fluid power, power transmission and motion control industries. Conexpo-Con/Agg and IFPE 2020 will be held March 10-14 in Las Vegas, USA. Still no confirmation of the rumors about engine previews, we'll be there and will keep you up-to-date.

A 'MAN' IN RED?

Cummins and MAN Energy Solutions. A suggestive hypothesis, considering the possibilities of integration of the respective portfolio, despite some partial overlapping.

«*Volkswagen announced in May that it is exploring a sale or partnership for its MAN Energy Solutions as part of a restructuring of the German cars, trucks and bus empire. VW has held talks with Cummins, and received an offer from the U.S. company for MAN Energy Solutions*».

This is what Reuters reported about the rumors on a primary operation in the engine field.

CUMMINS FOR BUS&COACH

ONE TO FIVE

BATTERY ELECTRIC SYSTEM

At Busworld Europe 2019, Cummins highlighted the new low-profile battery, designed for the European market, but available for use in other markets, which measures under 140 mm in height, in the 8.9-metre-long bus. This product will enable OEMs to meet European low floor requirements while maintaining a low centre of gravity and maximising utilisation of unoccupied space. The low-profile battery uses modern cell technology to deliver high energy density and packaging efficiency and represents a step forward for zero-emissions bus design. The low-profile battery is as part of a complete Battery Electric System (BES), including products from Cummins' existing product portfolio such as the BP74E batteries mounted in the roof and the Cummins System Controller.

Brian Wilson: «*We are launching a Euro VI-capable product in China, the X12, that meets also Chinese regulations. It's a no-EGR system*».

Columbus isn't just industrial engines. In the automotive industry it plays a leading role in both pickup trucks and buses: 70 to 75 thousand are produced every year by Cummins for the global bus market. We had a talk with Brian **Wilson**, General Manager of Cummins Global Bus Business about the future scenarios of the field.

Mr. Wilson, which is the share of Cummins in the bus sector?
In the heavy duty bus sector (mini and midi buses excluded) we have a market share around 21-22 per cent globally. We produce between 70 and 75 thousands engines each year for the global bus market.

As a global drivetrain supplier, which trends and differences are you observing in the different areas of the world with regards to energy transition of bus operations?
I would classify three distinct markets in the transition to electrification. First, Chinese market, that has been way ahead for years. In 2016 they had already sold 50,000 electric buses. The Chinese bus market can be considered as fully electrified. Secondly, we have North America and Europe: in these markets several countries are starting the transition, investing in infrastructures and starting to build their fleets moving from clean diesel and natural gas buses towards electric buses. Then we have the rest of the markets, such as Latin America and India for instance, where the countries are going now in the phase of piloting a few electric buses in order to understand how they actually perform, which kind of mainentance is required, the charging infrastructures needed, before they start to build their plans for the transition.

Cummins heavy duty market share is around 21-22 percent. Bus market is going to be fully electrified, coaches are still running by diesel or CNG, also in China

How Cummins Electrified Power division is organized?
It's a separate business unit for Cummins, the fifth and last to be created. What Cummins has realized is that if you want to invest on new features you have to separate them from the rest of the activities and set them alone so that you make sure that you invest and focus on these new technologies. Therefore, we set them aside to make sure that we can drive on this topic the needed attention, make the right investments, hire the right people and develop new products. In fact we are talking about very different products compared to diesel and natural gas products. Electrified Power is a product-focused business unit. It's a separate unit but we work a lot together, especially with bus customers. They develop the products but they tipically sell them through the other business units into their customer base.

Which will be the place of diesel and gas engines in the bus sector in the next ten years? You have also launched, still at Busworld, the L9N natural gas engine
We think that diesel and natural gas have a long life left in the bus market. If you take a look at how diesel engines are clean today versus Euro III or Euro IV you notice that they are really good products, they have a great range and operate in every environmental condition. Even in China the coaches are still running on diesel, because it's highly efficient, highly reliable and not very expensive.

Cummins stated that more than 2,000 hybrid buses, with Cummins technology, are operating in Europe. Do you see this technology as a 'bridge' for the future full electrification of the fleets or as a good long-term solution?
If battery power density and costs will improve in the way they are improving, hybrid technology could end up being just a short-term bridge until that technology can meet the required needs. Hybrids could play a role in markets that want to go toward cleaner powertrains but don't have the ability to invest in the infrastructures required for battery electric buses. For instance in Latin America hybrid buses could have a long life.

Riccardo Schiavo,
Sustainable Bus

IVECO, NIKOLA, FPT

ROAD TO THE HYDROGEN

Mark Russell, Nikola President, said: «*Why Iveco? We considered several OEMs and we chose CNH and IVECO for their background in trucks with natural gas and traditional fuel.*»

They say that three is the magic number. **Iveco**, **FPT Industrial** and **Nikola** clearly believe it. Following the announcement of the spin-off that merges the powertrain and the on-road divisions within the CNH Group, here are the very first results of the joint work with Nikola, the sparkling company from Phoenix, recently part of the family, specializing in the development of alternative technologies.

The Nikola TRE heavy-duty BEV (Battery Electric Vehicle) truck unveiled in Turin, based on the Iveco S-Way model, in turn presented last July in Madrid, is equipped with a modular battery system with a total capacity of 720 kWh, with an electric driveline capable of delivering 480 kilowatts of power and 1,800 Nm peak torque. The expected range can reach 400 kilometers, with a refill time of about two hours. The Nikola TRE will also be available in 2- or 3-axle rigid versions, with total ground mass from 18 to 26 tonnes for urban distribution and municipality missions.

The Nikola TRE, the e-truck maquette that Iveco, FPT and Nikola launched in Turin at the beginning of December, is expected to pave the way. Not to mention the projects on hydrogen, surely more interesting in the long term

The clearest goal, in the near future, is to promote zero-emission regional transport. What is certainly more ambitious is to have a basis for the development of the fuel cell version, that is to say a Fuel Cell Electric Vehicle (FCEV), hydrogen-powered, equipped with a system of carbon fiber tanks for a maximum load of 80 kilos of hydrogen on board. In terms of power or peak torque, the performance would be unchanged compared to the BEV truck, with the key difference of a range that could reach 800 kilometers with an average refill time of 15 minutes. The BEV model is expected be launched at the IAA 2020 in Hanover, while production and marketing expected as early as 2021. For the first deliveries of the fuel cell model, we are talking about 2023.

Great satisfaction was expressed by the top management of Nikola and CNH. Trevor Milton, Nikola Motors CEO, in particular, talked about a «*win-win partnership with Iveco and FPT. If we think - he added - that the agreement was announced only three months ago, I let you imagine what we can do together in the near future*». Milton has great confidence in the «revolutionary» potential of hydrogen, even though its gradual introduction should be supported by some additional efforts by the institutions.

A perfect host, Hubertus M. Mühlhäuser, CNH Industrial CEO, spoke instead of the encounter «*between two soul mates, who want to lead the transformation of sustainable transport. We see this step as a natural evolution of our company*».

Gerrit Marx, CNH President Commercial and Specialty Vehicles, tried to answer a key question, that is: Why now? The reasons, according to Marx, are essentially three. Tightening emissions regulations, which necessarily imply a share of zero-emission vehicles by 2025; the characteristics of hydrogen as a clean and conflict-free energy source, as it comes essentially from water; the need to create and promote circular economy, clearly expressed by the younger generations, above all.

And what about the role of FPT? Not at all secondary, according to Annalisa Stupenengo, CNH powertrain manager, who said that the advent of hydrogen does not change the strategy of FPT Industrial, which has long been engaged in the development of engines powered by alternative sources (natural gas, for example). The synergy with Nikola indeed helps to achieve the Group's targets earlier. Without neglecting at all research on more conventional engines.

THE CHICKEN AND THE EGG

Nikola and **Iveco** have thoroughly talked about a plan to create a system of fueling stations along the main road transport routes, both in Europe and the US. The plan foresees about 700 stations to be built in the US and 70 in Europe, relying more or less on the current network of LNG distributors, to be equipped with stations capable not only of supplying the vehicles with hydrogen, but also of generating it.

More than once. Nikola managers and experts mentioned the concept of the chicken and the egg. This means being able not only to design and build the vehicles and the batteries, but also to directly control the energy production. A business model that is clearly different compared to the current one.

The starting point is an onsite renewable power generation system, with the possibility to convert electricity to hydrogen via electrolysis. The hydrogen produced would then be stored and conveyed to fueling devices for trucks, which could fill up in just 15 minutes.

PERKINS ALTERNATIVE ENGINES

THREE FOR THE HYBRID

PERKINS PROPOSAL, IN DETAILS

Perkins has chosen a P1 configuration, the most suitable one for powertrains intended for the OEM market and not for a specific vehicle.
The first proposal is a classic 48V hybrid-electric. Ruggedised lithium-ion batteries store recovery energy. Long duration energy storage makes it suitable for machines with less predictable operating cycles.
The second proposal is not a preview, because Linde already proposed hydraulic-based hybrid systems.
This version employs a hydraulic accumulator to store energy in excess from the engine. Energy recovered from machine systems is stored in a hydraulic accumulator. This system provides a rapid release of stored energy, leverages existing machine hydraulics and ensures a friendly service network, as hydraulic components and systems are widely diffused, tried and tested.
Last but not least, here comes the third proposal. It's a very innovative hybrid-mechanical solution optimised for machines with short and repeated operating cycles such as loading, ensuring a very rapid release of stored energy. This solution offers an attractive path to engine downsizing as it takes less space than other solutions.

At Perkins, they think that hybrid powertrains play in the future an essential role also in industrial engines.
And so, it takes the field with three hybrid engines also proposing solutions entirely original and unusual.

Perkins is going to offer hybrid and electric technologies across its power range from 6 to 597 kW.
The first technology solutions to be released are hybrid-electric, hybrid-mechanical and hybrid-hydraulic, all of which complement the existing range of 0.5-18 litre diesel engines.
Diesel International has interviewed **Ajay Prasher**, Product marketing manager at Perkins, about a very hot issue in the current technological scenario.
Here we publish the first part of the interview. The second and last part will be published on the next issue of our magazine, the March/April one.

What does an OEM need to consider when evaluating the three technologies, namely hybrid-electric, hybrid-mechanical and hybrid-hydraulic?
Perkins has been able to develop three sets of technologies, each of which offers OEMs a unique set of performance attributes. OEMs would need to understand what base load and power the machine would require.
OEMs would then need to understand how much additional power boost is required and for how long.
For OEMs who need a sustained level of boost for a longer time, perhaps a telehandler looking for fuel economy savings, they would benefit from the electric hybrid system, which takes hybrid energy, stored as current in a battery, which is then returned back into the engine. In this case, the OEM would see up to a 20 percent fuel economy saving.
For OEMs who are looking for shorter periods of boost, they would benefit from the use of a hydraulic or kinetic hybrid system, which takes the hybrid energy that's been stored and returns the energy back into the engine. In this case, the OEM would be able to reduce the size of the engine by 30 percent, helping to reduce package size and installation costs.

Perkins has been developing hybrid technology for over ten years, collecting a wide range of machine data as well as the analytical tools to evaluate duty cycle characteristics. These data can be coupled with a range of TCO models

How can Perkins help OEMs choose the right technology?

Perkins has been developing hybrid technology for over 10 years and has been able to collect a wide range of machine data as well as the analytical tools to evaluate duty cycle characteristics. Each of the three hybrid systems offers a unique set of performance benefits that meets the demands of a wide range of machines. With our experienced hybrid controls team, we can ensure the machines' average duty cycle will meet the energy capture requirements to support maximum power output. Furthermore, Perkins can couple the machine performance data with a range of total cost of ownership models to ensure that the machine will perform technically and be economically viable.

What are the benefits of your 3 hybrid systems proposed, compared to traditional hybrids?

The majority of hybrids require the OEM to add the energy recovery technology to the machine, where energy is recovered and boosted back into the machine's transmissions.
Perkins' hybrid technologies help remove the burden upon the OEM, where all energy recovery, storage and return occur within the engine system. For OEMs who are looking for significant benefits in fuel consumption and downsizing opportunities, Perkins simple plug and play hybrid technology helps reduce engineering complexity, time and resources.

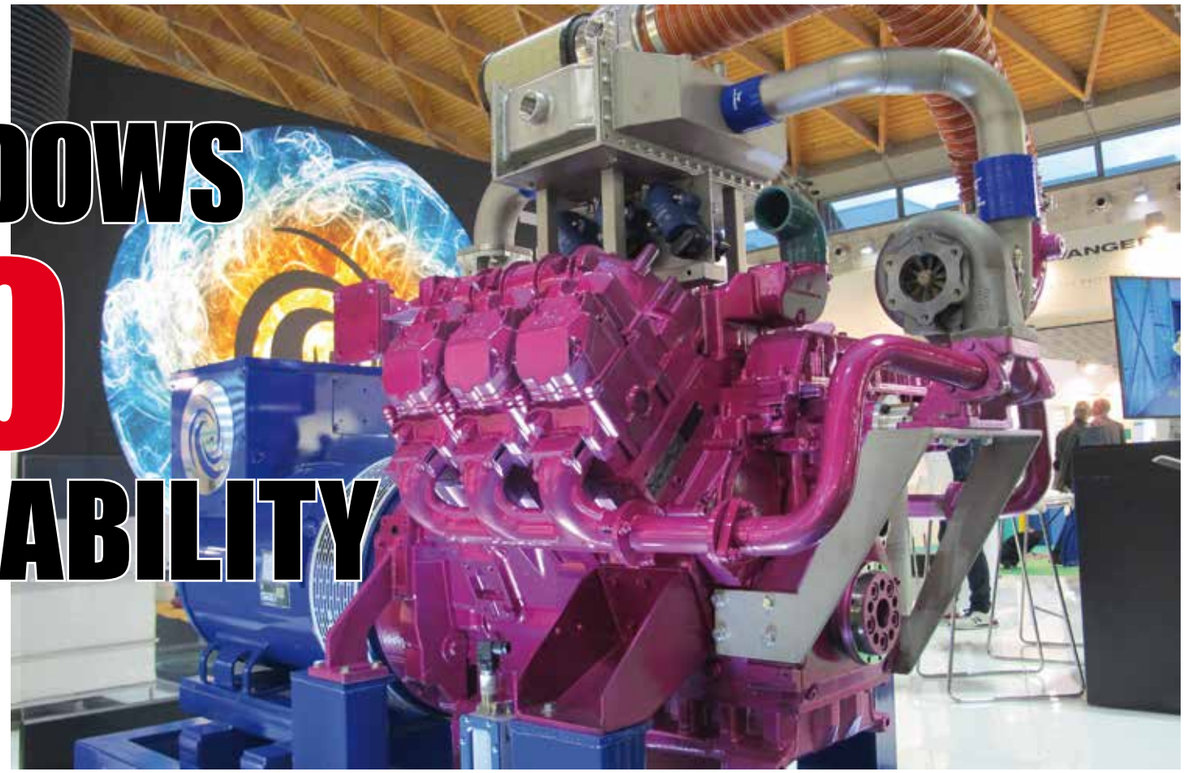
What are the most suitable uses for the electric hybrid?

The electric hybrid stores the recovered energy in the form of a battery current.
The nature of the battery ensures that energy can be stored sustainably and released over a pro-longed period. Products in scope would include generator sets, telehandlers or dumpers where they have predictable duty cycles or have long periods at low idle.

Alberto Scalchi

DPE & KEY ENERGY RIMINI

THE WINDOWS INTO SUSTAINABILITY



1,300 companies occupied 129,000 sm. The Italian Minister for the Environment Sergio Costa sayd: «*This is the world´s most important expo for the green economy*»

SUSTAINABLE TRUCK OF THE YEAR

Mercedes Actros wins STY Tractor 2020; its Active Drive Assist feature offers the 44 ton segment a chance to starts familiarizing with automated driving. Scania Hybrid is awarded STY Distribution 2020. Lithium-ion batteries of higher capacity -18.5 kWh – and a wider usage range (from 1.2 to 7.4 kwh) brings the mileage achievable in purely electric mode from 2 to 10 km. STY Van 2020 goes to Volkswagen E-Crafter: not an elementary electric copy of its diesel version, but a model based on real-life urban driving cycles.

The first edition of Distributed Power Europe took place in Rimini, November 5-8, in the frame of Ecomondo-Key Energy. The Cursor 9 by FPT Industrial played in team with Energy Rental, Sices and Riello UPS to score the pollutant reduction goal. While waiting for 2/2020 issue's in-depth event report, the event's leading players can provide a few highlights. According to Christian Piazzalunga - Sales operation manager at Sices, the system integrator specializing in designing and manufacturing switchboards and control systems «*Our system's newly adopted solutions stem from a careful analysis of the main critical issues affecting this kind of equipment, namely their long operating time, high noise levels, and the fact we do not know in advance which loads we will be feeding*».

Alessandro Zilli, Power Generation Marketing Manager at FPT Industrial, says their unit is «*Capable to generate a good 300kVA with only 8.7 litres, it delivers one of the best power-to-weight ratios on the market, with huge benefits for installation within a canopy and in terms of overall installation footprint. Also, its lightweight design makes it easier to transport, a key requisite for mobile gensets*». At the booth of its distributor Socoges, **Doosan Infracore** offered a world preview of its DX22. The 12 cylinder V engine is the first common rail designed by Doosan for gensets, concentrating 17% additional power (900 kVA) on the 750 kVA cylinder block. The DX22 was on display with the GE08TI, designed for applications requiring a mechanical engine, and the D24 in its mild-hybrid configuration featuring a 48 Volt/20 kW electric unit.

Ecomondo provided a green backdrop for Distributed Power Europe's debut. Stage V stationary engines shared Rimini's stage with gas cogen units, Key Energy's flagship: two sides competing, or two sides of the same coin?

At the Bu Power booth, **Perkins** showcased its 1103A-33TG2, in a version Made in UK and a Made in India counterpart. The 3.3L turbocharged engine delivers 60 kVA. In the large-size class, the 4008-TAG2A - 8 cylinders, 30.6 l, with intercooler, can reach 1067 kVA. **Volvo Penta** scored a double hit in Rimini, being present at DPE with its 6 cylinder, 16.1 L TWD1683GE, whose power generation configuration reaches up to 502 kVA in continuous mode, (670 for prime power, 737 for standby) as well as at the Volvo Group booth, with its D8 featuring common rail and after-treatment to be certified as Stage V compliant including in stationary applications: more news coming soon. Here's a little sneak preview: it will be available in a variety of configurations, e.g. with two different engine casing solutions designed to ensure the necessary installation flexibility. As for DPF maintenance, Volvo Penta gave priority to easy access and quick servicing, which allows for the necessary maintenance operations to be performed directly by operators.

Kohler was present through Valdinoci, a distributor that can tap into the rich stock warehouse located in Forlì, North Eastern Italy, which is where the KDI3404 power pack on display came from.

Quoting a comment by Luigi Valdinoci «*the KDI3.4, typically fan-to-flywheel, is provided with a power pack configuration, which means it is fitted with a radiator, air filter, SCR; the urea tank is located within the pack, which is also remotable. What we offer here is a plug-and-play product designed for small and medium OEMs, in line with the mother company*».

What about **Key Energy**'s most interesting highlights, then? A Loncin company, **CMD** showcased its Eco20X, producing syngas from the anaerobic fermentation of wood biomass e.g. forest trimmings, fruit stones, cereal processing waste, feeding a 4.3 L engine based on a GM platform. With a capacity of 20 kW of electricity and 40 kW of heat, this unit can turn three kilograms of wood chips into the same amount of energy that's produced from a liter of gasoline. Compact in size, it features system integration capabilities, including the feed hopper. Heat is recovered from wood combustion and from the engine. It's also suited for parallel operation, so much so that an installation arrangement made by CMD included some 10 units.

The RAMA Motori booth provided a showcase for the electric motors, front and rear axles manufactured by **Benevelli**, a small but dynamic company headquartered in the Italian motor valley, close to Reggio Emilia and Modena.

AGRITECHNICA HANOVER 2019

EMISSIONS, NOVELTIES, ALTERNATIVES

Agritechnica, Germany, 14-20 November. Here, diesel is still all the rage and alternatives are not limited to the much longed for electric. Monographs on FPT Industrial e MAN Engines will follow.

Cummins' faith in agricultural equipment was visible in Hanover. Following their 6.7 with structural oil pan presented two years ago, the time has now come for a 4 cylinder, in the 67 to 149 kW power band. «*As part of our Performance Series range, the F3.8 will deliver more machine capability and substantial productivity benefits for the farmers who operate Cummins powered equipment,*» explains Ann Schmelzer, General Manager Global Agriculture at Cummins. Kohler presented its Check App, making everything a click away.

All **Kohler** engines can be registered through the app, that also provides a broad overview of the engine's overall status. KDI's product range officially expands to include 105 kW and 650 Nm models, no-aftercooler versions and a full range of power packs to offer OEMs a plug-and-play solution.

John Deere spurs on the electric and the 13.6 L displacement. The leaping Deer electric features modular solutions, made up from the same components. The modular approach also characterizes hydraulic connections such as the Electric Pump Drive, and, in general, the balance between electric and mechanical that will facilitate customer installation.The Internal Permanent Magnet engine delivers 100 kilowatt. **Perkins** closed the circle adding a 2.2 L to the Syncro family, to fill the slot between the 1.7 and the 2.8 L. It delivers 55 kW and 270 Nm. According to Alex Eden, Syncro product marketing manager «*For the 2.2 engine we know customers are particularly focused on having tight turning circles due to the limited space in an orchard or vineyard*». **MTU**'s microgrid solutions open up to agriculture, says Cordelia Thielitz, Vice President Microgrids at Rolls- Royce: «*Many farmers already have large-scale photovoltaic or biogas plants and are therefore ideally equipped to use a microgrid. Our MTU EnergyPack, the battery container, and a smart energy management system allow the various energy sources to be optimally deployed – both technically and in terms of cost*». A four-time participant in Agritechnica, **Volvo Penta** focused on after-treatment and consumption. The Swedish Stage V approach reduces standstill DPF regeneration , has a common interface and all components for installation, including hoses and wiring harnesses; the exhaust after treatment systems (EATS) are flexible solutions. They can be installed in different orientations, making them suitable for most agricultural machinery and equipment. Installation in the machine is very similar, regardless of the emission level for which the engine is optimized. An enhanced service network can face up to the maintenance needs of Stage V engines. **Liebherr** placed the emphasis on components, such as engines for axial piston and medium pressure pumps. The Series 20 of the LH30VO axial piston pump features optimized coupling to PTOs and it can feed equipment, ventilation or machinery steering systems. At the **Kubota** booth, the V5009 - Diesel of the year winner 2019 - got all the spotlight. Diesel and dual-fuel versions (gasoline/LPG) were both on display, including the V2403-Cr and V3307, WG1903 and WG2503, as well as the V1505. Osaka doubled up with **Yanmar**, celebrating the structural version of their 4TN101 and 4TN107, in the 55 to 105 kW and 90 to 155 kW power bands, respectively. The 4.6L is already available, while the 3.6L is scheduled for 2021. Russian **Gaz** was also present in Hanover with a 1.1 L cylinder displacement, 4 cylinder (BxS 105x128 mm), 147 kW and 790 Nm, fitted onto Rostselmash 3000 Series harvesters. The Arbos booth hosted a D24 by **Doosan Infracore**, testifying to the joint-venture between the two companies.

Like at Bauma, Stage V stole the spotlight. Hot topics talked about among the booths included the chances of a Stage VI and, above all, what will be left of diesel and ICE now that chatter is spreading about gas, spurred by FPT Industrial

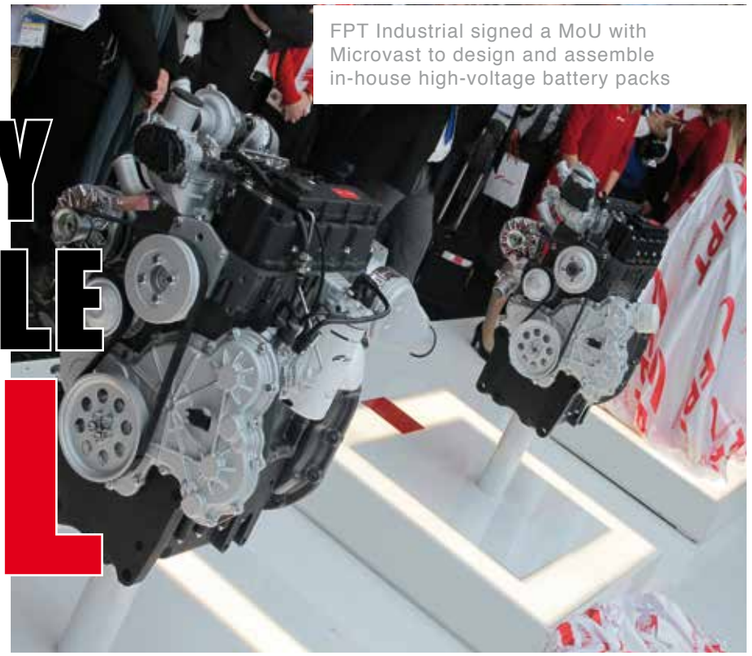
«With 2,820 exhibitors and 450,000 visitors Agritechnica has once again demonstrated its outstanding position as the world's leading trade fair for AG technology»

TRACTOR OF THE YEAR 2020

Fendt 942 Vario triumphed in the open field tractor category, crossing the line of 400 HP for the first time, equipped with a MAN D1556. Finalists included G Case Magnum 380 CVX Drive, Claas Axion 960 Terra Trac, McCormick X7.624 VT-Drive and Valtra N154e Versu.Fendt also won the 'Best Utility' award with its new 314 Vario Profi+, which made it to the finals alongside Kubota M4072, New Holland T5.140 Dynamic Command, Steyr 4130 Expert CVT and Valtra A 114 HiTech 4. The 'Best of Specialized 2020' award went to New Holland's T4.110 N, featuring the TerraGlide front axle suspension. Reaffirming the supremacy of Italian specialized tractors manufacturers, other finalists were Same Frutteto 100 ActiveSteer, Carraro Compact V75 and Massey Ferguson 3709 Alpine (developed by Carraro Agritalia). New Holland also boldly got into the sustainability ring, winning the 'Sustainable Toty 2020' title with New Holland Methane Power fitted with a FPT engine fueled solely with natural gas. Some 30 units are already scheduled for delivery in 2020.
The candidates to Sustainable Tractor of the Year included all finalists of the main three categories plus a selection of three advanced prototypes: New Holland Methane Power and the full-electric Fendt e100 and Rigitrac SKE 50.

FPT F28 STARTS @AGRITECHNICA

ONE BODY MULTIPLE SOUL



FPT Industrial signed a MoU with Microvast to design and assemble in-house high-voltage battery packs

FPT Industrial F28, 4 cylinders, BxS 91x108, 2 valves per cylinder, 375 Nm and 55 kW (potentially up to 74 kW). Why so much hype? This is the answer of Pierpaolo Biffali, Vice President Product Engineering of FPT Industrial: «*The range of agricultural and construction applications that uses this type of engine basically requires a global engine, able to meet the stringent regulations required by the European Union and EPA and at the same time the demand for sustainable costs coming from those markets that are moving towards stricter regulations, which require the use of premium technologies* ». «*On the other side*», continues Biffali «*the search for compactness - for instance the bridge (that is the distance between the cylinders) has been reduced - and construction simplicity did not affect the performance, suitable to meet the most demanding applications at sustainable costs in emerging markets such as India and China*».

From a journalistic point of view, however, the most seductive element is the eclectic nature of the F28. In addition to the diesel engine block, we found in Hanover its natural gas twin, with a view to modularity. FPT representatives tell us that «*The interfaces are the same and the gas version is about to be launched on some agricultural demos, only the implementation of certain functions (such as the tanks) is missing on the machine*».

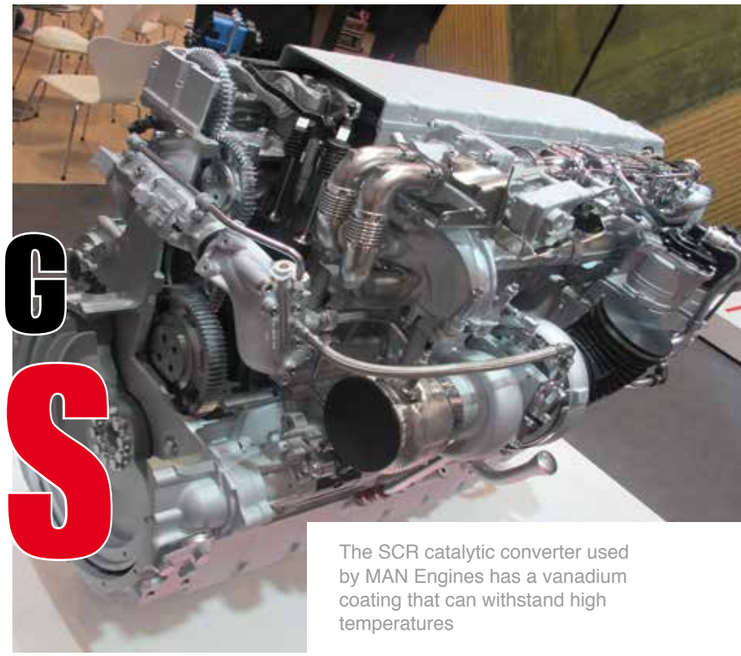
F28 are the initials of the FPT compact engine, born in both diesel and gas versions. Developed for CNH Industrial machines, it will also speak other languages in the next future, especially if the circular economy in agriculture will be not limited to an ideal outlook

A launch pointing to rationalization?
Yes, under 56 kW the 3,4 and 3,6 are disadvantaged by dimensions. Uniflow architecture, featuring intake and exhaust on the same side. External cooled EGR: compared to the F5 duct and cooler positions changed.
The configuration of the combustion chamber, with 2 oversized valves on one side and injector on the other, provides the engine an excellent response to loads.

What about the gas 'twin'?
The outlook of a circular agricultural economy to neutralize CO2 in farming operations with diesel-like performance and lower operating costs. It is possible to give value to the use of biomethane in the wine industry, for example, or in all those food segments which are particularly sensitive to environmental sustainability. **L.H.**

MAN D4276 BETWEEN THE FIELDS

PURE WORKING CLASS



The SCR catalytic converter used by MAN Engines has a vanadium coating that can withstand high temperatures

After the Bauma preview, also in Germany, further north in Hanover, the time to harvest has come for the D4276. To tell the truth, AGCO didn't wait to exploit the power of the lion on its Ideal 10, in continuity with the D3876, Diesel of the year 2016, with which it shares the interfaces besides a 4 mm bore increase (138 to 142 mm). Featuring 16.2 liters it is able to deliver 581 kW (a 515 kW version is also available), standing out as the most powerful 6-cylinder in-line engine designed so far by Man Engines for agricultural applications, and 3,400 Nm maximum torque steady from 1,350 to 1,600 rpm.
Common rail has been enhanced to improve fuel supply. The high-pressure pump provides a flow up to 40 percent higher without increasing vibration and noise emissions. Injectors have been specifically designed for the D4276 to deliver an injection pressure up to 2,500 bar for a more performing fuel spraying. The housing of the turbines in heat-resistant cast steel together with the aluminium body of the compressor able to withstand high temperatures increase turbo sturdiness. Furthermore, following its predecessor, the D3876 features some tested components such as the so-called domed valves, which thanks to a reinforcement of the valve support plates on the side of the combustion area reduce to a minimum the seat wear, ensuring longer intervals for valve clearance inspection. In the same way the top-down cooling system is used, which distributes the cooling liquid on the upper water jacket of the cylinder head along the engine and a uniform refrigeration on all cylinders, just like the improvements on crankcase and pistons.
MAN Engines also developed a maintenance-free distribution with hydraulic valve clearance compensation (MAN HydroDrive). In many agricultural machines it is in fact difficult to reach the valve cover, slowing down maintenance and downtime. Thanks to MAN HydroDrive checking and adjusting valve clearance will be no longer needed. Moreover, it is possible to exploit more effectively the room inside the machine above the cylinder head, for example to make the arrangement of the exhaust gas after-treatment systems more functional, positioning them closer to the engine.

Man Engines launched the AG version of its D4276, the 16.2-liter introduced at Bauma in Munich which shares the interfaces with the D38. Featuring 581 kW and 3,400 Nm it is the best performing 6-cylinder in-line that Nuremberg has ever designed for agriculture

2.8 - 3 LITERS OFF-ROAD

COMPACT AFTER TREATMENT

FPT Industrial introduced its 2.8 liter delivering 55 kW at 2,300 rpm and 375 Nm at 1,400 rpm. Who is among the compact engines between 2.8 and 3 liters, protagonists of this comparison, extrapolated in the huger range between 2 and 3.8 liters, which has reduced the primacy of the one-liter cylinder displacement. After the 3.6 liter at Bauma 2016, Perkins Syncro 2.8 made its debut at Bauma China. Working in 45 to 55 kW range, even the 2.8 together along with its older brother is intended to immediately interface with over 80 mobile applications. This means that attachments, dimensions and positioning in the engine compartment are interchangeable with previous generations thanks to the improved power density and a 22 percent downsizing. As stated by Perkins product concept marketing manager Oliver Lythgoe, «*the dimensions of our after-treatment system have been reduced by 40 percent*.»

The 2.8 liter completed FPT compact range. Perkins also features its Syncro in this displacement. Just under 56 kW we find even more compact solutions such as the 2.4 liter by Doosan, or even the 2 liter by Hatz. Among the Japanese Isuzu features the displacement of this comparison, from 2.8 to 3 liters. Among the engines with a captive vocation JCB, John Deere, SAME. Cummins with its QSF2.8

Deutz also appears in this range with its 2.2 liters showing a physiological torque deficit - 280 Nm compared to 375 Nm of 2.9 liters, which moreover stands out reaching the F28, very little behind the JCB, best in class with 400 Nm. The 3 and 4 cylinders from Cologne share the availability of the LPG edition which testifies the sensitivity of the manufacturers towards the conversion of these engines for indoor environments, such as forklifts and harvesters for greenhouses.

Doosan Infracore raised the performance bar by compacting and remoting the post-treatment module. The D24 meets the goals featuring 55.1 kW and an outstanding 139.7 Nm/liter specific torque, which comes from 320 Nm in just 2,392 cubic centimeters.

The Rising Sun brings all its samurai into play: Kubota, Isuzu, Mitsubishi and Yanmar. Kubota, however, stands between 2.6 liters (55.4 kW and 269 Nm) and 3.3 liters (same power rate and 66 Nm more), while Yanmar deploys in the range under 56 kW its Stage V 3,3 liters. Mitsubishi also shows off a unit of the same displacement delivering 55 kW and 280 Nm. Isuzu instead introduces the 4JJ1T, a different version of the 4JJ1X that we talked about. Compared to the latter power rate drops from 86 to 52 kW and torque from 375 to 255 Nm. The three-liter is Tier 4 Final approved,

Even in this power range, 3 and 4 cylinder diesel engines just below 56 kilowatts, DOC and DPF are an extremely common choice...

BRAND MODEL	CUMMINS QSF2.8	DEUTZ TCD 2.9	FPT F28	ISUZU 4JJ1T	JCB JCB430	DEERE EWX 2.9	PERKINS 904F-E28T	SAME KF3	VM R 754 ISE5
I. D.									
B x S mm - S/B	94 x 100 - 1,06	92 x 110 - 1,20	91 x 108 - 1,19	95 x 104 - 1,10	92 x 112 - 1,22	106 x 110 - 1,04	90 x 110 - 1,22	103 x 115 - 1,12	94 x 107 - 1,14
N. cil. - dm³	4 - 2,77	4 - 2,92	4 - 2,81	4 - 2,99	4 - 2,97	3 - 2,91	4 - 2,79	3 - 2,87	4 - 2,97
Maximum power kW - rpm	55 - 2.400	**55,4** - 2.200	55 - 2.300	52 - 2.000	55 - 2.200	55 - 2.200	55 - 2.400	**55,4** - 2.000	55 - 2.600
Mep at max power bar	10,1	10,5	10,4	10,6	10,3	10,5	10	11,8	**8,7**
Piston speed m/s	8	8,1	8,3	**7**	8,2	8,1	8,8	7,7	9,3
Maximum torque Nm - rpm	300 - 1.600	375 - 1.600	375,3 - 1.400	255 - 1.500	**400** - 1.200	304 - 1.600	300 - 1.600	340 - 1.500	309,7 - 1.100
Mep at max torque bar	13,9	13,2	17,1	**10,9**	17,2	13,4	13,7	11,8	13,4
Torque at max power Nm	216	235	225	245	235	235	216	**265**	206
% power at max torque (kW)	91,5 (50)	90,80 (50)	100,10 (**55**)	77,10 (40)	91,40 (50)	92,70 (51)	91,50 (50)	55,10 (3)	64,90 (36)
DETAILS									
Specific power kW/dm³	**19,8**	18,8	19,6	17,4	18,5	18,9	19,7	19,1	18,5
Specific torque Nm/dm³	108	128,2	133,5	85	**134,2**	104,4	107,1	118,2	104,2
Areal spec. power kW/dm²	19,78	20,83	21,15	18,18	20,68	20,75	21,65	**22,16**	19,78
RULES AND BALANCE									
Dry weight kg	214	237	250	322	345	251	320	420	260
L x W x H mm	642x655x718	648x560x685	623x581x746	886x757x762	752x594x815	676x577x956	633x542x785	621x577x679	705x600x760
Volume m³	0,30	0,25	0,27	0,51	0,36	0,37	0,27	**0,24**	0,32
Weight/power kg/kW	**3,9**	4,3	4,5	6,2	6,3	4,6	5,8	7,6	4,7
Weight/displacement kg/dm³	**77,1**	81	89	107,4	115,8	86,2	114,3	146,1	87,5
Power density kW/m³	183,3	221,6	203,7	102,0	152,8	148,7	203,7	**230,8**	171,9
Total density t/m³	0,71	0,95	0,93	0,63	0,96	0,68	1,19	1,75	0,81
Displacement/volume dm³/m³	9,25	11,70	10,41	5,88	8,27	7,87	10,37	**11,98**	9,28

JCB 3-liter Stage V

In its Stage V version the 3-liter by Jcb increased torque by 10 percent, from 400 to 440 Nm, a figure that makes it competitive even on the free market, in addition to allocating a lot of space under the hood compared to the 4.4-liter EcoMax. DPF and DOC are integrated into a single canning. The engine features four spark plugs to facilitate cold start and is fully integrated into the JCB LiveLink telematic system. The 3-liter Stage V will be featured on 531, 535 and 540 telescopic handlers, 3CX backhoe loaders, the large platform skid steer loaders and trackwd skid steer loaders, dumpers for construction sites from 6T to 9T, all-terrain forklift trucks and 13-ton excavators.

also because the Far East and North America are its favorite scenario, especially in earthmoving.

Following, three players of the agricultural market, VM Motori, SAME and John Deere. Cento - now closely linked with FCA automotive did not leave its industrial vocation and got ready for Stage V, as anticipated at EIMA 2018. The 3-liter does not push on performance, relying on a 1,600 bar common rail and fixed geometry turbo, rods and rocker arms and oil separator included in the rocker cover. Results are however appreciable, 310 Nm already available at 1,100 rpm.

SAME plays the Farmotion card. Conceived for SAME and Deutz specialized, it is the only odd along with John Deere. Faithful to 2 valves per cylinder, it features a fairly strong common rail: made in Bosch, 2,000 bar injection pressure, waste gate valve, after-treatment relying on catalyst and particulate filter. ■

BRAND MODEL	CUMMINS QSF2.8	DEUTZ TCD 2.9	FPT F28	ISUZU 4JJ1T	JCB JCB430	DEERE EWX 2.9	PERKINS 904F-E28T	SAME KF3	VM R 754 ISE5
INDEX									
Torque	10,1	8	11,4	6,7	12,3	8,1	10	10,6	**16,8**
Performance	4,3	4,8	4,9	3,7	4,9	4,3	4,4	4	4,4
Stress	7,3	7,1	8,5	**6**	8,5	7,2	7,5	6,5	7,6
Lightness	8,7	9	9,8	12,3	12,3	10,2	13,4	8,8	9,8
Density	20,3	23,3	**27,3**	9,6	20,6	16,6	22,4	23	18,5
DIESEL INDEX	6,6	6,6	**6,8**	5,6	6,5	6,2	6,2	5,8	6,5

1 FPT

2 CUMMINS

3 VM

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ALWAYS ON

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LOGSET, VISEDO AND AGCO

GREEN IN THE GREEN

"The #ETtalks Insights session held by Danfoss at Agritechnica allowed us to pull in one of our favorites, the Logset hybrid. Green maintenance is part of Scandinavians DNA as showed by this all-Finnish triangle, the forestry Logset, the Agco Power 7.4-liter and the Visedo inverter"

NAF Axles

If you have more than three wheels, you are hyperstatic. You can't rely on suspensions only when you carry a ten-meter-long boom that can lift a couple of tons at full extension. Then here come the NAF TAP axles. Featuring planetary gearboxes (which also help to improve ground clearance), 18 tons payload, differential lock, differential with wet disk brakes (which also work as parking brakes), the two side shafts swing around the central pivot (just like on a rear cantileve) to ensure wheels grip in all conditions. Add to this the hydraulic block of the frame joints, and the above mentioned tons become easily manageable.

VISEDO: Control and power

The EC-C1200-450 inverter is able to increase the DC voltage, control the speed and torque of the electric motor, convert the current from AC to DC and so on. It can work with currents up to 300 A and voltages up to 850 V DC: thanks to its liquid cooling system, it can operate between -40 and 105 °C at 100% humidity (IP67 grade). The inverter is tested and ISO16750 certified: 10G for vibrations and 50G for mechanical shocks. Provided with a specific software for functions and outgoing/incoming loads management, it can perform additional functions through customized hardware modules. A synchronous, six-pole, liquid-cooled reluctance motor with permanent magnets (SRPM) EM-PMI365-T800 turns all this into mechanical power. Compared to inductance motors or permanent magnet motors it provides smaller dimensions, low mass and superior efficiency. The nominal voltage is 500V and the efficiency is 96%. At 215 kg its weight/power ratio is 1.23 kg/kW. Liquid cooled, it can operate at ambient and liquid temperatures up to 65° C. Above this threshold power is automatically reduced. The windings are class F (temperature up to 155 °C).

Harvester and #ETtalks Insights is the Danfoss Agritechnica session focused on agriculture in a carbon-neutral perspective. What is the common denominator? The machine speaks Finnish, is the offspring of Logset and is a 24 tons, 13 meters, 8 wheel hybrid harvester. And who is Logset? Logset Oy is a Finnish forestry machines manufacturer. On its part, ETtalks Insights are part of the platform Engineering Tomorrow talks, created and managed by Danfoss to activate innovative thinking and solutions around climate and energy. Is it possible a climate-neutral agricultural sector?

Let's now get into detail. The push towards hybrid is always the same, optimizing consumption and reducing emissions. That's not an easy task, given that we talk about machines equipped with engines delivering several hundred kW that also work on two shifts with highly discontinuous work cycles, sudden peak loads alternating with minimum loads.

#ETtalks put the topic of climate-neutrality for the AG sector on the agenda of the leading innovation forum on farming technology, Agritechnica. The speakers explored all the possible solutions for reaching the target by the year 2050 and looked at the electrification of farming machinery as one of the key drivers for this transformation

The possibility of combining the diesel engine with a AGCO Power 74 AWF 7.4-liter six-cylinder, a power generator has allowed, above all, to maintain the same engine as the younger brother - the 8HT GTE despite the surely superior performance and two more tons. Performances almost double: the power goes from 220 to 380 kW (which is to say 73% more) and the torque from 1200 Nm of the engine alone to 2000 Nm with the support of the electric motor. A very important figure for vehicles that often do the heaviest jobs such as lifting and moving logs.

The improved performance allowed to increase the maximum traction, 230 kN (or 23.5 tons) compared to 190 kN (19.4 tons) of the 8GTH, and mount a 280kNm (28.6 tons meter) Mesera 285H crane boom (another Finnish specialist) which replaced the 240 kN (24.5 tons meter) 240H.

The boom is coupled with a Logset TH-75 or 85 head.

Still those performances don't lead to an increase in consumption, dropping by 27% on average thanks to the responsiveness of the electric motor that instantaneously delivers its 800 Nm (which are also constant from 0 to 2100 rpm) and avoids the engine to enter into ranges of poor performance. The ones that were once called "black smoke point" (carbon black). Now the black smoke is (almost)no longer visible but the performance of any diesel goes under anyway. And thanks to such a torque even at maximum rpm you get the 175 kW mentioned above (although, as we have seen, the overall power is electronically limited).

Lower consumption is also testified by the tank, which goes from 600 to 500 liters, thanks to both the generator and the supercapacitor, both manufactured by Danfoss Finnish branch through the acquisition of Visedo and now part of the product range called Editron. The supercapacitor has the task of accumulating the few kilowatt-hours needed: insensitive to low temperatures, it manages both currents (and, therefore, power) in charge or in discharge to be efficient for a suitable number of cycles. Unfortunately it is definitely expensive, heavy and bulky, but the Finns must have thought that advantages far outweighed disadvantages, especially considering that they're going to work a few km from the Polar Circle. A very cold environment.

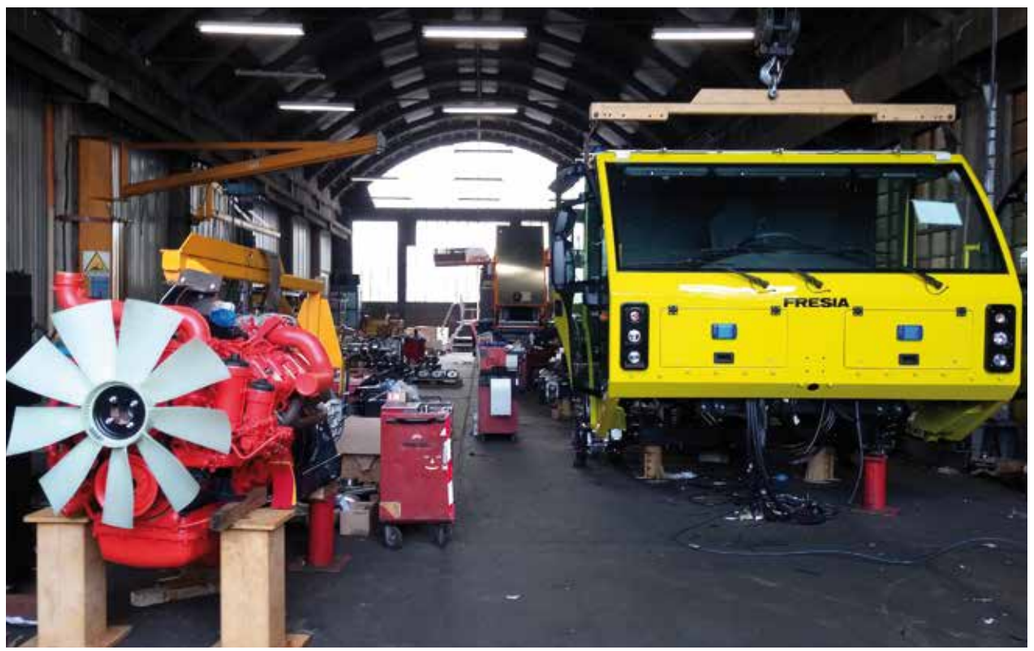
All this power must be managed. For example, you always have to keep your feet on the ground. NAF has managed this with its axles specifically developed for these applications, and a hydrostatic transmission combined with a two-speed NAF gearbox. Transmission and boom are both driven by a double pump delivering 210 l/min at 1000 rpm.

The operator is in control of everything from a high visibility cabin that can be turned and raised to ensure perfect visibility in all conditions. The control software completes the picture: the TOC 2 - MD2 allows perfect control of all the operation parameters of the machine which are displayed in the cabin. Functions are divided in basic functions, accessible to all, and advanced functions, which need authorization and allow customizing command and control both for engine and crane.

SCANIA AND VOLVO FOR FRESIA

WHAT A SWEDISH COMBO

Here's what we saw at Fresia headquarters: a snow blower equipped with three Volvo Penta engines, two for providing power to the blower and one, on the rear, for the vehicle traction. It's quite a unique solution found by Fresia engineers



A colourful collaboration. The red Scania DC16 engine, to the left, is ready to be mounted on a yellow Fresia crash tender chassis. For this type of special vehicles, acceleration, performance and reliability are key issues

It often snows in Millesimo, a hilly village along the highway that connects Turin to the Liguria region, in Northern Italy. Back in 1923, when the company was founded, Giobatta Fresia realized that in order to send trucks around it was necessary to equip them with some implements that would allow them to tackle snow-covered roads. That was the starting point that has led Fresia to become a very well-established manufacturer of snow clearing vehicles for road or airport use.

Relying on a series of engineering and organizational intuitions, the types of products that come out every day from the Italian facilites, now fully incorporated in the village of Millesimo, have increased and now include light and heavy tractors for airports, snow blowers, snow sweepers, military vehicles, metrocabs as well as ecological chassis.

Last but not least, always thinking of airports, crash tender chassis, sold by Fresia all over the world: from the Americans to the Middle East, the Far East and South-East Asia, so far more than 500 chassis, between 4x4, 6x6 and 8x8, have been built and sold. Especially abroad, since Fresia currently relies on foreign customers for about 95% of its overall turnover. We met Furio **Rossi**, Fresia Sales Manager.

Fresia has been producing for almost a century a broad range of special machines, some of them designed for airport applications. Here we talk about a snow blower with 3 Volvo Penta engines and a crash tender chassis with a Scania DC16

From snow blowers, then, up to other machines. How do you explain such an evolution?

It is true that these are different machines, but they share several aspects and components indeed: from the basic structure up to the final applications. For example, our expertise as for airport applications has led us to develop a lot of machines thought for the use within the airports.

Let's talk about engines. What are the aspects that you consider most before making your choice?

First of all, we look at their power and main features. Then, and this depends very much on the individual applications, we look at the emissions level. Assistance and after sales service is really important in some sectors, such as airports.

Speaking of snow blowers, there's a project you're particularly proud of...

One of the latest machines we have manufactured is something new not only for us but for the market. I'm talking about a snow blower addressed to the American market that mounts three Volvo Penta engines: two Stage V twin engines with 6 in-line cylinders, 12.8 litres displacement and capable of delivering 405 kilowatts of power each to handle the blower.

The machine also relies on a Volvo TAD-1172VE engine, also with 6 cylinders, 10.8 litres and 285 kilowatts at 1,700 rpm for traction. We currently have a Stage IV but we are ready to switch to Stage V when it becomes available. Such an engineering solution allows us to have a total power output of 1,095 kilowatts using two smaller, off-the-shelf engines with compressed delivery times and easier service rather than a single, more complex engine.

How did you manage to integrate the engines?

We make ourselves in-house the mechanical parts to couple the engines, so we don't need to turn to external suppliers. As for the electronics, we have used the Canbus connection which allows us to couple the engines' rpm with the utmost precision.

Crash tender chassis are also part of your portfolio. What are the main features you look at when it comes to the choice of the engines?

These machines are quite special, as they have to reach, inside the airport, the right location of the fire and intervene quickly: therefore, they require high performance in terms of acceleration and a rather low center of gravity in order not to risk overturning.

For one of the latest chassis, namely the F800, we chose a Scania DC16 087A, with 8 cylinders and 16-litre displacement, basically for its simplified wiring, high performance and perfect integration with the Scania control unit. ■

CUMMINS HSK78G

THE GOLDEN SEASON

UK POWER RESERVE

Cummins helped UK Power Reserve, part of the Sembcorp Industries group, to provide additional 500 megawatts of power to the UK national grid. This generating capacity is enough to power over a quarter of a million homes and meet over 1.4% of the UK's demand for electricity.
The order concerned the addition of 18 plants to UK Power Reserve's existing power stations. Subsequently, UK Power Reserve invested in a further 8 new plants, bringing the total to 26 delivering 508 MWs.
These milestones bring its total operating portfolio to 693 MW. Across the 26 plants, Cummins installed a total of 254 of C2000N5C gas generators.

«On the new HSK78G series there is an automated fuel adjustments engine feature wich is deal for remote operations»

Unveiled in Dubai exactly a year ago, the Cummins HSK78G stands between the 16-cylinder, 60-liter and the 18-cylinder, 91-liter. According to Craig Wilkins, Director of Cummins Prime Power Segment and Global Sales Support, «*the new generator series wants to achieve better performance and a low total cost of ownership. A high electrical efficiency of up to 44.2 percent (50Hz) and 43.5 percent (60Hz) is achieved on a wide range of pipeline natural gas down to 70 methane number (MN) without impacting power output and efficiency. The fuel flexibility of the HSK78G enables the utilization of low-cost, low-BTU and free fuel sources, that would otherwise be considered waste products, delivering robust power even with very aggressive fuels with minimal derating*».
The HSK78G is a 12-cylinder, 78-liter engine available in three power rates (1,600, 1,800, 2,000 kW). The top of the range works without derating up to 50° and 500 meters of altitude or 25° and 1,500 meters. Featuring a turbocharger on each bank, the engine is available in 250 or 500 mg/Nm^3 NOx version and is so versatile that it maintains carburation and settings and, within certain limits, performance and emissions even in case of methane number or calorific value change. The engine works with any type of gas: grid gas, biogas, even with torch gas up to 40 Methane number. This genset is designed to work in island and features almost 30% load intake in class C1. Some markets, particularly the UK, require to quickly get the nominal load: this genset is able to do so within 30 seconds from start. The rating steps to reach the nominal power are four. Some data to evaluate the impact of the 12 cylinders on the TCO: the minimum interval is 2,000 hours, the intermediate inspection is expected at 40,000 hours, the general inspection at 80,000 hours. Predictive maintenance is provided by detonation, exhaust gas temperature, spark plug voltage, NOx, bearings and windings temperature sensors. During the development of the engine a skid was prepared, equipped with tanks to add both natural gas propane and CO2, to analyze the acceptance speed of these variations: the HSK78G is able to accept variations up to 20 Mn in 16 minutes. During the test phase, both transients and constant load stability, noise emissions, up to 60 points of acoustic check on different loads and vibrations were examined thanks to sensors on the alternator. Approximately 240 Gigabytes of data on 370 vibration analysis points were collected. In conclusion, a summary of the chat with Charles **Knealing**, Cummins Assistant Chief Engineer, and Angela **Papageorgiou**, Marketing Communications Specialist, which summarizes the above mentioned data: «*Our temperature range is anywhere between -50 to 55 °C. On the HSK78G series we have features like engine oil heater and on the circulation pump also which are useful at extreme low temperatures, turbo trims for high altitude capacities and it is also very efficient even with very aggressive fuels. Due to the advanced onboard diagnostics of the HSK78G series you can remotely control the generator set and its performance, having 24h data management about how your generator set is performing. NOx sensors are embedded in the control algorithm directly measuring and controling NOx, ensuring emissions compliance. An innovative onboard spark plug life indicator is embedded, and data life logging and trending is available through the Human Machine Interface (HMI) control panel of the generator set*».

The HSK78G introduced at MEE has already made its way. The one leading to the Perth-based Blackham Resources, for instance, to supply prime power for the next stage of expansion at Blackham's Matilda-Wiluna gold mine

CANNES YACHTING FESTIVAL

BETWEEN TWO PORTS

GENOA BOAT SHOW

GM Marine was in Genoa, its first appearance in Europe, with three bare engines ready for marinization, a 2.8, a 3 and a 6.6 liter. The electronic control unit for boating called D-Mefi was also featured.
Mercury introduced the 450R Sport Master, an 8-cylinder, 4.6-liter, 331 kW V engine featuring double overhead camshaft, electronic power supply, the new **CMD** volumetric compressor and the Blue hybrid system, ready to equip some patrol boats with Volvo Penta engine. The HCU (Hybrid control unit) controls both the endothermic and the electric engine and dialogues with the GPS to automatically convert the navigation into electric when required. For the second year **ZF Marine** featured its the 8000 series, in a hybrid configuration with PTI and a 200 kW ZF electric motor featuring up to 16: 1 reduction ratio. Tideman Boats brought a High-Density PolyEthylene hull equipped with the **OXE 300** developed from the 2-liter by BMW.

Sylvie **Ernoult**, Director of the Cannes Yachting Festival: «*This year the Festival is organised between the two ports: the Vieux Port hosts the ultimate in motor boats while Port Canto becomes the new showcase for the sailing boats*»

Before updating you on what we have seen on the Croisette, a brief summary of the latest editions. In 2014, the presentation of MTU 2000 M96L series; in 2015 the C8.7 Caterpillar and the V12 1900 MAN; in 2016 again MAN with its i6, the R200S by Hyundai Seasall, the T8V.370 by Nanni Diesel; in 2017 the Show turns 40 and Volvo Penta presents its IPS1350; 2018, the year of FTP Industrial C16 and MAN V12-2000 also available in the hybrid version by Diesel Center.
FPT Industrial was again the protagonist of the opening day of the 2019 edition introducing the Red Horizon, developed in synergy with ZF and Navico. The integrated engine and transmission control is meant to counteract Volvo IPS and comply with the demand for simplification and integration of shipyards.
ZF's contribution has focused on electronic controls and the maneuvering system. Thanks to an ergonomic lever shape with touchpad, electronic 'Premium Control' provides complete navigation control, maneuverability in tight spaces and engine management for safe docking, while including the latest Controller Area Network (CAN bus) communication technology with a multi-function control head for up to six boat control stations. Simultaneously controlling engines, transmissions and thrusters, the additional 'premium joystick' provides low-speed ship control management, easy maneuverability in tight spaces and positioning of the ship against wind and stream.

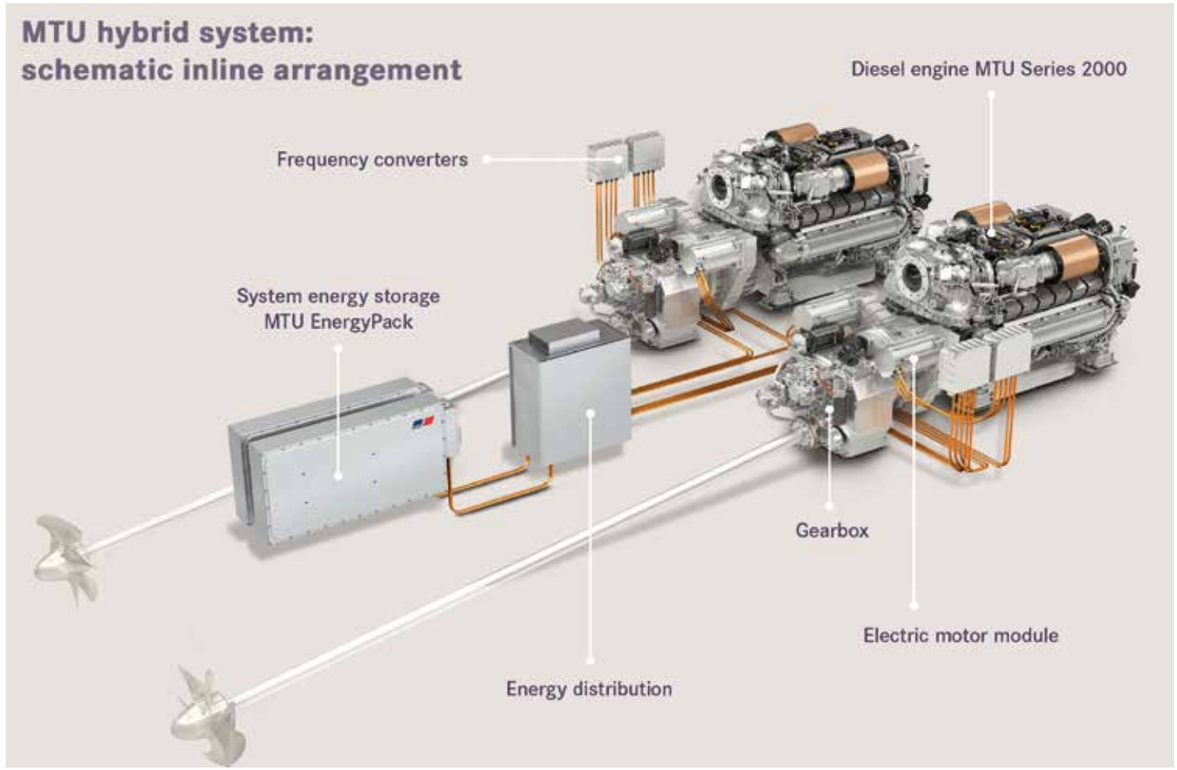
Red Horizon is the integrated system by FPT Industrial in collaboration with ZF and Navico. Focus on hybrid at MTU stand. No engine launches or restylings, apart from the Lucia 40 electric catamaran by Volvo Penta

MTU focuses on hybrid (see interview) and on evolution as a solution provider. Sunseeker has developed the first serial hybrid on the market in collaboration with MTU.
MAN exhibits the V12 2000 at the Monte Carlo Yachts stand, where he found space after the AB 100. Its younger brother was regularly present at the Lion's stand: 8 V cylinders, the historic two-liter cylinder (BxS 128 x 157 mmm), delivering 956 kW.
Also **Nanni Diesel** brings again last year's format with the full Platinum series derived from Scania: along with the 6 cylinders we've also seen the 16 liters, 1,200 HP (882 kW) N16.10100Cr3.

Volvo Penta deserves a separate chapter. At the Port Canto in Cannes we boarded the Lucia 40 catamaran by Fountaine Pajot shipyard. In the engine compartment the D1-20 has given way to an electric motor and batteries. The transplant was carried out without "rejection": 40 kW at the helm, 20 kW from each engine, allows to replicate the performance of the endothermic.
Anna Lindgren, Director of Marine Leisure Product Management, points out that the impact of this change goes far beyond the simple ecological impact: maneuverability is the key, also due to the immediate availability of electric torque. Another advantage is silence: no mechanical echo during navigation and the possibility of silence peripherals during docking.
By the way, the highlights of the electric group show 27 Nm torque at 5 knots and 17 Nm at 6 knots, a maximum speed of 8 knots and an hour of autonomy, which rises to three hours at 6 knots. Supervision is entrusted to the electronic control Evc 2, combined with a single interface for electric propulsion, a system adapted to the needs of power supply and hull (which with the endothermic engine does not usually feature the aforementioned control). On board generators deliver 7.2 kilowatts each and during navigation they are able to recharge the two 20 kW batteries which supply fridge, air conditioning and other services up to 12 hours.

MTU & MARINE HYBRID

READY TO START



Electrification, in the 'dark side' of yachts, means taking the road of hybrid. At least this is the point of view of those who, like MTU, are invested with the moral duty to inaugurate this new season. It is precisely in the segment where Friedrichshafen based company thrives, above 80 feet, where the engine room could allow the transfer of the electric fraction. The comparison in terms of overall dimensions, on the other hand, is with the SCR that deeply bothers the shipyards.

We met at Cannes Yachting Festival Daniel **Ramoli,** Senior Manager Sales Marine, and Tobias **Kohl**, Senior Manager Application Center Marine.

Present in the yacht business. MTU marine hybrid, for instance?

Rolls-Royce's business unit Power System's is on the way to become a solution provider, according to our strategy PS 2030. One example of a system solution is the hybrid system for yachts. The MTU hybrid system is providing additional benefits such as emission free operation, for example in a harbor or near the coast line, having real silence on board and offering higher efficiency and savings on fuel consumption. We have started with a pilot customer, Sunseeker shipyard, and we provide a serialized hybrid solution as a modular system. And we are pioneering on that.
The MTU inline hybrid solution consists of an intermediate shaft gearbox that is flanged between the diesel engine and the transmission gear unit. At this intermediate shaft gearbox, electric motors (1-4, depending on customer and performance requirements) are directly being attached.

The choice of the hybrid system is mature and they translate it into a serial proposal. One year ago Sunseeker announced at the Boot Show in Düsseldorf the first yacht with a serial hybrid. The signature is by MTU

And what about future?

One trend is electrification together with connectivity. The electrical systems get more complex than in the past. Therefore, we're no longer focusing on the engine and the gearbox. We manage the complete system: including all automation components such as monitoring and control on the bridge, but also control of the batteries and other electric components.
Differentiation is a keyword. We want to differentiate from others and it's not just by the engine itself. In the meanwhile, there's a trend towards downsizing in the market, while no longer all customers seek for the highest power but for an increased level of comfort on board. We see this as a key trend. We believe, that our integrated solutions such as our MTU hybrid will provide the right answers to this and owners desire.
However, we know that the production boat industry is still very conservative. Shipyards do not want to be a guinea pig. Therefore it's important for us to offer a highly reliable system, easy to integrate and operate. The MTU marine hybrid system is based on modular components, that will all be qualified upfront and through our network we will offer a worldwide service of the system.

"*We have started investigating fuel cell technology also for mobile application, this is definitely on our agenda. Power density, system dimensions and weight are the one aspects. Hydrogen infrastructure and safety regulations are the others*"

What's the real trump card for MTU in terms of integration?

Talking about the MTU yacht hybrid system for example, we have more components to be integrated, such as the power management system, electrical components like the electric machine, the batteries and the gensets. The whole equipment on board is operated by the intelligent automation system, which not only takes care for the different propulsion modes, including fuel consumption optimization. But it furthermore takes care for the distribution of the electricity on board and ensures that the system is always operated in good conditions. With our brand MTU we are in the system integration business since decades and we have the competence of integration in-house. We now use a different approach, by standardizing the system.

In this power range, is the race between MTU and MAN, which with the V12 2000 overtook the 2000M96 in terms of specific curves?

Our passion is to provide unique customer benefits, and the MTU yacht hybrid from Rolls-Royce is the best example. Imagine an owner enjoying the silence on board while cruising, or he is able to operate the boat electrically into a harbor, or he's even able to stay with his boat in a bay and he can swim, without having combustion engines running, purely on battery without smoke in the air. That's how customers want to use their boat.
Power is the one thing and out of discussion. However the other thing: we have the best torque with our engine, very important to bring the power to the water, for acceleration for example. We supply unrestricted full power and torque performance also at 45 degrees ambient temperature and 32 degrees sea water conditions. It's the combination that makes our engine unique.

MTU is been pioneer in CNG propulsion systems. What about LNG?

We do not see that technologies like LNG will come to the yacht market in the next couple of years. But if it comes, we will be prepared for it. We have done a proper evaluation of LNG engines in yachts. We have developed our first MTU mobile lean burn gas engines, based on Series 4000, targeting commercial applications such as ferries and tug boats. But for yachts there are some disadvantages, why the industry doesn't support using LNG: A very large tank system is needed, and space on board of a yacht is a critical asset. Second point is infrastructure availability worldwide. Therefore the market is very resistant in integrating gas engines.

METSTRADE 2019

PLENTY OF TECHNOLOGY AT SEA

The modern and well-equipped Rai exhibition center in Amsterdam is missing only the boats. MetsTrade 2019, however, registered almost 28,000 visitors, featuring several components and accessories for pleasure boating.
FPT Industrial has chosen Amsterdam to launch two new engines for commercial applications. The C16 600, 16 liters, 600 HP (442 kW) and 2,680 Nm, designed for heavy commercial applications, takes up the structure of the C16, launched last year in Cannes in its marine version. Another new feature is the N67 450 N with 6 cylinders in line, an evolution of the NEF family for light leisure and commercial applications, featuring 450 HP maximum power (330 kW) at 3,000 rpm and 1,350 Nm at 1,800 rpm. The goal, in both cases, is optimizing TCO. «*We have improved the cooling system and reached Stage V Iwv* (Inland waterway vessels, ed) *certification for the 450 N limited to 170 HP. This allows us to enter the Stage V market even without a post-treatment system*», said Guglielmo Tummarello, FPT Marine sector manager.

The latest edition of MetsTrade, which is getting more and more international indeed, focused on circular economy and sustainability.
There was also a lot of talk about Total cost of ownership (TCO) walking around the booths of engine manufacturers, between new products and well-established solutions for marine applications

John Deere continues the well-started path to leave behind its image of agriculture-only manufacturer. We've seen on display at Mets, within an engine range from 60 to 559 kW, the 4045SFM85, a 4.5 liter 4-cylinder engine delivering from 205 to 235 kW. «*We intend to increase our market share in the marine sector, relying on our expertise in agriculture and CE*», said Account Manager Jean-Michel Grimault.
Volvo Penta showcased its most interesting news introduced in the marine sector this year, in particular the rework on D4 and D6 models that we saw in late spring in Göteborg, featuring new top specifications that lead to 235 kW for the D4 and 353 kW for the D6. **Hyundai Seasall** showed up at the Dutch appointment with a novelty in the outboard, namely the 199 kW S30-OB diesel with direct injection common rail, revised in its overall weight and designed for easy maintenance. **Oxe Diesel**'s 300 HP is also outboard, expected on the market in February 2020. Main features: 3 liters displacement, 680 Nm at 1,750 rpm, 300 HP at 4,200 rpm, 395 kg. Curiosity for the Dutch **Diemax** and the orange color of the 6 and 12 cylinder diesels featuring an aluminum engine block which is lighter and extremely compact. Soon, stated CEO Gert van den Brink, they will finally be available on the market.
From diesel to electric, **Torqeedo** (Deutz Group) introduced a new version of Cruise electric outboards, the 10.0 T powered by two Power 48-5000 lithium-ion batteries featuring BMW technology.
A special mention for the Italian **AS Labruna**, which displayed the HydroPod, a hydraulic pod delivering 500 HP (almost 368 kW) and 2,500 Nm: an interesting novelty that fits into a niche traditionally reserved to surface propellers or IPS. «*HydroPod provides maximum torque at low rpm, therefore strong accelerations and a rapid glide phase. The 360-degree rotation also guarantees extreme maneuverability. In addition, the hydraulic valves mounted on the cylinders ensure that the pod is raised automatically in the event of a collision without damaging the hull*», said Massimo Labruna.

VIBRO-ACOUSTIC COMFORT

Being true that Vulkan products are well established in commercial marine applications, the Italian branch is recognized with a deep-rooted expertise in pleasure boating.
«*We work with local shipyards both in new boat projects and in refit or repowering projects that involve changing engines or gearboxes with new solutions able to increase comfort on board and reduce noise*», told us Fabio Santoro, Vulkan Italia Sales Manager. Relying on its product portfolio, Vulkan offers integrated solutions to meet both customer needs and international safety or comfort standards. Without neglecting customization. «*Around 70-80 percent of our solutions are customized, thanks to a process entirely managed from Italy. We speak above all of elastic mounts, joint shaft couplings or possible interfaces on torsional couplings, which remain indeed the core business of our parent company*».

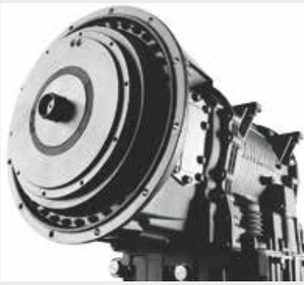
To the left, a picture of the FPT C16 600 taken in Amsterdam right after its presentation to the press. Above, Vulkan Italia booth and, below, the HydroPod by AS Labruna

ALLISON 4000 SERIES

OFF-ROAD MISSION EFFICIENCY

4000 SERIES: MADE TO WORK HARD

The torque converter allows to cope with the most extreme situations protecting mechanical parts and extending reliability and durability. A faster acceleration makes it possible to reach speeds that are 14 percent higher than with automatic transmissions. Allison Continuous Power Technology delivers balanced power and torque making acceleration smooth and gradual.
The Fuel Sense technology offers a strong reduction of fuel usage, thanks to optimized shifting based on the current engine torque and power. Engine-driven PTO positions are provided to operate a variety of functions. The Auxiliary Function Range Inhibit increases safety when operating a crane or other special equipment.



Camolese says: «*We are going to prove these commonplace views wrong, showing that based on numbers, our 4000 Series is definitely suited for work in a construction site*»

After convincing the waste collection and distribution pros (and not only them), Allison Transmission is heading straight for the quarry/construction and off-road specialists.
Off-road dumper trucks, be it rigid or articulated, have indeed been using automatic transmission for decades in order to face up to challenging work conditions no other system without a torque converter could withstand.
A route one was forced to take to increase efficiency and reduce the TCO of quarry and construction vehicles that by their very nature are placed under heavy strain, with increased wear and tear as a natural consequence.
The notion of Total Cost of Ownership is still far from being grasped or implemented in the earth moving industry. All the more so when it comes to transport. Speaking of machine hour rate is almost taboo in a sector where a lot of companies needing to replace their equipment still have not figured out what the global cost of a given machine, piece of equipment or tipper is.

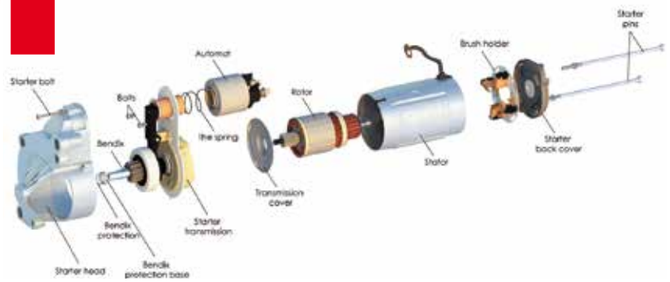
After waste collection and distribution, the efficiency mission will target quarry and construction operations, with TCO as the guiding notion and a transmission that outperforms traditional manual and robotized versions alike

«Our goal as Allison Transmission» said Sergio **Camolese**, Market Development Europe Director «*is to build an 'automatic gearbox culture' in the European quarry and construction industry, by showing that if you do the math, the benefits are pretty obvious. When we mention the TCO, a lot of companies in the industry haven't the foggiest idea what we are talking about. In strategic sectors such as waste collection and short/medium distance distribution, we have proven that going automatic is undeniably cost-effective, in that it brings about more productivity, less consumption for the same amount of work, and enhanced reliability across the equipment lifespan. Which means lower overall maintenance costs and a lower total cost of ownership*».
«*Our Allison Customer Experience Center (ACE) of Szentgotthárd, Hungary*» he continued «*is firmly focused on the quarry and construction sector; it illustrates and provides hands-on demonstrations on and off-road of the efficacy of our 4000 Series automatic gearbox in particularly demanding applications. All the vehicles available at the center are from the major industrial vehicle manufacturers, ranging across Mercedes Benz Zetros 4x4 down to Tatra Phoenix 10x10 all the way through Renault, Iveco, Astra, MAN, Volvo and Scania. This latter can be compared against an identical model fitted with an Optishift robotized gearbox*».
«*The current technology*» Camolese explained « *is light years away from Italy's still predominant perception of automatic gearboxes. The current engines' torque delivery and elasticity combined with an optimal electronic control of the engine/transmission interface allow for a smooth, linear operation which enhance and highlight Allison transmissions' potential. The torque converter is an added benefit as it allows to cope with the toughest and most complex situations that are commonplace in a quarry or construction site. Both on and off road*».
«*It is no coincidence*» Camolese added «*that many well-known dump truck manufacturers are choosing Allison as their first ever supplier of automatic gearboxes. Our Customer Experience Center in Szentgotthárd has a 30 ton Bell dumper that can show the true potential of our automatic transmissions. Volvo, a world leader in articulated dump trucks, has fitted an Allison onto its A60H, a 98 ton dumper that can reach a max speed of 55 km/h. I think we could not find a more tangible evidence of its performance, reliability and low running costs*».
«*It is a pretty stimulating goal*» he continued «*one that Allison intends to pursue by providing users an in-depth overview of the benefits this type of transmission could bring about, right in those situations in which many continue to see the manual or robotized gearbox as the cheapest and most advantageous options*». ■

AS-PL

THE WIND FROM POLAND

Robert **Snider**: *«Each month the AS-PL product offer increases by approximately 80 to 100 new products & parts. Our products are an alternative to the most popular brands, such as: Bosch, Valeo, Denso, Magneti Marelli»*



Efficiency is too tricky to achieve to be handled just by engine manufacturers alone. We talked about it with Robert **Snider**, Chief marketing officer in AS-PL, established in 1992 in Gdańsk (Poland).

Which applications do you focus on?

We deliver a wide range of products, more than 17,000 different products (including 2,100 types of starters, 2,900 types of alternators and 12,000 components) with a total of almost 250,000 reference numbers dedicated for passenger cars, lorries, agricultural machines, boats, motorcycles, and for the industrial market. Our products are an alternative to the most popular brands, such as: Bosch, Valeo, Denso, Magneti Marelli etc. As products are divided into three product lines (Premium, Standard and Economy) and undergo strict testing procedures and meet the highest requirements in relation to their assembly and technical parameters.

As part of a drive towards producing top-quality products, a quality management system compliant with Iso 9001:2015 was implemented.

Can you describe a new product?

Each month the AS-PL product offer increases by approximately 80 to 100 new products and parts. One of such examples is the Starter no. S3165S. The starter with index number S3165S is a product of the AS brand. It belongs to 'Standard line', the leading product line of the AS brand. Our product can be used in selected models of Ford (C-Max, Focus or Grand C-Max) and Volvo (C30, S40, S80, V40, V50, V60, V70 or XC40) vehicles and is replacement for Valeo products. It has 12 V, 2.3 kW power and CW rotation.

The offered products include parts and components for passenger cars, lorries, agricultural machines, boats, motorcycles, and for the industrial market. However, our widest range of product applies to passenger cars.

Fabio Butturi

The offered products include parts and components for passenger cars, lorries, agricultural machines, boats, motorcycles and for the industrial market. AS-PL delivers more than 17,000 different products with a total of almost 250,000 reference numbers

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DANA AND FENDT

HERE'S THE SECRET OF SUCCESS

The close collaboration with Dana lies behind the success of the Fendt 900 Vario tractors series. One of these, the 942 model, is the current Tractor of the Year

The Fendt 942 Vario tractor is the largest in its power series. On display at Agritechnica, the tractor was awarded "Tractor of the Year 2022". Previously, the Fendt 728 Vario gained the award in the 'Best Utility' category for 2022.

Ranging from 415 to 517 kilowatts, the five new Fendt 900 Vario tractors provide unprecedented fuel efficiency, uptime and agronomic benefits through features such as the Fendt Tyre [illegible] system [illegible] and Fendt's [illegible] VarioDrive Continuously variable transmission (CVT).

Behind the success of the 900 Vario Series of Fendt tractors is the close collaboration with Dana. The US company is, in fact, according to [illegible], [illegible] Fendt [illegible], "Dana has long served as our trusted collaborator in developing advanced drive technologies for Fendt tractors, and we anticipate continued success as we extend our relationship with the new series of Fendt 900 Vario tractors."

In particular, the Spicer [illegible] features an independent front suspension, which provides isolation from body vibration.

With approximately 10 centimeters of vertical movement, the axle provides stable ground contact and traction [illegible]. The configuration provides improved vehicle control, operator comfort, traction and handling characteristics for safer operation, especially at elevated speeds. Additionally, the Spicer 900 axle is designed to support Fendt's proprietary tire inflation system. ■

Anti vibration mounts

Patrini MPG family of anti-vibration mounts, developed for cab, engine and chassis, was designed for the agricultural and earth-moving sector. The MPG products were born to absorb shocks coming from high dynamic forces in the 3 axes, with significant radial rigidity. The coating of the metal part is made of rubber to make it resistant to corrosion. The family consists of three members with specific sizes to meet different dimensional requirements and application conditions: MPG 65, MPG 80 and MPG 110.

A 'FASTER' CONCEPT IS UNDER THE SPOT

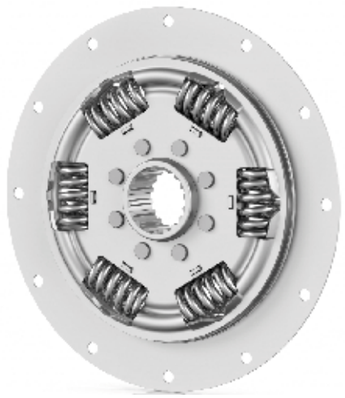
For the moment, it is an idea, a conceptual work in progress on which Faster engineers are working. This type of product, a casting solution, usually operates in a mechanical way, through the hands, pushing or pulling, sometimes with the help of a lever.
In this case there is the electronic part, with a software that facilitates the connection and disconnection, reducing the physical effort of the operator. Two versions are available. One has an electric motor, allowing users to press a button to operate some components inside the casting. The part of the connection effort is then operated by an electric motor. The second version has a sensor on the function, which reads the signal present on the tube with another sensor. The sensor identifies which line to connect by flashing an electrode. At that point, the operator simply has to approach the tap and complete the operation.
The price factor could be the only factor that prevents diffusion. However, the ergonomic benefits must be considered, as well as in terms of saving time. Compared to the prototype, there may be developments in sensor technology.
The concept was presented during the last edition of Agritechnica, where Faster showed the ongoing synergy with Sun Hydraulics, as both the companies are currently part of the Helios Technology Group.

BONFIGLIOLI AND THE AGRICULTURAL MARKET

We asked Manuel Cortesi, Market Segment Sales Manager for the Agriculture Industry for Bonfiglioli, for a comment on Bonfiglioli's updated connections with the AG market.
«We could start with the dynamic brakes that eliminate disc brakes. We saw the possibility of using a Bonfiglioli hydraulic motor with variable displacement, both two-position and proportional control (continuously variable).
There is also the possibility of changing the ratio inside the gearbox – Cortesi says – *which allows a smaller motor and a higher torque range than a gearbox with a fixed ratio.*
This opportunity is particularly appreciated by harvesting machines, for chopping or harvesting potatoes, beets or anything else. The market response to the solutions we have proposed is generally positive, especially on dynamic brakes».

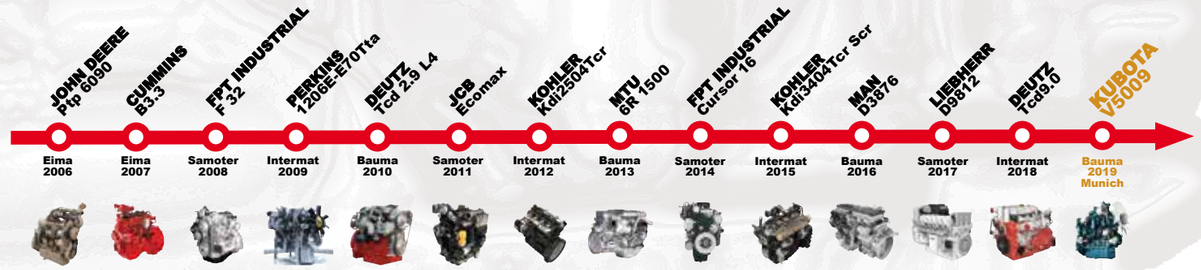
ZF: ABOUT TORSIONAL DAMPERS

ZF has enhanced its offer in terms of torsional dampers, key components indeed for smooth and high-performance powertrains in vehicles. High demands, in fact, are placed on the torque transmission between engine and transmission. Torsional dampers are always installed behind the engine as vibrational dampers, when the powertrain does not have a shift and start-up clutch.
A bolt-on torsional damper is an economical yet effective solution for decoupling torsional vibrations, based on the steel spring damper technology used in clutch discs. The DynaDamp from ZF is thought for applications with greater demands, using the same technology as the established dual-mass flywheel in order to decouple torsional vibrations reliably and with a high degree of effectiveness.



2019 DIESEL OF THE YEAR

KUBOTA V5009



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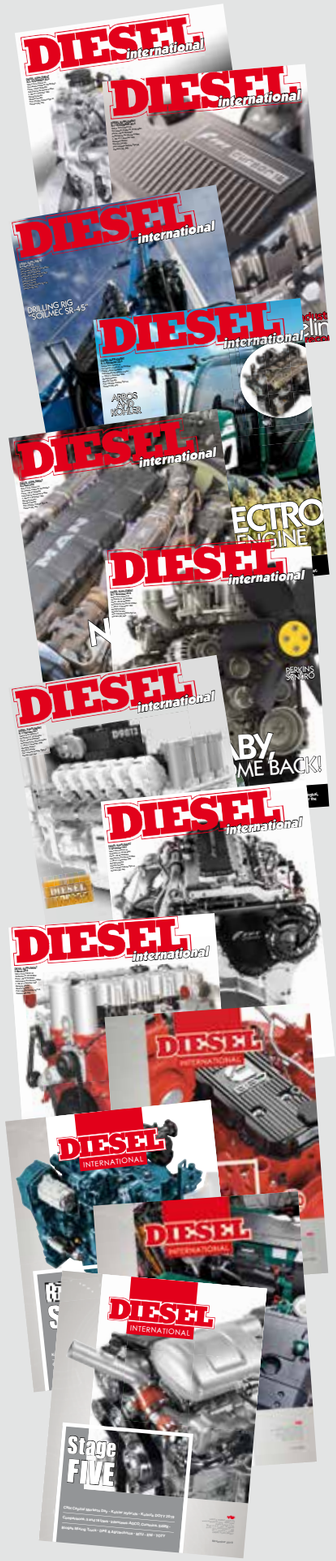

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